Dollar-weighted return on aggregate corporate sector: How is it distributed across countries?

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August 17, 2017

Abstract

Prior studies have shown that the return on a security (i.e., buy-and-hold return or *BHR*) can differ from the return to investors (i.e., dollar-weighted return or *DWR*) if there is a correlation between the security return and the capital that investors commit to the security. In this paper, we compute the *DWR* for the aggregate corporate sector in 43 countries and examine its cross-country variation, with particular attention to the difference between emerging and developed markets. We find that the *DWR* is not as widely dispersed across countries as the *BHR*. Between emerging and developed markets in particular, no difference is found in *DWR*, although the *BHR* is unsurprisingly higher in emerging markets than in developed countries. It turns out that the lower *DWR* in emerging markets relative to their own *BHR* is related to the greater comovement in firm-level funding activities in those countries. Our results support a version of efficient international capital markets in which capital moves across countries until neither emerging markets nor developed countries offer any better or worse profit opportunity. Our results also suggest that correlated investments across firms are associated with a lower return to investors, or equivalently, a lower cost of funds to corporations.

Keywords: Dollar-weighted return; Corporations; Emerging markets; Comovement
JEL classification: F30; F65; G31; G32

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1. Introduction

Emerging markets refer to a group of countries that are emerging from under-developed status and catching up with advanced economies (Bekaert and Harvey (2002; p.429)). By nature, those countries grow fast and so do their corporations. Consequently, corporations in emerging markets and their securities, as a whole, offer a higher return than those in developed countries. However, is that high return also the one that is actually experienced by investors? According to Dichev (2007), the return to investors can differ from the return on security if there is a certain correlation between the security return and the capital that investors commit to the security.[1] In other words, the dollar-weighted return (*DWR*; i.e., the return to investors) can deviate from the buy-and-hold return (*BHR*; i.e., the return on securities) depending on the timing and magnitude of capital committed to investment. In the context of emerging markets, their higher security return may well induce investors to provide more funds but the subsequent return may decline as the investment opportunities dry out, which would lower *DWR* more than *BHR*. Or, it could be that newly available funds open up more business opportunities, thereby raising *DWR* more than *BHR*. In this paper, we compute the *DWR* on the aggregate corporate sector in a number of countries and examine its cross-country distribution, with particular attention to emerging markets.[2]

DWR is, in essence, the internal rate of return, which is known to be difficult to correctly estimate. For example, there can be more than one internal rate of return due to frequent changes in sign of the capital flows, and the measure can be misleading in evaluating mutually exclusive projects. We take these issues seriously and devote one section (Section 3.3) to the robustness of our *DWR* estimates.

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[1] Dichev (2007) offers the following example. Suppose that that the price of a stock rises from $10 to $20 and then falls back to $10 over time. The geometric average return on the security over those two periods is 0%. However, if an investor purchases 100 shares of the stock at $10, buys another 100 shares at $20, and liquidates her entire holdings when the price comes down to $10, then the return that actually accrues to this investor—i.e., the dollar-weighted return—is -26.8%.

[2] We focus only on publicly traded companies, since the security returns on privately held companies are not readily available.

In short, the section shows that our *DWR* estimate for each of our sample countries is the only discount rate—in the range between 0% to 50% in annual terms—that makes the net present value (NPV) of investing in a country's corporate sector zero.

Our empirical analysis is based on a sample of 43 countries (22 of which are emerging markets) for the period of 1994-2013, from which we obtain three sets of findings. The first one is easy to summarize. We begin by confirming that the *BHR* on the aggregate corporate sector is unquestionably higher in emerging markets than in developed countries. We then find that the *DWR* paints a completely different picture, as the *DWR* in emerging markets is statistically indistinguishable from that in developed countries. The near-parity in *DWR* between emerging and developed markets is attributable to the *DWR* in emerging market being remarkably lower than their own *BHR*. In other words, the return on corporations in developed countries remains similar whether it is computed for their securities (i.e., *BHR*) or for their capital providers (i.e., *DWR*). Perhaps more tellingly, we find that the correlation between a country's economic growth—as measured by the GDP growth rate—and its *DWR* is essentially zero, while the correlation between economic growth and *BHR* is predictably positive. In sum, the timing and the magnitude of capital committed to emerging-market corporations are such that the actual experience of the emerging-market investors is no better than that of developed-country investors.

The "weights" in *DWR* are the year-by-year market values of corporations, which are determined by the cash flows between the corporate sector and capital-market investors. That is, the weights are the cross-company sum of the firm-level fundings from capital markets. The dramatic wedge between *DWR* and *BHR* in emerging markets indicates that firm-level funding activities in those countries are highly correlated with each other and thus create non-negligible "ups and "downs" in the aggregate capital flows. Our second set of findings are for this commonality in firm-level capital-market funding activities. While such commonality might be indicative of uninformed herding behavior, it is also

possible that the commonality arises from the coordinated corporate investments. As an intermediate step toward the relation between this funding commonality and *DWR*, we examine the commonality *per se*. Specifically, we devise a parsimonious measure of funding commonality by dividing the aggregate funding volatility by the median firm-level funding volatility. By construction, the ratio is higher, the more positively correlated are the firm-level funding activities. We find that this ratio is significantly higher in emerging markets than in developed countries. In other words, emerging-market companies access capital markets more simultaneously than do their developed-country peers.

The third set of findings are for the association between the funding commonality and *DWR*. What we are particularly interested in is whether the dramatic wedge between *DRW* and *BHR* in emerging markets is attributable to the strong funding commonality in those countries. To answer this question, we regress *DWR* (relative to *BHR*) on a dummy variable for emerging markets and then add our funding commonality measure to see if the explanatory power of the emerging-market dummy variable is taken away—or at least weakened—by the inclusion of funding commonality. Indeed, we find this to be the case. Other country characteristics such as the quality of investor protection and the degree of financial openness, on the other hand, fail to take away or weaken the explanatory power of the emerging-market dummy variable for the cross-section of *DWR* (relative to *BHR*). Further, our measure of funding commonality remains significant in the presence of other country characteristics in the regression. In sum, the return accruing to capital providers (relative to the security return) is poorer in emerging markets when firm-level funding activities in those countries are more positively correlated with each other and thus create more procyclical aggregate funding patterns.

What are the takeaways of our results? Our analysis suggests that, while emerging markets have grown fast and their corporations have offered a higher security return than those in developed countries, capital has migrated in such a way that investors as a whole did not earn any higher return from emerging markets than from developed countries. Hence, our results support a version of

efficient international capital markets in which investors keep moving funds between emerging and developed countries until neither country group offers any better profit opportunity.[3]

In a broader cross-section of the 43 sample countries, *DWR* is not at parity. While not as large as the distribution of *BHR* (between 1.9% and 36.3%), the dispersion in *DWR* is sizable over the range of 1.1% to 15.1%. Our analysis reveals that this cross-country distribution of *DWR* is related to the degree of comovement in firm-level funding activities. More precisely, correlated funding activities are associated with a lower return to investors and, further, this explains why the *DWR*s in emerging markets are low despite their high *BHR*s. Our findings thus add to the literature that characterizes emerging markets with various forms of comovement (e.g., Morck, Yeung, and Yu 2000; Jin and Myers 2006).

Our paper also contributes to the growing literature on *DWR*. Since Dichev (2007), a number of papers employ this computation method (e.g., Friesen and Sapp 2007; Keswani and Stolin 2008; Phalippou 2008; Dichev and Yu 2011; Hayley 2014) and we are aware of various interpretational issues raised by those studies (e.g., hindsight effects in Hayley (2014)). We stress that we are not employing any premise in interpreting our results. More specifically, we say nothing about investors' timing ability, nor do we make any statement about equity risk premium.[4] Instead, we only report that the returns accruing to investors as a whole are similar between emerging and developed markets. While a number of explanations may exist for the similar returns to investors across countries, the result *per se* constitutes evidence of a version of efficient international capital markets.

[3] Caselli and Feyrer (2007) compute the marginal product of capital for a number of countries and show that this measure is similar across countries, a finding that also supports the notion of efficient international capital markets.

[4] For example, even if the *DWR* is inflated by the intentional payouts after a period of good return (so that less capital is invested in corporations), it is still the return that accrues to investors. In words, this is what investors really experience. Also, we are free from endogeneity. If fund flows cause a contemporaneous or subsequent returns, then the hindsight effects would be muted. Still, this is what happens to investors.

Finally, our results add to the literature on corporate investment in relation to capital-market valuation. Arif and Lee (2016), using data from developed countries including the U.S., show that aggregate corporate investment peaks when the stock-market valuation is irrationally high and thus a poor return on corporate equities ensues. While we are silent about investor sentiment, the time-series correlation between corporate investment and stock-market valuation is certainly related to our paper. More specifically, their results imply a lower *DWR* than *BHR* in developed markets, which seems at odds with our results (i.e., *DWR* and *BHR* being similar to each other in developed markets). Unlike us, however, Arif and Lee (2016) use changes in net operating assets—along with capitalized R&D expenses—as a measure of corporate investment. According to Kothari, Lewellen, and Warner (2017), Arif and Lee's (2016) measure "includes not just capital expenditures but also acquisitions, depreciation, asset write-downs, and other long-term accruals" and "is much more volatile and less persistent" (p.3, footnote 2).[5] Kothari et al. then conjecture that the predictability in Arif and Lee (2016) "comes from items other than capital expenditures" (p.3, footnote 2). On that issue, we only say that our results are not inconsistent with Arif and Lee's (2016) and the difference between the two studies is attributable to different measures of corporate investment. It will be interesting to use Arif and Lee's (2016) measure and examine any differences in predictability between emerging and developed markets. Certainly, however, that is beyond the scope of this present paper.

This paper proceeds as follows. Section 2 details our sample and data. Section 3 reports the estimated *DWR* and its cross-country distribution. Section 4 introduces our measure of funding commonality and Section 5 reports its relation between *DWR*. Section 6 concludes the paper.

2. Sample and data

[5] Changes in net operating assets in particular are, in effect, accruals (Dechow, Richardson, and Sloan 2008).

We construct our sample by collecting data of all public companies in non-US countries from the Worldscope database and data of all public companies in the U.S. from the Compustat database over the period of 1994-2013. Annual accounting and stock market variables retrieved from the two databases are denominated in U.S. dollars and their full descriptions are provided in Appendix I.

We screen the sample as follows. First, since our study period begins in 1994, the countries that are introduced to the Worldscope after 1994 are excluded. To increase the sample size, however, we make one exception, namely, Czech Republic which starts being covered by the Worldscope in 1995. Second, we require the data of at least 30 firms to be available each year for each country. Third, we remove financial firms (SIC codes of 6000-6999) to reduce the double-counting problem in the estimation of aggregate returns, as suggested by Fama and French (1999).[6] Fourth, we only include the companies that have data on the market capital and book capital for any two years between 1994 and 2013. Finally, we remove Taiwan and Luxemburg from the sample. After this screening process, we have 45,611 firms from 43 countries in the sample. In a given year, as many as 22,833 firms exist in our sample.

3. Dollar-weighted-return (*DWR*) vs. buy-and-hold return (*BHR*)

3.1. Return computation

The aggregate buy-and-hold return (*BHR*) on a country's corporate securities is computed as follows. First, we calculate the following simple annual return:

$$R_t = \frac{(CE_t - INV_t) + (MCAP_t - MCAP_{t-1})}{MCAP_{t-1}}, \tag{1}$$

[6] We also drop a Turkish firm (DataStream code 27743T) because it has an extreme large value of market equity.

where *CE* is cash earnings, *INV* is investment, and *MCAP* is the market value of total capital. Specifically, *CE* is the sum of income before extraordinary items, extraordinary items and discontinued operation, interest expense, income statement deferred taxes, and depreciation. *INV* is the change in book value of total capital over the past year, plus depreciation. Book value of total capital (denoted as *BCAP* hereafter) is the sum of the year-end book value of long-term debt, short-term debt, and equity (i.e., total assets net of total liabilities plus balance sheet taxes deferred and investment tax credit).[7] Finally, market value of total capital, *MCAP*, is the sum of market value of common equity, book value of long-term debt, book value of short-term debt, and book value of preferred stocks. Note that the total capital measures also reflect the value of firms newly entering the sample as well as the value of those companies that exit the sample during the year. All variables are aggregate, meaning that they are the sum of firm-level data across companies in a given year, and are denominated in U.S. dollars.

The *BHR* is the geometric average of the simple annual returns above, which is:

$$BHR = \sqrt[19]{(1+R_1)*(1+R_2)*...*(1+R_{19})} - 1. \tag{2}$$

The *BHR*, being in U.S. dollar terms, can be viewed as the return that is useful to a representative investor who moves funds across countries in search of a better profit opportunity. Our computation above also measures corporate payouts by the difference between corporate cash earnings and investments (e.g., Rajan and Zingales 1998; Fama and French 1999). If payouts are negative, then it

[7] To have the broadest coverage of data, we set the variables used to compute the cash flow-related variables to zero if they are missing, except for the income before extraordinary items and changes in book capital. However, when the income before extraordinary items and investment items are missing for some companies in some years, we treat them as missing and set the firms' net cash flows for those years to zero. If short-term debt is not available, we use current liabilities.

means that companies raise funds from capital markets. The *BHR* is the simple average over the sample period and, hence, does not take into account the possibility that the investor has different amounts of capital invested in the corporations at different points in time.

The *DWR* addresses this limitation by computing return as follows.

$$0 = -MCAP_{1994} - \sum_{t=1994}^{T=2013} \frac{INV_t - CE_t}{(1+DWR)^{(t-1994)}} - \sum_{t=1994}^{T=2013} \frac{Enter_t - Exit_t}{(1+DWR)^{(t-1994)}} + \frac{MCAP_{2013}}{(1+DWR)^{20}}, \quad (3)$$

where $Enter_t$ is the initial market capital of firms who enter the sample in year t, while $Exit_t$ is the terminal market capital of firms who leave the sample in year t. Thus, (*Enter – Exit*) represents the net funds from capital markets that are associated with incoming and leaving companies. On the other hand, (*INV – CE*) is the funds that are provided by capital markets to existing companies. Consequently, *DWR* is the discount rate that makes the net present value of investing in the corporate sector zero. Equivalently, *DWR* is the average annual return at which the initial capital provision—i.e., $MCAP_{1994}$—and the subsequent ones—i.e., (*CE – INV*) and (*Exit – Enter*)—grow toward the terminal value of the corporate sector—i.e., $MCAP_{2013}$. As such, *DWR* correctly recognizes the amount of capital that is committed to corporations each year by weighting annual returns by the beginning-of-year market value of total capital (see Hayley (2014) for details). Fama and French (1999) and Dichev (2007) note that this metric correctly quantifies the return accruing to the investors.

Table 1 reports our sample countries by grouping them into developed markets and emerging markets, along with the average value of the variables for the *BHR* and *DWR* computation. As shown in the second column, the sample is unbalanced in the sense that several countries have a greater presence than others. For example, as many as 5,171 U.S. companies are included in the sample (on average in a given year), followed by Japan with 3,140 companies. At the other end of the spectrum,

Czech Republic and Colombia have available data only for 30 and 33 companies, respectively. This is, however, less of a concern, since we compute the *BHR* and *DWR* for each country and then examine the cross-section in which countries are given the equal weight. In later analysis, we also control for the differing numbers of sample firms across countries.

We assume that a firm enters our sample at the end of the first fiscal year for which its market capital (*MCAP*) and book capital (*BCAP*) data are available, and that it leaves the sample at the end of the last fiscal year for which those data are available. Such "entering" and "exiting" companies are tallied and their average numbers in a given year are reported in the third and fourth columns of Table 1. Approximately 10% of the sample firms are entering firms and about 5% leave the sample during the study period. The table also reports the average aggregate values (in billions of U.S. dollars) of book value of total capital, market value of total capital, cash earnings, and investment for each country. The previous section already details how those variables are used in return computations.

3.2. Estimation results

Table 2 reports the estimated *BHR* and *DWR* for each country. As in Table 1, we group countries by emerging and developed markets. On average across all sample countries, the *DWR* for the aggregate corporate sector is approximately 8.5%, with a cross-sectional standard deviation of 2.8%. The *BHR*, on the other hand, averages to 12.5%, with a standard deviation of greater than 6%. Thus, the security return is more widely dispersed across countries than the return accruing to investors.

A more interesting pattern arises when the emerging markets are examined separately from the developed countries. The latter country-group shows quite similar *BHR* and *DWR*, as the averages are respectively 9.4% and 8.9%. In striking contrast, the *DWR* of emerging markets is on average 8.2% and is much lower than their mean *BHR* of 15.5%. This pattern is not just limited to the averages. Of the 21 sample developed markets, 12 countries have a higher *BHR* than their own *DWR*, whereas 9

countries have the opposite pattern (i.e., *BHR* being lower than *DWR*). However, our sample emerging markets unanimously show a *BHR* that is lower than their own *DWR*. To highlight this pattern, the last two columns of Table 2 show the size of *DWR* relative to *BHR*, either as a difference or as a ratio. As just mentioned, emerging markets universally have a smaller *DWR* than *BHR*. As a result, the difference is negative without an exception and the ratio is always smaller than unity.

The pattern of *DWR* being lower than *BHR* in emerging markets is particularly pronounced in the countries that are known for their impressive economic growth. Specifically, China, Indian, and Poland have the singularly high *BHR* of 36.3%, 19.3%, and 29.3%, respectively. However, their *DWR*s are less than half of the *BHR*. Specifically, China's *DWR* is only 8.4% while Poland's is meager 6.7%. The Indian case is somewhat better but its *DWR* is still unimpressive at 9.2%. The stellar performance of (some) emerging markets seems to hold true only in terms of the security return; the actual investors' experiences do not seem to be as great as the security return suggests.

Table 3, Panel A, tests the difference in *BHR* or in *DWR* between emerging and developed markets. It is shown that the two groups of countries have significantly different *BHR*s but their *DWR*s are statistically indistinguishable. Specifically, the difference in mean *DWR* between the two groups is only 0.7% while the difference in median *DWR* is 0.8%. Despite little difference in *DWR* between emerging and developed markets, there is a non-negligible variation in this return measure in a broader cross-section of the 43 sample countries. To further gauge this cross-sectional variation, we compare the above- and below-median countries in terms of *DWR* (or *BHR*) and report the results in Panel B of Table 3. Unlike the emerging- *versus* developed-market comparison, we see a statistically significant difference in *DWR*, as well as in *BHR*, between the two groups. After all, Table 2 already reports that the dispersion in *DWR* is between 1.1% and 15.1%, a range that is smaller than that of *BHR* (from 1.9% to 36.3%) but still is a sizable magnitude.

In short, the returns to investors are not significantly different between emerging and developed markets. Still, there is an economically important—as large as 14%—variation across countries. We take a closer look at the cross-country distribution of *DWR* in Sections 4 and 5. Before that, however, we check on three issues.

3.3. Robustness of DWR estimates

We now evaluate the validity of our *DWR* estimates. This is necessary because the *DWR* is essentially the internal rate of return, which is the root of a polynomial consisting of the initial and subsequent capital provisions and the terminal payoffs, all computed at a common point in time. (See Eq. (3) in Section 3.1.) As those capital flows between corporations and capital-market investors change signs (e.g., payouts in one year and additional fundings the next year), there can be more than one root (e.g., Ross, Westerfield, Jordan 2008; p.281). It is also well-known that this return measure is often misleading when evaluating mutually exclusive projects.

The latter issue is related to the differing scales of investment. For example, the 1% return on a million-dollar investment is clearly better than the 10% return on a thousand-dollar investment. This is less of an issue in our analysis, because the investment in corporations around the world is likely to be highly divisible. In other words, the investment can be easily scaled up or down so that the return alone can speak to the superiority among various investment opportunities.

The possibility of multiple roots, however, is an issue that warrants a careful analysis. In principle, there will be more than one root for Eq. (3) as long as the cash flows in the equation do change signs frequently. However, some of those roots are going to be just a mathematical solution to the equation and not a proper discount rate in the economic sense. For example, consider the following cash flows: -60 in year 0, +200 in year 1, and -150 in year 2. The cash flows change signs twice and, consistent with the Descartes' Rule of Sign, there are two roots: 13.96% and 119.37%.

Each number makes the value of the three cash flows—computed at a common point in time—zero. However, if one is to seek a reasonable discount rate or a proper measure of investment return for those cash flows, it is obviously 13.96% that makes economic sense, not 119.37%.

On these grounds, we compute the net present value of Eq. (3), for each sample country, using a discount rate between 0% to 50% in annual terms. We are particularly interested in whether the *DWR* in Table 2 is the only discount rate that generates a net present value of zero. (While there may be other mathematical "roots" outside the 0%-50% range, we would not consider them to be an economically sensible measure of return on corporations.) Indeed, we do confirm that the *DWR* in Table 2 is the only discount rate, in the range from 0% to 50% in annual terms, that generates a net present value of zero. We prepared the graphs for each of our sample countries that show the relation between discount rate (x-axis) and net present value (y-axis) and those graphs are available upon request.

3.4. DWR, BHR, and economic growth

As a second check, we associate each of the two return measures with economic growth. We visualize those associations in Figure 1, Panel A. As might well be expected, the figure shows a strong positive relationship between a country's economic growth (as measured by the average GDP growth rate) and the *BHR* on its corporate sector. The correlation coefficient is greater than 0.7, and thus the *R*-squared of the univariate regression is higher than 50%. In stark contrast, there is virtually zero correlation between economic growth and *DWR*. That is, the actual return accruing to investors is not systematically different between countries that grow fast and others that do not.

In Panel B, we directly associate *BHR* (x-axis) with *DWR* (y-axis). If the capital-market fundings by corporations are stable over time or they are unrelated to corporate security returns, then the two return measures should be identical, meaning that their association should be on a 45-degree line. On

the other hand, if the capital-market fundings have a non-random cyclical pattern, then the two return measures will deviate from each other. In the extreme, they could be completely unrelated to each other, thereby creating a flat line for the graph. It turns out that the relationship between a country's *BHR* and its *DWR* is only weakly positive. Specifically, the graph is below a 45-degree line with a slope of 0.14. The regression *R*-squared is also low at 9.5%. The upshot is that a high security return and a high return to investors are not two sides of the same coin.

3.5. BHR and DWR in local currency

The results in the preceding sections are based on the variables denominated in U.S. dollars. It is a correct approach for our analysis, as capital is presumed to migrate across countries in search of superior profit opportunities. In other words, the relevant return should be the one denominated in an internationally convertible currency such as U.S. dollars (e.g., Brennan and Cao 1997; Griffin, Nardari, and Stulz 2004). As a third check, however, we repeat the analysis using the local currency-denominated variables and examine any changes from the U.S. dollar-based results.

The return based on local currency ignores the possibility that currency itself changes in value. With the local currency-based variables, there is thus room for both an upward bias (in case that the currency has been devalued or depreciated) and a downward bias (when the currency has been revalued or appreciated). If, for example, the high-growth countries tend to have a positive currency return, then the local-currency results will lead to a weaker association between *BHR* and economic growth as the *BHR* denominated in local currency is under-stated. On the other hand, if economic growth and currency returns are negatively related, then the local-currency *BHR* and economic growth could be more strongly associated than they really are. The bias is amplified in the local-currency *DWR*, because it is affected additionally by the capital flows denominated in local currency. For example, a given amount of capital committed to corporations is made smaller in local currency in

case that the capital inflows and the currency returns are positively correlated. The association between *DWR* and economic growth—if any—will thus be blurred.

Figure 2, Panel A, shows that the link between *BHR* and economic growth weakens when the return is measured in local currency. Specifically, the regression *R*-squared declines from 50.66% (Figure 1, Panel A) to 28.29% (Figure 2, Panel A), a finding that indicates that the economic growth and the currency returns are positively correlated. Put differently, the results show that fast-growing countries tend to see their currencies rise in value. The figure also shows that the association between *DWR* and economic growth continues to be absent.

Panel B of Figure 2 associates the *BHR* and the *DWR*. Being denominated in local currency, the two return measures show a stronger relation. Specifically, the *R*-squared of the univariate regression increases to 41.46% from 9.54% (Figure 1, Panel B). The slope also rises to 0.41 from 0.14 (Figure 1, Panel B). The improved relation between *BHR* and *DWR* means that the capital flows to/from corporations, which create a wedge between *BHR* and *DWR*, are sensitive to currency value changes. It is also consistent with those capital flows being correlated with the currency return as well as with the security return (in local currency). Regardless, the slope is smaller than unity (i.e., 0.41) and, again, the interpretation is that a high security return and a high return to investors are not two sides of the same coin.

4. Weights in *DWR*

The weight in our *DWR* computation is the market value of corporate total capital at each point in time and it is determined by the aggregate capital-market fundings by corporations. Given that the emerging-market *DWR* is different from the *BHR*, the corporate funding activities in those countries must be highly volatile over time and are also cyclical (i.e., correlated with the security return). Further, the volatility of the aggregate funding activities means that firm-level funding activities in

emerging markets are not diversified but comoving, because the aggregate fundings are the sum of the firm-level funding activities. In this section, we take a closer look at the commonality in firm-level funding activities.

4.1. Firm-level vs. aggregate capital-market funding

Firm-level funding is measured by the difference between investments and cash earnings, scaled by the lagged book value of total capital. Table 4 reports, in the second and third columns, the mean and median firm-level fundings for each country. To obtain those numbers, we first compute the capital-market funding for each company each year and then compute the mean or the median value over time for each company. We then compute the average values of the mean or the median in a country. Examining the numbers in the two columns, it is unmistakable that the numbers are more positive in developed markets than in emerging markets. In other words, companies in developed markets raise more funds from capital markets than returning to capital-market investors, compared to emerging-market companies. For example, the average median firm-level funding activities are -0.2% for emerging markets, but the developed countries have the average median firm-level funding of 11.5%. That is, while the companies in emerging markets return a meager -0.2% of their total capital back to investors, the developed-country peers obtain as much as 11.5% of their total capital from capital markets. The difference between the two numbers is also statistically different with a *t*-statistic of 3.77.

What about the aggregate funding activities? To answer this question, each year we sum each of the funding-related variables (i.e., investments, cash earnings, and the value of total capital) across companies in a country and compute the aggregate funding activities by taking the difference between the aggregate corporate investments and the aggregate cash earnings, divided by the aggregate lagged book value of capital. In doing so, we prepare two versions of aggregate measures, one without

"entering" and "exiting" firms and the other with them. The first measure is easier to compare with the firm-level data, since one can directly observe how much of firm-level activities are diversified cross-sectionally. The second measure, however, is a more precise approach to quantifying the actual aggregate funding activities. The mean and the median of the first measure appear in the fourth and fifth columns of Table 4, while those of the second measure are reported in the sixth and seventh columns.

It is quite striking that the pattern changes dramatically with the aggregate data. The fourth through seventh columns clearly indicate that the developed-country companies as a whole return funds back to investors, on average. The average aggregate funding activities are around -1.5% for developed markets, meaning that approximately 1.5% of total capital is paid out to investors. On the other hand, the statistics for emerging markets are different between the two aggregate measures. When the funding activities associated with the "entering" and "exiting" firms are excluded (i.e., fourth and fifth columns), emerging-market companies return funds, on average. However, the measure including those firms suggest that companies raise more funds from capital markets than they return. If the question is how much funds are raised or returned, then this is the correct measure. Thus, we infer that emerging market companies as a whole raise funds more from capital markets than they give back to the markets, on average.

4.2. Measuring comovement in firm-level funding activities

We now measure commonality in firm-level funding activities. Specifically, we employ a ratio of the volatility of the aggregate funding activities to the volatility of the firm-level (median across companies) funding activities.[8] Since the commonality means non-diversifiability of firm-level

[8] To ensure robustness of our results, we continue to use the two versions of aggregate funding measures (i.e., the one with "entering" and "exiting" firms and the other without).

funding activities, the ratio will increase with firm-level funding commonality. Conversely, if firm-level funding activities are idiosyncratic and diversifiable, then the aggregate funding activities will be stable and the ratio will have a lower value.

Table 5 reports those ratios for our sample countries. Three patterns immediately manifest themselves. First, firm-level funding activities are more volatile in developed countries than in emerging markets. The median firm-level funding volatility is on average 31% in developed countries, but it is a lower 24% in emerging markets. This observation is consistent with developed-market companies accessing external capital markets more actively than emerging-market firms. Second, and in stark contrast to the first, the aggregate funding activities are more volatile in emerging markets than in developed countries. This pattern is robust between the two alternative measures of aggregate funding activities. With either one, the aggregate funding activities in emerging markets are nearly twice as volatile as in developed countries. Third, and as a corollary to the second, the ratio of the aggregate volatility to the median firm-level volatility is much higher in emerging markets. In other words, there is a stronger commonality in firm-level funding activities in emerging markets than in developed countries.

As mentioned in Section 4.1, the aggregate funding measure without entering and exiting firms is better compared with the firm-level measure for the diversification purposes. In the analysis below, we thus use the ratio based on this aggregate funding measure. Specifically, we use the log of the ratio of the aggregate funding variance to the median firm-level funding variance. This transformation mitigates effects of large values while amplifies the variations among small ones, thereby ensuring sufficient cross-country variation in the measure without overweighting a few large values.

4.3. Funding comovement and other country characteristics

What we eventually want to do is to see whether the dramatic wedge between *DWR* and *BHR* in emerging markets is related to funding commonality. Put differently, we want to see the extent to which the drop in emerging markets' *DWR* relative their own *BHR* is attributable to the fact that their firm-level funding activities are correlated across companies. Before that task (which is done in Section 5), however, we first examine the correlation between our commonality measure and other country characteristics. The country characteristics we consider include: political environments, investor protection, informational transparency, financial openness, financial development, trade openness, and GDP growth rate. (The construction methods and data sources of those country characteristics are detailed in Appendix II.)

Table 6 shows that the dummy variable for emerging markets (D_{EM}) is highly correlated with a number of country characteristics. As shown in the second column of the table, emerging markets have: greater funding commonalities, higher economic growth rates, greater political uncertainties, poorer informational environments, and more closed yet less developed financial markets. The correlations among those country characteristics are also significant. It is thus clear to which characteristics is the wedge between emerging markets' *DWR* and their own *BHR* attributable. Put differently, it is unclear whether the wedge is due to the funding commonalities in emerging markets or some other aspects of those countries. In the next section, we examine the extent to which the low *DWR* in emerging markets (relative to their own *BHR*) is attributable to the funding commonalities in those countries.

5. Funding comovement and *DWR*

5.1. Univariate relation between funding comovement and DWR

As the first look at the data, we plot the univariate relationship between funding commonality and a ratio of *DWR* to *BHR*. Panel A of Figure 3 shows that there is a strong negative relationship

between funding commonality and *DWR* (relative to *BHR*). The *R*-squared of this univariate regression is greater than 35%, which translates into a correlation coefficient of greater than 0.6 in absolute terms. Thus, there is no arguing about the association between the drop in return in emerging markets and the funding comovement in those countries. The question is, then, whether this association is a sideshow of some other country characteristics or it is unique due to the funding commonalities.

Before proceeding to investigate into those questions, however, we modify the graph by replacing the ratio of *DWR* to *BHR* with *DWR* alone (Panel B) or with *BHR* alone (Panel C). The additional graphs paint a more complete picture of how the funding commonality is related to the return measures in emerging markets. Specifically, greater commonalities in funding activities are negatively related to *DWR*, whereas they are positively—albeit very weakly—associated with *BHR*. Due to the opposite patterns of the two associations, the ratio of *DWR* to *BHR* is very strongly and negatively related to the funding commonality. Put differently, the pattern in Panel A is attributable more to that funding commonalities lowering the return to investors than to the commonality raising the security return.

5.2. Relation between funding comovement and DWR – Controlling for other country attributes

We now control for other country characteristics in the relation between funding commonality and *DWR* (relative *BHR*). To this end, we estimate the following cross-sectional regression:

$$\frac{DWR}{BHR}_i = \alpha + D_{EM} + \sum_i X_i + \varepsilon_i, \tag{4}$$

where D_{EM} is a dummy variable for emerging markets and X_i is country i's characteristic such as funding commonalities and investor protection. Since only the emerging markets experience a large

gap between their own *DWR* and *BHR*, the coefficient for the dummy variable will be significant and negative. The question is, then, which attributes of the emerging markets are responsible for this pattern. Put differently, our empirical strategy is to see which country characteristics take away—or at least weaken—the explanatory power of D_{EM} for the dependent variable.

Table 7 reports the results. As shown in models (1) through (11), the dummy variable for emerging markets remains significant in the presence of a country characteristic. Of the 11 characteristics, only three enter the regression significantly, namely, GDP growth rate, funding commonality, and information quality. Thus, we can examine which of the three variables most weakens the explanatory power of the dummy variable. It turns out that the funding commonality reduces the magnitude of the dummy variable's coefficient the most. Consistent with this result, when all variables are included in one regression (Model (12)), funding commonality stands out as the only country characteristic that enters the regression with a significant coefficient. Further, the dummy variable for emerging markets loses its significance when all variables are included in the regression.

Our results above are open to at least two other possibilities besides the comovement among individual companies. First, it could be that emerging markets have only a small number of companies and our results are driven by the resulting lack of diversification, not the firm-level comovement. The number of companies is indeed lower in emerging markets and it is correlated with some of the country characteristics, including our funding commonality measure (negatively). To directly address this issue, we add the log number of sample firms in each country to the regression (results not tabulated). Along with the emerging-market dummy (and an intercept), the log number of sample firms is only insignificantly related to *DWR*/*BHR*. Also, the inclusion of this variable does not affect the significance of other country characteristics. More precisely, our measure of funding commonality remains significant and the emerging-market dummy variable continues to be insignificant when all variables are included in the regression.

Another possibility is that emerging markets have a few big firms and their movements function as "granules", thereby causing a non-diversifiable fluctuation (Gabaix 2011). To address this issue, we modify our measure of funding commonality by replacing the aggregate variance with the median firm-level variance weighted by firm size. Often called the "fundamental volatility" (Carvalho and Gabaix 2013), this measure quantifies the aggregate fluctuations without taking into account correlations among individuals. In essence, it is the median firm-level variance multiplied by the Herfindahl index (based on firm size). The more concentrated the economy is, the higher is the Herfindahl index and the higher is the resulting ratio. We, however, find that this alternative funding commonality measure is unrelated to *DWR*/*BHR*. We thus conclude that our results are not driven by some granules and their movements in the economy.

6. Conclusions

In this paper, we report two stylized facts about aggregate corporate sector and the investment in it. Namely,

(1) The dollar-weighted return—or equivalently, the return accruing to investors—is not different between emerging and developed markets, although the security return is significantly higher in emerging markets than in developed countries.

(2) The wedge between the two return measures in emerging markets is attributable to the positive cross-firm correlations in firm-level fundings from capital markets.

The first result is consistent with the notion of efficient international capital markets: namely, capital migrates in a way that there is no better or worse profit opportunity, at least between emerging

and developed markets. The second result then shows that such a "return parity" is indeed attributable to fund flows. In words, our results indicate that "capital runs as surely and instantly where it is most wanted, and where there is most to be made of it, as water runs to find its level."[9]

[9] This is Bagehot's quote (1873), which is reported in Levine (1997; p.695).

Appendix I: Definitions of firm-level variables

Variables (DS/WorldScope code)	**Definitions**
Market value (mv)	Share price multiplied by number of ordinary shares in issue
Total assets (WC02999)	The sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets
Total liability (WC03351)	All short and long-term obligations expected to be satisfied by the company
Short-term debt and current portion of long-term debt (WC03051)	Portion of debt payable within one year, including current portion of long-term debt and sinking fund requirements of preferred stock or debentures
Current liabilities (WC03101)	Debt or other obligations that the company expects to satisfy within one year
Long-term debt (WC03251)	All interest bearing financial obligations, excluding amounts due within one year
Preferred stocks (WC03451)	A claim prior to the common shareholders on the earnings of a company and on the assets in the event of liquidation
Balance sheet deferred taxes (WC03263)	The accumulation of taxes which are deferred as a result of timing differences between reporting sales and expenses for tax and financial reporting purposes
Net income before extraordinary items (WC01551)	Income before extraordinary items and preferred and common dividends, but after operating and non-operating income and expense, reserves, income taxes, minority interest and equity in earnings
Extraordinary items and gain/loss sale of assets (WC01601)	Gains and losses resulting from nonrecurring or unusual events
Interest expenses (WC01251)	The service charge for the use of capital before the reduction for interest capitalized
Depreciation, depletion and amortization (WC01151)	Depreciation represents the process of allocating the cost of a depreciable asset to the accounting periods covered during its expected useful life to a business. Depletion refers to cost allocation for natural resources such as oil and mineral deposits. Amortization relates to cost allocation for intangible assets such as patents and leasehold improvements, trademarks, bookplates, tools and film cost.
Income statement deferred taxes (WC18188, WC18189)	Deferred domestic income tax represents the portion of deferred taxes due to the government of the country where the company is domiciled that have been expensed during the year. Deferred foreign income tax represents the portion of deferred taxes that are due to the government of the country where the company generates income but is not domiciled that have been expensed during the year.
Nation (WC06026)	It represents the country in which the company is domiciled.
Nation code (WC06027)	It represents the country under which the company is followed on Worldscope.
SIC code (WC07021)	SIC codes, a standard industry classification provided by the U.S. government, are assigned to both U.S. and non U.S. companies according to the type of business in which they are engaged.

Appendix II: Definitions of country characteristics

Variable	Label	Description	Source
GDPgrw	Growth rate of GDP per capita	Logarithm of Average growth rate of GDP per capita over 1994-2013.	The World Bank
Politic	Political risk index	It is the logarithm of the average index over 1996-2013. The index consists of 6 components, which are voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. A higher value of the index means better country governance.	The Political Risk Service of the International Country Risk Guide (ICRG)
Inv_prt1	Revised anti-director index	Summation of Vote by mail, Shares not deposited, Cumulative voting, Oppressed minority, Preemptive rights, and Capital to call meeting	Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008)
Inv_prt2	Anti-self-dealing index	Average of ex-ante and ex-post private control of self-dealing	Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008)
Info	Information transparency	It is the logarithm of the disclosure index. The index measures the strength of auditing and reporting standards. It is scaled between 1 and 7, with a higher value indicating stronger information transparency.	The Global Competitiveness Report
Fin_open	Financial liberalization	It is a ratio of foreign assets and foreign liabilities, including direct investments and portfolio investments from the International Investment Positions, over GDP. The ratio is averaged over 1994-2013.	The IFS of IMF
Fin_dev1	Stock market size	It is a ratio of market capitalization of listed shares to GDP. The ratio is averaged over 1994-2013.	The world bank
Fin_dev2	Credit market size	It is a ratio of domestic credit to private sector over GDP. The ratio is averaged over 1994-2013.	The world bank
Fin_dev3	Stock market turnover ratio	Ratio of the value of total shares traded to average market capitalization. The ratio is averaged over 1994-2013.	The world bank
Trd_open	Imports and exports	A ratio of imports and exports of goods and services over GDP. The ratio is averaged over 1994-2013.	The World Bank

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Table 1. Number of firms and aggregate variables of sample countries

This table presents the number of all publicly traded nonfinancial firms in 43 countries (21 developed market countries and 22 emerging market countries) along with the average aggregate variables in the sample for the period of 1994-2013. Data of U.S. companies are collected from the COMPUSTAT and data of non-U.S. companies are collected from the WorldScope. Only those countries that are initially introduced into the WorldScope before 1994 and have at least 30 publicly traded companies are included in our sample. Financial firms whose SIC codes belong to 6000-6999 are excluded from the sample. Firms in the sample are required to have data on the market and book value of capital for any two years between 1994 and 2013. We assume that a firm enters the sample at the end of the first year for which it has market and book value data and that it leaves the sample at the end of the last year for which it has market and book value data. The variable of Firm in this table represents the average number of firms each year for each country. Entering is the annual average number of firms entering the sample after year 1994. Exiting is the annual average number of firms leaving the sample before the year 2013. *BCAP* (in billions of dollars) is the average end-of-year aggregate book capital, computed as the summation of the end-of-year book value of long-term debt, short-term debt, and equity across all firms. Short-term debt is measured by debt in current liabilities; if it is not available, then short-term debt is measured by current liabilities. *MCAP* (in billions of dollars) is the average end-of-year aggregate market capital, computed as the sum of the market value of common stocks, the book value of long-term debt, short-term debt, and preferred stock across all firms. *CE* (in billions of dollars) is the average annual aggregate cash earnings, computed as the sum of income before extraordinary items, extraordinary items and discontinued operations, interest expenses, income statement deferred taxes, and depreciation and amortization. *INV* (in billions of dollars) is the mean of annual aggregate investment, computed as the change in book capital from year t to year t+1, plus depreciation.

Country	# of Sample firm	# of entering firms	# of exiting firms	*BCAP*	*MCAP*	*CE*	*INV*
Developed markets							
Australia	1,033	117	39	365	644	53	52
Austria	67	6	4	60	76	9	8
Belgium	101	8	6	180	259	26	28
Canada	1,535	189	84	666	995	96	107
Denmark	127	10	7	88	153	15	12
Finland	118	7	4	125	219	18	13
France	615	47	43	1,310	1,761	171	173
Germany	577	40	34	1,014	1,421	159	143
Hong Kong	640	50	8	634	818	77	91
Ireland	58	4	4	45	97	5	5
Italy	189	14	10	546	647	73	73
Japan	3,140	137	70	4,002	4,915	385	292
Netherlands	137	8	10	243	475	45	31
New Zealand	89	9	5	34	44	4	3
Norway	149	15	12	136	179	22	21
Singapore	411	36	12	177	222	19	22
Spain	119	6	6	411	574	62	55
Sweden	305	30	16	188	348	30	24
Switzerland	182	10	7	329	721	55	36
United Kingdom	1,362	108	112	1,646	2,855	267	211
United States	5,171	360	435	7,360	22,633	1,033	909

Table 1. cont.

Country	# of Sample firm	# of entering firms	# of exiting firms	*BCAP*	*MCAP*	*CE*	*INV*
Emerging markets							
Argentina	61	7	3	39	58	7	3
Brazil	102	11	4	292	360	38	32
Chile	139	9	5	133	165	15	17
China	1,434	167	17	1,107	1,815	138	225
Colombia	33	4	3	38	57	5	6
Czech Republic	30	8	5	24	29	4	3
Greece	218	16	10	64	102	7	8
India	1,087	126	20	328	574	51	49
Indonesia	249	18	4	79	141	12	10
Israel	197	24	8	77	107	9	10
Korea, Republic of	989	98	24	737	760	94	103
Malaysia	655	52	19	205	249	23	25
Mexico	99	7	5	191	306	32	25
Pakistan	132	10	13	17	25	3	2
Peru	74	8	4	22	39	4	4
Philippines	124	9	3	47	67	7	7
Poland	184	25	7	49	58	7	7
Portugal	56	5	4	74	94	10	10
South Africa	251	25	19	117	208	23	14
Sri Lanka	77	12	13	4	5	1	1
Thailand	347	21	5	104	156	16	14
Turkey	175	15	4	80	113	11	10

Table 2. Estimates of dollar-weighted return (*DWR*) and buy-and-hold return (*BHR*)

This table presents dollar-weighted (*DWR*) and buy-and-hold (*BHR*) returns of the aggregate corporate sector for 21 developed market countries and 22 emerging market countries. The DWR is computed as the internal rates of return on the aggregate market capital over the period of 1994-2013, assuming that firms are acquired at market value when they enter the sample and then sold at market value when they leave the sample or when the sample is liquidated in 2013. The *DWR* is obtained from the following equation:

$$0 = -MCAP_{1994} - \sum_{t=1994}^{T=2013} \frac{INV_t - CE_t}{(1+DWR)^{(t-1994)}} - \sum_{t=1994}^{T=2013} \frac{Enter_t - Exit_t}{(1+DWR)^{(t-1994)}} + \frac{MCAP_{2013}}{(1+DWR)^{20}}$$

where $MCAP_{1994}$ is the initial market capital of all firms entering the sample in year 1994; CE_t and INV_t are respectively the aggregate cash earnings and gross investments in year t of all firms entering the sample before *t*; $Exit_t$ is the terminal market capital of firms who leave the sample in year t, while $Enter_t$ is the initial market capital of firms who enter the sample in year *t*. Finally, $MCAP_{2013}$ is the final market capital of firms observed in year 2013.

The *BHR* is the geometric mean of simple percentage returns of the aggregate corporate sector over the period of 1994-2013. The simple return of the aggregate corporate sector for each country for year t is computed as:

$$R_t = \frac{(CE_t - INV_t) + (MCAP_t - MCAP_{t-1})}{MCAP_{t-1}}$$

In the second and third columns of this table, *DWR* and *BHR* are estimated by U.S. dollar-denoted cash flows and market capital.

Country	*DWR*	*BHR*	*DWR – BHR*	*DWR/BHR*
Developed markets				
Australia	10.3%	11.2%	-0.9%	0.916
Austria	7.1%	9.5%	-2.4%	0.744
Belgium	11.5%	7.5%	4.0%	1.536
Canada	10.2%	8.8%	1.4%	1.158
Denmark	11.2%	10.9%	0.3%	1.029
Finland	9.5%	9.7%	-0.3%	0.972
France	7.3%	8.0%	-0.7%	0.912
Germany	7.6%	10.9%	-3.2%	0.703
Hong Kong	9.2%	12.7%	-3.5%	0.722
Ireland	9.2%	12.0%	-2.8%	0.769
Italy	6.5%	7.6%	-1.1%	0.851
Japan	1.1%	1.9%	-0.8%	0.580
Netherlands	9.1%	8.9%	0.2%	1.027
New Zealand	6.5%	5.9%	0.6%	1.108
Norway	8.4%	11.0%	-2.6%	0.762
Singapore	5.7%	8.2%	-2.5%	0.698
Spain	9.6%	11.4%	-1.9%	0.837
Sweden	11.2%	10.1%	1.1%	1.105
Switzerland	11.8%	11.6%	0.2%	1.017
United Kingdom	9.1%	7.5%	1.6%	1.212
United States	14.5%	11.8%	2.7%	1.226
Average	**8.9%**	**9.4%**	**-0.5%**	**0.947**

Table 2. cont.

Country	*DWR*	*BHR*	*DWR – BHR*	*DWR/BHR*
Emerging markets				
Argentina	5.2%	9.5%	-4.3%	0.544
Brazil	15.1%	20.7%	-5.6%	0.728
Chile	5.7%	8.1%	-2.4%	0.703
China	8.4%	36.3%	-28.0%	0.230
Colombia	11.0%	18.7%	-7.7%	0.591
Czech Republic	9.9%	14.5%	-4.6%	0.684
Greece	1.8%	8.1%	-6.3%	0.222
India	9.2%	19.3%	-10.2%	0.475
Indonesia	8.7%	16.0%	-7.3%	0.546
Israel	7.7%	13.5%	-5.9%	0.567
Korea, Republic of	5.8%	9.7%	-3.8%	0.604
Malaysia	4.1%	6.8%	-2.7%	0.598
Mexico	10.8%	11.9%	-1.0%	0.912
Pakistan	8.8%	18.3%	-9.5%	0.482
Peru	11.7%	16.5%	-4.8%	0.708
Philippines	8.3%	12.9%	-4.6%	0.644
Poland	6.7%	29.3%	-22.5%	0.230
Portugal	6.4%	15.1%	-8.8%	0.420
South Africa	10.4%	11.9%	-1.6%	0.868
Sri Lanka	10.1%	19.1%	-9.0%	0.530
Thailand	7.1%	12.0%	-4.9%	0.590
Turkey	8.0%	13.5%	-5.5%	0.591
Average	**8.2%**	**15.5%**	**-7.3%**	**0.567**

Table 3. Mean and median difference tests for *DWR* and *BHR*

This table reports mean and median difference tests for *DWR* and *BHR* of 43 sample countries. In Panel A, sample countries are categorized into 21 developed market countries and 22 emerging market countries. In Panel B, sample countries are grouped into two sub-samples based on whether a country's *DWR* (or *BHR*) is above or below the relative median *DWR* (or *BHR*) of all sample countries. We test their mean and median differences between each two sub-samples. *P*-value is reported in parentheses. For the median difference test, *p*-value is based on the Wilcoxon test statistics.

	DWR		*BHR*	
	Mean	Median	Mean	Median
Panel A: Developed *versus* emerging markets				
Developed markets (DM)	8.9%	9.2%	9.4%	9.7%
Emerging markets (EM)	8.2%	8.3%	15.5%	14.0%
DM – EM	0.7%	0.8%	-6.1%	-4.3%
p-value for difference	(0.445)	(0.313)	(<0.001)	(<0.001)
Panel B: Above *versus* below sample median				
Below median	6.4%	6.7%	8.6%	8.8%
Above median	10.7%	10.3%	16.6%	14.5%
Below – Above	-4.3%	-3.5%	-8.0%	-5.7%
p-value for difference	(<0.001)	(<0.001)	(<0.001)	(<0.001)

Table 4. Mean and median of firm- and country-level funding ratios

This table presents the mean and median of firm- and country-level funding ratios for 21 developed market countries and 22 emerging market countries over the sample period of 1994 to 2013. Firm-level funding ratios (*FFR*) are defined as the difference between a firm's investments (*inv*) and its cash earnings (*ce*) in proportion to its lagged book capital (*l_bcap*). Similarly, a country-level funding ratio (*CFR*1) is the ratio of a country's aggregate investments (*INV*) in excess of its aggregate cash earnings (*CE*) over its lagged aggregate book capital (*L_BCAP*). An alternative measure of country-level funding ratios (*CFR*2) takes into account of firms entering and exiting the sample during the sample period. This measure adds the market value of firms entering the sample net of that of firms exiting the sample to the numerator of the *CFR*1. A negative number of funding ratio means that capital flows from individual firms or the aggregate corporate sector to capital providers, whereas a positive number means that capital flows from the capital market to individual firms or the aggregate corporate sector. The sample is winsorized at the 1% funding ratios.

Country	*FFR*: (*inv*–*ce*)/*l_bcap*		*CFR*1: (*INV*–*CE*)/*l_BCAP*		*CFR*2: *CFR*1+(*enter*-*exit*)/*l_BCAP*	
	Mean	Median	Mean	Median	Mean	Median
Developed market countries						
Australia	68.4%	38.7%	-0.5%	-1.2%	0.7%	0.7%
Austria	9.4%	3.7%	-2.1%	-3.6%	1.0%	-2.2%
Belgium	8.2%	2.8%	-1.5%	-2.1%	-8.1%	-6.9%
Canada	78.9%	43.3%	1.4%	0.8%	-1.4%	-2.0%
Denmark	13.0%	2.8%	-3.1%	-3.5%	-2.2%	-2.2%
Finland	5.8%	-2.7%	-3.7%	-4.9%	-2.0%	-3.9%
France	16.0%	7.8%	-0.5%	-0.6%	-0.7%	-0.1%
Germany	15.9%	5.1%	-1.6%	-1.5%	3.5%	-1.1%
Hong Kong	27.3%	6.8%	0.2%	1.3%	3.5%	3.2%
Ireland	43.7%	31.3%	0.5%	1.6%	3.3%	3.7%
Italy	9.7%	2.6%	-0.9%	-1.2%	-0.9%	-1.4%
Japan	4.2%	1.0%	-1.4%	0.2%	0.0%	0.9%
Netherlands	7.9%	-0.2%	-3.3%	-3.4%	-3.8%	-5.1%
New Zealand	27.4%	10.3%	-2.5%	-3.7%	-4.0%	-5.4%
Norway	31.5%	17.5%	0.3%	-0.3%	3.2%	0.0%
Singapore	14.8%	6.7%	-0.2%	-0.1%	3.4%	1.0%
Spain	4.9%	-1.7%	-0.9%	-0.9%	0.5%	0.1%
Sweden	44.0%	23.8%	-2.9%	-3.3%	-4.0%	-3.3%
Switzerland	8.5%	1.4%	-2.6%	-2.4%	-2.7%	-3.4%
United Kingdom	35.0%	17.1%	-2.2%	-1.5%	-5.0%	-4.8%
United States	38.9%	23.3%	-1.2%	-1.3%	-7.2%	-7.3%
Average	**24.5%**	**11.5%**	**-1.4%**	**-1.5%**	**-1.1%**	**-1.9%**

Table 4. cont.

Country	*FFR*: (*inv–ce*)/*l_bcap*		*CFR*1: (*INV–CE*)/*l_BCAP*		*CFR*2: *CFR*1+(*enter-exit*)/*l_BCAP*	
	Mean	Median	Mean	Median	Mean	Median
Emerging market countries						
Argentina	-6.3%	-7.8%	-8.1%	-8.3%	4.3%	5.8%
Brazil	10.5%	-1.6%	-3.0%	-2.7%	1.0%	1.4%
Chile	7.1%	0.5%	0.5%	0.5%	0.8%	2.6%
China	23.2%	8.7%	1.9%	3.6%	24.6%	14.5%
Colombia	7.2%	3.1%	1.2%	3.5%	19.8%	5.3%
Czech Republic	-5.2%	-6.3%	-4.4%	-6.5%	18.1%	-2.6%
Greece	12.1%	1.3%	1.3%	-1.6%	32.4%	5.0%
India	10.4%	0.9%	-3.4%	-5.4%	19.6%	2.4%
Indonesia	12.3%	0.8%	-3.6%	-2.8%	2.4%	1.4%
Israel	20.3%	5.6%	0.0%	-3.0%	7.0%	6.0%
Korea, Republic of	14.9%	7.3%	0.6%	1.0%	4.1%	5.5%
Malaysia	7.4%	1.0%	0.1%	-0.3%	0.5%	0.6%
Mexico	1.4%	-3.2%	-3.5%	-3.5%	-4.1%	-4.6%
Pakistan	-2.7%	-10.4%	-11.1%	-11.6%	10.5%	-3.7%
Peru	5.1%	-0.4%	-2.7%	-6.0%	6.8%	0.6%
Philippines	15.9%	0.2%	-2.2%	-3.0%	9.3%	7.0%
Poland	20.9%	5.9%	-2.5%	-3.8%	7.2%	4.0%
Portugal	2.8%	-0.5%	-1.3%	-2.4%	12.0%	7.0%
South Africa	11.6%	-1.1%	-6.3%	-11.0%	-5.0%	-5.2%
Sri Lanka	8.6%	-3.6%	-2.5%	-2.9%	-7.3%	-6.4%
Thailand	4.4%	-1.3%	-2.7%	-1.2%	4.5%	1.4%
Turkey	6.8%	-3.8%	-1.3%	0.1%	4.7%	6.8%
Average	**8.6%**	**-0.2%**	**-2.4%**	**-3.1%**	**7.9%**	**2.5%**

Table 5. Volatility of firm- and country-level funding ratios

This table presents the standard deviation of firm- and country-level funding ratios for 21 developed market countries and 22 emerging market countries. Firm- and country-level funding ratios are described in the caption of Table 4. For the volatility of firm-level funding ratios, we compute the standard deviation of each individual firm's time-series funding ratios over the sample period and then take the mean and median across firms within each country. The mean and median volatility of firm-level funding ratios are reported in the second and third columns. For the volatility of country-level funding ratios, we compute the standard deviation of the time-series aggregate funding ratios. The volatilities of the two measures of country-level funding ratios are reported in the fourth and fifth columns. The sample is winsorized at the 1% funding ratios.

Country	Volatility of *FFR*		Volatility of:		Vol(*CFR*1)/ median Vol(*FFR*)	Vol(*CFR*2)/ median Vol(*FFR*)
	Mean	Median	*CFR*1	*CFR*2		
Developed market countries						
Australia	111.9%	71.4%	8.2%	7.5%	0.114	0.105
Austria	34.9%	19.0%	8.5%	14.5%	0.447	0.763
Belgium	31.6%	20.5%	3.6%	9.3%	0.174	0.452
Canada	130.2%	86.9%	5.1%	7.1%	0.058	0.082
Denmark	43.0%	22.4%	6.4%	8.7%	0.286	0.388
Finland	37.2%	22.5%	5.9%	10.7%	0.262	0.477
France	45.7%	23.2%	3.1%	5.8%	0.135	0.250
Germany	49.8%	25.9%	3.7%	14.7%	0.142	0.568
Hong Kong	72.5%	33.6%	4.1%	7.7%	0.122	0.229
Ireland	71.2%	34.9%	7.6%	13.4%	0.218	0.383
Italy	36.6%	19.3%	3.3%	8.8%	0.172	0.455
Japan	23.6%	14.7%	6.3%	7.6%	0.425	0.520
Netherlands	40.3%	22.3%	3.3%	15.6%	0.147	0.701
New Zealand	65.7%	27.1%	11.7%	13.7%	0.432	0.506
Norway	64.0%	37.9%	5.3%	10.8%	0.139	0.284
Singapore	39.5%	20.7%	5.8%	8.0%	0.279	0.386
Spain	33.5%	21.2%	4.0%	11.2%	0.187	0.527
Sweden	77.1%	38.4%	5.4%	9.9%	0.139	0.259
Switzerland	35.5%	19.2%	4.0%	6.2%	0.210	0.322
United Kingdom	80.3%	36.6%	2.8%	3.8%	0.077	0.104
United States	76.5%	34.2%	1.2%	3.9%	0.036	0.112
Average	**57.2%**	**31.0%**	**5.2%**	**9.5%**	**0.200**	**0.375**

Table 5. cont.

	Volatility of *FFR*		Volatility of:		Vol(*CFR*1)/ median Vol(*FFR*)	Vol(*CFR*2)/ median Vol(*FFR*)
	Mean	Median	*CFR*1	*CFR*2		
Emerging market countries						
Argentina	27.8%	19.9%	7.6%	14.3%	0.381	0.720
Brazil	55.6%	34.4%	7.6%	11.7%	0.221	0.341
Chile	38.4%	19.4%	6.7%	7.9%	0.345	0.406
China	50.5%	26.5%	8.6%	28.5%	0.325	1.077
Colombia	26.4%	18.4%	12.0%	48.1%	0.651	2.607
Czech Republic	24.3%	18.0%	10.9%	66.8%	0.602	3.703
Greece	43.1%	26.9%	11.4%	75.3%	0.424	2.798
India	42.8%	24.2%	8.4%	46.2%	0.349	1.913
Indonesia	55.5%	24.8%	9.0%	10.0%	0.362	0.403
Israel	59.2%	24.4%	6.8%	10.6%	0.280	0.436
Korea, Republic of	40.4%	23.6%	9.6%	11.8%	0.404	0.500
Malaysia	33.5%	18.8%	11.3%	11.8%	0.601	0.629
Mexico	29.0%	16.0%	4.4%	5.1%	0.273	0.318
Pakistan	33.3%	21.2%	8.5%	49.1%	0.402	2.310
Peru	32.6%	20.8%	7.8%	22.8%	0.374	1.094
Philippines	62.1%	26.4%	7.7%	20.7%	0.290	0.784
Poland	59.7%	30.7%	8.7%	14.7%	0.284	0.478
Portugal	30.9%	21.6%	9.7%	24.6%	0.450	1.139
South Africa	65.7%	34.8%	14.8%	16.2%	0.427	0.467
Sri Lanka	41.2%	20.7%	9.2%	11.7%	0.444	0.566
Thailand	35.7%	19.7%	11.0%	20.5%	0.557	1.038
Turkey	52.7%	35.6%	15.4%	14.3%	0.434	0.403
Average	**42.7%**	**24.0%**	**9.4%**	**24.7%**	**0.404**	**1.097**

Table 6. Correlation coefficients among country-level variables

This table reports correlation coefficients between country-level variables. **Fund_comm** is the logarithm of the variance of *CFR*1 to the median variance of *FFR*. Other variables are defined in Appendix II. Briefly, **GDPgrw** is the logarithm of the average growth rate of GDP per capita over 1994-2013. **Politic** is the logarithm of the average political risk index. The higher the index is, the more stable is the political environment. **Inv_prt1** is the revised anti-director rights index and **Inv_prt2** is the anti-self-dealing index, both constructed by Djankov et al. The higher the indices are, the better is the protection of minority shareholder rights. **Info** is a measure of information transparency. The higher the index is, the more transparent is the information environment. **Fin_open** is the mean ratio of foreign assets and foreign liabilities to GDP for the period of 1994-2013. **Fin_dev1** is the mean ratio of market capitalization of listed companies over GDP for the period of 1994-2013. **Fin_dev2** is the mean ratio of domestic credit to private sector over GDP over 1994-2013. **Fin_dev3** is the average turnover ratio of stocks traded in the market during 1994-2013. **Trd_open** is the average ratio of imports and exports of goods and services over GDP over 1994-2013. ** and * indicate statistical significance at the 1% and 5% levels, respectively. *P*-values are reported in parentheses.

	D_{EM}	Fundcomm	GDPgrw	Politic	Inv_prt1	Inv_prt2	Info	Fin_open	Fin_dev1	Fin_dev2	Fin_dev3
Fundcomm	0.661										
	(0.000)										
GDPgrw	0.430	0.257									
	(0.004)	(0.096)									
Politic	-0.795	-0.521	-0.388								
	(0.000)	(0.000)	(0.010)								
Inv_prt1	-0.129	-0.052	-0.200	0.082							
	(0.409)	(0.742)	(0.198)	(0.601)							
Inv_prt2	-0.106	-0.072	0.285	0.016	0.369						
	(0.497)	(0.647)	(0.064)	(0.920)	(0.015)						
Info	-0.500	-0.343	-0.185	0.522	0.395	0.292					
	(0.001)	(0.024)	(0.234)	(0.000)	(0.009)	(0.058)					
Fin_open	-0.575	-0.347	-0.119	0.488	0.198	0.233	0.296				
	(0.000)	(0.023)	(0.446)	(0.001)	(0.203)	(0.133)	(0.054)				
Fin_dev1	-0.357	-0.359	-0.084	0.290	0.339	0.461	0.537	0.512			
	(0.019)	(0.018)	(0.594)	(0.059)	(0.026)	(0.002)	(0.000)	(0.001)			
Fin_dev2	-0.630	-0.409	-0.235	0.613	0.156	0.360	0.427	0.485	0.569		
	(0.000)	(0.007)	(0.129)	(0.000)	(0.319)	(0.018)	(0.004)	(0.001)	(0.000)		
Fin_dev3	-0.213	-0.317	0.093	0.069	-0.076	-0.038	-0.130	-0.042	0.043	0.283	
	(0.170)	(0.039)	(0.553)	(0.659)	(0.629)	(0.810)	(0.408)	(0.788)	(0.785)	(0.066)	
Trd_open	-0.260	-0.033	0.102	0.232	0.274	0.404	0.351	0.595	0.616	0.268	-0.131
	(0.092)	(0.835)	(0.517)	(0.135)	(0.076)	(0.007)	(0.021)	(0.000)	(0.000)	(0.083)	(0.402)

Table 7. Regression results of *DWR*/*BHR* on country-level variables

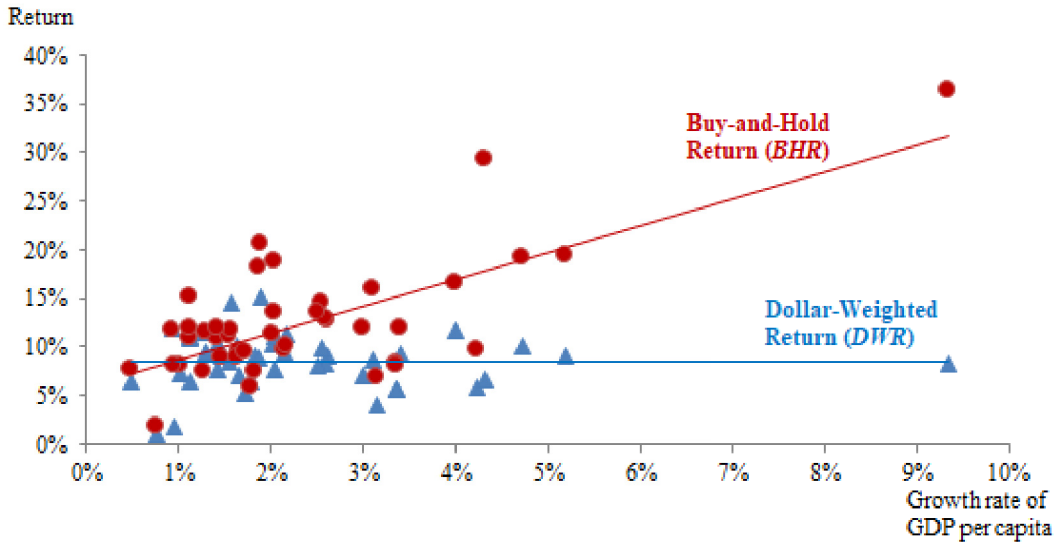
This table reports regression results. The dependent variable is the ratio of *DWR* relative to *BHR*. Country-level variables are defined as in the caption of Table 6. An intercept is in the regression but is not reported in the table to save space. Robust *t*-statistics are reported in brackets. *** and ** indicate statistical significance at the 1% and 5% level, respectively.

	Dependent variable: *DWR*/*BHR*											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
D_{EM}	-0.325***	-0.274***	-0.366***	-0.367***	-0.378***	-0.320***	-0.406***	-0.370***	-0.402***	-0.396***	-0.397***	-0.216
	[-4.664]	[-3.248]	[-3.538]	[-5.995]	[-6.083]	[-5.112]	[-5.357]	[-5.311]	[-4.462]	[-6.011]	[-6.196]	[-1.662]
GDPgrw	-4.335**											-4.184
	[-2.220]											[-1.754]
Fund_comm		-0.064**										-0.067**
		[-2.404]										[-2.222]
Politic			0.040									-0.025
			[0.209]									[-0.102]
Inv_prt1				0.154								0.078
				[1.801]								[0.740]
Inv_prt2					0.079							0.219
					[0.362]							[0.909]
Info						0.469**						0.402
						[2.492]						[1.571]
Fin_open							-0.010					0.003
							[-0.735]					[0.231]
Fin_dev1								0.023				-0.016
								[0.362]				[-0.189]
Fin_dev2									-0.037			-0.050
									[-0.388]			[-0.467]
Fin_dev3										-0.074		-0.052
										[-1.209]		[-0.851]
Trd_open											-0.045	-0.053
											[-1.214]	[-0.836]
Obs.	43	43	43	43	43	43	43	43	43	43	43	43
Adj. R^2	0.493	0.497	0.447	0.482	0.449	0.484	0.451	0.449	0.449	0.464	0.459	0.502

Figure 1. Returns on aggregate corporate sector in 43 countries (in U.S. dollar terms)

This figure plots *DWR* and *BHR* based on U.S. dollars. *DWR* and *BHR* are described in the caption of Table 2. Panel A plots *DWR* and *BHR* against the average growth rate of GDP per capita over the period of 1994 to 2013. The blue line is the fitted line between *DWR* and GDP growth rate and the red line is the fitted line between *BHR* and GDP growth rate. Panel B plots *DWR* against *BHR*.

Panel A



Panel B

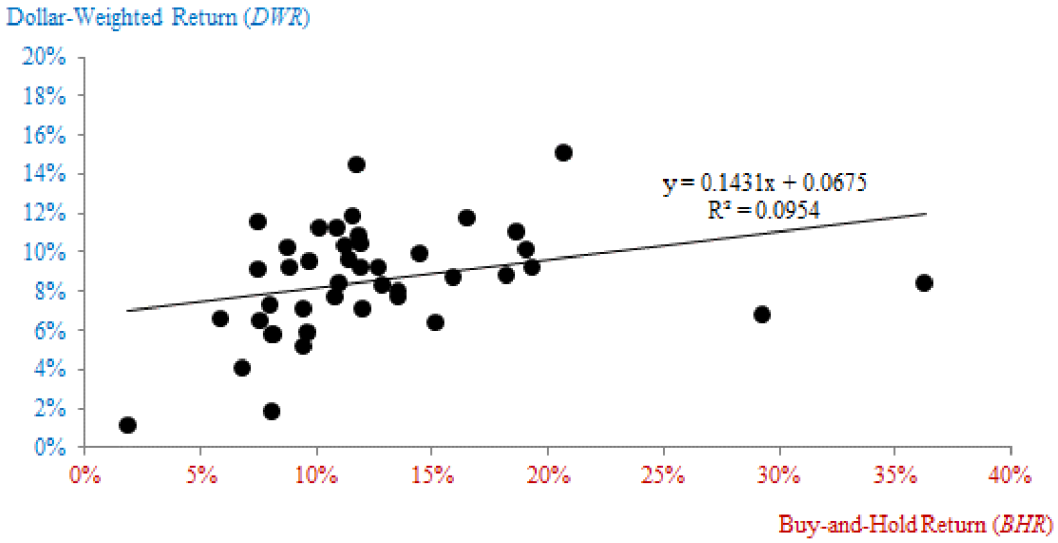
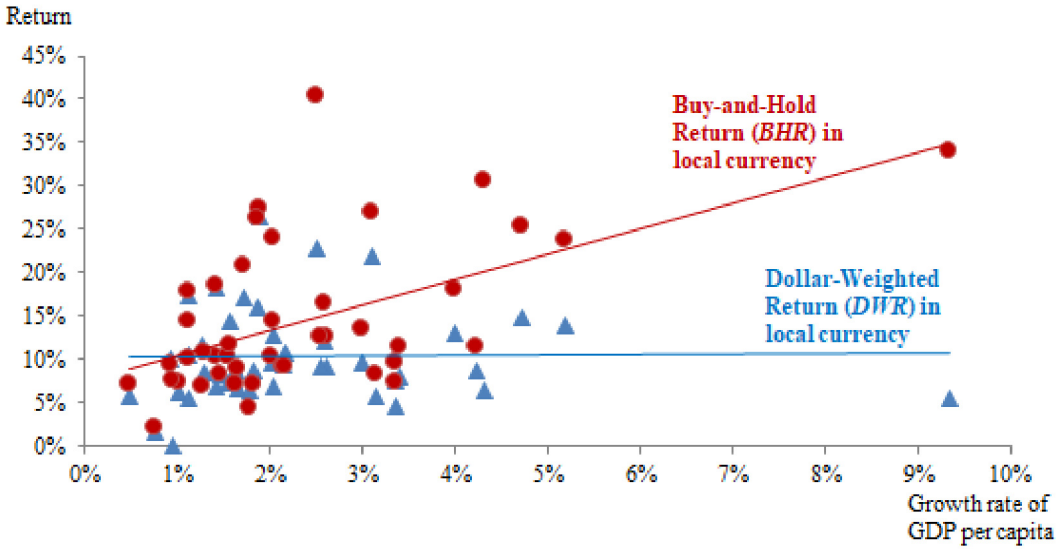


Figure 2. Returns on aggregate corporate sector in 43 countries (in local-currency terms)

This figure plots *DWR* and *BHR* based on local currencies. Panel A plots *DWR* and *BHR* against the average growth rate of GDP per capita over the period of 1994 to 2013. The blue line is the fitted line between *DWR* and GDP growth rate and the red line is the fitted line between *BHR* and GDP growth rate. Panel B plots *DWR* against *BHR*.

Panel A



Panel B

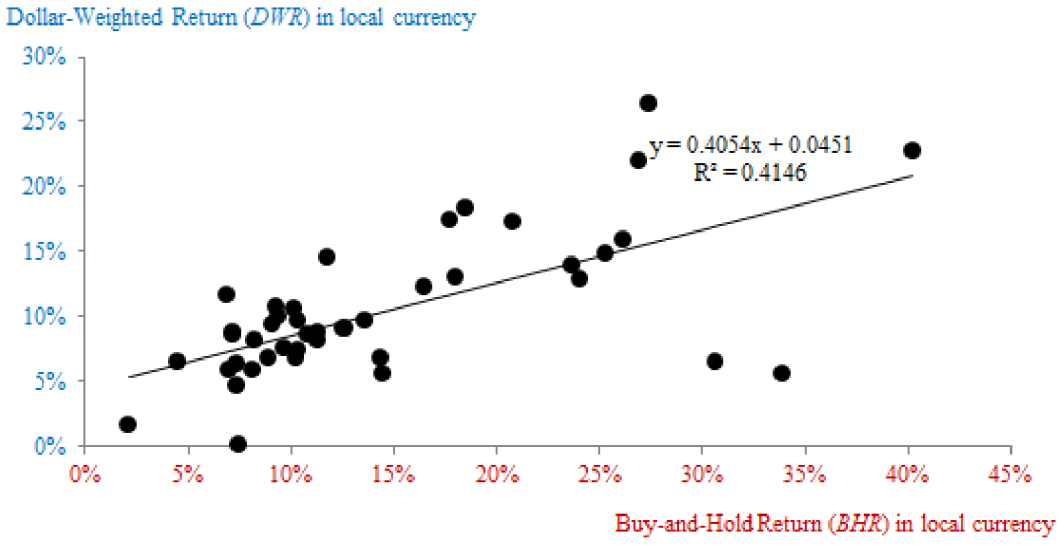
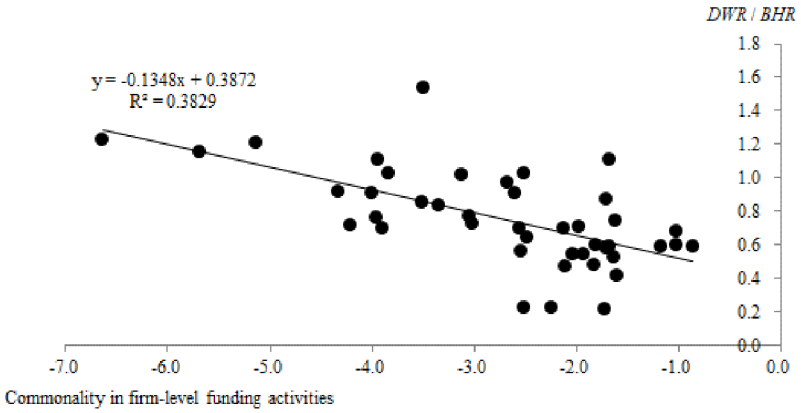


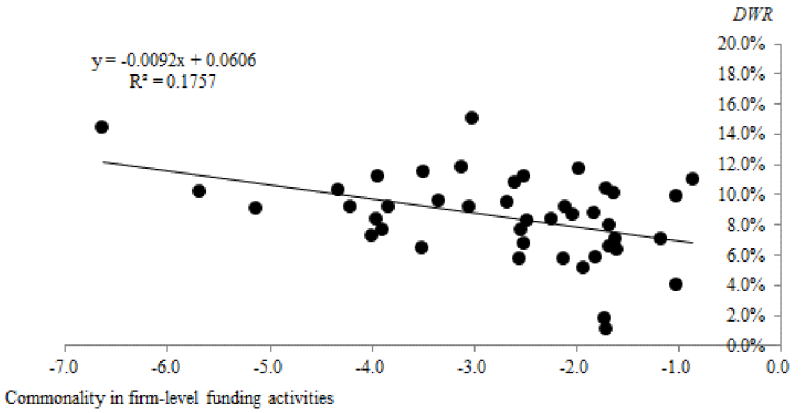
Figure 3. Dollar-weighted return and funding commonality

This figure plots *DWR*/*BHR* (*DWR*, or *BHR*) against a measure of funding commonality

Panel A



Panel B



Panel C