Country-specific growth opportunities, within-country heterogeneity, and the role of financial globalization

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Abstract

Using data for 53,365 firms from 40 countries over the period of 1991-2012, we find that there is a country-specific component in corporate growth opportunities and this component is much more pronounced in small companies than in large firms. We also find that the country-dependence of corporate growth options -- especially the one for small firms -- decreases as the country becomes more open financially. Interestingly, the exact opposite pattern exists in industry-specific growth opportunities, as they increase with the country's financial openness, especially for small firms. With the development of financial globalization, small firms are also found to invest more in line with industry-specific growth options and less with country-specific ones, compared to large companies. Overall, the results indicate that financial globalization helps corporate growth opportunities -- and thus investments -- to be determined globally rather than locally and reduces firm heterogeneity in the country.

Keywords: Country; Growth opportunities; Heterogeneity; Financial globalization; Firm size
JEL classification: F30; F65; G30

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1. Introduction

Oftentimes, we see companies in a country to be valued similarly and, as a result, worth more or less than their industry peers in other countries. Of course, this is not surprising, as some of the factors affecting corporate valuation are clearly country-specific (e.g., laws, regulations, and local financial-market development). When it comes to firm heterogeneity, however, there is no foregone conclusion. For example, we do not know *ex ante* whether the country-specific, say, discount in firm value is particularly severe for certain domestic companies. What is even more uncertain – and thus worth an investigation – is the firm heterogeneity in relation to financial globalization. While financial globalization is expected to weaken the overall country-dependence of corporate valuation, it remains to be seen how financial globalization would affect cross-firm differences within a country. For example, as a country becomes more open, would the heterogeneity rise or fall? And, in what manners? In this paper, we address those questions.

To measure the country-specific component in firm value, we begin by noting that a valuation commonality arises among same-country firms when the country-specific valuation factors serve as a constraint or a privilege, thereby affecting the pricing of the local firms' growth opportunities. To see this, one can imagine some local companies that have limited access to global capital markets or those that enjoy a preferential treatment by the local government. In both cases, a shared firm value occurs because the country-specific factors affect those companies' ability to take advantage of growth options. As a standard measure of firm value in excess of assets in place (i.e., the growth-option component), Tobin's q is thus well suited for our analysis.

More specifically, we measure the country-specific growth opportunities (*CSGOs*) by estimating a year-by-year cross-sectional regression of firm-level Tobin's q on a set of country and industry dummy variables, *à la* Heston and Rouwenhorst (1994). The coefficient on each of the country dummies, in absolute terms, then represents the country's average deviation from the global average while the industry effects are taken into account. That is, the absolute value of the country dummy's coefficient quantifies the country-specific *and* industry-neutral component in corporate growth opportunities.[1]

[1] As such, it is a directionless measure. However, we also examine the signed measure of *CSGOs*.

The other measurement task -- namely, firm heterogeneity in *CSGOs* -- is a bit tricky because it is likely to be in multiple dimensions. For example, a group of politically well-connected firms and the rest can constitute a dimension along which to examine the heterogeneity in question. Alternatively, firms with overseas subsidiaries against others may also show a meaningful difference in *CSGOs*. And the list can go on and on, as firm heterogeneity cannot really be reduced to one particular scenario. In this paper, we use firm size. While this variable is likely to proxy for more than one firm attribute, it is equally likely that each of those firm characteristics is potentially related to the degree of *CSGOs* in the same direction. For example, it will probably be large companies that have political connections and they will be the ones that have subsidiaries outside the country. That is, firm size can serve as a "catch-all" proxy for many different firm characteristics that can affect the degree of *CSGOs*.[2]

Using data for 53,365 firms from 40 countries over the period of 1991-2012, we first document the existence of sizable *CSGOs*. Across the sample countries, the country-specific component causes corporate growth opportunities to be 16% higher or lower than they would otherwise be, on average. We, however, find no evidence of asymmetry in *CSGOs*, in that there is little difference between the upward and the downward deviations caused by the country-specific components.

When we separately examine small companies and larger ones (as defined by the median total assets in a given country, each year), *CSGOs* turn out to be much more pronounced in small companies than in large firms. More specifically, while the *CSGOs* of large firms account for approximately 13% of their growth opportunities, small companies have 22% of their growth options driven by country-specific components. In addition, there is evidence of asymmetry in small firms, as the country-specific component causes their growth options to be priced lower rather than higher. Put differently, the country-specific component affecting small firms appears to be a constraint rather than a privilege.

In order to see the relation of *CSGOs* -- and their cross-firm difference -- to financial globalization, we regress them on a measure of a country's financial openness, along with a

[2] It is worth noting that prior studies have already established firm size as a useful proxy for various barriers to international investors, which must be highly correlated with the degree of *CSGOs* (e.g., Kang and Stulz 1997).

large set of control variables. In cross-section, a country's overall *CSGOs* -- as well as those of small and large firms -- are negatively related to the country's financial openness, which we measure by the sum of the country's foreign assets and liabilities, divided by its GDP. This result means that companies in financially more open countries have fewer *CSGOs* than (similar-sized) firms in relatively closed countries. However, the economic magnitude is much greater in the small-firm case and, as a result, greater financial openness is associated with a narrower gap in *CSGOs* between small and large companies. The negative relation between financial openness and the *CSGO*-gap is also present regardless of whether the country-specific component adds to growth options or reduces them.

We also conduct a "within-country" analysis, in which we associate changes in financial openness with changes in the *CSGOs* differential. As in the cross-sectional analysis, we continue to find a negative relation between the two. This time, the interpretation is that as a country becomes more open financially, the difference in *CSGOs* between small and large firms in the country shrinks. It is important to note that this result is driven exclusively by small firms, because only their *CSGOs* -- and not those of large companies -- decrease in financial openness. Similar to the cross-sectional analysis, we distinguish between when the *CSGOs* grow more positive and when they become more negative. The negative relationship between changes in financial openness and changes in the *CSGOs* differential is unaffected by this distinction.

At least three issues need addressing. One is, of course, endogeneity and the second is whether Tobin's q-ratio is an appropriate proxy for corporate growth opportunities. Finally, it is necessary to delve into the exact meaning of the weaker *CSGOs* that are associated with greater financial openness. Starting with the last, we examine whether the weaker *CSGOs* are indicative of more correlated growth options across countries regardless of their economic fundamentals. To answer this question, we turn our attention to industry-specific components in corporate growth opportunities. The idea is that, if the results on *CSGOs* are due to corporate growth options being priced more similarly across countries regardless of the difference in their economic fundamentals, then we should see no change—or even a decrease—in the role of industry-specific components. We thus repeat our analysis with the industry-specific growth opportunities (*ISGOs*), and find that the *ISGOs* become *more important* as the country experiences greater financial openness. Moreover, consistent with

the earlier results on *CSGOs*, the increased *ISGOs* are found to be stronger in small firms. As a result, the difference in *ISGOs* between small and large firms decreases in financial globalization. In sum, the weaker *CSGOs* associated with financial openness -- especially in small firms -- are accompanied by more distinct growth options in the dimension of industry -- again for small firms in particular.

One may ask whether such global pricing of corporate growth options is desirable. To the extent that the industry-specific components we measure are justified by economic fundamentals, the observed alignment of growth options by the global industry standards should be deemed beneficial. If, however, the industry components are contaminated by non-fundamental factors, then the conclusion needs to be qualified. Indeed, this concern corresponds to the earlier-raised issue of whether the q-ratio is a proper proxy for corporate growth options. As a measure based on the market value of corporate assets (mostly equity prices), the q-ratio could contain mispricing and, hence, the stronger *ISGOs* we report above may be attributable to the growing presence of industry-wide mispricing across countries. This scenario, however, does not seem to go that far, because our findings are limited to small firms whereas the industry-wide misvaluation across countries—if any—must be more pronounced in large companies which are the typical target of international investors (Kang and Stulz 1997; Bartram, Griffin, Ng, and Lim 2016).[3]

Finally, we discuss endogeneity. We first remind the reader that small and large firms are defined by the median total assets in a country and not by market capitalization. Thus, any changes in their growth options (i.e., changes in equity prices) do not affect, nor are affected by, the groupings of small and large firms.

Moving on to the reverse causality, we note that this scenario amounts to saying that a narrower gap in *CSGOs* between small and large firms *triggers* greater capital movements across countries, or conversely, a wider gap in *CSGOs* between the two groups of companies *discourages* cross-border capital inflows and outflows. We find this scenario to be highly implausible, unless the *CSGO*-gap is correlated with some country-specific institutions that work against foreign capitals. For example, it could be that certain regulations, which put

[3] In Section 4.2, we provide direct evidence that the global factor as measured by changes in the VIX index affects large firms disproportionately more than small ones. We also show that the effect of financial openness is independent of this global factor.

foreign investors at a disadvantage and thus discourage cross-border capital flows, also favor large local companies over smaller ones, thereby contributing to a wider *CSGO*-gap. This scenario is, then, reduced to the omitted-variable version of endogeneity, namely, that both cross-border capital flows and within-country heterogeneity in *CSGOs* are driven by a factor that is more fundamental than the two.

We are in complete agreement with this omitted-variable interpretation. After all, cross-border capital flows in our analysis are simply an empirical proxy for financial openness and we are *not* arguing that those flows *per se* create the results. That is, a country's financial openness must have other aspects besides cross-border capital flows, such as the facilitation of information diffusion across countries. However, all those aspects are likely to be positively correlated and our proxy simply attempts to capture this correlation. Note also that, as our empirical specification explicitly controls for other related country attributes—such as the trade openness, the national wealth, the economic growth, and the status of domestic financial markets, our measure based on capital flows must be proxying for the degree of the country's financial openness.

To sharpen our inferences, however, we turn our attention to a real variable and conduct additional analysis. Specifically, we estimate the standard investment-q regression, in which we use four decomposed q-ratios -- namely, the global, country-specific, industry-specific, and firm-specific parts of q-ratio. The decomposition is made possible by the earlier-mentioned cross-sectional regression of q ratio on country and industry dummy variables. The estimated intercept of the regression is the global component of the q-ratio, while the regression residuals correspond to the firm-specific part. Finally, the predicted values based on the coefficients for the country and industry dummy variables are, respectively, the country- and industry-specific q-ratios. (See Section 4.3 for details.)

The findings are striking. Small firms' investment is typically aligned more with country-specific q and less with industry-specific q, compared with large firms. However, when the country is financially open, the investment of small companies becomes more responsive to industry-specific growth options and less to country-specific ones. These results are in complete agreement with our earlier findings, namely, that small companies have stronger *CSGOs* (weaker *ISGOs*) in general but, as the country opens itself, the *CSGOs* (*ISGOs*) of small firms decrease (increase).

Our paper is related to several lines of research. Closely related to our paper, Bekaert et al. (2007) show that corporate growth options are globally created and exploited as the country's financial sector is open to foreigners. Similarly, Fisman and Love (2004) show that the economic and financial developments cause countries to grow similarly, which implies that the *CSGOs* weaken accordingly. To these studies, our paper adds two new findings, namely, that financial globalization helps reduce the within-country difference in growth opportunities by making the growth options—especially those of small firms—priced globally than locally and that those companies invest in response to their changed growth opportunities.

A handful of studies focus on the differing effects of financial globalization on domestic companies. They include Beck, Demirguc-Kunt, and Maksimovic (2005), Christoffersen, Chung, and Errunza (2006), Gozzi, Levine, and Schmukler (2008), and Beck, Demirguc-Kunt, Laeven, and Levine (2008). All those studies agree that theories are of little help and it is more of an empirical question. Christoffersen et al. (2006) find that stock-market opening benefits large companies more than small firms. Similarly, Gozzi et al. (2008) find that easier access to international capital markets are enjoyed mostly by large firms. However, Beck et al. (2005), based on a survey, note that small firms are particularly more constrained by domestic institutions and, thus, the improvement in institutions will benefit small companies more than large firms. Using the same survey data, Beck et al. (2008) also find that financial development – which tends to occur simultaneously with financial globalization – helps small firm-dominant industries grow faster than large firm-dominant industries. Our paper contributes to this literature by reporting that financial globalization affects domestic companies differently in a way that small companies have fewer country-specific components and more industry-specific components in their growth options and investment.

Certainly, studies on the relative importance between country- and industry-specific components in stock returns are related to our paper. Earlier studies have established that country effects are more important than industry effects (e.g., Heston and Rouwenhorst 1994; Griffin and Karolyi 1998; Brook and Del Negro 2004). However, industry effects are not to be ignored and at times appear to be the dominant factor in stock returns (e.g., Cavaglia et al. 2000; Ferreira and Gama 2005; Carrieri, Errunza, and Hogan 2007; Carrieri,

Errunza, and Sarkissian 2008). While not examining stock returns, our study finds that the country-specific components are more important than the industry-specific ones in corporate valuation. Recall, however, that our focus is not to test between the country and the industry effects. Instead, we are interested in the cross-firm difference in country effects and how this heterogeneity within a country is related to the degree of the country's financial openness. The two features—i.e., the within-country firm heterogeneity and its relation to financial globalization—also distinguish our study from An, Bhojraj, and Ng (2010) who study the relative importance between country and industry effects in corporate valuation ratios (book-to-market equity ratio and earnings-to-market ratio) in terms of the stock-return predictability.[4]

This paper proceeds as follows. Section 2 explains the sample and data, and Section 3 reports the main empirical results. Section 4 provides additional robustness checks. Section 5 concludes the paper.

2. Sample and data

To construct the sample, we begin with all Worldscope companies for non-U.S. countries and all Compustat firms for the U.S. over the period from 1991 to 2012. We require both the country and the industry codes to be available, and also the total assets, book value of equity, and market value of equity to be positive. Finally, we require total assets to be greater than or equal to book value of equity. The q-ratio—our proxy for corporate growth opportunities—is then computed as the market value of asset (book value of assets minus book value of equity plus market value of equity) divided by the book value of assets. We treat the q-ratio as missing if it is greater than 100. To further alleviate the extreme value problem, we use the natural log of q-ratio in our analysis.

We assign sample companies into one of the Fama-French 48 industries. Those companies that do not belong to any of the 48 industries are dropped from the sample. Separately, each year we define small (large) firms as those companies whose total assets are below (above) the sample median value within the country. We then require, each year

[4] Using data from 1990 to 2006, An et al. (2010) find that the return predictability stems mostly from the idiosyncratic components in stock returns, neither the country-specific nor industry-specific components.

during our sample period, a country to have at least one small firm and one large firm. This is a binding constraint, because some countries may not have data for certain years, in which case those countries do not make our final sample. We also require a given industry across countries to have at least one small and one large company each year.

We do not include Hong Kong and Taiwan in the sample, because their country-level variables are not available from the data sources we use, such as the International Monetary Fund. We also ensure that the country code and country name in the Worldscope database are correctly matched (e.g., code 826 for United Kingdom and not, say, Cayman Islands). As a result, we have 40 countries and 47 industries. As many as 53,365 firms enter our sample at least once and the average number of sample firms in a given year is 22,402.[5]

Table 1 reports some information about our final sample. Panel A in particular shows the list of 40 countries along with the average number of companies in each country. Slightly more than a quarter of the sample firms are from the U.S., followed by Japan that accounts for approximately 14% of the sample. As such, the sample is uneven but it is reasonable as the U.S. companies are considered to set the global standards (Rajan and Zingales 1998). The table also provides the size and q-ratio information for the sample firms, as well as for small and large companies separately, in a given country. The average size (total assets in million US dollars) of small and large firms suggests the existence of several disproportionately large companies in each country (Gabaix 2011). Tobin's q-ratio is generally higher for small firms than for large companies.

In Panel B, we report summary statistics for q-ratios across sample firms and sample years (for all firms and then for small and large firms separately). As we truncate the sample at the q-ratio of 100, the maximum sample q-ratio is 99.27 while the minimum is near-zero. Small firms have a wider range of q-ratio than large firms, both below and above the median. Consequently, the higher q-ratio of small firms is not as pronounced in terms of the median as in mean. Still, the q-ratio is typically higher in small firms than in large firms. Of course, we control for these differences between small and large firms when we analyze their difference in *CSGOs*.

[5] We intentionally drop one Turkish company from the sample (Worldscope company code 27743TD), as its total assets change dramatically, from 610,175,184.58 in 1991 to 561.72 in 1992 and then to 516,504,061.49 in 1993. This is an obvious error but, instead of artificially correcting the numbers, we exclude the company from the sample.

3. Empirical results

3.1. CSGOs and firm heterogeneity

We now estimate the following year-by-year cross-sectional regression to quantify the country-specific components in corporate growth opportunities while controlling for industry-specific components:

$$\ln q_k = \alpha + \sum_c \beta_c * CNTRY_c + \sum_i \gamma_i * INDST_i + \varepsilon_k , \quad (1)$$

$$s.t. \sum_c \beta_c = 0 \text{ and } \sum_i \gamma_i = 0 ,$$

where ln q_k is the natural log of firm k's q-ratio, $CNTRY_c$ is the 0/1 dummy variable for country c, and $INDST_i$ is the 0/1 dummy variable for industry i.[6] To gauge the cross-firm difference in *CSGOs*, we re-estimate Eq. (1) separately for small and large firms.

To obtain a summary measure for the overall *CSGOs* and their firm heterogeneity, we sum the absolute values of the estimated β_c's across countries; that way, we have one number for each year. Similarly, we separately sum the absolute values of the β_c's that are estimated only with small firms and those with large firms; consequently, we obtain one annual measure of small firms' *CSGOs* and the one for large firms. We plot those three annual time-series in Figure 1 (top panel).

The figure shows a huge difference in *CSGOs* between small and large firms in a given country. The economic magnitude of this within-country heterogeneity can be computed as follows. The small-firm *CSGOs* in the figure, when averaged across time, are 7.95. Since it is an aggregate number that is summed across 40 countries, the cross-country average is 7.95/40 or 0.199. This is a measure of volatility—i.e., how much the q-ratios of small firms deviate from the global average (after controlling for their different industry memberships). The comparable number for large firms is 0.128 (the average of the large-firm *CSGOs* in the

[6] Note that the two constraints do not use any weighting scheme. Compared to the case where those coefficients are weighted by the number of firms in the corresponding country or industry, our approach allows a larger coefficient for the country or industry with more firms. Specifically, if the constraint were $\sum n_c * \beta_c = 0$, where n_c is the number of firms in country c, the resulting estimate for β_c would be smaller than ours by the order of $1/n_c$. We use this non-weighted constraint so that the coefficient is affected more by the countries and industries with more firms.

figure, 5.13, divided by 40). Thus, *CSGOs* of small firms is approximately 55% greater than those of large firms.

It is also instructive to recall that we use the natural log of q as the dependent variable in this specification. Thus, the average *CSGOs* for small firms -- i.e., 0.199 – means that a typical small firm's q is deviating from the global small-firm average by 22% (i.e., $e^{0.199} - 1$) *due to the country-specific components*. In contrast, the deviation of the large-firm q due to the country-specific components is 13.7% ($e^{0.128} - 1$). Again, the difference is greater than 50%.

Another way of putting the estimated *CSGOs* into perspective is to compare them with industry-specific growth opportunities (*ISGOs*). To this end, we repeat the analysis using the estimated γ's (for all firms, small firms only, or large firms only). The bottom panel of Figure 1 shows virtually no difference between small and large firms. While large companies have somewhat more industry-specific components in their growth opportunities than small companies, industry-specific components in small firms' growth options are only 2% smaller than those of large firms. The lack of difference, however, is not due to the limited role of industry in corporate growth opportunities. As evident in the two panels of Figure 1, the *ISGOs* are just only slightly smaller than the *CSGOs*, although such comparison is not the goal of this paper.

One potential issue with Figure 1 is that Eq. (1) is estimated separately for small and large firms. That is, their *CSGOs* and *ISGOs* are measured against different benchmarks (i.e., the intercepts of each regression). While the two intercepts turn out to be quite close to each other (not reported), we attempt to ensure the robustness of the results by estimating an alternative equation that imposes one common intercept. Specifically, we estimate:

$$\begin{aligned} \ln q_k = {} & \alpha \\ & + \sum_c \beta_{c,small} * CNTRY_c * SM_c + \sum_c \beta_{c,large} * CNTRY_c * LG_c \\ & + \sum_i \gamma_{i,small} * INDST_i * SM_c + \sum_i \gamma_{i,large} * INDST_i * LG_c + \varepsilon_k \end{aligned} \quad , \qquad (2)$$

$$s.t. \ \sum_c \beta_{c,small} + \sum_c \beta_{c,large} = 0 ,$$

$$\sum_i \gamma_{i,small} + \sum_i \gamma_{i,large} = 0 ,$$

$$\sum_c \beta_{c,small} + \sum_i \gamma_{i,large} = 0 \text{ , and}$$

$$\sum_i \gamma_{i,small} + \sum_c \beta_{c,large} = 0 .$$

where SM_c (LG_c) is a 0/1 dummy variable for small (large) companies in country c. Other variables are already defined in Eq. (1). In essence, Eq. (2) additionally includes a dummy for small firms and another one for large companies, and has them interact with the country and the industry dummy variables. Note also the changes in the constraints: the set of four constraints are imposing the zero-sum condition on any combinations between small and large companies. Otherwise, the intercept – the benchmark – would be biased between the two groups of companies and cannot remain neutral.

Figure 2 shows that this alternative specification makes virtually no change to the earlier results. Namely, we continue to observe a large difference in *CSGOs* between small and large companies (top panel) but only a negligible difference in *ISGOs* (bottom panel). In words, the results in Figure 2 confirm that the previously observed difference in *CSGOs* between small and large firms and the lack of difference in *ISGOs* are not attributable to different benchmarks. In the following analysis which associates *CSGOs* with financial globalization, we employ the estimates from this one-regression specification.[7]

3.2. CSGOs, firm heterogeneity, and financial globalization – Cross-country analysis

Basic setup

We now associate a country's *CSGOs* with the degree of its financial openness. In particular, we examine how the difference in *CSGOs* between small and large companies is related to financial openness. To this end, we estimate the following regression:

$$Depvar_{c,t} = a + b * FinOpen_{c,t} + \sum_k c_k * Control_{c,k,t} + y_t + e_{c,t}, \qquad (3)$$

where $Depvar_{c,t}$ is one of the following: the *CSGOs* of country *c* in year *t* (i.e., β_c estimate in absolute terms from Eq. (1)), the *CSGOs* of country *c*'s small firms in year *t* (i.e., $\beta_{c,small}$

[7] To further ensure the robustness of our results, we used the raw q-ratio (i.e., not in log) as the dependent variable and found a very similar result to Figures 1 and 2. We also used the log q-ratio that is truncated at the 1 and 99 percentiles and found that the patterns in the figures are robust to using this alternative dependent variable. The results are available upon request.

estimate in absolute terms from Eq. (2)), the *CSGOs* of country *c*'s large firms in year *t* (i.e., $\beta_{c,large}$ estimate in absolute terms from Eq. (2)), and the difference in *CSGOs* between small and large firms in country *c* in year *t* (i.e., the absolute value of the difference between $\beta_{c,small}$ and $\beta_{c,large}$). Hereafter, those estimates are denoted by $CSGOs_{\text{all}}$, $CSGOs_{\text{small}}$, $CSGOs_{\text{large}}$, and $CSGOs_{\text{diff}}$, respectively. It is a panel regression with country-year observations and, in order to examine the cross-section at the country level, we use the year fixed-effects (y_t).

We need to detail how we measure the degree of a country's financial openness. For the cross-country analysis here, we use the sum of a country's foreign assets and foreign liabilities, divided by its GDP. The resulting variable is effectively the cumulative gross capital flows over time. That is, our measure presumes that countries with more cross-border capital flows—not just during the current period but also in the past, and both inflows and outflows—are more open financially.[8] However, we stress that this measure is only a proxy and we are well aware that a country's financial openness is a multi-dimensional phenomenon that affects and is affected by many other aspects of the country. Thus, our results below should not be interpreted as capital flows *per se* affecting the *CSGOs*. Instead, it should be interpreted as a country's financial openness causing a certain pattern in *CSGOs*.

In order to establish a relationship between *CSGOs* and financial openness, we need to control for other country characteristics that are not directly related to financial openness. We thus include in the regression credit market size, stock market size, stock market turnover, log GDP per capita, GDP per capita growth, and trade openness. In addition, we control for the median firm size (total assets) of a country, the number of firms in a country, the median q-ratio of a country, and the cross-sectional standard deviation of q-ratios within a country (all variables in log). When the $CSGOs_{\text{small}}$ or the $CSGOs_{\text{large}}$ are used as the dependent variable, the control variables are computed only with small or large firms in the country. With the $CSGOs_{\text{diff}}$ as the dependent variable, we use the log difference in a given variable between small and large firms, except that the number of firms is the total number of firms in a country. Controlling for those variables is important because otherwise the results could be spurious.

[8] Luxemburg is excluded from the regression analysis, since its foreign assets and liabilities are more than 100 times of the country's GDP. Not using Luxemburg is common in the international finance and economic literature. See, e.g., Feldstein and Horioka (1980) and Tesar (1991).

Summary statistics

Table 2, Panel A, reports the summary statistics of the regression variables. The first four rows are the dependent variables (i.e., $CSGOs_{all}$, $CSGOs_{small}$, $CSGOs_{large}$, and $CSGOs_{diff}$) and they are followed by the measure of financial openness and the control variables. The average *CSGOs* in a given country ($CSGOs_{all}$) is 0.140 and this estimate is slightly lower than our earlier result in Section 3.1 (0.151, which is the average of the "all-firm" line in the top panel of Figure 1). The difference stems from the fact that we now require data for financial openness (i.e., foreign assets and liabilities). Considering that such data are available only after the country is financially open to some extent, a lower estimate of *CSGOs* in this section (i.e., a higher value for *CSGOs* in the unscreened sample in Section 3.1) is not surprising.[9] The table confirms, again, the more pronounced *CSGOs* in small firms than in large companies (0.188 vs. 0.120, on average). In Section 3.1, the estimates are 0.199 and 0.128, respectively, and the *CSGOs* estimates in this screened sample are predictably lower than in the earlier unscreened sample.

The difference estimate ($CSGOs_{diff}$) needs explaining. In this analysis, we first compute the difference between $\beta_{c,small}$ and $\beta_{c,large}$ each year for each country, and then take the absolute value of the difference. While not corresponding to $CSGOs_{small} - CSGOs_{large}$, the $CSGOs_{diff}$ correctly gauges how far apart the growth options of small and large firms are; it then makes the deviation non-directional by taking the absolute value of it. Put differently, the $CSGOs_{diff}$ is the log difference in (the country-specific component-driven) q between small and large firms, in absolute terms.

The variable of interest is *FinOpen*, our proxy for a country's financial openness. As explained above, it is the ratio of foreign assets and liabilities to GDP. The average value is 1.805 but the median is 1.023, with a maximum of 28.971. As such, the variable is heavily right-skewed. To mitigate the extreme-value problem, we alternatively employ several dummy variables, as well as the original continuous one, in the regressions. In the later within-country analysis, we use the 1st difference of this variable, since it is likely to be non-

[9] We do *not* treat the missing foreign assets and liabilities as zero.

stationary. Other control variables are also reported in Table 2 and do not seem to raise any outlier issue.

In Panel B, we examine whether there is a difference in the *CSGO* estimates between when the signed $CSGOs_{all}$ is positive (i.e., "country premium" case) and when it is negative (i.e., "country discount" case). Except for $CSGOs_{small}$, there is no reliable difference between the two cases. The pattern in $CSGOs_{small}$ is interesting. Its magnitude is greater when the country as a whole experiences a discount than when the country enjoys a premium. This observation suggests that the country-specific components for small firms are more of a constraint rather than a privilege.

Regression results

Table 3, Panel A, reports the panel regression results. As shown at the top of the table, a country's financial openness is significantly and negatively associated with each of the four *CSGOs* estimates. Since the regressions include year fixed-effects, the results are indeed a cross-country pattern. That is, the negative coefficients on *FinOpen* indicate that corporate growth options are less country-specific in countries that are financially more open than in closed countries. More interestingly, the significant and negative relations of *FinOpen* to $CSGOs_{small}$, $CSGOs_{large}$, and $CSGOs_{diff}$ suggest that the weaker *CSGOs* associated with financial openness is particularly pronounced in small firms and thus the gap in *CSGOs* between small and large firms is narrower in financially open countries.

To better understand the economic magnitude, we replace the original, continuous *FinOpen* with a 0/1 dummy variable representing the above-median countries (Panel B) or with two 0/1 dummy variables each corresponding to the above-q3 and to the below-q1 countries (Panel C). These alternative specifications also mitigate the effect of any extreme *FinOpen* values on the results. The estimated coefficients on the above-median dummy with $CSGOs_{diff}$ (Panel B) is -0.045 and this corresponds to the mean difference in $CSGOs_{diff}$ between the above- and below-median countries. The coefficient in Panel C for the above-q3 countries is even bigger in magnitude at -0.069. Given that the average $CSGOs_{diff}$ is 0.155 and the dummy for the below-q1 does not enter the regression significantly, we can infer that the $CSGOs_{diff}$ of the above-q3 countries is, on average, 0.10325. That is, the difference

in q between small and large firms in those countries is approximately 1.1 (from $e^{0.10325}$), whereas the average $CSGOs_{diff}$ in the rest of the countries is 1.2 (from $e^{0.17225}$).

We also examine any asymmetry in our results by allowing the coefficient on *FinOpen* to change between the country-premium and the country-discount cases. We do so by introducing a dummy variable for the country-premium case and its interactive term with the financial-openness variable. Panel D, which only reports the coefficients on the country-premium dummy, the financial-openness variable, and their interactive term, shows that the effect of financial openness on *CSGOs* is not reliably different between the two cases, as the interactive terms are all insignificant.

Endogeneity

Focusing on $CSGOs_{diff}$ is useful in addressing endogeneity, since the reverse causality would mean that, as small and large firms become more similar to each other in terms of their country-specific growth options, this similarity *causes* their country to become more open financially. We find such a causal relation quite difficult to rationalize: why would the similarity in growth options between small and large firms *cause* financial openness or, as an empirical matter, cross-border capital flows? Perhaps one can consider an omitted variable that can affect both the *CSGOs* and the cross-border capital flows. For example, a certain regulation that can contribute to a more level playing field for local companies (i.e., a narrower *CSGO*-gap) may also facilitate cross-border capital flows. As explained in the introduction, we fully embrace this interpretation. The variable we employ here, *FinOpen*, is only an empirical proxy for a country's financial openness and we are not arguing that cross-border capital flows *per se* cause any results. We only rely on the fact that countries that are more financially open have more cross-border capital flows. Unless our proxy picks up other aspects of the country that are not related to financial openness, our results must be indicative of financially open countries having smaller cross-firm differences in the pricing of corporate growth options than do financially closed countries.

This last point above begs an inspection of the control variables, so that we can be assured that other country characteristics not directly related to financial openness are correctly taken into account. In our regressions, we are controlling for the degree of a country's financial development and economic development to correctly isolate the effects

of financial openness on the results. Reading the coefficient on the control variables in Table 3, the size of the credit and stock markets (*Credit* and *Stock*) are not reliably associated with *CSGOs*, suggesting that once the financial-openness aspect is controlled for, financial development does not affect the country-dependency in corporate growth options.[10] It is interesting to see the stock-market turnover (*Tover*) to be differently related to $CSGOs_{small}$ and to $CSGOs_{large}$. However, this variable does not explain the difference in *CSGOs* between small and large firms.

The degree of economic development is controlled via two variables, namely, GDP per capita (*GDP*) and its growth (*GDPgrw*). The wealth of a country (i.e. *GDP*) is significantly and negatively related to each of $CSGOs_{all}$, $CSGOs_{small}$, and $CSGOs_{large}$. However, due to this universal impact on local firms, *GDP* does not explain the cross-firm difference. It is interesting to note that, in Panels B and C where we employ dummy variables for financial openness, *GDP* loses its significance. It appears that the overarching dummy variables capture the effect of economic development as well as that of financial openness. The coefficient on *GDPgrw* suggests that the country-dependency of large firms' growth opportunities, but not that of small firms, is weaker in fast-growing countries. However, the variable has little explanatory power for the difference between the two groups of companies.

The degree of trade openness, denoted by *TrdOpen*, is measured by the ratio of import and export to GDP and it is significantly and positive related to the *CSGOs* of large firms. That is, countries with more international trades tend to have more country-specific components in large firms' growth opportunities. We conjecture that this result obtains as the international trades of some countries concentrate in their large companies in different industries. Since it is not the variable of our main interest, we do not conduct further investigation.

In addition to the macroeconomic controls above, we employ four additional variables that are constructed with firm-level data in a given country for a given year. They are the median firm size (total assets), the median q-ratio, the cross-sectional standard deviation of

[10] This "no-result" of the financial development measures is not impossible. For instance, if well-developed credit markets make local companies dependent on local markets, then it would hamper corporate growth options from being priced by the global standards.

q-ratio, and the number of companies. All four variables are computed within a country or in the country's small-firm or large-firm subset. (All variables are first computed and then put in log to enter the regression.) When the dependent variable is the $CSGOs_{diff}$, we replace the median firm size, the median q-ratio, and the standard deviation of q-ratio with their differences between small and large firms; for the number of firms, we use the total number of firms in the country.

It turns out that those four variables all explain the difference in *CSGOs* between small and large firms. Specifically, the estimated coefficients and their signs indicate that the countries with more firms and a smaller difference in size, q, or q-dispersion between small and large firms tend to have a smaller $CSGOs_{diff}$. While these results are to some extent expected, they are not mechanical or tautological by any means. More importantly, *FinOpen* survives all these controls.

In sum, the regression results in this section establish a cross-country pattern, namely, that the countries that are financially more open have less pronounced *CSGOs* and also a narrower gap in *CSGOs* between small and large companies than financially closed countries. Next section turns our attention to the within-country perspective.

3.3. CSGOs, firm heterogeneity, and financial globalization – within-country analysis

Basic setup

We now turn to the association of *FinOpen* with *CSGOs* within a country. Since the two variables are likely to be non-stationary, we use their 1st difference and also employ the country fixed-effects in the panel regressions. A significant and negative coefficient on Δ*FinOpen* against Δ*CSGOs* would then indicate that, as a country becomes financially more open, its corporate growth opportunities contain fewer country-specific components. Also, with changes in $CSGOs_{diff}$ as the dependent variable, a significant coefficient on Δ*FinOpen* would suggest that, as a country becomes more open financially, corporate growth opportunities are priced globally and, as a consequence, the gap between small and large firms narrows.

Specifically, we estimate the following regression:

$$\Delta Depvar_{c,t} = a \ + b \ * \Delta FinOpen_{c,t} + \sum_k c_k * \Delta Control_{c,k,t} + y_t + c_c + e_{c,t}\,, \qquad (4)$$

where $\Delta Depvar_{c,t}$ is the annual change (from year *t*-1 to year *t*) in one of the four dependent variables for Eq. (3). That is, it is one of $\Delta|\beta_c|$, $\Delta|\beta_{c,small}|$, $\Delta|\beta_{c,large}|$, and $\Delta|\beta_{c,small} - \beta_{c,large}|$. The regressors are the same as those in Eq. (3) except that we now use their annual changes. In order to examine the within-country variation, we use the country fixed-effects (c_c) along with the year fixed-effects (y_t).

Regression results

Table 4, Panel A, shows the regression results. It is evident that changes in a country's financial openness—i.e., Δ*FinOpen*—are significantly and negatively related to changes in the *CSGOs* of all firms ($\Delta CSGOs_{\text{all}}$) and of small firms ($\Delta CSGOs_{\text{small}}$). However, Δ*FinOpen* is insignificant when the changes in large firms' *CSGOs* are used as the dependent variable. Consequently, Δ*FinOpen* is significantly and negatively related to $\Delta CSGOs_{\text{diff}}$, which means that as a country becomes more open financially, the difference in *CSGOs* between small and large firms shrinks precisely because of the reduction in country-dependence of small firms' growth options.[11] Similar to the cross-sectional analysis, we distinguish between when $CSGOs_{\text{all}}$ increases and when it decreases. Panel B of Table 4, the last column, show that the reduction in the *CSGO*-gap is not different between the two cases, as the interactive term is insignificant..

With the country fixed-effects and the 1st difference in variables, the reverse causality—especially for the $CSGOs_{\text{diff}}$—is made quite implausible: how could it be the case that a country is made more open financially *by* the growth opportunities of small firms and large firms becoming more similar to each other? It seems only sensible to argue—as we do—that a country's financial openness causes the growth opportunities of small and large firms to be similar owing to the weaker role of country-specific components.

4. Additional analysis

4.1. Industry-specific growth opportunities (ISGOs)

[11] Among the control variables, the role of GDP growth (Δ*GDPgrw*) is unmistakable. It thus follows that a country's *CSGOs* weaken as the country grows faster. However, this effect is common to both small and large companies and has no explanatory power for the $CSGOs_{\text{diff}}$.

Can the narrower *CSGO*-gap between small and large firms be due to a growing presence of a "global factor" that would make those companies similar to each other? By nature, such a factor must be at work across countries and it will also reduce the cross-firm differences within a country. One way of evaluating this possibility is to gauge the industry-specific growth opportunities (*ISGOs*). The idea is that, if our results on *CSGOs* are due to a global factor making corporate growth options similar across companies and countries regardless of the difference in their economic fundamentals, then we should see no change -- or even a decrease -- in the role of industry-specific components.

Our estimates of *ISGOs* are for a given industry across countries (i.e., γ_i in Eq. (1)) and thus we need to convert them to country-specific measures. To this end, we employ the following procedure. Each year within a country, we compute the fraction of firms that belong to each of the industries in the country. For example, if a country has 10 firms in automobiles and 20 in electronics (and no other industries), then the auto industry is given a value of 1/3 and the electronics 2/3. We then use those fractions as weights to compute the weighted average *ISGOs* within the country. That is, $|\gamma_{auto}|$* (1/3) + $|\gamma_{electronics}|$ *(2/3), in which γ_i are estimated by Eq. (1).

For the *ISGOs* of small or large firms and their difference, we use the estimates of Eq. (2), namely, $\gamma_{i,small}$ and $\gamma_{i,large}$. Specifically, in each country, we compute the fraction of small or large firms in each industry. Continuing on the earlier example, suppose that the auto industry has 3 large firms and 7 small firms, while there are 12 large and 8 small electronics companies. Then the small-firm *ISGOs* of this country is $|\gamma_{auto,\,small}|$ * (7/15) + $|\gamma_{electronics,\,small}|$ *(8/15). Similarly, the country's large-firm *ISGOs* is $|\gamma_{auto,\,large}|$ * (3/15) + $|\gamma_{electronics,\,large}|$ *(12/15). Finally, the difference in industry effect between small and large firms in our example is $|\gamma_{auto,\,small} - \gamma_{auto,\,large}|$ * (1/3) + $|\gamma_{electronics,\,small} - \gamma_{electronics,\,large}|$ * (2/3).

Table 5 reports summary statistics for the resulting *ISGOs*, with which we make three observations. First, the magnitude of industry-dependence of growth options is almost comparable to that of country dependence. We cannot directly compare the numbers in Table 2 and those in Table 5, since the *ISGOs* here are reconstructed to represent the industry-dependence of a given country. Besides, such a comparison is not our goal in this paper. Still, we note that *ISGOs* is far from being negligible. Second, unlike the *CSGOs*, there are more industry-specific components in large firms' growth options than in small-firm

growth opportunities. Third, the difference in *ISGOs* between small and large firms is limited. With those *ISGOs* estimates, we examine the cross-country pattern by using Eq. (3) where the dependent variable is now $ISGOs_i$ (with the subscript i being "all", "small", "large", or "diff").

Table 6, Panel A, shows that *FinOpen* is significantly and positively related to $ISGOs_{all}$ and $ISGOs_{small}$. Surprisingly, it is significantly and negatively related to $ISGOs_{large}$, although the difference between small and large companies does not show any reliable relationship with *FinOpe*n. Before making any inference from those estimates, we first ensure the robustness of the results by replacing the continuous openness measure with dummy variables. Panels B and C of Table 6 show that the coefficient on *FinOpen* is most significant when the dependent variable is $ISGOs_{small}$. The interpretation is thus that small companies in financially open counties have more industry-specific components in their growth opportunities than small companies in financially closed countries. The results on the $ISGOs_{all}$ are also reliable, although this pattern appears to be driven by the divergence between the most open countries (i.e., above-q3 countries) and the rest. Finally, the insignificant coefficient of *FinOpen* for the $ISGOs_{diff}$ also remains robust.

We now turn to the within-country analysis by utilizing Eq. (4). Table 7, Panel A, shows that changes in *FinOpen* is significantly and positively related to changes in all firms' and small firms' *ISGOs*. This result is consistent with the cross-country result above and indicates that, as a country becomes more open financially, the growth opportunities of its companies—especially those of small firms—are better aligned with the global (i.e., country-neutral) industry fundamentals. Consistent with the cross-country analysis above, $\Delta FinOpen$ is unrelated to $\Delta ISGOs_{large}$. Most importantly, the difference in *ISGOs* between small and large firms *decreases* with financial openness. That is, the gap between small and large firms shrinks in terms of the industry-dependence of their growth options.

4.2. Role of global factor – An analysis of VIX

To further investigate the role of a global factor that would make *CSGOs* similar across companies regardless of their economic fundamentals, we include in the regression the VIX index as another control. Prior studies have documented that cross-border capital flows have a commonality and it is negatively related to VIX—that is, capital moves more across

countries when VIX is low (e.g., Rey 2015). We thus take a negative value of the average VIX during a year—denoted hereafter by *negVIX*—and use its annual change (i.e., from the last year's average to this year's average) as an additional control in the within-country regressions.

By construction, this variable has the same value for a given year across all countries. Using Δ*negVIX* together with year fixed-effects would thus eliminate the time-series variation in the VIX variable. For this reason, we employ this additional control variable without year fixed effects. In a sense, the analysis in this section is replacing the year fixed effects with a single variable whose value changes over time. Our goal here is to see whether Δ*FinOpen* survives this additional control.

Table 8 reports the six sets of regression results. As shown in the first two columns, the relationship between small firms' growth options ($\Delta CSGOs_{small}$ and $\Delta ISGOs_{small}$) and financial openness (Δ*FinOpen*) is robust to controlling for changes in VIX. While the increase in *ISGOs* with financial openness weakens in the presence of the VIX variable, the openness variable only slightly misses the significance (*p*-value=0.115). The results on large firms' growth options ($\Delta CSGOs_{large}$ and $\Delta ISGOs_{large}$), reported in the next two columns, also show that Δ*FinOpen* mostly maintains its coefficient in the presence of Δ*negVIX* (i.e., a significant and negative coefficient with $\Delta CSGOs_{large}$ and an insignificant coefficient with $\Delta ISGOs_{large}$).

One noticeable pattern is that the coefficient on Δ*negVIX*, when regressed on Δ*CSGOs*, is greater (in absolute terms) for large companies than for small firms. In contrast, the coefficient on Δ*FinOpen* is larger in magnitude for small firms than for big companies. At a minimum, these observations indicate that the two variables have different effects on corporate growth options.

The last two columns in Table 8 are for the regressions whose dependent variables are $\Delta CSGOs_{diff}$ and $\Delta ISGOs_{diff}$, respectively. It is indeed telling that Δ*negVIX* has no explanatory power for the difference in *CSGOs* between small and large companies, whereas Δ*FinOpen* continues to be significant and negative (i.e., it reduces the gap between small and large companies). With $\Delta ISGOs_{diff}$ as the dependent variable, both variables enter the regression significantly. However, Δ*negVIX* and Δ*FinOpen* have different signs of coefficients, as the former is positive (i.e., it contributes to a *wider* gap) and the latter is negative (i.e., it

reduces the gap). As mentioned in the preceding paragraph, this finding confirms that the effect of financial openness is independent of the global trend proxied by VIX.

4.3. Impact on real variables – An analysis of investment-q sensitivity

Basic setup

We now turn our attention to real – as opposed to financial – variables. Specifically, we estimate the standard investment-q regression to gauge the relevance of the q-ratio – our proxy for corporate growth options – for the corporate investment policy. In doing so, we decompose the q-ratio into the global, country-specific, industry-specific, and firm-specific components and examine the role of each one in corporate investment. The decomposition is made possible by Eq. (2), from which the estimated intercept (α) is the global component in q-ratio and the estimated β and γ are, respectively, the country- and industry-specific components. Note that Eq. (2) allows for different country- and industry-specific components between small and large firms (i.e., β_{small} and β_{large}; γ_{small} and γ_{large}). Finally, the regression residual (ε) represents the firm-specific component in q-ratio.

As a baseline specification, we estimate the following regression:

$$\begin{aligned} I_{k,c,i,t} = {} & \alpha \\ & + \beta_G * G\mathrm{q}_{t-1} + \beta_C * C\mathrm{q}_{c,t-1} + \beta_I * I\mathrm{q}_{i,t-1} + \beta_F * F\mathrm{q}_{k,t-1} \\ & + \beta_{cf} * cf_{k,t} + \beta_{sz} * sz_{k,t-1} \\ & + \varepsilon_{k,c,i,t} \end{aligned}, \qquad (5)$$

where $I_{k,c,i,t}$ is the investment by firm k that belongs to country c and industry i during year t, as measured by the changes in total assets during the year, divided by total assets at the end of year t–1. $G\mathrm{q}_{t-1}$, $C\mathrm{q}_{t-1}$, $I\mathrm{q}_{t-1}$, $F\mathrm{q}_{t-1}$ are, respectively, the global, country-specific, industry-specific, and firm-specific components of q-ratio at the end of year t–1. Cash flows of firm k during year t ($cf_{k,t}$) are measured by the sum of the income before extraordinary items and the depreciation and amortization, divided by total assets at the end of year t–1. Finally, firm size ($sz_{k,t-1}$) is the natural log of total assets at the end of year t–1. While the q-ratio has already been truncated at 100 (see Section 2), the other three variables (I, cf, and sz) do contain extreme values. We thus truncate them at the 1st and the 99th percentiles. We compute the mean values for each company and for each year (within a country), and de-

mean the original variable with the two means. Thus, Eq. (5) is equivalent to a panel regression with firm and (country-specific) year fixed effects.

Regression results

Model (1) in Table 9 reports the baseline regression results. As well established in the literature (e.g., Fazzari, Hubbard, and Petersen 1988), cash flow enters the regression positively while firm size does so with a negative coefficient. All four q variables are also positively related to corporate investment, suggesting that the q-ratio is a good proxy for corporate growth options. Our ultimate goal is to detect any difference between small and large firms in the investment-q link and the impact of financial openness on this relationship. Thus, we modify Eq. (5) by adding a dummy variable for small firms, D_{small}, and have it interact with each of the six regressors.

This modified Eq. (5) is the Model (2) in Table 9. Its estimates indicate that the investments of small firms are less sensitive to the global, industry-specific, and firm-specific q-ratios than those of large firms. More important, however, small-firm investment is *more* sensitive to the country-specific q-ratio than large companies. Indeed, this is consistent with our earlier finding, namely, that small-size firms have more *CSGOs* than do large companies.

What about financial openness? To see its effect on the investment-q link, we split the sample into two groups. More specifically, we create a dummy variable representing the high degree of financial openness, D_{open}, and separately examine the observations whose D_{open} is zero and those with a value of one for the dummy variable. To construct D_{open}, we first de-mean $\Delta FinOpen$ by the country-specific and the year-specific average values and then assign a value of one to the observations whose de-meaned values are greater than or equal to the sample median. That way, we identify the observations for which the country is becoming more open financially.

When Model (2) is estimated separately in each sub-sample, the most pronounced finding is that the greater sensitivity of small firms' investment to the country-specific q-ratio is found only when the openness measure is below the sample median (i.e., the sub-sample of D_{open}=0). In the other sub-sample (i.e., the one with D_{open}=1), the country-specific q and investment link is not significantly different between small firms and large companies.

This sub-sample result further confirms our finding above, namely, that small firms' country-dependence of growth options is mitigated as the country becomes more open financially.

In addition, the sub-sample analysis reveals two other notable patterns. One is that the coefficient for *I*q*D_{small} is much less negative in the high-openness sub-sample than in the low-openness one (-0.052 *vs*. -0.105). It implies that small companies are relatively more responsive to the *ISGOs* (albeit still less so than large ones) as the country becomes more open financially. The other pattern is that the coefficient for *F*q*D_{small} is also less negative in the sub-sample of D_{open}=1 than in the sub-sample of D_{open}=0 (-0.036 *vs*. -0.055). The interpretation is that small companies become relatively more responsive to their own signal about growth opportunities (again, although still less so than large firms) as the country becomes more open financially.

To formally test those patterns and also to ensure the robustness of the already-tested results, we estimated the following, full-blown equation:

$$\begin{aligned} I_{k,c,i,t} = {} & \alpha + \sum_{x}^{X} (\beta_x * X_{x,t}) \\ & + \alpha_1 * D_{small} + \sum_{x}^{X} (\gamma_x * X_{x,t} * D_{small}) \\ & + \alpha_2 * D_{open} + \sum_{x}^{X} (\lambda_x * X_{x,t} * D_{open}) \\ & + \alpha_3 * D_{small} * D_{open} + \sum_{x}^{X} (\varphi_x * X_{x,t} * D_{small} * D_{open}) + \varepsilon_{k,c,i,t} \end{aligned} \quad , \qquad (6)$$

where $X_{x,t}$ is the full set of regressors in Eq. (5).

We are particularly interested in the estimated ϕ's, which are the difference-in-difference estimates. They can test whether there is an openness effect *unique to small firms* (compared to large companies), or equivalently, whether there is an *additional small-firm effect* during the high-openness state (compared to low-openness state).

The results are reported under Model (3) in Table 9. They confirm all three findings in Model (2) with sub-samples, namely, that small companies become less dependent on country-specific growth options (i.e., negative coefficient for *C*q*D_{small}*D_{open}), that their investment is more aligned with industry-specific growth options (i.e., positive coefficient for *I*q*D_{small}*D_{open}), and that small-size companies pay more attention to their own signals

when making investment decisions (i.e., positive coefficient for $Fq*D_{small}*D_{open}$), as their country becomes more open financially.

In sum, the results in this section confirm that small firms are more dependent on the country-specific growth options than large firms but this dependency decreases with financial openness. At the same time, while small firms' reference to the industry-specific growth options is weaker than that of large companies, financial globalization improves this. Finally, small firms respond more to their own signals about growth options as the country becomes more open financially.

5. Conclusions

Using data for 53,365 firms from 40 countries over the period of 1991-2012, we examine the extent to which a firm's growth opportunities are country-specific. In particular, we focus our attention on two aspects of country-specific growth opportunities (*CSGOs*), namely, the cross-firm difference within a country and the impact of financial globalization on *CSGOs* and their within-country heterogeneity. We find that: (1) small firms in a country have greater country-specific components in their growth options compared to large firms in the same country; (2) the *CSGOs*—especially those for small firms—decrease as the country is financially more open; and (3) the difference in *CSGOs* between small and large firms is reduced by the country's financial openness.

When we focus on the industry-specific growth opportunities (*ISGOs*), the pattern turns out to be the opposite: small firms in a country have weaker *ISGOs* compared to large firms and the *ISGOs*—especially those for small firms—increase as the country is financially more open. However, the difference in *ISGOs* between small and large firms decreases with the country's financial openness, just as with the *CSGOs*. Finally, we find that the actual investment pattern is in complete agreement with the observed changes in corporate growth options. That is, as financial globalization progresses, small firms invest more in line with industry-specific growth options and less with country-specific growth opportunities.

We conclude the paper by addressing one possible criticism on our results. Some may argue that our empirical work is designed to find stronger result in small firms, as it focuses on a relatively recent period. Indeed, it is possible -- or even likely -- that large companies have already been globalized at the beginning of our study period and thus there is not

much to be changed in those large companies. What strikes us as interesting, however, is that small firms are affected by financial globalization, not that large companies are not affected. That is, our results show that financial globalization is not irrelevant for small companies.

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Table 1. Sample characteristics

This table reports the average number of sample firms and their size and q-ratio by country (in Panel A) and th summary statistics of Tobin's q-ratio across sample countries and sample years (in Panel B). The sample period is from 1991 to 2012.

Panel A: Sample countries and characteristics of sample firms

Country	Avg. # of firms	Avg. firm size (in million U$)			Avg. q-ratio		
		all	small	large	all	small	large
ARGENTINA	61	1,283	131	2,409	1.71	2.28	1.16
AUSTRALIA	970	1,891	38	3,753	1.95	2.39	1.51
AUSTRIA	89	5,836	122	11,470	1.41	1.64	1.18
BELGIUM	141	10,459	105	20,758	1.36	1.52	1.21
BRAZIL	94	6,102	366	11,934	1.26	1.37	1.16
CANADA	1,347	2,168	38	4,295	2.20	2.91	1.49
CHILE	147	1,352	90	2,618	1.75	2.15	1.34
CHINA	1,092	1,878	111	3,644	2.16	2.58	1.74
COLOMBIA	33	2,348	222	4,393	1.07	1.06	1.08
DENMARK	225	2,326	54	4,593	1.39	1.36	1.42
FINLAND	126	1,894	77	3,695	1.51	1.65	1.38
FRANCE	711	9,558	61	19,044	1.51	1.74	1.28
GERMANY	689	8,397	54	16,724	1.73	2.02	1.43
GREECE	213	1,616	45	3,216	1.62	1.82	1.43
INDIA	918	719	34	1,403	1.67	1.69	1.66
INDONESIA	244	626	44	1,214	1.35	1.31	1.40
IRELAND	64	6,571	59	12,995	2.22	2.14	2.31
ITALY	243	13,298	242	26,313	1.26	1.34	1.18
JAPAN	3,194	4,655	161	9,150	1.30	1.42	1.17
KOREA(SOUTH)	879	2,182	155	4,203	1.11	1.21	1.01
LUXEMBOURG	34	6,150	179	11,949	1.31	1.32	1.29
MALAYSIA	646	674	50	1,299	1.39	1.53	1.26
MEXICO	107	2,646	309	5,003	1.34	1.27	1.41
NETHERLANDS	163	14,129	127	28,049	1.63	1.77	1.50
NEW ZEALAND	91	594	45	1,139	1.63	1.96	1.30
NORWAY	166	2,230	83	4,366	1.60	1.99	1.22
PAKISTAN	135	282	23	543	1.31	1.31	1.30
PERU	77	577	48	1,098	1.64	1.59	1.68
PHILIPPINES	159	680	40	1,312	1.73	2.16	1.30
PORTUGAL	61	6,154	157	12,013	1.12	1.01	1.23
SINGAPORE	394	1,343	60	2,606	1.36	1.50	1.24
SOUTH AFRICA	301	1,676	57	3,289	1.66	1.81	1.51
SPAIN	156	13,687	237	27,009	1.35	1.39	1.31
SWEDEN	306	3,490	45	6,941	1.89	2.28	1.50
SWITZERLAND	234	12,799	183	25,365	1.48	1.61	1.35
THAILAND	363	854	39	1,665	1.34	1.36	1.32
TURKEY	179	1,333	62	2,604	1.76	1.78	1.75
UK	1,501	5,512	27	11,008	1.93	2.32	1.54
USA	5,830	4,116	75	8,161	2.85	3.15	2.56
VENEZUELA	24	1,706	153	3,190	0.96	1.04	0.87

Table 1 (cont.)

Panel B: Summary statistics of q-ratios (across sample countries and years)

	q-ratio		
	all	small	large
# of obs.	492,856	246,401	246,455
Mean	1.97	2.26	1.68
Std. dev	3.67	4.45	2.63
Min	0.00	0.00	0.01
P1	0.33	0.25	0.49
Q1	0.91	0.86	0.94
Median	1.13	1.18	1.10
Q3	1.77	2.04	1.57
P99	15.64	19.83	10.92
Max	99.27	99.27	98.55

Table 2. Summary statistics of regression variables

This table reports summary statistics of the variables in the cross-section regression analysis. ***CSGOs***$_{all}$ is the country-specific growth opportunities (***CSGOs***) for all firms in a country and is measured by the absolute value of β_c in Eq.(1). Similarly, ***CSGOs***$_{small}$ and ***CSGOs***$_{large}$ are, respectively, the ***CSGOs*** of small and large firms in a country and are measured by the absolute values of $|\beta_{c,small}|$ and of $|\beta_{c,large}|$ in Eq.(2). ***CSGOs***$_{diff}$, computed as $|\beta_{c,small} - \beta_{c,large}|$, is a measure of difference in ***CSGOs*** between small and large firms in a country. *FinOpen* is our measure of a country's financial openness and is measured by the sum of the country's foreign assets and foreign liabilities, divided by its GDP. *Credit* is the ratio of domestic credit to private sector over GDP. *Stock* is the ratio of market capitalization of listed companies over GDP. *Tover* is the ratio the total value of shares traded over the average market capitalization. *GDP* is the natural log of GDP per capita. *GDPgrw* is the growth rate of GDP per capita. *TrdOpen* is the sum of imports and exports to GDP. *md*SIZE$_i$ is the median total assets (in log) for firm group i. *n*FIRMi is the number of firms (in log) for firm group i. *md*Qi and *std*Qi are, respectively, the median q-ratio and its cross-sectional standard deviation of firm group i (both in log). When the firm group is "diff", it refers to the difference in the corresponding variable between small and large firm groups. All variables are at annual frequencies and for a given country. The sample period is 1991-2012.

Panel A. Summary statistics of regression variables

Variable	N	Mean	Std Dev	Min	Median	Max
CSGOs$_{all}$	730	0.140	0.130	0.000	0.109	1.286
CSGOs$_{small}$	730	0.188	0.183	0.000	0.144	1.635
CSGOs$_{large}$	730	0.120	0.110	0.000	0.095	0.937
CSGOs$_{diff}$	730	0.155	0.141	0.000	0.113	1.352
FinOpen	730	1.805	2.674	0.044	1.023	28.971
Credit	713	0.939	0.549	0.088	0.957	2.321
Stock	728	0.706	0.545	0.010	0.558	3.289
Tover	727	0.742	0.610	0.002	0.604	4.974
GDP	730	9.520	1.193	6.018	9.986	11.509
GDPgrw	724	0.019	0.032	-0.117	0.020	0.162
TrdOpen	730	0.725	0.550	0.138	0.585	4.397
*md*SIZE$_{all}$	730	5.240	0.911	2.386	5.211	7.388
*n*FIRM$_{all}$	730	5.522	1.329	0.693	5.313	8.926
*md*Q$_{all}$	730	0.124	0.194	-0.582	0.099	1.513
*std*Q$_{all}$	730	0.199	0.868	-1.795	0.102	2.843
*md*SIZE$_{small}$	730	4.018	0.922	1.152	3.993	6.486
*n*FIRM$_{small}$	730	4.824	1.335	0.000	4.620	8.234
*md*Q$_{small}$	730	0.141	0.280	-0.758	0.117	1.916
*std*Q$_{small}$	729	0.337	0.951	-1.689	0.232	3.026
*md*SIZE$_{large}$	730	6.647	0.959	4.111	6.629	9.119
*n*FIRM$_{large}$	730	4.832	1.323	0.000	4.625	8.232
*md*Q$_{large}$	730	0.110	0.159	-0.444	0.087	1.193
*std*Q$_{large}$	729	-0.391	0.727	-2.441	-0.421	3.171
*md*SIZE$_{diff}$	730	-2.628	0.566	-4.146	-2.677	-0.908
*md*Q$_{diff}$	730	0.031	0.202	-0.735	0.025	1.479
*std*Q$_{diff}$	729	0.728	0.841	-3.190	0.660	4.481

Table 2 (cont.)

Panel B. Summary statistics – separately for country discounts and premiums

	when the signed $CSGOs_{all}$ is negative ("country discount"; n=352)		when the signed $CSGOs_{all}$ is positive ("country premium"; n=378)		p-value for difference in:	
	Mean	Median	Mean	Median	Mean	Median
$CSGOs_{all}$	0.147	0.119	0.134	0.102	(0.155)	(0.092)
$CSGOs_{small}$	0.204	0.164	0.174	0.126	(0.024)	(0.004)
$CSGOs_{large}$	0.118	0.099	0.121	0.091	(0.739)	(0.193)
$CSGOs_{diff}$	0.152	0.106	0.157	0.133	(0.596)	(0.126)

Table 3 Panel regressions of *CSGOs* on financial openness

This table presents the panel regression results of country-specific growth opportunities (***CSGOs***) in a country on the country's financial openness. The variables are defined in Table 2 caption. The subscript i in *md*SIZE$_i$, *n*FIRM$_i$, *md*Q$_i$, and *std*Q$_i$ corresponds to "all", "small", "large", or "diff". The sample period is from 1991 to 2012. Numbers in parentheses are the *p*-values that are adjusted by heteroscedasticity-consistent standard errors.

Panel A

	Dependent variable			
	CSGOs$_{all}$	***CSGOs***$_{small}$	***CSGOs***$_{large}$	***CSGOs***$_{diff}$
FinOpen	-0.004	-0.008	-0.005	-0.009
	(0.042)	(0.005)	(0.034)	(0.000)
Intercept	0.419	0.669	0.228	0.206
	(<.0001)	(<.0001)	(0.000)	(0.003)
Credit	-0.013	0.002	-0.009	0.010
	(0.311)	(0.896)	(0.349)	(0.441)
Stock	-0.013	-0.017	-0.010	-0.005
	(0.217)	(0.259)	(0.241)	(0.652)
Tover	-0.004	-0.039	0.026	-0.015
	(0.708)	(0.000)	(0.006)	(0.226)
GDP	-0.026	-0.027	-0.025	-0.005
	(<.0001)	(0.005)	(<.0001)	(0.381)
GDPgrw	-0.646	-0.358	-0.705	0.298
	(0.047)	(0.450)	(0.002)	(0.332)
TrdOpen	0.011	-0.020	0.041	-0.020
	(0.285)	(0.092)	(<.0001)	(0.045)
*md*SIZE$_i$	-0.002	-0.021	0.011	-0.044
	(0.710)	(0.036)	(0.053)	(0.000)
*n*FIRM$_i$	0.003	-0.010	0.008	-0.010
	(0.634)	(0.176)	(0.112)	(0.045)
*md*Q$_i$	0.222	0.169	0.220	-0.100
	(0.018)	(0.044)	(0.007)	(0.077)
*std*Q$_i$	-0.030	-0.052	0.014	-0.017
	(0.002)	(<.0001)	(0.229)	(0.009)
# of years	22	22	22	22
# of countries	39	39	39	39
R-squared	0.174	0.194	0.198	0.151
Year FE	YES	YES	YES	YES

Table 3 (cont.)

Panel B

	Dependent variable			
	$CSGOs_{all}$	$CSGOs_{small}$	$CSGOs_{large}$	$CSGOs_{diff}$
FinOpen (dummy for above median)	-0.102 (<.0001)	-0.126 (<.0001)	-0.089 (<.0001)	-0.045 (0.004)
Intercept	0.287 (<.0001)	0.502 (<.0001)	0.088 (0.154)	0.145 (0.042)
Credit	-0.017 (0.168)	-0.007 (0.702)	-0.016 (0.086)	-0.003 (0.803)
Stock	-0.006 (0.532)	-0.008 (0.568)	-0.002 (0.774)	-0.001 (0.903)
Tover	0.004 (0.684)	-0.030 (0.004)	0.032 (0.000)	-0.013 (0.329)
GDP	0.001 (0.851)	0.004 (0.720)	-0.001 (0.816)	0.002 (0.751)
GDPgrw	-0.700 (0.025)	-0.426 (0.359)	-0.743 (0.001)	0.273 (0.373)
TrdOpen	0.014 (0.122)	-0.019 (0.086)	0.043 (<.0001)	-0.030 (0.002)
$md\text{SIZE}_i$	-0.012 (0.073)	-0.032 (0.002)	0.006 (0.252)	-0.043 (<.0001)
$n\text{FIRM}_i$	-0.006 (0.294)	-0.018 (0.014)	0.002 (0.680)	-0.008 (0.110)
$md\text{Q}_i$	0.242 (0.005)	0.196 (0.015)	0.225 (0.002)	-0.085 (0.144)
$std\text{Q}_i$	-0.031 (0.001)	-0.057 (<.0001)	0.014 (0.168)	-0.018 (0.007)
# of years	22	22	22	22
# of countries	39	39	39	39
R-squared	0.239	0.242	0.266	0.149
Year FE	YES	YES	YES	YES

Table 3 (cont.)

Panel C

	Dependent variable			
	CSGOs$_{all}$	***CSGOs***$_{small}$	***CSGOs***$_{large}$	***CSGOs***$_{diff}$
FinOpen (dummy	-0.065	-0.077	-0.072	-0.069
for above q3)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
FinOpen (dummy	0.040	0.057	0.027	0.025
for below q1)	(0.056)	(0.058)	(0.068)	(0.209)
Intercept	0.252	0.447	0.066	0.069
	(0.002)	(<.0001)	(0.380)	(0.412)
Credit	-0.026	-0.017	-0.026	-0.012
	(0.042)	(0.336)	(0.009)	(0.339)
Stock	0.009	0.011	0.013	0.015
	(0.440)	(0.537)	(0.107)	(0.236)
Tover	-0.002	-0.038	0.029	-0.013
	(0.846)	(0.000)	(0.001)	(0.303)
GDP	-0.008	-0.005	-0.009	0.007
	(0.309)	(0.656)	(0.141)	(0.353)
GDPgrw	-0.722	-0.463	-0.769	0.226
	(0.031)	(0.350)	(0.001)	(0.472)
TrdOpen	0.020	-0.012	0.051	-0.017
	(0.044)	(0.328)	(<.0001)	(0.073)
*md*SIZE$_i$	-0.005	-0.024	0.011	-0.046
	(0.443)	(0.017)	(0.045)	(<.0001)
*n*FIRM$_i$	0.001	-0.010	0.007	-0.009
	(0.916)	(0.144)	(0.151)	(0.070)
*md*Q$_i$	0.221	0.173	0.215	-0.092
	(0.013)	(0.033)	(0.004)	(0.105)
*std*Q$_i$	-0.031	-0.056	0.013	-0.018
	(0.001)	(<.0001)	(0.244)	(0.007)
# of years	22	22	22	22
# of countries	39	39	39	39
R-squared	0.204	0.216	0.242	0.168
Year FE	YES	YES	YES	YES

Table 3 (cont.)

The table below reports the results of the regressions, which introduce a 0/1 dummy variable for the country-premium case and its interactive term with financial openness to the regressions in Panels A, B, and C. To save space, we only report the coefficients on the dummy, financial openness, and their interactive terms.

Panel D

	Dependent variable			
	CSGOs$_{all}$	***CSGOs***$_{small}$	***CSGOs***$_{large}$	***CSGOs***$_{diff}$
$D_{country\ premium}$ (A)	-0.028	0.026	-0.058	-0.129
	(0.725)	(0.789)	(0.482)	(0.306)
FinOpen (B)	-0.001	-0.002	-0.001	-0.008
	(0.771)	(0.669)	(0.727)	(0.032)
A * B	-0.001	-0.003	-0.004	0.005
	(0.779)	(0.692)	(0.343)	(0.385)
$D_{country\ premium}$ (A)	-0.045	-0.019	-0.037	-0.178
	(0.578)	(0.846)	(0.670)	(0.160)
FinOpen (dummy for above median; C)	-0.048	-0.048	-0.046	-0.056
	(<.0001)	(0.001)	(0.000)	(0.001)
A * C	0.021	0.000	0.022	0.014
	(0.205)	(0.997)	(0.204)	(0.614)
$D_{country\ premium}$ (A)	-0.094	-0.113	-0.131	-0.357
	(0.345)	(0.359)	(0.194)	(0.021)
FinOpen (dummy for above q3; D)	-0.033	-0.046	-0.033	-0.054
	(0.008)	(0.005)	(0.002)	(0.002)
A * D	0.010	0.011	-0.008	-0.017
	(0.533)	(0.584)	(0.596)	(0.464)
FinOpen (dummy for below q1; E)	0.008	-0.005	0.001	-0.004
	(0.562)	(0.779)	(0.910)	(0.847)
A * E	0.026	0.059	0.024	0.063
	(0.271)	(0.067)	(0.259)	(0.111)

Table 4 Panel regressions of changes in *CSGOs* on changes in financial openness

This table presents the panel regression results of changes in country-specific growth opportunities (***CSGOs***) in a country on changes in the country's financial openness. Unlike Table 3, this regression analysis employs the country fixed-effects (Panels A and B, respectively). The variables are defined in Table 2 caption and their first differences at annual frequencies are used. The subscript i in *md*SIZE$_i$, *n*FIRM$_i$, *md*Q$_i$, and *std*Q$_i$ corresponds to "all", "small", "large", or "diff". The sample period is from 1991 to 2012. Numbers in parentheses are the *p*-values that are adjusted by heteroscedasticity-consistent standard errors.

Panel A

	Dependent variable			
	Δ*CSGOs*$_{all}$	**Δ*CSGOs*$_{small}$**	**Δ*CSGOs*$_{large}$**	**Δ*CSGOs*$_{diff}$**
Δ*FinOpen*	-0.028	-0.042	-0.013	-0.020
	(0.004)	(0.002)	(0.188)	(0.017)
Δ*Credit*	0.015	-0.007	0.004	-0.039
	(0.646)	(0.892)	(0.927)	(0.349)
Δ*Stock*	0.001	0.049	0.006	0.044
	(0.957)	(0.098)	(0.777)	(0.045)
Δ*Tover*	0.001	0.021	0.006	0.039
	(0.938)	(0.298)	(0.619)	(0.017)
Δ*GDP*	0.107	0.108	0.134	-0.053
	(0.159)	(0.234)	(0.015)	(0.404)
Δ*GDPgrw*	-0.576	-0.427	-0.464	-0.144
	(0.001)	(0.040)	(0.001)	(0.366)
Δ*TrdOpen*	0.126	0.145	0.134	-0.037
	(0.127)	(0.224)	(0.028)	(0.736)
Δ*md*SIZE$_i$	-0.016	-0.079	-0.070	-0.057
	(0.651)	(0.071)	(0.066)	(0.018)
Δ*n*FIRM$_i$	0.007	-0.066	-0.034	0.065
	(0.908)	(0.496)	(0.427)	(0.205)
Δ*md*Q$_i$	0.504	0.369	0.365	0.045
	(<.0001)	(0.000)	(<.0001)	(0.508)
Δ*std*Q$_i$	-0.010	-0.034	0.033	-0.017
	(0.285)	(0.007)	(0.083)	(0.094)
# of years	21	21	21	21
# of countries	39	39	39	39
R-squared	0.365	0.267	0.306	0.102
Year FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES

Table 4 (cont.)

The table below reports the results of the regressions, which introduce a 0/1 dummy variable for the country-premium case and its interactive term with financial openness to the regressions in Panels A. To save space, we only report the coefficients on the dummy, financial openness, and their interactive terms.

Panel B

	Dependent variable			
	$\Delta CSGOs_{all}$	$\Delta CSGOs_{small}$	$\Delta CSGOs_{large}$	$\Delta CSGOs_{diff}$
$D_{\Delta \text{ signed } CSGOs(all)>0}$ (A)	-0.064	-0.062	-0.039	0.006
	(<.0001)	(0.001)	(<.0001)	(0.588)
$\Delta FinOpen$ (B)	-0.057	-0.087	-0.025	-0.039
	(0.011)	(0.006)	(0.171)	(0.037)
A * B	0.048	0.074	0.020	0.031
	(0.020)	(0.020)	(0.297)	(0.130)

Table 5 Summary statistics of industry-specific growth opportunities (*ISGOs*)

This table reports summary statistics of the industry-specific growth opportunities (***ISGOs***) that are re-computed for each country. To compute $\boldsymbol{ISGOs_{all}}$ for a country, in each year within a country, we first compute the fraction of its firms that belong to each of the industries in the country and then use those fractions as weights to compute the weighted average ***ISGOs*** (the γi estimates from Eq. (1)) within the country. For the ***ISGOs*** of small (i.e., $\boldsymbol{ISGOs_{small}}$) and large firms (i.e., $\boldsymbol{ISGOs_{large}}$) and their difference (i.e., $\boldsymbol{ISGOs_{diff}}$), we use the estimates of Eq. (2), namely, $\gamma_{i,small}$ and $\gamma_{i,large}$, and use as weights the fraction of small or large firms in each industry; we then take the weighted average of ***ISGOs***. See Section 4.1 for details. The sample period is 1991-2012.

Variable	N	Mean	Std Dev	Min	Median	Max
$\boldsymbol{ISGOs}_{\text{all}}$	730	0.154	0.042	0.067	0.149	0.387
$\boldsymbol{ISGOs}_{\text{small}}$	730	0.151	0.050	0.047	0.142	0.490
$\boldsymbol{ISGOs}_{\text{large}}$	730	0.174	0.041	0.081	0.168	0.356
$\boldsymbol{ISGOs}_{\text{diff}}$	730	0.080	0.017	0.035	0.080	0.139

Table 6 Panel regressions of *ISGOs* on financial openness

This table presents the panel regression results of industry-specific growth opportunities (***ISGOs***) in a country on the country's financial openness. $\boldsymbol{ISGOS}_{all}$, $\boldsymbol{ISGOS}_{small}$, $\boldsymbol{ISGOS}_{large}$, and $\boldsymbol{ISGOS}_{diff}$ are defined as in the caption of Table 5 and in Section 4.1. The subscript i in $md\text{SIZE}_i$, $n\text{FIRM}_i$, $md\text{Q}_i$, and $std\text{Q}_i$ corresponds to "all", "small", "large", or "diff". The independent variables are defined in the caption of Table 2. The sample period is fro m1991 to 2012. Numbers in parentheses are the *p*-values that are adjusted by heteroscedasticity-consistent standard errors.

Panel A

	Dependent variable			
	$\boldsymbol{ISGOs}_{all}$	$\boldsymbol{ISGOs}_{small}$	$\boldsymbol{ISGOs}_{large}$	$\boldsymbol{ISGOs}_{diff}$
FinOpen	0.001	0.002	-0.001	0.000
	(0.027)	(0.010)	(0.000)	(0.132)
Intercept	0.112	0.078	0.129	0.057
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Credit	-0.007	-0.011	-0.004	-0.003
	(0.003)	(0.000)	(0.249)	(0.008)
Stock	0.008	0.009	0.006	0.002
	(<.0001)	(0.001)	(0.004)	(0.035)
Tover	0.003	0.006	0.001	0.000
	(0.047)	(0.001)	(0.543)	(0.667)
GDP	0.004	0.004	-0.001	0.001
	(0.000)	(0.006)	(0.375)	(0.016)
GDPgrw	0.019	0.038	-0.030	0.061
	(0.603)	(0.446)	(0.618)	(0.005)
TrdOpen	-0.013	-0.011	-0.010	-0.006
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
$md\text{SIZE}_i$	-0.004	-0.004	0.011	-0.004
	(0.011)	(0.002)	(<.0001)	(0.001)
$n\text{FIRM}_i$	0.000	0.006	-0.005	0.001
	(0.845)	(<.0001)	(0.001)	(0.280)
$md\text{Q}_i$	-0.009	0.009	-0.045	-0.011
	(0.271)	(0.315)	(<.0001)	(0.001)
$std\text{Q}_i$	0.004	0.003	0.014	0.001
	(0.012)	(0.164)	(<.0001)	(0.025)
# of years	22	22	22	22
# of countries	39	39	39	39
R-squared	0.713	0.640	0.574	0.424
Year FE	YES	YES	YES	YES

Table 6 (cont.)

Panel B

	Dependent variable			
	ISGOs$_{all}$	***ISGOs***$_{small}$	***ISGOs***$_{large}$	***ISGOs***$_{diff}$
FinOpen (dummy	0.007	0.014	-0.001	0.001
for above median)	(0.005)	(0.001)	(0.836)	(0.340)
Intercept	0.121	0.097	0.130	0.060
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Credit	-0.005	-0.007	-0.006	-0.004
	(0.029)	(0.014)	(0.049)	(0.002)
Stock	0.008	0.008	0.007	0.002
	(<.0001)	(0.005)	(0.001)	(0.041)
Tover	0.002	0.005	0.002	0.000
	(0.110)	(0.006)	(0.398)	(0.749)
GDP	0.002	0.001	-0.002	0.001
	(0.066)	(0.565)	(0.277)	(0.114)
GDPgrw	0.017	0.042	-0.023	0.062
	(0.621)	(0.398)	(0.708)	(0.005)
TrdOpen	-0.012	-0.009	-0.013	-0.007
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
*md*SIZE$_i$	-0.003	-0.004	0.011	-0.003
	(0.033)	(0.011)	(<.0001)	(0.006)
*n*FIRM$_i$	0.000	0.005	-0.004	0.001
	(0.939)	(<.0001)	(0.008)	(0.110)
*md*Q$_i$	-0.010	0.007	-0.047	-0.012
	(0.222)	(0.454)	(<.0001)	(0.000)
*std*Q$_i$	0.005	0.004	0.013	0.001
	(0.002)	(0.044)	(<.0001)	(0.020)
# of years	22	22	22	22
# of countries	39	39	39	39
R-squared	0.712	0.641	0.569	0.424
Year FE	YES	YES	YES	YES

Table 6 (cont.)

Panel C

	Dependent variable			
	ISGOs$_{all}$	***ISGOs***$_{small}$	***ISGOs***$_{large}$	***ISGOs***$_{diff}$
FinOpen (dummy	0.007	0.017	-0.003	-0.002
for above q3)	(0.003)	<.0001	(0.198)	(0.135)
FinOpen (dummy	0.003	-0.008	0.018	0.002
for below q1)	(0.288)	(0.042)	(<.0001)	(0.339)
Intercept	0.113	0.117	0.085	0.050
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Credit	-0.004	-0.005	-0.006	-0.004
	(0.127)	(0.087)	(0.067)	(0.001)
Stock	0.007	0.004	0.010	0.003
	(0.000)	(0.185)	(<.0001)	(0.006)
Tover	0.002	0.005	0.001	0.000
	(0.107)	(0.003)	(0.649)	(0.630)
GDP	0.004	0.000	0.003	0.002
	(0.003)	(0.954)	(0.099)	(0.005)
GDPgrw	0.016	0.054	-0.043	0.058
	(0.665)	(0.287)	(0.505)	(0.008)
TrdOpen	-0.013	-0.012	-0.011	-0.006
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
*md*SIZE$_i$	-0.004	-0.004	0.010	-0.004
	(0.012)	(0.003)	(<.0001)	(0.001)
*n*FIRM$_i$	-0.001	0.005	-0.004	0.001
	(0.570)	(<.0001)	(0.001)	(0.258)
*md*Q$_i$	-0.009	0.009	-0.051	-0.010
	(0.271)	(0.328)	(<.0001)	(0.001)
*std*Q$_i$	0.005	0.004	0.014	0.001
	(0.003)	(0.054)	(<.0001)	(0.030)
# of years	22	22	22	22
# of countries	39	39	39	39
R-squared	0.713	0.647	0.587	0.426
Year FE	YES	YES	YES	YES

Table 7 Panel regressions of changes in *ISGOs* on changes in financial openness

This table presents the panel regression results of changes in industry-specific growth opportunities (***ISGOs***) in a country on changes in the country's financial openness. Unlike Table 6, this regression analysis employs the country fixed-effects, with or without the year fixed-effects (Panels A and B, respectively). $\boldsymbol{ISGOS}_{all}$, $\boldsymbol{ISGOS}_{small}$, $\boldsymbol{ISGOS}_{large}$, and $\boldsymbol{ISGOS}_{diff}$ are defined as in the caption of Table 5 and in Section 4.1. The independent variables are defined in the caption of Table 2. The sample period is from 1991 to 2012. Numbers in parentheses are p-values adjusted by heteroscedasticity-consistent standard errors.

	Dependent variable			
	$\Delta\boldsymbol{ISGOs}_{all}$	$\Delta\boldsymbol{ISGOs}_{small}$	$\Delta\boldsymbol{ISGOs}_{large}$	$\Delta\boldsymbol{ISGOs}_{diff}$
Δ*FinOpen*	0.004	0.006	-0.001	-0.003
	(0.037)	(0.014)	(0.819)	(0.051)
Δ*Credit*	0.008	0.004	0.009	0.001
	(0.396)	(0.793)	(0.358)	(0.845)
Δ*Stock*	0.004	0.006	0.001	0.002
	(0.529)	(0.335)	(0.767)	(0.422)
Δ*Tover*	-0.003	-0.005	-0.001	0.003
	(0.097)	(0.143)	(0.585)	(0.123)
Δ*GDP*	-0.003	0.004	-0.014	-0.009
	(0.788)	(0.792)	(0.137)	(0.189)
Δ*GDPgrw*	-0.015	-0.033	-0.003	0.015
	(0.515)	(0.377)	(0.905)	(0.452)
Δ*TrdOpen*	0.013	0.020	0.014	0.004
	(0.466)	(0.330)	(0.212)	(0.647)
Δ*md*SIZE$_i$	0.006	0.004	0.014	-0.006
	(0.248)	(0.479)	(0.001)	(0.047)
Δ*n*FIRM$_i$	0.016	0.026	0.015	0.004
	(0.166)	(0.180)	(0.100)	(0.540)
Δ*md*Q$_i$	0.000	0.012	-0.012	-0.001
	(0.960)	(0.220)	(0.158)	(0.882)
Δ*std*Q$_i$	0.003	0.002	0.005	-0.001
	(0.008)	(0.278)	(0.002)	(0.090)
# of years	21	21	21	21
# of countries	39	39	39	39
R-squared	0.851	0.717	0.821	0.424
Year FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES

Table 8 Panel regressions of changes in *CSGOs (ISGOs*) on changes in VIX

This table presents the panel regression results of changes in industry-specific growth opportunities (***ISGOs***) in a country on changes in VIX index along with other regressors including the changes in the country's financial openness. This regression analysis employs the country fixed-effects only without the year fixed-effects. All variables are the same as those in Table 7, except *negVIX*, which is the negative value of the average VIX during a year. Its annual change is denoted by Δ*negVIX* in the table. The sample period is from 1991 to 2012. Numbers in parentheses are the *p*-values that are adjusted by heteroscedasticity-consistent standard errors.

	$\Delta CSGOs_{small}$	$\Delta ISGOs_{small}$	$\Delta CSGOs_{large}$	$\Delta ISGOs_{large}$	$\Delta CSGOs_{diff}$	$\Delta ISGOs_{diff}$
Δ*FinOpen*	-0.039	0.006	-0.017	0.002	-0.019	-0.002
	(0.011)	(0.115)	(0.088)	(0.329)	(0.012)	(0.029)
Δ*negVIX*	-0.129	0.213	-0.297	0.219	0.055	0.040
	(0.343)	<.0001	(0.001)	<.0001	(0.495)	(0.000)
Intercept	0.022	-0.008	0.003	0.008	0.012	0.002
	(0.684)	(0.420)	(0.964)	(0.365)	(0.774)	(0.705)
Δ*Credit*	-0.014	-0.008	-0.001	0.013	-0.041	0.003
	(0.773)	(0.776)	(0.983)	(0.305)	(0.264)	(0.575)
Δ*Stock*	0.072	0.033	-0.005	0.025	0.051	0.005
	(0.009)	(0.000)	(0.816)	<.0001	(0.006)	(0.027)
Δ*Tover*	0.012	-0.014	-0.004	-0.003	0.036	0.002
	(0.495)	(0.005)	(0.760)	(0.335)	(0.013)	(0.148)
Δ*GDP*	0.060	0.037	0.067	0.014	-0.048	-0.018
	(0.396)	(0.014)	(0.152)	(0.160)	(0.208)	<.0001
Δ*GDPgrw*	-0.476	-0.050	-0.351	-0.002	-0.185	0.043
	(0.010)	(0.271)	(0.005)	(0.950)	(0.186)	(0.013)
Δ*TrdOpen*	0.050	-0.034	0.107	0.014	-0.072	-0.002
	(0.545)	(0.158)	(0.039)	(0.306)	(0.304)	(0.682)
Δ*md*SIZE$_i$	-0.075	0.003	-0.064	0.013	-0.057	-0.005
	(0.053)	(0.693)	(0.102)	(0.058)	(0.012)	(0.090)
Δ*n*FIRM$_i$	-0.042	0.030	-0.059	0.039	0.064	0.008
	(0.646)	(0.186)	(0.182)	(0.005)	(0.155)	(0.092)
Δ*md*Q$_i$	0.342	0.009	0.324	0.005	0.046	-0.002
	(0.001)	(0.337)	(0.000)	(0.622)	(0.508)	(0.620)
Δ*std*Q$_i$	-0.024	0.012	0.038	0.017	-0.015	-0.001
	(0.067)	<.0001	(0.027)	<.0001	(0.134)	(0.110)
# of years	21	21	21	21	21	21
# of countries	39	39	39	39	39	39
R-squared	0.227	0.325	0.254	0.490	0.089	0.107
Year FE	NO	NO	NO	NO	NO	NO
Country FE	YES	YES	YES	YES	YES	YES

Table 9 Investment-q regressions with decomposed q-ratios

This table presents the panel regression results of corporate investment rate on the decomposed q-ratios, cashflow, and firm size. All variables are de-meaned by the firm's own average and the year-by-year (within a country) mean value. The decomposition is conducted by Eq. (2). The investment rate, cashflow, and firm size variables are also truncated at the 1st and 99th percentiles. The sample period is from 1991 to 2012. Numbers in parentheses are the *p*-values that are adjusted by heteroscedasticity-consistent standard errors.

	Dependent variable: (Total assets$_t$ – total assets$_{t-1}$) / total assets$_{t-1}$									
	Model (1) (full sample)		Model (2) (full sample)		Model (2) (sub-sample: D_{open}=0)		Model (2) (sub-sample: D_{open}=1)		Model (3) (full sample)	
	Coeff	(p-val)	Coeff	(p-val)	Coeff	(p-val)	Coeff	(p-val)	Coeff	(p-val)
Intercept	-0.547	(<.0001)	-0.502	(<.0001)	-0.528	(<.0001)	-0.479	(<.0001)	-0.528	(<.0001)
D_{small}			-0.125	(<.0001)	-0.095	(<.0001)	-0.154	(<.0001)	-0.095	(<.0001)
D_{open}									0.049	(0.023)
D_{small}*D_{open}									-0.058	(0.053)
*G*q	0.154	(<.0001)	0.271	(<.0001)	0.236	(<.0001)	0.294	(<.0001)	0.236	(<.0001)
*G*q*D_{small}			-0.190	(0.000)	-0.161	(0.024)	-0.210	(0.002)	-0.161	(0.024)
*G*q*D_{open}									0.058	(0.444)
*G*q*D_{small}*D_{open}									-0.049	(0.620)
*C*q	0.148	(<.0001)	0.150	(<.0001)	0.137	(<.0001)	0.163	(<.0001)	0.137	(<.0001)
*C*q*D_{small}			0.015	(0.006)	0.039	(<.0001)	-0.006	(0.450)	0.039	(<.0001)
*C*q*D_{open}									0.026	(0.002)
*C*q*D_{small}*D_{open}									-0.045	(<.0001)
*I*q	0.188	(<.0001)	0.231	(<.0001)	0.239	(<.0001)	0.223	(<.0001)	0.239	(<.0001)
*I*q*D_{small}			-0.078	(<.0001)	-0.105	(<.0001)	-0.052	(0.001)	-0.105	(<.0001)
*I*q*D_{open}									-0.016	(0.321)
*I*q*D_{small}*D_{open}									0.053	(0.022)
*F*q	0.133	(<.0001)	0.160	(<.0001)	0.175	(<.0001)	0.145	(<.0001)	0.175	(<.0001)
*F*q*D_{small}			-0.045	(<.0001)	-0.055	(<.0001)	-0.036	(<.0001)	-0.055	(<.0001)
*F*q*D_{open}									-0.030	(<.0001)
*F*q*D_{small}*D_{open}									0.019	(0.034)

cf	0.558	(<.0001)	0.759	(<.0001)	0.726	(<.0001)	0.798	(<.0001)	0.726	(<.0001)
$cf*D_{small}$			-0.305	(<.0001)	-0.294	(<.0001)	-0.322	(<.0001)	-0.294	(<.0001)
$cf*D_{open}$									0.071	(0.028)
$cf*D_{small}*D_{open}$									-0.028	(0.465)
sz	-0.095	(<.0001)	-0.097	(<.0001)	-0.100	(<.0001)	-0.093	(<.0001)	-0.100	(<.0001)
D_{small}			-0.005	(0.000)	-0.001	(0.685)	-0.010	(<.0001)	-0.001	(0.685)
$sz*D_{open}$									0.007	(<.0001)
$sz*D_{small}*D_{open}$									-0.009	(0.002)
Adj R^2	0.128		0.134		0.134		0.135		0.135	
# obs.	377,316		377,316		181,448		195,868		377,316	

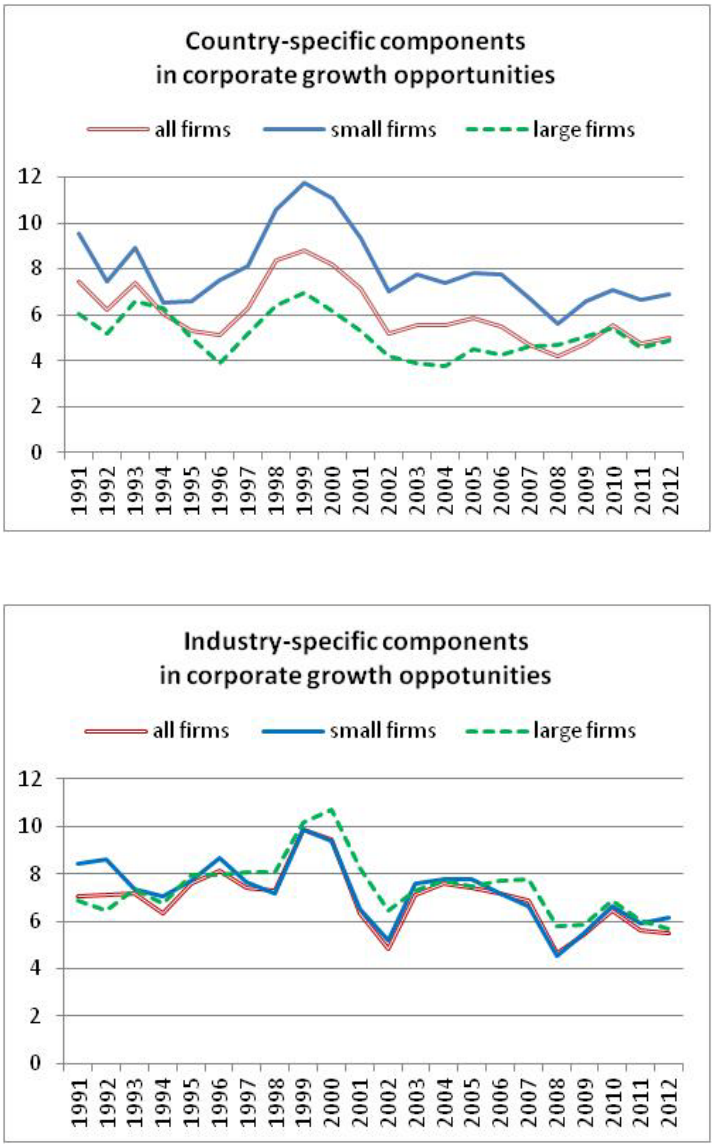
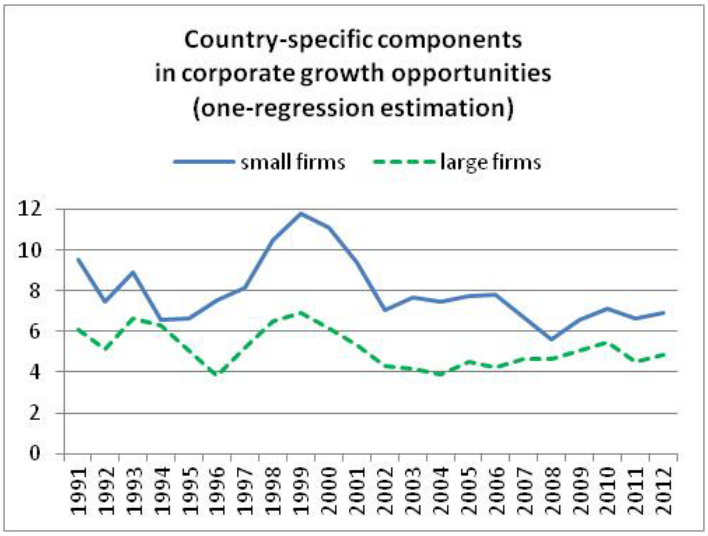


Figure 1. Country- and industry-specific components in corporate growth opportunities

Small and large firms are defined each year within a country by the median asset size. The country-specific growth opportunities (top panel) are the sum across 40 sample countries, while the industry-specific growth opportunities (bottom panel) are the sum across 47 sample industries. The sample period is from 1991 to 2012.



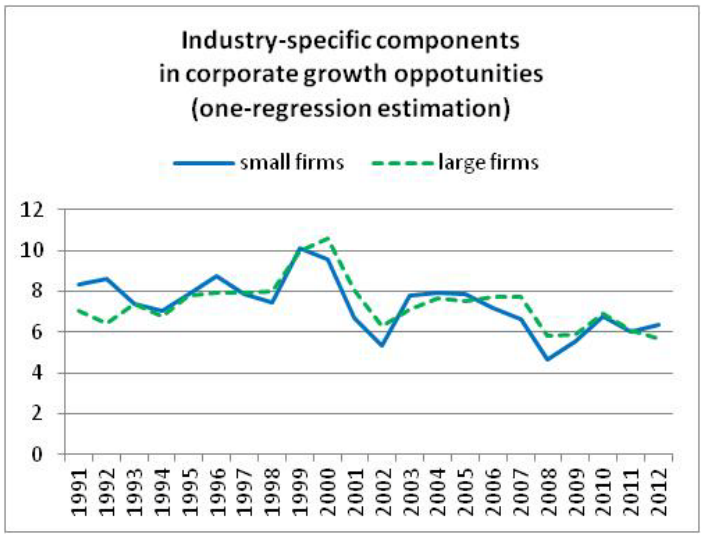


Figure 2. Country- and industry-specific components in corporate growth opportunities: Estimated by one regression

Small and large firms are defined each year within a country by the median asset size. The country-specific growth opportunities (top panel) are the sum across 40 sample countries, while the industry-specific growth opportunities (bottom panel) are the sum across 47 sample industries. The sample period is from 1991 to 2012.