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Do Investors Value Cash Flow Stability of Listed Infrastructure Funds?

FLORIAN BITSCH

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Do Investors Value Cash Flow Stability of Listed Infrastructure Funds?*

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Do Investors Value Cash Flow Stability of Listed Infrastructure Funds?

Abstract

I analyze cash flow characteristics of listed infrastructure investment companies and funds and compare this unique infrastructure sample with a non-infrastructure reference group. I confirm that infrastructure investment provide more stable cash flows than non-infrastructure investments. However, I do not find that investors positively value this cash flow stability. Instead, more volatile cash flows are valued with a premium. On the other hand, earnings management proxied by accrual volatility is valued with a discount. My paper offers evidence that higher infrastructure investments in general are valued with a positive 'infrastructure premium' that is not driven by more stable cash flows. I find additional indications that transparent financial and governance structures as well as regulatory risk play a significant role for the valuation of infrastructure investment companies and funds.

Keywords: infrastructure funds, cash flow volatility

JEL Classification: G23, G24

1 Introduction

I analyze cash flow characteristics of listed infrastructure investment companies and funds and compare this unique infrastructure sample with a non-infrastructure reference group. I confirm that infrastructure investment provide more stable cash flows than non-infrastructure investments. However, I do not find that investors positively value this cash flow stability. Instead, more volatile cash flows are valued with a premium. On the other hand, earnings management proxied by accrual volatility is valued with a discount. My paper offers evidence that higher infrastructure investments in general are valued with a positive 'infrastructure premium' that is not driven by more stable cash flows. I find additional indications that transparent financial and governance structures as well as regulatory risk play a significant role for the valuation of infrastructure investment companies and funds.

Numerous studies have described and analyzed the so-called infrastructure investment gap. This term describes the fact that globally the demand for infrastructure investments significantly exceeds the volume of financing available (*e.g.* see OECD (2007), p. 14 ff.). Given financial constraints of the public sector that has served as the major financing source for infrastructure assets so far, alternative financing sources need to be developed.

The solution most often stated is to facilitate investments and thus get the money from the private sector to narrow the investment gap (Chew (2011), p. 2). Although the market for infrastructure investments has developed in recent years, it is still not clear what exactly characterizes financing of and investment in infrastructure assets and thus if they would attract private investors sufficiently at all. For example, infrastructure investments are said to offer long-term, stable and predictable, inflation-linked returns with low correlation to other assets as well as stable operating cash flows (see *e.g.* Inderst (2009) and Inderst (2010), Lawrence and Stapledon (2008)).

Literature on infrastructure investments can be grouped into four categories (Bitsch et al. (2010)). Empirical studies on direct unlisted (*i.e.* not publicly traded) investments such as public-private-partnerships (PPP) and project finance vehicles include Välilä (2005), Esty (2003) and Esty (2010), respectively. Empirical studies on direct listed investments such as infrastructure stocks and bonds include Rothballer and Kaserer (2011), Roedel and Rothballer (2011) and Sawant (2010a). They find that infrastructure compared to non-infrastructure stocks have significantly lower

systematic risk, higher firm-specific risk, but do not provide any significant inflation linkage and thus inflation hedge for investors. However, infrastructure project bonds show more stable cash flows compared to equities and a low correlation with them.

Bitsch et al. (2010) is the first paper that empirically analyzes infrastructure investments by unlisted private equity funds representing unlisted indirect investments. They were also the first to analyze the stability of total cash flows in an infrastructure context. The result was that there is no significant difference between infrastructure and non-infrastructure investments, which could be caused by the peculiarities of private equity investments and therefore not be representative for the overall infrastructure market as the authors suggest.[1] This paper contributes to the existing literature as it analyzes operating cash flow variability of listed infrastructure funds. They represent the fourth category, listed indirect investments. There exist only a few studies that focus on corporate governance issues of listed infrastructure funds. These studies mainly focus on Australia (see Davis (2008), or Lawrence and Stapledon (2008)). However, no extensive neither global empirical analysis exists so far. Reasons for this include the fact that private investments into infrastructure in general are a rather new phenomenon, infrastructure research is a rather emerging field and data is simply rare or not easily accessible.

I contribute to extant research using a unique global sample of 120 listed infrastructure investment companies and funds. By integrating an international sample of listed private equity (LPE) used in Lahr and Herschke (2009), I am able to compare effects for the infrastructure *vs.* non-infrastructure universe.

Studies on capital allocation decisions show on average that investors value smooth cash flows positively (*e.g.* Lang et al. (2003a), Badrinath et al. (1989) or Trueman and Titman (1988)). In particular, Rountree et al. (2008) show for a sample of US listed firms that earnings smoothness is associated with superior firm valuation. Also if decomposing earnings, they show that smoothness of the cash flow as well as the accruals component of earnings positively affects firm value measured based on Tobin's q. However, investors discriminate between the components and focus on cash flow volatility but ignore accrual volatility.

Evidence on valuation and cash flow characteristics as well as earnings smoothness is of particular interest in the context of the valuation of infrastructure funds.

[1] Another reason could be data-driven, since their data set contained total cash flows only and did not allow disentangling between operating and non-operating cash flows.

Infrastructure is generally assumed to differ not only in operating and risk characteristics, but also to provide a high degree of stable and thus predictable operating cash flows (see *e.g.* Davis (2008), Inderst (2009) and Inderst (2010), Lawrence and Stapledon (2008)). However, the relationship between infrastructure funds and cash flow smoothness has not been tested empirically up to date.

This paper contributes to this research gap as I find no significant difference between the volatility of net income. However, decomposing net income into the cash flow and accrual component, I find that infrastructure investments offer significantly lower volatilities of operating cash flows, which is consistent with the general assumption. In a next step, I analyze if and to what extent investors price cash flow volatility at all. Evidence suggests that

i) volatility of net income is not associated with valuation levels. Instead, investors clearly discriminate between the volatility of cash flow and accrual component of earnings which is consistent to Rountree et al. (2008).

ii) Investors value volatility of the cash flow component with a premium but

iii) volatility of the accrual component with a discount.

A positive impact of cash flow volatility on valuation is contrary to Rountree et al. (2008). However, my empirical evidence is by and large in line with theoretical considerations on cash flow volatility. Following Merton (1974) and viewing equity as a call option on firm value, cash flow volatility should indeed add firm value as my results suggest. Chi and Wu (2010) document this positive relation also in an empirical study for a sample of US listed firms. They find that cash flow volatility is associated with an economically significant increase in firm value and thus support my results. Following Leuz et al. (2003), I link accrual volatility to earnings management. Based on agency theory, managers have an incentive to engage in opportunistic earnings management (*e.g.* Leuz et al. (2003), Healy and Wahlen (1999)). By gaining private benefits of control at the expense of investors, this action is valued negatively as my results suggest.

Additionally, I find that investors value infrastructure funds with a general infrastructure premium. Although I cannot find the economics for this premium, I can rule out smoother cash flows as main driver. I also link my results to further transparency implications and address sector-specific valuation levels within the infrastructure context.

The paper is organized as follows: Section 2 describes the sample composition and gives details on construction of variables and descriptive statistics. In Section 3 I present results from my multivariate analyzes of valuation of cash flow volatility. Section 4 investigates further results on corporate governance and infrastructure specifics, while Section 5 concludes.

2 Data description

2.1 Sample composition

My sample consists of listed (*i.e.* publicly traded) infrastructure investment vehicles (IIVs). It is based on the universe of global infrastructure equities as described in Rothballer and Kaserer (2011).[2] Out of this sample, I select all vehicles that have as a business model to pool money from investors in order to invest into and manage a portfolio of infrastructure assets. The underlying assets must be primarily non-public companies. Thus, an IIV provides the investor with the opportunity to directly participate in a portfolio of non-public infrastructure assets.

Thereby, I derive a sample of 120 infrastructure investment vehicles with a majority having their primary listing in the USA (33.3%), Canada (29.2%), Australia or New Zealand (13.3%) and the UK (11.7%). The remaining sample is listed in the rest of the world including countries such as Brazil, India or Korea (12.5%). Following Lahr and Herschke (2009), I can split the whole sample of *infrastructure investment vehicles (IIVs)* into internally and externally managed vehicles, which I call *infrastructure investment companies (IICs)* and *infrastructure investment funds (IIFs)*, respectively. This gives 45 IICs and 75 IIFs. Figure 1 gives a schematic overview of this classification and lists a few examples for each category.

Insert Figure 1 about here.

Hereby, I refer to an externally managed vehicle if it contracts out management functions. A well-known example is the so called "infrastructure fund model"[3] or the "... asset-manager model for infrastructure, where a sponsoring manager - usually but not always an investment bank - establishes a separate publicly traded en-

[2] Additionally, I also screened the universe of select financials (SIC codes starting with 67, GICS code 4020, Diversified Financials) as well as the oil and gas sector (SIC codes starting with 13, GICS code 101020) backed by an ongoing news search primarily at www.infrastructureinvestor.com.

[3] Davis (2008), p. 2.

tity to own infrastructure assets while contracting out management functions to the sponsor..."[4] to which the entity pays fees. These fees mostly consist of a base or management and a performance fee. However, the fee can also be a fixed amount written down in a management agreement or include payments to the general partner in case of a limited partnership. Opposite to that, an internally managed vehicle invests into a portfolio of infrastructure assets with no payments to external management. This means they employ their own managers. IICs can be hard to distinguish from operating infrastructure companies and therefore have to make clear statements regarding their business model, for example "... [our] principal objective is to generate substantial capital growth for investors by investing principally in high quality ... infrastructure assets, providing ... sustainable cash flows over the long term...." [5]

To be able to identify infrastructure-specific characteristics, I include the sample of listed private equity vehicles (LPE) used in Lahr and Herschke (2009) and Kaserer et al. (2010). Due to the analogous structure of internally managed investment companies *vs.* externally managed investment funds, I can control for fund and management structure and thus compare effects between the infrastructure (infra) and non-infrastructure (non-infra) subsamples. Also Davis (2008) as well as Lawrence and Stapledon (2008) point out similarities between listed private equity and infrastructure investment vehicles.[6] This adds 240 vehicles to the sample of which 164 are internally and 76 externally managed.

2.2 Variables and descriptive statistics

Because I am primarily interested in the valuation of cash flow volatility, I first derive the measures of cash flow and its volatility. I decompose annual net income (NI) into its two components operating cash flow (CF), from now on simply called cash flow, and accruals (ACC). After standardizing net income and cash flow by total assets, accruals are calculated for year t as the difference between net income and operating cash flows following Dechow and Dichev (2002):

$$ACC_t = NI_t - CF_t$$

[4] Lawrence and Stapledon (2008), p. 4.
[5] http://www.eredene.com/approach/investment-policy
[6] See Davis (2008), p. 4, or Lawrence and Stapledon (2008), p. 6 f.

The standard deviation of the yearly data for $t \in [2000, ...2010]$ proxies for volatility for each vehicle in the sample and thus gives the volatility of net income, *vola(NI)*, volatility of cash flow, *vola(CF)*, and volatility of accruals, *vola(ACC)*. Only those year observations are considered for which there exists i) a matching pair observation for NI and CF as well as ii) a minimum of three subsequent year observations.

Insert Table and 2 about here.

Table 1 in the Appendix provides detailed information on how each variable is derived and calculated. Table 2 shows the descriptive statistics for the volatility of net income, cash flow and accruals for the total as well as the two infra-/non-infra subsamples. The volatility of net income *vola(NI)* does not differ significantly between the infra and non-infra subsamples with standard deviations of 0.29 and 0.28, respectively. Similar holds for the volatility for both subsamples of accruals *vola(ACC)*, which is on a comparable level with standard deviations of 0.27 and 0.25, respectively. The volatility of cash flows *vola(CF)*, however, shows a different relation. I find that with a standard deviation of 0.07, it is significantly lower for IIVs than for the non-infrastructure subsample with a standard deviation of 0.14.[7] This result is consistent with the common assumption about cash flow stability of infrastructure investments as suggested by prior literature (*e.g.* Inderst (2009), Inderst (2010) and Lawrence and Stapledon (2008)). Being on average less than half of accruals volatility, cash flow volatility forms also the smaller component of total net income volatility.

Due to the fact that I have an unbalanced panel and that I calculate one measure of cash flow volatility per vehicle over the whole period, I reduce the sample to cross-sectional observations. Accordingly, I calculate the mean of the standardized net income, cash flow and accrual over all available years between 2000 and 2010 for each vehicle to derive *NI*, *CF* and *ACC*. The descriptive statistics provided in Table 2 indicate on average negative accruals that do not differ significantly between the infra and non-infra subsample. However, IIVs offer significantly higher and positive cash flows than non-infra vehicles over the sample period. *Corr(CF, ACC)* gives the correlation between cash flows and accruals over all periods per vehicle. The coefficient is -0.36 for the whole sample and does not differ significantly between the two subsamples.

[7] For comparison, Francis et al. (2004), p. 986, report an average cash flow volatility of 0.074 for a large sample of listed US firms between 1975 and 2001, Dechow and Dichev (2002) a standard deviation of 0.06 between 1987 and 1999.

Following the same procedure, I also calculate the mean of all accounting observations such as Tobin's Q, average total assets measures in USD as well as average debt-financing-ratio. Table 3 also shows the descriptive statistics of the accounting variables for the total sample as well as both subsamples.

Insert Table 3 about here.

To measure valuation levels of the listed vehicles, I apply Tobin's Q. It is a proxy for firm value as it is commonly used in literature (*e.g.*, see Fang et al. (2009) or Gompers et al. (2003)). I calculate the variable *tobinsQ* as the ratio of market value of equity plus debt and book value of equity plus debt. While the total sample has an average Tobin's Q of 1.29, the infra-subsample shows a higher value of 1.53 than the non-infra subsample of 1.11. This difference is statistically significant and implies that investors value infrastructure vehicles higher than non-infrastructure. I aim to explore in this paper why this is the case. One possible explanation might be that investors do value smooth cash flows as reported in Rountree et al. (2008). As a consequence, investors might value infrastructure investment vehicles higher, because they have significantly lower cash flow volatility, *i.e.* smoother cash flows. Although intuitive, I can see later that this line of argumentation cannot be confirmed by multivariate regressions.

The variable *totassets* gives the average total assets for each vehicle over time and proxies the size of the vehicles. It is measured in billion USD. The average size of all vehicles in my total sample is USD 1.12 billion, which is close to the average firm size of USD 1.11 billion as reported in Rountree et al. (2008). However, splitting my sample into the infra and non-infra subsamples, I find that infrastructure investment vehicles are with average total assets of USD 1.67 billion significantly larger than the non-infra benchmark with USD 0.68 billion. This is consistent with the general assumption that infrastructure asset are specifically large.[8] *debtfin* gives the average debt-financing-ratio of each vehicle and measures the leverage. Table 3 shows that the leverage of my infra subsample is twice as high as for the non-infra subsample with a statistically significant difference. This is consistent to the general evidence that infrastructure assets have on average a higher leverage than non-infra assets.[9]

[8] For example, see Sawant (2010b), p. 32.

[9] The absolute level of leverage needs to be interpreted with care. Minority investments below 50% are recognized using the equity method according to the International Financial Reporting Standards (IFRS). In this case the leverage in the underlying infrastructure assets is not reflected in the leverage of the investment vehicles and leverage of the investment vehicles in this sample is biased downwards. For example, on an asset level there are high average debt-financing ratios of 70% reported (see Esty (2003) p. 7, or Weisdorf (2007), p. 24).

For the same time period, I also calculate the unlevered systematic risk $beta_unlev$ and annualized idiosyncratic risk *idio* based on the total monthly returns provided by Thomson Reuters Datastream. Table 3 also displays the descriptive statistics of the risk measures. The systematic risk is derived from a one-factor model, whereby I regress the total return of a local stock index onto the total return of each vehicle. The resulting levered beta is de-levered by the average debt-financing-ratio as described above and proxies the systematic operative risk of each vehicle. Table 3 shows that infrastructure investment vehicles have on average an unlevered beta of 0.49, which is significantly lower than for the non-infra subsample with an average unlevered beta of 0.64. This is close to the results reported by Rothballer and Kaserer (2011) who find an unlevered beta of 0.37 for infrastructure stocks. The idiosyncratic risk is calculated as the residual between total volatility and the product of squared beta of a vehicle with the total volatility of its local market index. The presented variable *idio* is annualized. Both risk measures are by construction contemporaneous measures to the accounting variables described before.

Insert Table 4 about here.

Table 4 shows the table with correlation coefficients between all variables. It shows that in a univariate analysis none of the risk measure is significantly correlated to firm value. Intuitively, higher levels of net income, cash flows and accruals are positively correlated to firm value. Consistent with Dechow and Dichev (2002), Table 4 shows significantly positive correlations between net income and cash flow as well as net income and accruals. It also confirms the significant negative correlation between cash flow and accruals as reported in Table 2. However, it is not correlated to firm value. This is also the case for volatility of net income. Interestingly, the volatilities of its two components cash flow and accruals have a significantly different relation with valuation. Volatility of accruals *vola(ACC)* is significantly positively related to valuation levels, whereas volatility of cash flows *vola(CF)* is positively - although not significantly - correlated to valuation levels. This provides first empirical evidence that investors do significantly differentiate between the cash flow and the accrual component, which I aim to further investigate in the following. Another significant finding is that large firms as well as firms with higher debt levels are valued with a significant premium and at the same time provide significantly more stable net income, cash flows and accruals. The relation between size and the three volatility measures is consistent with Dechow and Dichev (2002).[10]

[10]See Dechow and Dichev (2002), p. 47.

The fact that the dummy variable for infrastructure investment vehicles is highly positively correlated to valuation encourages further exploring the determinants of valuation in the context of infrastructure. However, because IIVs correspond to larger size and higher debt levels at the same time, I need to control for these characteristics in a multivariate analysis.

We therefore apply in the following section multivariate regression analyses to ask if and to what extent investors value cash flow stability of infrastructure investment vehicles.

3 How do investors value cash flow volatility

3.1 Multivariate regressions

Following Shin and Stulz (2000) as well as Rountree et al. (2008) I run pooled regressions on Tobin's Q, whereby the accounting variables and risk measures described in the previous section serve as independent variables. Because independent and dependent variables refer to the time frame 2000 through 2010, I can verify if there is a contemporaneous effect on the level of valuation. In particular, this enables us to analyze if and to what extent investors value cash flow volatility of infrastructure investment vehicles. I perform an ln-transformation with all variables given in a cardinal scale indicated by the Ln-prefix at the beginning of the variable names. This does not only allow for an easier interpretation of log-log regression models, but also further controls for potential outliers.[11]

In the following regressions, I control for year effects by adding dummies for every year between 2000 and 2010. They take on the value one if for a given vehicle if it was active, *i.e.* listed, in this particular observation year. Because I use a sample of global vehicles from regions with different regulation or reporting standards and practice, I also control for such institutional characteristics following Leuz (2010). They clustered countries into three clusters:[12] 1) outsider economies that are "characterized by large stock markets, low ownership concentration, extensive outsider rights, high disclosure and strong legal enforcement", 2) insider economies with strong legal enforcement, but "smaller stock markets, higher ownership concentration, weaker investor protection, and lower disclosure levels and 3) insider

[11] See also Rountree et al. (2008), p. 241.
[12] See Leuz (2010), Table 3, Panel C.

economies with similar characteristics as countries in the second cluster but with weak legal enforcement.[13] The data and clustering is an updated and extended version of Leuz et al. (2003). It is based on reporting practice and regulatory data from Djankov et al. (2008), Licht et al. (2007) and La Porta et al. (2006) amongst others. I control for these institutional characteristics by using dummy variables if a vehicle in my sample has its primary exchange listing in one of the clusters described above. Outsider economies in cluster one include countries such as Australia, Canada, the USA and the UK. 79.45% of all vehicles in my sample are in this cluster. Cluster two includes most continental European countries such as France, Germany, Netherlands, Switzerland as well as Japan and South Korea. 15.42% of all vehicles in my sample are in this cluster. The remaining 5.14% of my sample is listed in countries such as Brazil, India or Taiwan, which are contained in cluster three.

I also control if particular infrastructure sectors experienced a significant premium or discount by investors. Hereby I differentiate between the sectors transportation, electricity, oil and gas, water, telecommunication and social infrastructure. I incorporate this by adding dummy variables that take on the value one if the vehicle has invested in this sector in any year between 2000 and 2010.

Insert Table 5 about here.

Regressions (1) and (2) in Table 5 show the regression results with the Ln-transformed Tobin's Q as dependent variable. I apply ordinary least square regressions (OLS) with White's heteroscedasticity-consistent estimators. Although I control for year and institutional effects as described above, I do not display the results for those dummies for a better overview. Both regression specifications are identical except that regression (1) includes volatility of net income *vola(NI)* as an independent variable. Regression (2) lacks this variable and splits this into the volatilities of its cash flow and accrual component, *vola(CF)* and *vola(ACC)*, respectively.

Similar to Rountree et al. (2008), leverage is negatively but not statistically significant, associated with valuation level in both regressions. Opposite to this, I find a significant positive relation between the proxy for firm size and valuation. This implies that larger firms trade at a premium compared to smaller ones. The two risk measures for systematic and idiosyncratic risk have both a positive but not significant influence.

I can confirm the indications of the univariate findings on volatilities reported in

[13] See Leuz (2010), p. 21.

Table 4. First, volatility of net income has no significant influence on valuation levels as shown in regression (1). Instead, I can confirm discriminating effects on valuation when decomposing net income into its components as shown in regression (2), which is by and large consistent to Rountree et al. (2008). However, I report opposing effects where investors value cash flow volatility positively and accrual volatility negatively. These effects are highly significant and also robust as shown below in Section 3.2. The decomposition even increases the already high explanatory power of the regression from an adjusted R-squared of 34.1% to 36.2% - compared to 22.9% and 27.3% reported for similar regressions in Rountree et al. (2008). This suggests that investors significantly differentiate between the cash flow and accrual component of net income to a similar magnitude: an increase of cash flow volatility by 1% is associated with an increase in value of approximately 0.09%, whereas an increase of accrual volatility by 1% is associated with a decrease in value of approximately 0.08%. For comparison, Chi and Wu (2010) also find an economically significant increase in value of approximately 0.14% for a 1% increase in cash flow volatility.

Second, the fact that cash flow volatility is positively valued in my sample does not confirm the findings of Rountree et al. (2008) that investors value smooth cash flows. In contrary, following Merton (1974) and viewing equity as a call option on firm value, then cash flow volatility should indeed add firm value which is consistent with what my results suggest. Similarly, Pastor and Veronesi (2003) interpret cash flow volatility as uncertainty over future growth opportunities, which imply a positive valuation of cash flow volatility. Additionally, this positive relation is also documented in the empirical study by Chi and Wu (2010). They even find evidence that the negative impact of cash flow volatility on firm value reported in Rountree et al. (2008) is due to the fact that non-standardized per-share volatilities were used. If cash flows are standardized for total assets as I did in this paper, they find that the negative relation turns positive as reported in my paper. A positive relation can also be supported by the theoretical agency argument that managers cannot diversify sufficiently the stream of income they receive from the firm. As a consequence, they engage in lower levels of firm risk associated with lower cash flow volatilities and thus decrease firm value (Amihud and Lev (1981)).[14] Higher firm risk and cash flow volatilities can limit this inefficiency and thus increase firm value.

Third, accrual volatility is clearly valued by investors at a discount. I explain this with opportunistic managers who manipulate accruals and therefore reduce

[14]See Chi and Wu (2010), p. 18.

the wealth of shareholders. Based on principal-agent theory, managers have an informational advantage over the investor about the true state of the company. At the same time, managers have some accounting discretion about accruals and thus reported earnings. Following Leuz et al. (2003) and Healy and Wahlen (1999), the manager has an incentive to use this discretion to misrepresent firm performance in order to gain private control benefits at the expense of the investors.[15] For example, managers could try to avoid the reporting of large losses to mitigate disciplinary action against him (*e.g.* Degeorge et al. (1999)). I can therefore interpret accruals and accrual volatility as proxy for earnings management. Because such action by managers reduces the wealth of shareholders, investors value this with a discount as confirmed in my empirical analysis. Alternatively, Dechow and Dichev (2002) identify both accrual and earnings volatility as proxy for accrual and earnings quality, where a higher volatility signifies lower quality.

Regression (3) underpins the effect of earnings management by adding *corr(CF, ACC)* as independent variable. It is commonly used in literature as proxy for earnings smoothing which is a particular form of earnings management (*e.g.* Lang et al. (2003b), Leuz et al. (2003), Barton (2001)). In times of volatile cash flows, managers can report negative accruals to partially offset high cash flows and vice versa to smoothen net income and earnings. Similar to Rountree et al. (2008), the negative and significant coefficient shows that the more negative the correlation, *i.e.* the more earnings smoothing by the management, the larger the discount for firm value. By adding this variable, not only the significance of the negative impact of accrual volatility on valuation increased, also the R-squared of the overall regressions increased to high 37.1%.

Thus, both proxies for earnings management, correlation between cash flow and accruals as well as volatility of accruals, consistently show that earnings management is valued with a discount by investors. Following Lang et al. (2011), I can also relate earnings management to the level of transparency for investors. The more managers engage in earnings management, the less transparency there is about the true economic performance about the firm, and the more firms are valued with a

[15] This action is also referred to as asset expropriation, see Lang and Maffett (2010), p. 33. Alternatively, a positive effect of transparency on firm valuation could also be explained by an efficient resource allocation, see Lang and Maffett (2010), p. 29.

discount.[16]

So far, the interpretations of regressions referred to my whole sample of investment vehicles including infra as well as non-infra. One could argue that infra vehicles should then be valued by investors at discounts if they i) show significantly lower cash flow volatility as reported in Table 2 and ii) cash flow smoothness is punished by investors as shown above. Nevertheless, I find higher valuation levels for infra vehicles *vs.* non-infra vehicles. Table 3 showed an average Tobin's Q of 1.53 for infra vehicles, which is significantly higher than the one of 1.11 for non-infra vehicles. My regression model suggests that the discount from smooth cash flows for infrastructure vehicles is at least partially offset by a general infrastructure premium shown by the positive and highly significant regression coefficient for the dummy variable *infra*. For example, Regression (2) in Table 5 implies infrastructure investment vehicles on average are *ceteris paribus* valued 48% higher than non-infrastructure investment vehicles. This means despite controlling for risk measures, accounting characteristics, time or institutional effects, there is an unobserved characteristic of infrastructure vehicles in my model that causes this infrastructure premium. One of the myriad possibilities might be a money chasing deals phenomenon. This describes the empirical fact that private equity can be subject to overinvestment, so that asset prices go up and performance goes down.[17] Reasons for this include that the market for private equity investments is segmented with a limited number of potential investments that are illiquid. This implies that in times of high capital inflows into this particular market, the supply of potential investments does not adjust sufficiently and valuations increase. Because also infrastructure assets are subject to these conditions, this phenomenon might also occur for infrastructure investment vehicles as indicated in previous literature.[18] However, this remains an assumption with no clear empirical indication.

To show that the valuation effects described above don't only hold for the total but also for the infra and non-infra subsample I perform similar regressions for the two subsamples separately in the next section besides other robustness checks.

[16] Lang et al. (2011) show empirically for a large sample of international firms that lower transparency lowers liquidity, and thus increases expected return and cost of capital, which leads to lower valuations. The mediator between transparency and valuation here is liquidity instead of cash flows. However, the net effect could be positive or negative, considering the possible costs of transparency. For example, earnings management through earnings smoothing could also reduce cost of debt through lower default risk for creditors. See also Lang and Maffett (2010), p. 28.

[17] See for example Gompers and Lerner (2000) as well as Diller and Kaserer (2009).

[18] Orr and Kennedy (2008), p. 99, or Lawrence and Stapledon (2008), p. 25.

3.2 Robustness checks

The main goal of this section is to show that the positive valuation of cash flow volatility shown in Section 3.1 is not driven by misspecification of the regression. In specific, I show that the results are robust to alternative specifications of the dependent as well as independent variables and hold for subsamples, too. Table 6 provides the series of robustness checks.

In Table 6 I perform the same regressions as in Table 5, now separately for the infra (Regressions 1 and 2) and non-infra sample (Regressions 3 and 4). Because the number of observations sharply drops, the explanation power of these regressions as well as significance of their independent variables is rather low. Nevertheless, the regressions confirm for both subsamples the positive effect of cash flow volatility and negative effect of accrual volatility on valuation. I find additionally that within the infra sample, leverage has a highly significant negative impact on valuation. This might be an indicator for the criticism that some infrastructure investment vehicles have exceeded optimal levels of leverage.[19]

Regressions (5) and (6) show that the results on cash flow volatility reported in Table 5 are also robust if I use the Ln-transformation of the market-to-book value Ln_MVBV as an alternative valuation measure.

In regressions (7) and (8) I have also included return on assets as a proxy of profitability following Rountree et al. (2008). I have not included this variable in the previous analysis in Table 5, because this variable is not available for many observations and thus further decrease my sample size. The regressions show that including the Ln-transformation of return on assets Ln_ROA, sample size is decreased but explanatory power significantly increased expressed by an adjusted R-squared to up to 44%. More importantly, the effects of cash flow volatility as described for Table 5 are robust. Also, return on assets has a significantly positive impact on valuation levels. This is consistent with the results reported in Rountree et al. (2008).

The regression results from Table 5 might have also been biased because I constructed the measures of volatilities based on different numbers of cash flow observations due to the unbalanced structure of the panel. With a mean and median number of cash flow observations of 6.52 and 7, respectively, I perform the same regressions as in Table 5 except with a minimum number of cash flow observations of 7 instead of 3. Regressions (9) and (10) in Table 6 show that my results are also

[19] See Davis (2008), p. 8, or Lawrence and Stapledon (2008), p. 22 ff.

robust to this robustness check.

Finally, the elevated variance inflation factors (VIFs) give rise for a concern about multi-collinearity amongst the independent variables of the regressions in Table 5 and 6. However, the values of *max VIF without year and institutional cluster dummies* show that for all regressions the maximum VIF is smaller than 3 when the dummy variables controlling for year and institutional effects are not included in the regressions. This shows that some of the control variables are slightly correlated, but multi-collinearity is not an issue amongst the main explanatory variables.

4 Further results

Besides the main results on cash flow volatility and earnings management presented in Section 3, Table 5 also reveals a highly significant and economically meaningful discount for externally managed vehicles. In the context of infrastructure funds for example, Davis (2008) mentions "complex and opaque financial" structures that "make the true financial position of the fund hard to determine".[20] This could also facilitate managers to gain private control benefits or reduces the shareholders" monitoring capabilities, similar to the earnings management described above. Furthermore, Lawrence and Stapledon (2008) list concerns on the governance structure that can lead amongst others to less transparency or misalignment of interests between shareholders and managers and thus reduce valuation of infrastructure funds.

Orr and Kennedy (2008) point out that transparency is specifically necessary for financing infrastructure projects through capital markets, which requires "ongoing and high quality disclosure of operating and financial performance" of the assets.[21] Greater transparency further develops this market, increases investment and *ceteris paribus* positively affects valuations. Earnings management or intransparent legal and organizational structures, however, is not likely to enhance such qualities.

The regression results in Table 5 also report a significant premium for investment vehicles that invest in the oil and gas sector. On the other hand, vehicles that invest in the transportation and electricity sectors are valued at a significant and economically meaningful discount. These results are also valid after the robustness checks in Table 6. It is likely that those sector-specific valuations depend to a large extent to

[20] Davis (2008), p. 8.
[21] Orr and Kennedy (2008), p. 104.

sector-specific risks and regulations. For example, Bitsch et al. (2010) report significantly higher returns for the transport sector within the infrastructure universe. The authors suggest this might be driven by a high degree of government intervention and less independent regulation. This could lead to higher investment uncertainty and thus higher cost of capital, which could imply lower valuations similar to my results. However, sector-specific risk and return profiles are heterogeneous and require more attention and research to enable robust conclusions.

5 Summary

It is widely believed that infrastructure investments offer some typical financial characteristics such as long-term, stable and predictable, inflation-linked cash flows with low correlation to other assets. However, research on infrastructure investments is an emerging field and the number of studies is till limited. So far, the existing empirical research on infrastructure mainly focuses on listed infrastructure companies, public-private-partnerships (PPP) or project finance.

This paper contributes to a research gap as it provides first empirical evidence for a larger sample of listed infrastructure investment vehicles. I categorize them into internally and externally managed vehicles, which I label infrastructure investment companies and infrastructure investment funds, respectively. Comparing this sample to a non-infrastructure reference group of listed private equity vehicles, I can confirm the common hypothesis that infrastructure investments provide more stable operating cash flows than non-infrastructure investments.

In a next step, I analyze if and to what extent investors price cash flow volatility at all. First, evidence suggests that volatility of net income is not associated with valuation levels. Instead, investors clearly discriminate between the volatility of cash flow and accrual component of earnings that is consistent to existing literature. Second, I find that investors value volatility of the cash flow component with a premium. Although existing theoretical as well as empirical literature provides evidence for both a negative and positive relation, I explain this result by viewing equity as a call option on firm value. In this context, cash flow volatility should indeed add firm value as my results suggest.

Third, I find that volatility of the accrual component is valued with a discount on valuation levels. This negative relation between accruals and valuation levels is

by and large consistent with existing literature. I relate this finding to discounts for opportunistic earnings management by mangers at the expense of investors.

Overall, infrastructure investment vehicles are valued at a significant 'infrastructure premium' over the non-infrastructure reference group. One rationale for this might be that infrastructure investments considered in this time period have been subject to the so-called money chasing deals phenomenon. Although I have no clear indication for the economics of this result, I can say that it is not the more stable cash flows that lead to the higher valuation levels.

Further results suggest that not only earnings management but also externally managed vehicles are valued at a discount. I relate this to complex financial and governance structures. Possible reasons for this include less transparency that leads to agency conflicts and lower valuations. I also find that investment vehicles that invest into oil and gas infrastructure are valued at a premium as opposed to vehicles investing into transportation or electricity infrastructure, which are valued at a discount. Likely reasons for this include differing regulatory risks.

Summing up, my paper supports the perception that infrastructure investment vehicles do have specific characteristics that are of interest to institutional investors. Most importantly, they provide more stable operating cash flows. However, investors do not positively value this as often perceived. An overall positive 'infrastructure premium' reveals that a more detailed picture the infrastructure market is still needed. For example, the influence of regulatory risk needs to be better understood. In this regard, my paper offers some limited evidence that can be used as a starting point for future research.

Figures

Figure 1: Overview of infrastructure investment vehicles, companies and funds

Infrastructure Investment Vehicles (IIVs)	
Internally Managed Infrastructure Investment Companies (IICs)	**Externally Managed Infrastructure Investment Funds (IIFs)**
• BF Utilities Ltd.	• Brookfield Renewable Power
• Cheung Kong Infrastructure Holdings	• HSBC Infrastructure Company
• Eredene Capital	• Macquarie Infrastructure Group
• GTL Infrastructure Ltd.	• Prime Infrastructure Group
• IPSA Group plc	• Utilico Investment Trust plc
...	...

Note: The figure gives an overview of infrastructure investment vehicles (IIVs). IIVs can be categorized in internally and externally managed vehicles, called infrastructure investment companies (IICs) and infrastructure investment funds (IIFs). Examples for each subsample are given.
Source: own contribution, based on Lahr and Herschke (2009)

Tables

Table 1: Definition of variables, listed funds

Category	Variable name	Description
Dependent	tobinsQ	Average of all available yearly observations for the sum of market capitalization (TOB item: ws.yrendmarketcap) and total debt (TOB item: ws.totaldebt) divided by the sum of total shareholders' equity (TOB item: totalshareholderequity) and total debt (TOB item: ws.totaldebt).
	MVBV	Average of all available yearly observations for market capitalization (TOB item: ws.yrendmarketcap) divided by total shareholders' equity (TOB item: totalshareholderequity).
Earnings component	NI	Average of all available yearly observations of net income (TOB item: ws.netincome) standardized by total assets of the vehicle (TOB item: ws.totalassets).
	CF	Average of all available yearly observations of operating cash flows (TOB item: ws.NetCashFlowOperatingCFStmt) standardized by total assets of the vehicle (TOB item: ws.totalassets).
	ACC	Average of all available yearly observations of accruals, whereby accruals is the difference between standardized yearly net income and operating cash flows (see NI, CF above).
	corr(CF, ACC)	Correlation between standardized yearly cash flow and accrual observations (see CF, ACC above).
	vola(NI)	Standard deviation of yearly, standardized net income observations (see NI above).
	vola(CF)	Standard deviation of yearly, standardized net income observations (see CF above).
	vola(ACC)	Standard deviation of yearly, standardized accrual observations (see ACC above).
Accounting	totassets	Average of all available yearly observations for total assets of a vehicle in USD (TOB item: ws.totalassetsUSD).
	debtfin	Average of all available yearly observations of debt (TOB item: ws.totaldebt) divided by total assets of a vehicle (TOB item: ws.totalassets).
	ROA	Average of all available yearly observations for return on assets (TOB item: ws.returnonassets).
Risk	beta_unlev	Beta of a vehicle deleverd with its debt-equity ratio using the Hamada equation. Beta is the regression coefficient from the one-factor-model regressing return of the market index on vehicle return. Market index is the MSCI country index for each vehicle. All returns are total monthly returns between 2000 and 2010 and obtained from Thomson Reuters Datastream. Debt-equity ratio is the average of all available yearly observations of debt (TOB item: ws.totaldebt) divided by equity (TOB item: ws.totalshareholderequity). A corporate tax rate of 30% is applied.
	idio	Annualized idiosyncratic risk, whereby idiosyncratic risk is the square root of the difference between return variance of a vehicle and the product of its squared beta multiplied with ist market index' return variance. All returns are total monthly returns between 2000 and 2010 and obtained from Thomson Reuters Datastream.

Table 1 continued:

Structure/industry	infra	Dummy variable equal to 1 for infrastructure vehicles.
	external	Dummy variable equal to 1 for externally managed vehicles.
	oil_gas	Dummy variable equal to 1 for externally vehicles that have invested into oil or gas infrastructure.
	transport	Dummy variable equal to 1 for externally vehicles that have invested into transportation infrastructure.
	electricity	Dummy variable equal to 1 for externally vehicles that have invested into elictricity infrastructure.

Note: Column 'Category' shows if the variable refers to the category earnings management, accounting, risk or structure/ industry. The 'Ln'-prefix of a variable name indicates that the natural logarithm of the observations is taken. 'TOB item' is the name as indicated in the database ThomsonONEBanker.

Table 2: Cash flow and volatility statistics

	Infra						Non-infra							Total sample					
Variable	Mean	Median	Min	Max	Std dev	N	Mean	Median	Min	Max	Std dev	N	Sign	Mean	Median	Min	Max	Std dev	N
NI	0	0.03	-0.95	0.13	0.14	108	-0.38	0	-16.93	0.11	2.01	139	**	-0.22	0.01	-16.93	0.13	1.52	247
CF	0.06	0.07	-0.57	0.22	0.12	106	-0.06	-0.01	-1.93	0.19	0.21	140	***	-0.01	0.02	-1.93	0.22	0.18	246
ACC	-0.06	-0.06	-0.38	0.25	0.07	109	-0.3	0	-16.05	0.24	1.85	138	-	-0.20	-0.03	-16.05	0.25	1.38	247
Corr(CF, ACC)	-0.42	-0.55	-1.00	0.99	0.5	111	-0.32	-0.46	-1.00	0.99	0.58	142	-	-0.36	-0.53	-1.00	0.99	0.55	253
vola(NI)	0.29	0.04	0.00	23.16	2.21	110	0.28	0.08	0.00	7.00	0.77	139	-	0.28	0.06	0.00	23.16	1.57	249
vola(CF)	0.07	0.04	0.01	1.12	0.12	109	0.14	0.05	0.01	1.64	0.27	141	***	0.11	0.05	0.01	1.64	0.22	250
vola(ACC)	0.27	0.04	0.01	21.00	2.00	110	0.25	0.12	0.00	4.46	0.47	139	-	0.26	0.07	0.00	21.02	1.37	249

Table 3: Risk and accounting statistics

	Infra						Non-infra							Total sample					
Variable	Mean	Median	Min	Max	Std dev	N	Mean	Median	Min	Max	Std dev	N	Sign	Mean	Median	Min	Max	Std dev	N
tobinsQ	1.53	1.43	0.56	3.87	0.58	108	1.11	0.97	0.52	3.38	0.52	139	***	1.29	1.11	0.52	3.87	0.58	247
beta_unlev	0.49	0.48	-0.09	1.48	0.33	98	0.64	0.48	-0.20	2.29	0.52	133	**	0.58	0.48	-0.20	2.29	0.46	231
idio	0.39	0.29	0.15	1.41	0.25	99	0.44	0.39	0.14	1.67	0.26	135	*	0.42	0.34	0.14	1.67	0.26	234
totassets(USDbn)	1.67	0.88	0.00	12.61	2.14	106	0.68	0.09	0.00	11.87	1.74	135	***	1.12	0.26	0.00	12.61	1.99	241
debtfin	0.35	0.33	0.00	0.81	0.19	109	0.20	0.17	0.00	1.00	0.20	154	***	0.27	0.26	0.00	1.00	0.20	224
external	0.61	1.00	0.00	1.00	0.49	111	0.29	0.00	0.00	1.00	0.45	142	***	0.61	0.00	0.00	1.00	0.50	253

Note: Table 2 gives descriptive statistics of cash flow and volatility measures, Table 3 gives descriptive statistics of risk and accounting measures for all vehicles with a minimum number of 3 cash flow observations. Statistics are given for the full sample as well as the infra and non-infra subsamples. Column "Sign" indicates whether the difference between the infra and the non-infra subsample is significant, as measured by the test for difference in mean. The asterisks indicate the level of significance (*, **, *** significant at the 10-, 5- and 1-percent levels, respectively).

Table 4: Correlation matrix

Spearman's correlation coefficients	Tobins's Q		beta_unlev		idio		NI		CF		ACC		corr(CF,ACC)	
Tobins's Q	1.000													
beta_unlev	0.008		1.000											
idio	-0.052		0.362	***	1.000									
NI	0.302	***	-0.085		-0.572	***	1.000							
CF	0.484	***	-0.096		-0.380	***	0.672	***	1.000					
ACC	-0.359	***	0.004		-0.210	***	0.301	***	-0.339	***	1.000			
corr(CF,ACC)	0.056		0.136		0.135		-0.170	**	-0.130	*	-0.227	***	1.000	
vola(NI)	-0.085		0.355	***	0.506	***	0.423	***	-0.350	***	-0.256	***	0.524	***
vola(CF)	0.045		0.319	***	0.459	***	-0.246	***	-0.200	***	-0.199	***	-0.067	
vola(ACC)	-0.212	***	0.349	***	0.543	***	-0.479	***	-0.446	***	-0.154	**	0.165	**
totassets	0.323	***	-0.084		-0.435	***	0.506	***	-0.504	***	0.039		-0.193	***
debtfin	0.261	***	-0.263	***	-0.056		0.174	**	0.348	***	-0.144	*	-0.244	***
infra	0.486	***	-0.202	***	-0.256	***	0.329	***	0.578	***	-0.340	***	-0.075	
external	-0.006		-0.228	***	-0.269	***	0.204	***	0.219	***	0.019		-0.215	***

	vola(NI)		vola(CF)		vola(ACC)		totassets		debtfin		infra		external
vola(NI)	1.000												
vola(CF)	0.608	***	1.000										
vola(ACC)	0.860	***	0.694	***	1.000								
totassets	-0.468	***	-0.439	***	-0.482	***	1.000						
debtfin	-0.333	***	-0.239	***	-0.306	***	0.594	***	1.000				
infra	-0.370	***	-0.213	***	-0.445	***	0.438	***	0.375	***	1.000		
external	-0.413	***	-0.281	***	-0.387	***	0.222	***	0.160	**	0.325	***	1.000

Note: Coefficients display Spearman's correlation coefficients for all vehicles with a minimum number of 3 cash flow observations. Exception: the coefficient between dummy variables infra and external displays Cramer's V. The asterisks indicate the level of significance for the test of independence (*, **, *** significant at the 10-, 5- and 1-percent levels, respectively).

Table 5: Main regressions

Model number	(1)		(2)		(3)	
Variables	Ln_tobinsQ		Ln_tobinsQ		Ln_tobinsQ	
Ln_beta_unlev	0.0002		0.0043		0.0013	
	(0.01)		(0.12)		(0.04)	
Ln_idio	0.0244		0.0642		0.0477	
	(0.41)		(1.09)		(0.81)	
Ln_vola(NI)	0.0343		-		-	
	(1.21)					
Ln_vola(CF)	-		0.0855	***	0.1070	***
			(2.72)		(3.02)	
Ln_vola(ACC)	-		-0.0758	**	-0.0901	***
			(-2.46)		(-2.77)	
corr(CF, ACC)	-		-		0.0920	*
					(1.72)	
Ln_totassets	0.0194		0.0212		0.0251	
	(1.12)		(-2.46)		(1.37)	
Ln_debtfin	-0.0093		-0.0133		-0.0065	
	(-0.60)		(-0.84)		(-0.42)	
infra	0.4170	***	0.3900	***	0.3660	***
	(0.88)		(5.27)		(4.92)	
external	-0.1500	***	-0.1650	***	-0.1450	**
	(-2.65)		(-2.85)		(-2.51)	
oil_gas	0.1190	**	0.1030	*	0.0922	*
	(2.16)		(1.89)		(1.72)	
transport	-0.1800	***	-0.1590	**	-0.1640	***
	(-2.88)		(-2.58)		(-2.75)	
electricity	-0.1530	**	-0.1450	**	-0.1440	**
	(-2.44)		(-2.34)		(-2.34)	
constant	0.1500		0.0942		0.1377	
	(0.72)		(0.45)		(0.67)	
year dummies	yes		yes		yes	
institutional cluster dummies	yes		yes		yes	
Number of observations	188		188		188	
F-statistic	5.85	***	5.55	***	5.39	***
Max. VIF	5.60		5.40		5.41	
Max. VIF without year and instituional cluster dummies	2.24		2.77		2.88	
Adjusted R^2	34.10%		36.2%		37.1%	

Note: The table gives the results of OLS regressions for the full sample with Ln_TobinsQ as dependent variable and a minimum of 3 cash flow observations per vehicle. Regression (1) includes volatility of net income vola(NI) as exogenous variable. Regression (2) includes its components volatility of cash flow vola(CF) and accrual vola(ACC) instead. Both regressions use White's heteroscedasticity-consistent estimators. The independent variables are listed in the first column. The second and third columns show the non-standardized coefficients of each exogenous variable and the associated t-statistics. The asterisks indicate the level of significance (*, **, *** significant at the 10-, 5- and 1-percent levels, respectively).

Table 6: Robustness checks

Model	min. of 3 cash flow observations, infra sample		min. of 3 cash flow observations, non-infra sample		min. of 3 cash flow observations, full sample		min. of 3 cash flow observations, full sample		min. of 7 cash flow observations, full sample	
Number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variables	Ln_tobinsQ	Ln_tobinsQ	Ln_tobinsQ	Ln_tobinsQ	Ln_MVBV	Ln_MVBV	Ln_tobinsQ	Ln_tobinsQ	Ln_tobinsQ	Ln_tobinsQ
Ln_ROA	-	-	-	-	-	-	0.0435	0.0489 *	-	-
							(1.30)	(1.70)	-	-
Ln_beta_unlev	0.0255	0.0254	0.0205	0.0199	-0.0793	-0.0736	0.0314	0.047	0.0515	0.0586
	(0.65)	(0.64)	(0.39)	(0.38)	(-1.53)	(-1.43)	(0.74)	(1.26)	(1.18)	(1.58)
Ln_idio	-0.1864	-0.1279	0.1360	0.1490 *	0.0417	0.0952	0.0332	0.0757	-0.0203	0.0246
	(-2.36)	(-1.69)	(1.55)	(1.74)	(0.47)	(1.07)	(0.51)	(1.19)	(-0.33)	(0.42)
Ln_vola(NI)	0.0067	-	0.0346	-	0.0620	-	0.0101	-	0.0184	-
	(0.16)		(1.02)		(1.51)		(0.28)		(0.48)	
Ln_vola(CF)	-	0.0919 *	-	0.0372	-	0.110 **	-	0.0774 ***	-	0.0914 **
		(1.92)		(0.90)		(2.43)		(2.41)		(2.36)
Ln_vola(ACC)	-	-0.1190	-	-0.0210	-	-0.0793 *	-	-0.107 ***	-	-0.1060 **
		(-1.61)		(-0.49)		(-1.76)		(-2.69)		(-2.53)
Ln_totassets	-0.0269	-0.0281	0.0266	0.0247	0.0582 **	0.0607 **	0.0150	0.0139	0.0102	0.0100
	(-0.98)	(-0.99)	(1.37)	(1.15)	(2.49)	(2.35)	(0.70)	(0.64)	(0.44)	(0.41)
Ln_debtfin	-0.0647 ***	-0.0642 **	-0.0148	-0.0191	0.0006 **	-0.0057	-0.0035	-0.0080	-0.0150	-0.0209
	(-2.48)	(-2.32)	(-1.11)	(-1.32)	(0.03)	(-0.30)	(-0.24)	(-0.59)	(-0.53)	(-0.74)
infra	-	-	-	-	0.5860 ***	-0.5600 ***	0.3960 ***	0.3840 ***	0.4970 ***	0.4570 ***
					(5.76)	(4.97)	(4.57)	(4.79)	(5.76)	(5.44)
external	-0.0502	-0.0497	-0.2840 ***	-0.3230 ***	-0.1170	-0.1390 *	-0.1580 **	-0.1890 ***	-0.1940 ***	-0.1990 ***
	(-0.83)	(-0.82)	(-2.83)	(-3.08)	(-1.47)	(-1.71)	(-2.35)	(-2.88)	(-2.92)	(-2.95)
oil_gas	0.1124	0.0936	0.0272	0.0464	0.0681	0.0483	0.0715	0.0515	0.0821	0.0687
	(1.53)	(1.49)	(0.37)	(0.63)	(0.77)	(0.53)	(1.31)	(1.02)	(1.25)	(1.11)
transport	-0.3036 ***	-0.2410 **	-0.0584	-0.0645	-0.2760 ***	-0.2520 ***	-0.2110 ***	-0.1780 ***	-0.1760 ***	-0.1400 ***
	(-3.36)	(-2.50)	(-0.58)	(-0.62)	(-3.24)	(-2.89)	(-3.10)	(-2.83)	(-2.43)	(-1.96)
electricity	-0.2127 **	-0.2083 ***	0.0757	0.0934	-0.2440 ***	-0.2350 **	-0.0720	-0.0574	-0.1440 **	-0.1510 **
	(-2.62)	(-2.77)	(0.81)	(0.96)	(-2.64)	(-2.54)	(-1.05)	(-0.90)	(-2.00)	(-2.14)
constant	-0.3817	0.1597	0.2150	0.1642	0.1540	0.0742	0.1380	0.0789	1.2510 ***	1.0560 **
	(-1.40)	(0.66)	(-0.77)	(0.59)	(0.47)	(0.22)	(0.61)	(0.35)	(2.85)	(2.39)

Table 6 continued:

Model	min. of 3 cash flow observations, infra sample				min. of 3 cash flow observations, non-infra sample				min. of 3 cash flow observations, full sample				min. of 3 cash flow observations, full sample				min. of 7 cash flow observations, full sample			
Number	**(1)**		**(2)**		**(3)**		**(4)**		**(5)**		**(6)**		**(7)**		**(8)**		**(9)**		**(10)**	
year dummies	yes		yes		yes		yes		yes		yes		yes		yes		yes		yes	
institutional cluster dummies	yes		yes		yes		yes		yes		yes		yes		yes		yes		yes	
Number of observations	88		88		100		100		188		188		137		137		128		138	
F-statistic	5.26	***	7.66	***	3.11	***	2.52	***	6.88	***	6.85	***	6.78	***	7.58	***	2.91	***	2.80	***
Max. VIF	4.81		4.62		5.50		5.30		5.60		5.40		5.08		4.87		5.60		5.40	
Max. VIF without year and institutional cluster dummies	2.15		2.58		2.15		2.58		2.24		2.77		2.33		2.73		2.24		2.77	
Adjusted R^2	38.2%		41.8%		23.6%		22.3%		36.0%		36.8%		41.1%		44.4%		36.7%		39.8%	

Note: The table gives the results of OLS regressions with differing specifications. Regressions (1) and (2) reproduce Table 5 for the infra subsample only. Regressions (3) and (4) reproduce Table 5 for the non-infra subsample only. Regressions (5) and (6) reproduce Table 5 with Ln_MVBV instead of Ln_tobinsQ as dependent variable. Regressions (7) and (8) reproduce Table 5 including Ln_ROA as an additional independent variable. Regressions (9) and (10) reproduce Table 5 for vehicles with a minimum of 7 cash flow observations. All regressions use White's heteroscedasticity-consistent estimators. The independent variables are listed in the first column. The following columns show the non-standardized coefficients of each exogenous variable and the associated t-statistics. The asterisks indicate the level of significance (*, **, *** significant at the 10-, 5- and 1-percent levels, respectively).

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