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Do financial constraints really matter? A case of understudied African firms

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Abstract

Using a system of equations to account for the simultaneity, inter-temporal and interdependent nature of corporate decisions, we document several new insights into how emerging market firms allocate funds across competing uses-of-funds. Emerging market firms save most of the operating cash flow. When the firms spend, they allocate the remainder to dividend payments first, followed by debt retirements, then equity repurchases and lastly investments. This pecking order of prioritizing savings and dividends ahead of other uses-of-funds highlight difficulties in accessing external finance and a stubbornly resilient signalling motive for firms operating under a high degree of information asymmetry and agency costs. We further find significant asymmetry and heterogeneity in the allocation of funds conditional on credit constraints, deviations from target and around the financial crisis. Our findings signal the need for policies that improve access to external finance and information disclosure in emerging markets.

KEYWORDS

asymmetry in corporate decisions, cash flow allocations, emerging markets, financial constraints, financial crisis

1 | INTRODUCTION

Do financial constraints affect real economic activities? If so, what are the channels through which they affect real activities? How do we measure and test for financial constraints? These questions have been explored several times, but in all cases, the results are inconclusive.[1] However, apart from the evidence on developed economies, we know little about how financial constraints affect investment and financing decisions in emerging capital markets. We attempt to fill this lacuna by examining how emerging market firms allocate operating cash flow to savings, investments, dividends, debt retirements and equity repurchases. By examining all uses-of-funds as opposed to adopting a piecemeal approach of focusing on either investment-cash flow sensitivity or cash flow-sensitivity of cash, our study provides new insights on the impact of financial constraints on investment and financing decisions.

Changes in how firms allocate funds have real implications on firm growth, employment and economic growth. For example, building-up cash reserves entail reducing or postponing current investments. At the same time, this accumulation of savings indicates increasing difficulties in accessing external finance, which is of interest to policymakers, particularly in less-developed capital markets. Similarly, a high allocation of funds to dividends signals a lack of other viable monitoring

mechanisms in the form of governance and institutional structures (Brav, Graham, Harvey, & Michaely, 2005; He, Ng, Zaiats, & Zhang, 2017; Iturriaga & Crisóstomo, 2010) or the lack of further growth opportunities. The former requires that managers adopt a high dividend payout to signal the quality of the firm in the presence of a high degree of information asymmetry and agency costs. At the same time, the latter is plausible, but less so for emerging markets that are less saturated and have lower barriers to entry (see Panibratov, 2017). This rules out the latter and leaves the signalling motive as the most plausible reason why emerging market firms would payout most of the funds rather than retain and re-investment, which negatively impact on firm-growth, employment and economic growth. On the other hand, high allocations to debt repayments and equity repurchases *per se* are indicative of better access to external finance (active capital markets), hence boosting firm-growth, employment and economic growth.[2] Therefore, understanding how emerging market firms allocate funds represents an interesting research question with wider economic and welfare implications.

To accomplish the above objective, we estimate a system of equations relating the five uses-of-funds to operating cash flow and several control variables and lagged uses-of-funds to account for the interdependence and inter-temporal nature of corporate decisions. This aspect is particularly pertinent in emerging markets where access to external finance is much limited, and firms rely mostly on internal sources of capital, thereby, making investment and financing decisions more inter-temporal and interdependent. We then test for asymmetry in cash flow allocations or sensitivities conditional on four commonly used measures of credit constraints. To shed further insights on whether cash flow sensitivities are asymmetric, we use a *quasi-natural experiment* in the form of the financial crisis, which is mainly external and reliably orthogonal to local credit market conditions in emerging markets. Using this external and unexpected credit supply shock increases our ability to test and discriminate among several plausible propositions that have been advanced in the literature (see Almeida, Campello, & Weisbach, 2004; Chang, Dasgupta, Wong, & Yao, 2014; Gatchev, Pulvino, & Tarhan, 2010; Lewellen & Lewellen, 2016). In addition, we also investigate whether non-linearities in cash flow and deviations from target cash holdings, investment, dividends and capital structure influence allocations across the five uses-of-funds. This part of our analysis seeks to shed further empirical insights on the often-overlooked interdependence of investment and financing decisions.

Using a sample of 5,940 firm-year observations from eight emerging economies from 2000–2015, and a system of equations framework for five uses-of-funds, we find a noteworthy pecking order in the allocation of funds and significant interdependence of investment and financing decisions. Specifically, the sampled emerging market firms save 44% of operating cash flow. When they spend, they allocate the remainder in order of proportions to dividend payments first (19%), followed by debt retirements (15%), then equity repurchases (14%), and lastly investments (8%). This pecking order in the allocation of funds reveals several insights on how firms make investment and financing decisions in the presence of binding credit constraints, information asymmetry and agency costs. Notably, the disproportionately high savings emphasize the maintenance or enhancement of financial flexibility as a more critical goal that ranks ahead of all other uses-of-funds when access to external finance is limited. Therefore, this accumulation of cash reserves, which often entails cutting back or postponing investments, should be of concern to investors and policymakers alike as it hampers firm-growth, and consequently, employment and economic growth in emerging markets.

Dividend payments, which consistently rank just below savings, appear sticky-down, implying that, on average, firms increase or maintain rather than reduce or curtail the payouts during the financial crisis. This finding of a sticky-down pattern in dividends is surprising and unique to our sampled non-utility and non-financial firms as it is in contrast with results in prior studies. For example, Shirai (2004) argues that firms can easily cutback on dividends to avert bankruptcy as they are not mandatory like interest and debt repayments. A notable exception is Floyd, Li, and Skinner (2015) who document similar resilience in dividend payouts during the financial crisis but only for U.S. banks which use dividends to signal their profitability and solvency to stakeholders. We attribute the unique sticky-down pattern for the sampled non-utility and non-financial firms to the prevalence of information asymmetry and agency costs in emerging markets that drive a stubbornly strong signalling motive against deteriorating business fundamentals during the financial crisis. The aforementioned stylized patterns, which are in stark contrast to those in the U.S. where firms allocate 36% of operating cash flow to savings, 32% to debt retirements, 23% to investments, 9% to equity repurchases and only 1% to dividends as reported by Chang et al. (2014). This highlights the utilitarian nature of the emerging market context as an independent sample for reconciling and generalizing findings from developed economies.

Our findings of uniquely low investment-cash flow sensitivities (cash flow allocations to investments), even for constrained firms during the financial crisis, show the poor performance of this commonly used measure of credit or financial constraints in environments and

around events where the credit constraints are supposedly more binding. Our results show that investment-cash flow sensitivities are more linked to under and over-investment problems than financial constraints *per se*, as firms with low (high) sensitivities under-invest (over-invest). This is in contrast with a strong correlation between investment and credit constraints in prior literature (see Almeida & Campello, 2007; Beatty, Liao, & Weber, 2010; Biddle & Hilary, 2006; Fazzari et al., 1988). From our further analyses, cash flow sensitivity of cash, which until recently has received limited coverage, emerges as a more reliable and informative measure of credit constraints that correlates significantly with credit market conditions. These findings signal the need for a shift in research focus as firms are increasingly investing in intangible capital and cutting-back on physical or tangible investments.

The allocations of funds to debt retirements and equity repurchases for our sampled emerging market firms are comparatively lower and higher, respectively, than those in the U.S. (see Chang et al., 2014). These differences indicate the less-developed nature of the capital markets in emerging economies. The sampled firms have approximately 85.4%–86.2% of total assets financed by equity (high equity dependence) as the emerging bond or debt markets are still in their infancy (see Mu, Phelps, & Stotsky, 2013; Shirai, 2004). Further, our results show significant interdependence in investment and financing decisions, which suggests that overlooking this critical aspect could lead to biased inferences on cash flow sensitivities.

To check the robustness of our findings, we use the financial crisis as a *quasi-natural experiment* to examine how managers allocate funds across competing uses-of-funds. Again, we find that our main story holds as the firms in our sample save most of their operating cash flow and prioritize dividends ahead of other uses-of-funds. In additional analyses, we find that deviating from the target cash holdings, investments, dividends and capital structure has real implications on how firms allocate funds. Our results further suggest that firms above (below) the target cash holdings tend to build-up more cash reserves and allocate less to investments, dividends, debt retirements and equity repurchases. For the above-target investment firms, we find the opposite as they save less, which further confirms the trade-off between savings and investments in markets where access to external finance is limited. Also, we find that above-target dividend firms allocate less funds to other uses-of-funds and that dividends are resilient or stick-down. This finding points to a strong signalling motive in emerging markets beleaguered by a prevalence of information asymmetry and agency costs, and signals the need for policies that improve information disclosure and access to external finance.

Our study makes several contributions to the literature. First, we provide further empirical evidence from a richer framework that simultaneously models all uses-of-funds while accounting for the inter-temporal and interdependent nature of investment and financing decisions. Adopting this approach helps introduce some order in the rich body of empirical evidence. This is in stark contrast to the extant studies using a *ceteris paribus* approach (piecemeal approach) of focusing on a single use of funds (e.g., Almeida et al., 2004; Chen, Chen, Schipper, Xu, & Xue, 2012; Guariglia & Yang, 2016; Moshirian, Nanda, Vadilyev, & Zhang, 2017). Our results not only confirm the significant interdependence in investment and financing decisions but also show that firms simultaneously allocate funds across savings, investments, dividend payments, debt retirements and equity repurchases (sources-equal-uses-of-funds). In addition, we find that deviating from optimal investment and financing levels have real implications on corporate decisions or outcomes. These findings suggest that estimates of cash flow sensitivities based on piecemeal approaches and static models should be interpreted with caution as they could lead to biased inferences. Second, we show that firms in emerging markets prioritize savings ahead of investments and other uses-of-funds, which indicates limited access to external finance. Third, we show that the usefulness of investment-cash flow sensitivity has declined and that the measure is more linked to under and over-investment problems rather than financial constraints. A substitute in the form of cash flow sensitivity of cash emerges as a more relevant measure of credit constraints that correlates significantly with changes in credit markets. Fourth, our further analyses show that the significant asymmetries in cash flow sensitivity of cash reported in the literature disappear once negative-cash flow firms are excluded, this helps shed more light on the mixed empirical findings in the literature (Almeida et al., 2004; Bao, Chan, & Zhang, 2012; Machokoto & Areneke, 2020; Riddick & Whited, 2009). Fifth, we provide new evidence on the stickiness of dividend payouts in emerging markets even during the financial crisis when business fundamentals deteriorated. We attribute the dividend stickiness to the prevalence of agency costs and information asymmetry in less-developed capital markets. Sixth, we report a battery of robustness tests aimed at addressing mis-measurement errors associated with Tobin's q (a proxy of future growth opportunities) and provide meaningful comparisons on the relative performance of the estimators in a new and unique emerging market context. Finally, we extend the analyses of financial constraints on all uses-of-funds to understudied emerging markets are institutionally different from

advanced economies, where the literature in concentrated. In doing so, we provide new empirical evidence from an independent and unique emerging market sample that helps to generalize and reconcile the mixed findings in the literature.

The rest of the paper is organized as follows. Section 2 presents a brief background of the context and hypotheses. Section 3 introduces the empirical approach and describes the data used. Section 4 presents the empirical findings and robustness tests. Section 5 concludes.

2 | THE EMERGING-MARKET CONTEXT AND HYPOTHESES

In the following sub-sections, we present a brief overview of the relevant contextual issues to this study and the motivations of our hypotheses.

2.1 | The emerging market context

By way of motivation, we plot two commonly used measures of financial development (stock market capitalization-to-GDP and private debt-to-GDP) for the sampled countries, and other selected emerging and developed economies. Figure 1 presents a scatterplot of the average stock market capitalization-to-GDP (%) and private credit-to-GDP (%) with the superimposed average GDP (constant 2010 USD) over the sample period.

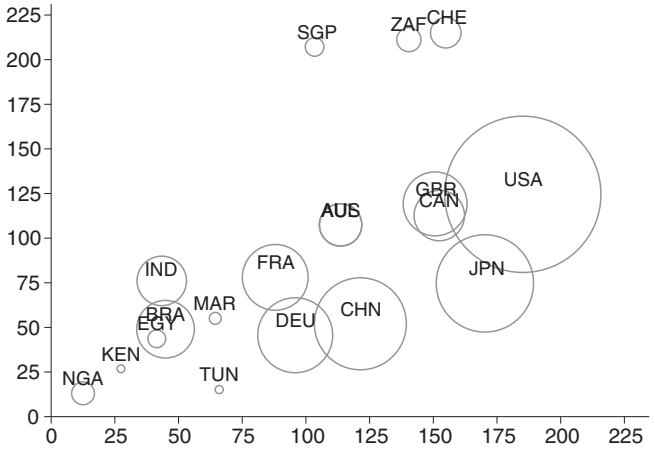

FIGURE 1 Financial development and economic growth. The figure presents a scatter plot of stock market capitalization-to-GDP (%) and private credit-to-GDP (%) with superimposed average GDP (constant 2010 USD). The depicted emerging and developed countries (FIC Codes) are Australia (AUS), Brazil (BRA), Canada (CAN), China (CHN), Egypt (EGY), France (FRA), Germany (DEU), India (IND), Ivory Coast (CIV), Japan (JPN), Kenya (KEN), Morocco (MAR), Nigeria (NGA), Singapore (SGP), South Africa (ZAF), Switzerland (CHE), Tunisia (TUN), UK (GBR) and USA (USA). The data is drawn from *The World Bank* over the period 2000–2015. All variables used are defined in Appendix A

Figure 1 shows that most African countries consistently rank below other emerging and developed economies, except for South Africa. The scatterplots are in line with Mu et al. (2013), who find that the African bond markets are still in their infancy. Similarly, Gwatidzo and Ojah (2014) document a significant influence of non-traditional factors (e.g., education of the managers, location, legal infrastructure and location) on financing decisions of firms operating in less-developed African economies.

The case of South Africa, as depicted in Figure 1, is unique among several dimensions. The country appears to have robust stock and bond markets as it is ranked second only to Switzerland based on stock market capitalization-to-GDP, and fourth just below the U.S., Japan and UK based on private debt-to-GDP. Nevertheless, South Africa has lower levels of GDP per capita relative to the other selected exemplary emerging and developed economies. This finding highlights significant disparities, where finance is only accessible to a few companies and individuals. Our observation corroborates Gwatidzo and Ojah (2014) who find that, within South Africa, only a few companies can access formal non-bank financing as most companies either cannot afford the interest rates charged by banks or fall-short of the stringent loan requirements imposed by lenders in risky capital markets (most companies and individuals do not have the required collateral or credit history).

The low levels of financial development depicted in Figure 1 for the sampled emerging countries have several implications on how firms allocate funds. For example, Oztekin (2015) report significant differences in corporate debt levels, with South African firms (the only African country in their sample) having 13% of their total assets financed by debt. This is comparatively lower than those in Brazil (27%), Canada (18%), France (23%), Germany (16%), India (28%), Japan (23%), Singapore (19%), Switzerland (24%), UK (17%) and USA (23%). This limited access to finance, in particular long-term debt, increases equity dependence as reported by Mu et al. (2013), thereby making the payment of dividends a priority for most emerging market firms. This equity dependence reinforces the dual role of dividends—as both monitoring (disciplinary role) and signalling devices—in markets characterized by a high degree of information asymmetry and agency costs (see Brav et al., 2005; He et al., 2017; Iturriaga & Crisóstomo, 2010). For the case of emerging markets, the disciplinary role of corporate debt is forfeited, and dividends naturally emerge as the best and most viable option given that directly policing or monitoring managers is not feasible as it is only costly but fraught with institutional deficiencies that cannot be easily addressed by investors. The lack of a robust corporate

debt market also increases reliance on internal financing sources such as retained earnings and cash reserves (see Guariglia & Yang, 2018). This implies a significant focus on buffering of cash reserves to hedge against future shortfalls. However, this conservatism (accumulation of large cash reserves) leads to under-investment problems as firms can only increase cash reserves by reducing or postponing current investments.

On the other hand, as access to external finance is limited in emerging markets, the correlation between investments and cash flow (investment-cash flow sensitivity) should be much higher as firms rely mostly on internal capital and are still heavily invested in tangible or physical capital as noted by Moshirian et al. (2017). In addition, as most of the corporate borrowings have shorter maturities and are in the form of bank loans (see Gwatidzo & Ojah, 2014; Sorge, Zhang, & Koufopoulos, 2017), emerging market firms are likely to commit a significant proportion of funds to debt retirements. This concentration of short-term borrowings not only increases maturity mismatch and refinancing risks but could also lead to short-termism, with managers focusing more on servicing and refinancing debt at the expense of other strategic or long-term goals.

In summary, a combination of the above unique peculiarities makes emerging markets a utilitarian context or an independent sample that is akin to a laboratory setting for reconciling and validating existing theories and findings from studies in developed economies.

2.2 | Hypotheses

A large body of literature starting with Fazzari et al. (1988) examines the effects of financial constraints on real decisions by examining the sensitivity of investment to cash flow. Firms facing binding financial constraints tend to rely mostly on internal funds as they have limited access to external financing sources (see, Almeida & Campello, 2007; Chen & Chen, 2012; Fazzari et al., 1988; Moshirian et al., 2017). The limited access to external finance should lead to high investment-cash flow sensitivity and cash flow sensitivity of cash, with the sensitivity being more pronounced in emerging economies that have less-developed institutions relative to other advanced economies. Also, according to Moshirian et al. (2017), firms in emerging economies are structurally different from those in advanced economies as they operate with more physical capital. These high investments in physical capital should lead to a higher correlation between investment and operating cash flow for emerging market firms relative to those reported in the literature from developed economies.[3]

At the same time, Almeida et al. (2004), Riddick and Whited (2009) and Bao et al. (2012) also show that cash flow sensitivity of cash increases with credit constraints. Similarly, Khurana, Martin, and Pereira (2006) report a decrease in cash flow sensitivity of cash with financial development. In addition, Chang et al. (2014) also find that U.S. firms allocate a high proportion of funds to savings and debt retirements. In contrast, they find that US firms allocate less to investment, equity repurchases and dividends in that order. Lewellen and Lewellen (2016) documents similar variations in cash flow allocations for U.S. firms, except that most of the funds are allocated towards investments rather than savings. The studies mentioned above point to significant variations in the allocation of funds across competing uses with credit constraints. Therefore, our first hypothesis is stated as follows:-

Hypothesis 1 (H1) *Cash flow sensitivities for cash, dividends and debt retirements are higher and lower for investments and equity repurchases.*

Although there is some emerging consensus that credit constraints affect corporate decisions, the measurement and channels or mechanism of this effect is debated. The mixed results across different measures of financial constraints have further compounded the debate. For example, Hadlock and Pierce (2010) and Chang et al. (2014) have both cast doubts on the appropriateness of the KZ Index (Kaplan & Zingales, 1997) as their test return results that are impulsive and unreliable. Similarly, Chen and Chen (2012) find no differences in investment-cash flow sensitivity between supposedly constrained and unconstrained firms classified based on traditional measures of credit constraints (size, firm-age, credit ratings, dividend payouts and corporate governance index). However, a recent study by Chang et al. (2014) finds significant differences in cash flow sensitivities based on some of the above mentioned measures of credit constraints. They find that constrained firms categorized based on the WW Index (Whited & Wu, 2006), HP Index (Hadlock & Pierce, 2010), size, dividend-paying status and credit ratings allocate most of their funds to savings and equity repurchases, and less to investments, dividends and debt retirements relative to their unconstrained counterparts. Lewellen and Lewellen (2016) report similar differences which are in stark contrast to Chen et al. (2012) who find no differences. They attribute the disparities in cash flow sensitivities, in particular, the low investment-cash flow sensitivity as reported by Chen et al. (2012), to the use of noisy measures or proxies of cash flow.

In addition to the debate on the measures of financial constraints, an emerging tranche of the literature on

whether cash flow sensitivity of cash is asymmetric or not reports similarly mixed results. For example, whereas Almeida et al. (2004), Khurana et al. (2006), Chang et al. (2014), Lewellen and Lewellen (2016), Grullon, Larkin, and Michaely (2018) and McLean and Zhao (2018) find a positive effect of cash flow on changes in cash (the cash flow sensitivity of cash), Riddick and Whited (2009) and Bao et al. (2012) find this effect to be negative. They single out mis-measurement errors associated with Tobin's *q* as the main reason for the differences in cash flow sensitivity of cash. However, their proposed way of addressing the mis-measurement errors *via* generalized method of moments (GMM) estimators based on higher-order moments is similarly debated as Almeida and Campello (2007), Chang et al. (2014) and Lewellen and Lewellen (2016) show that these estimators return economically impulsive cash flow sensitivities of cash. This mixed evidence leaves the central question of whether financial constraints affect real decisions open to debate, especially in emerging markets where the literature is sparse, and access to external finance is limited. Accordingly, we propose and test the following hypothesis using several proxies of financial constraints:-

Hypothesis 2 (H2) *Cash flow sensitivities are heterogeneous or asymmetric and differ across different measures of financial constraints.*

3 | DATA AND METHODOLOGY

3.1 | Data

We extract accounting data from *Datastream* and macroeconomic data from *The World Bank* database over the period 2000–2015. Our sample coverage is purely dictated by data availability. Following the standard convention in the literature, we drop firms in heavily regulated financial and utility sectors (Brav, 2009; Flannery & Rangan, 2006; Oztekin, 2015). We exclude firms with missing data on key variables. To reduce the compounding effect of outliers or merger and acquisitions, we drop firms with more than 100% growth in assets or sales and winsorize all variables used at the lower and upper one percentile. Our final sample consists of 639 firms with 5,940 firm-year observations from Egypt, Ghana, Ivory Coast, Kenya, Morocco, Nigeria, South Africa and Tunisia. All variables used are defined in Appendix A.

Table 1 reports the summary statistics and differences in cash flow and uses-of-funds conditional on four proxies of financial constraints. Panel A, for the main variables, shows that the mean (median) of 0.018 (0.008), 0.079 (0.064), 0.054 (0.034), 0.019 (0.000), −0.061 (−0.057), and 0.156 (0.138) for changes in cash (ΔCash), investments (Capex), dividends (Div), changes in debt (ΔD), changes in equity (ΔE) and cash flow (CF), respectively. Panel B of Table 1 shows that, on average, constrained firms have lower CF, investments (Capex), pay less in dividends (Div) and retire less debt (ΔD) and repurchase less equity (ΔE). At the same time, constrained firms save (ΔCash) relatively more than unconstrained firms. These differences appear to be in line with our expectations that constrained firms are likely to prioritize enhancing financing flexibility (ΔCash) ahead of other uses-of-funds (Capex, Div, ΔD and ΔE).

Table 2 presents the pairwise Spearman (Pearson) correlations in the above (below) diagonal. The pairwise correlations show that CF is positively correlated with changes in cash (ΔCash), investments (Capex) and dividends (Div), while it is negatively correlated with changes in debt (ΔD) and changes in equity (ΔE). These correlations are in line with our initial predictions on the uses-of-funds (CF allocations). Table 2 also shows that changes in cash (ΔCash) are negatively correlated with investments (Capex) and dividends (Div), which suggests that firms build-up cash reserves by forgoing investments and curtailing dividend payments. The correlations of the other control variables are consistent with the literature, and for brevity, we only further discuss key variables of interest.

3.2 | Methodology

To examine CF sensitivities, we follow Gatchev et al. (2010) and simultaneously estimate the following system of equations:

$$\begin{bmatrix} \Delta\text{Cash}_{ijt} \\ \text{Capex}_{ijt} \\ \text{Div}_{ijt} \\ \Delta\text{D}_{ijt} \\ \Delta\text{E}_{ijt} \end{bmatrix} = \mathbf{L}\left[\text{CF}_{ijt}\right] + \mathbf{K}\begin{bmatrix} \Delta\text{Cash}_{ijt-1} \\ \text{Capex}_{ijt-1} \\ \text{Div}_{ijt-1} \\ \Delta\text{D}_{ijt-1} \\ \Delta\text{E}_{ijt-1} \end{bmatrix} + \mathbf{M}\begin{bmatrix} q_{ijt-1} \\ \text{SG}_{iJt-1} \\ Size_{ijt-1} \\ \text{PPE}_{ijt-1} \end{bmatrix} + \begin{bmatrix} \epsilon_{ijt}^{\Delta\text{Cash}} \\ \epsilon_{ijt}^{\text{Capex}} \\ \epsilon_{ijt}^{\text{Div}} \\ \epsilon_{ijt}^{\Delta\text{D}} \\ \epsilon_{ijt}^{\Delta\text{E}} \end{bmatrix} \quad (1)$$

where ΔCash_{ijt}, Capex_{ijt}, Div_{ijt}, ΔD_{ijt} and ΔE_{ijt} are the changes in cash, investments, dividends, changes in debt

TABLE 1 Basic statistics

Panel A: Main variables										
#	Variables	N	Mean	*SD*	Min	p25	Median	p75	Max	Trend
(1)	ΔCash	5,940	0.018	0.079	−0.394	−0.019	0.008	0.047	0.679	−0.021
(2)	Capex	5,940	0.079	0.063	0.000	0.035	0.064	0.107	0.529	−0.156***
(3)	Div	5,940	0.054	0.067	0.000	0.013	0.034	0.070	0.730	0.085**
(4)	ΔD	5,940	0.019	0.084	−0.525	−0.016	0.000	0.045	0.802	0.145***
(5)	ΔE	5,940	−0.061	0.110	−0.795	−0.102	−0.057	−0.020	0.732	0.157***
(6)	CF	5,940	0.156	0.100	0.000	0.085	0.138	0.208	0.703	−0.299***
(7)	q	5,940	1.727	1.155	0.284	1.090	1.459	2.060	50.535	3.420***
(8)	SG	5,940	0.126	0.188	−0.496	0.034	0.110	0.203	0.976	−0.832***
(9)	Size	5,940	15.255	1.974	8.039	13.817	15.455	16.671	19.294	4.925***
(10)	PPE	5,940	0.364	0.222	0.009	0.171	0.331	0.546	0.977	−0.009
(11)	WW	5,940	−0.734	0.096	−0.991	−0.801	−0.748	−0.666	−0.370	−0.227***
(12)	HP	5,940	−11.497	0.943	−12.369	−12.135	−12.079	−10.989	−6.765	−3.283***
(13)	LogAge	5,940	2.436	0.516	1.099	2.079	2.485	2.833	3.258	8.511***

Panel B: Differences across sub-samples								
		Variables	CF	ΔCash	Capex	Div	ΔDebt	ΔEquity
FC	Category	Metric	(1)	(2)	(3)	(4)	(5)	(6)
WW	Low	Mean	0.156	0.012	0.086	0.062	0.025	−0.068
		Median	0.137	0.005	0.074	0.038	0.004	−0.061
	High	Mean	0.157	0.025	0.072	0.047	0.012	−0.054
		Median	0.141	0.012	0.056	0.029	0.000	−0.053
	Diff *p-value*	Mean	[0.767]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
		Median	[0.027]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
HP	Low	Mean	0.152	0.013	0.086	0.058	0.027	−0.062
		Median	0.134	0.005	0.074	0.035	0.006	−0.059
	High	Mean	0.162	0.024	0.070	0.050	0.008	−0.060
		Median	0.147	0.012	0.053	0.031	0.000	−0.054
	Diff *p-value*	Mean	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.525]
		Median	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.003]
Size	Low	Mean	0.169	0.022	0.073	0.058	0.010	−0.066
		Median	0.153	0.011	0.056	0.035	0.000	−0.058
	High	Mean	0.143	0.013	0.086	0.050	0.028	−0.056
		Median	0.125	0.005	0.074	0.031	0.008	−0.057
	Diff *p-value*	Mean	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
		Median	[0.000]	[0.000]	[0.000]	[0.009]	[0.000]	[0.468]
LogAge	Low	Mean	0.165	0.023	0.076	0.053	0.015	−0.059
		Median	0.147	0.010	0.059	0.033	0.000	−0.056
	High	Mean	0.145	0.012	0.083	0.056	0.024	−0.064
		Median	0.128	0.005	0.071	0.035	0.007	−0.059
	Diff *p-value*	Mean	[0.000]	[0.000]	[0.000]	[0.104]	[0.000]	[0.129]
		Median	[0.000]	[0.000]	[0.000]	[0.095]	[0.000]	[0.002]
Crisis	Pre-crisis	Mean	0.168	0.024	0.084	0.054	0.018	−0.071
		Median	0.147	0.010	0.065	0.034	0.000	−0.067

(Continues)

TABLE 1 (Continued)

Panel B: Differences across sub-samples								
		Variables	**CF**	**ΔCash**	**Capex**	**Div**	**ΔDebt**	**ΔEquity**
	Crisis	Mean	0.155	0.013	0.079	0.059	0.013	−0.062
		Median	0.139	0.005	0.064	0.038	0.000	−0.058
	Diff *p-value*	Mean	[0.000]	[0.000]	[0.009]	[0.016]	[0.045]	[0.010]
		Median	[0.005]	[0.001]	[0.533]	[0.012]	[0.652]	[0.000]
Countries	Others	Mean	0.174	0.012	0.079	0.083	0.011	−0.073
		Median	0.154	0.005	0.057	0.063	0.000	−0.067
	South Africa	Mean	0.152	0.019	0.079	0.048	0.021	−0.058
		Median	0.136	0.008	0.065	0.030	0.001	−0.056
	Diff *p-value*	Mean	[0.000]	[0.003]	[0.975]	[0.000]	[0.001]	[0.000]
		Median	[0.000]	[0.100]	[0.023]	[0.000]	[0.000]	[0.000]

Note: The table presents the summary statistics of the variables used. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and 10 % levels, respectively.

and changes in equity, respectively, for firm i in country j at time t; **L**, **K** and **M** are matrices of parameter coefficients of size 5×1, 5×5, 5×4, respectively; CF_{ijt} is cash flow and the control variables are; q_{ijt-1} is lagged market-to-book value, SG_{iJt-1} is lagged sales growth, $Size_{ijt-1}$ is the lagged logarithm of total assets, and PPE_{ijt-1} is lagged property, plant and equipment; and, $\epsilon_{ijt}^{\Delta Cash}$, ϵ_{ijt}^{Capex}, ϵ_{ijt}^{Div}, $\epsilon_{ijt}^{\Delta D}$ and $\epsilon_{ijt}^{\Delta E}$ are the error terms. The literature informs the choice of control variables (e.g., Almeida et al., 2004; Chang et al., 2014; Chen & Chen, 2012; Gatchev et al., 2010). The sources-equal-uses-of-funds or adding-up constraint (CF should equal the uses-of-funds) requires that $\mathbf{i}'\mathbf{L} = 1$, $\mathbf{i}'\mathbf{K} = \underset{1\times 5}{0}$ and $\mathbf{I}'\mathbf{am} = \underset{1\times 4}{0}$ (see Gatchev et al., 2010). The adding-up constraint will naturally be satisfied if there are no income items that have been directly reported in total equity instead of the income statement (a practice commonly known as "dirty-surplus accounting" [see Chang et al., 2014; Lewellen & Lewellen, 2016]).

To study the impact of financial constraints on CF sensitivities, we split the sample based on the WW Index (WW) (Whited & Wu, 2006), HP Index (HP) (Hadlock & Pierce, 2010), firm-size (Size) and firm-age (LogAge).[4] In each year for each country, we categorize firms as being constrained (unconstrained) if they are below (above) the median firm-size and firm-age, and unconstrained (constrained) if they are below (above) the median of the WW Index and HP Index. Other extant studies use different categorization or classification schemes such as the upper and lower terciles or quantiles of the distribution to study asymmetry in CF sensitivities (see Almeida et al., 2004; Almeida, Hsu, & Li, 2013; Almeida & Philippon, 2007; Bao et al., 2012; Chen et al., 2012). As using these schemes increase the likelihood of finding differences, we contend that using the median is a more conservative approach and preferable, especially in cases where the sample size is small, or the distribution of the data is skewed. We, however, take comfort in that our untabulated results based on the upper and lower terciles or quantiles classification schemes do not materially differ from the main findings.

We estimate our models simultaneously using seemingly unrelated regressions (SUR) in line with recent literature (see Andres, Cumming, Karabiber, & Schweizer, 2014; Chang et al., 2014; Gatchev et al., 2010; Gatchev, Spindt, & Tarhan, 2009). Using this framework enables us to simultaneously account for both the interdependence and inter-temporal nature of investment and financing decisions, and also the sources-equal-uses-of-funds or adding-up constraint (CF should equal the uses-of-funds). As argued by Gatchev et al. (2010), overlooking the inter-temporal and interdependent nature of corporate investment and financing decisions could lead to bias inferences on CF sensitivities. However, for robustness and to ensure comparability with prior studies, we also present results based on the equation-by-equation approach (separately estimated equations). Specifically, we also estimate our models using ordinary least squares (OLS), fixed effects

TABLE 2 Correlations

#	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	ΔCash	1	−0.103***	−0.037***	0.019	0.160***	0.314***	−0.017	0.068***
(2)	Capex	−0.093***	1	0.049***	0.235***	−0.026**	0.285***	0.199***	0.088***
(3)	Div	−0.052***	0.079***	1	0.055***	−0.526***	0.469***	0.581***	0.059***
(4)	ΔD	0.080***	0.262***	0.067***	1	0.030**	−0.110***	0.146***	0.088***
(5)	ΔE	0.199***	−0.036***	−0.522***	−0.043***	1	−0.306***	−0.307***	−0.044***
(6)	CF	0.319***	0.300***	0.573***	−0.036***	−0.290***	1	0.429***	0.175***
(7)	*q*	0.033**	0.143***	0.472***	0.120***	−0.187***	0.381***	1	0.167***
(8)	SG	0.071***	0.117***	0.083***	0.075***	−0.030**	0.197***	0.087***	1
(9)	Size	−0.096***	0.127***	−0.004	0.076***	0.013	−0.071***	0.063***	−0.031**
(10)	PPE	−0.049***	0.393***	−0.041***	−0.014	0.026**	0.060***	−0.025*	−0.061***
(11)	WW	0.087***	−0.134***	−0.116***	−0.083***	0.039***	−0.008	−0.125***	0.042***
(12)	HP	0.054***	−0.096***	−0.049***	−0.107***	0.014	0.047***	−0.079***	0.021
(13)	LogAge	−0.043***	−0.008	−0.048***	0.076***	0.062***	−0.158***	0.027**	−0.150***
#	**Variables**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**			
(1)	ΔCash	−0.108***	−0.047***	0.102***	0.061***	−0.048***			
(2)	Capex	0.200***	0.448***	−0.199***	−0.188***	0.059***			
(3)	Div	−0.014	−0.097***	−0.142***	−0.052***	−0.039***			
(4)	ΔD	0.099***	0.000	−0.097***	−0.139***	0.105***			
(5)	ΔE	0.051***	0.083***	0.026**	−0.019	0.097***			
(6)	CF	−0.094***	0.055***	0.009	0.062***	−0.159***			
(7)	*q*	0.129***	−0.081***	−0.201***	−0.167***	0.107***			
(8)	SG	−0.034***	−0.084***	0.032**	0.051***	−0.134***			
(9)	Size	1	0.278***	−0.950***	−0.850***	0.445***			
(10)	PPE	0.253***	1	−0.255***	−0.184***	0.089***			
(11)	WW	−0.944***	−0.240***	1	0.821***	−0.428***			
(12)	HP	−0.899***	−0.165***	0.862***	1	−0.462***			
(13)	LogAge	0.425***	0.069***	−0.410***	−0.456***	1			

Notes: The table presents the pairwise Spearman (Pearson) correlations in the above (below) diagonal. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and 10 % levels, respectively.

(FE), the higher-order moments estimator of Erickson and Whited (2000, 2002) (GMM3–GMM5), instrumental variables 2SLS (IV-2SLS) (Baum, Schaffer, & Stillman, 2008), instrumental variables GMM (IV-GMM) (Baum et al., 2008; Baum, Schaffer, & Stillman, 2003), difference general method of moments (DIFF-GMM) (Arellano & Bond, 1991), system general method of moments (SYS-GMM) (Blundell & Bond, 1998) and Panel Vector Autoregression models (PVAR) (Abrigo & Love, 2016). The latter methods use higher-order moments or instrumental variables to address mis-measurement errors associated with Tobin's *q*, a proxy of future growth opportunities.[5]

4 | RESULTS

In this section, we first estimate a system of equations with and without the sources-equal-uses-of-funds (adding-up) constraint to understand how firms allocate operating CF. Next, we examine the effects of financial constraints on CF sensitivities conditional on several commonly used proxies of financial constraints. We then use the financial crisis as a *quasi-natural experiment* to better understand this effect during significant contractions in credit supply. Finally, we present a battery of robustness tests aimed at addressing several problems surrounding the study of CF sensitivities.

4.1 | The investment and financing-CF sensitivities

Table 3 presents the estimation results of a system of equations depicted by Equation (1) that relate the uses-of-funds to CF and several control variables. Columns (1)–(5) and (6)–(10) present estimation results for models without and with the sources-equal-uses-of-funds (adding-up) constraint, respectively.

Columns (1)–(5) of Table 3, for estimates of CF sensitivities based on models without the sources-equal-uses-of-funds constraint, show that firms allocate most of the internally generated CF to savings (43.8%), followed by dividends (17.7%), debt (13.6%), equity (10.2%) and investments (8.4%) in that order. The results show that, on average, a firm increases savings by 2.97%, and reduce debt by 1.14%, while paying 1.13% in dividends, and at the same time allocating 0.87% to equity repurchases, and only investing 0.57% for a one *SD* increase in operating CF. This pecking order in CF allocations is consistent with our first hypothesis. It also shows that emerging market firms are subject to significant credit constraints as the allocations to savings are 5.2 times higher than those to investments (Capex). The results are in stark contrast to Chang et al. (2014), who find that U.S. firms allocate 28% and 33% of operating CF to investments and savings, respectively.

Columns (1)–(5) further show that investment and financing decisions are inter-temporal and interdependent as the coefficients of the lagged uses-of-funds (ΔCash, Capex, Div, ΔD and ΔE) are significant. Our untabulated results, when we exclude the lagged uses-of-funds, further confirm the bias in the estimates of CF sensitivities based on models that overlook the inter-temporal and interdependent nature of investment and financing decisions. The estimates from these models return comparably higher CF allocations to equity purchases and dividend payments and lower allocations to savings, investments and debt retirements. Our further analyses using an equation-by-equation approach confirms this bias and emphasize the need to account for the inter-temporal and interdependent nature of corporate decisions.

The estimates of CF sensitivities based on models with the sources-equal-uses-of-funds (adding-up) constraint, in Columns (6)–(10), are similar to those in Columns (1)–(5) based on models estimated without the adding-up constraint. This finding suggests that our results are robust to the critique that CF sensitivities which are not estimated simultaneously and without explicitly imposing the adding-up constraint lead to biased inferences (see Gatchev et al., 2010). Instead, our results corroborate Chang et al. (2014) and Lewellen and Lewellen (2016) who argue that if variables are consistently defined in the absence of "dirty-surplus accounting" (a practice of directly reporting income items in total equity rather than the income statement—this is akin to by-passing the income statement), the adding-up constraint will naturally be satisfied. However, in contrast to the aforementioned studies, Columns (6)–(10) show lower allocations to investments (Capex) and equity repurchases (ΔE), and higher allocations to savings, dividends and debt retirements (except for Chang et al. (2014) who report CF allocations of 32% to debt retirements in the U.S.). The differences indicate the cautious investment approaches of firms that operate in environments where access to external finance is limited. At the same time, enhancing financial flexibility by building substantial cash reserves and signalling to the market by pre-committing to pay dividends appear to be more pressing goals for firms in emerging markets relative to those in developed economies.

In summary, our estimates of CF sensitivities reveal several noteworthy patterns; (1) the high allocations to savings and dividends suggest two primary motives—the need to enhance financial flexibility through buffering cash reserves when access to external finance is limited, and at the same, pre-committing to paying dividends as a way of reducing information asymmetry and agency costs, and (2) a high reliance on short-term debt or short-term debt dependence as evidenced by the significantly higher CF allocations to debt retirements, (3) low-equity repurchases (which indicate equity dependence) highlighting the less-developed nature of the capital markets, and (4) under-investment problems as evidenced by the significantly lower allocation of funds to investments. Although the above results reveal unique insights into how firms allocate operating CF, they are limiting as the linear models used implicitly assume homogeneity in CF sensitivities. Yet, theory and anecdotal evidence point to significant asymmetry or heterogeneity in investment and financing decisions.

4.2 | The effects of financial constraints on CF sensitivities

We next explore the impact of financial constraints on investment and financing decisions by comparing CF sensitivities or allocations between constrained and unconstrained firms. We categorize or classify firms into the low (high) regime if they are below (above) the median of the WW Index (WW), HP Index (HP), firm-size (Size) and firm-age (LogAge) in each year for each country. Table 4 summarizes the results for the subsamples.

TABLE 3 Cash flow sensitivities

Panel A: Main models										
	Models without constraints					**Models with constraints**				
	ΔCash	Capex	Div	ΔD	ΔE	ΔCash	Capex	Div	ΔD	ΔE
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CF_{ijt}	0.438***	0.084***	0.177***	−0.136***	−0.102***	0.444***	0.084***	0.185***	−0.152***	−0.135***
	(0.013)	(0.007)	(0.007)	(0.014)	(0.017)	(0.013)	(0.007)	(0.006)	(0.013)	(0.012)
q_{ijt-1}	−0.000	0.002***	0.007***	0.005***	0.004**	−0.000	0.002***	0.007***	0.005***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SG_{ijt-1}	−0.002	0.001	0.020***	0.001	−0.016**	−0.005	0.001	0.015***	0.009*	0.002
	(0.005)	(0.003)	(0.003)	(0.006)	(0.007)	(0.005)	(0.003)	(0.003)	(0.006)	(0.005)
$Size_{ijt}$	−0.014***	−0.013***	0.012***	−0.034***	−0.029***	−0.018***	−0.013***	0.006***	−0.022***	−0.004
	(0.003)	(0.002)	(0.002)	(0.004)	(0.005)	(0.003)	(0.002)	(0.002)	(0.004)	(0.003)
PPE_{ijt}	0.149***	−0.096***	−0.115***	−0.025	0.142***	0.166***	−0.096***	−0.092***	−0.070***	0.048***
	(0.016)	(0.009)	(0.009)	(0.018)	(0.021)	(0.016)	(0.009)	(0.008)	(0.016)	(0.015)
$\Delta Cash_{ijt-1}$	−0.228***	0.001	0.025***	0.023*	−0.065***	−0.212***	0.001	0.046***	−0.017	−0.149***
	(0.012)	(0.007)	(0.006)	(0.013)	(0.015)	(0.011)	(0.007)	(0.006)	(0.012)	(0.011)
$Capex_{ijt-1}$	−0.113***	0.370***	0.029**	0.272***	−0.075***	−0.122***	0.370***	0.018	0.294***	−0.028
	(0.022)	(0.013)	(0.012)	(0.025)	(0.029)	(0.022)	(0.013)	(0.011)	(0.023)	(0.021)
Div_{ijt-1}	−0.136***	0.019	0.239***	0.207***	−0.204***	−0.148***	0.019	0.224***	0.237***	−0.142***
	(0.023)	(0.014)	(0.013)	(0.026)	(0.031)	(0.023)	(0.014)	(0.012)	(0.024)	(0.023)
ΔD_{ijt-1}	0.024**	−0.017**	−0.080***	−0.098***	0.087***	0.030**	−0.017**	−0.072***	−0.114***	0.055***
	(0.012)	(0.007)	(0.007)	(0.014)	(0.016)	(0.012)	(0.007)	(0.006)	(0.012)	(0.012)
ΔE_{ijt-1}	0.064***	−0.035***	−0.023***	0.008	0.035**	0.067***	−0.035***	−0.018***	−0.001	0.015
	(0.011)	(0.006)	(0.006)	(0.012)	(0.014)	(0.011)	(0.006)	(0.005)	(0.011)	(0.010)
N	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940
R^2	0.24	0.19	0.29	0.06	0.04	0.24	0.19	0.28	0.06	0.03
Panel B: Correlation of residuals across the system of equations										
	Models without constraints					**Models with constraints**				
Variables	ΔCash	Capex	Div	ΔD	ΔE	ΔCash	Capex	Div	ΔD	ΔE
ΔCash	1.000***	−0.217***	−0.234***	0.164***	0.240***	1.000***	−0.216***	−0.227***	0.165***	0.237***
Capex	−0.184***	1.000***	0.053***	0.313***	0.026**	−0.184***	1.000***	0.058***	0.311***	0.017
Div	−0.222***	0.003	1.000***	0.106***	−0.343***	−0.219***	0.003	1.000***	0.102***	−0.354***
ΔD	0.145***	0.296***	0.117***	1.000***	−0.007	0.143***	0.295***	0.111***	1.000***	−0.001
ΔE	0.253***	0.057***	−0.371***	−0.069***	1.000***	0.246***	0.056***	−0.377***	−0.058***	1.000***

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. Panel A presents the main models. Panel B presents the Spearman (above diagonal) and Pearson (below diagonal) pairwise correlations of the residuals across the equations. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and 10 % levels, respectively.

TABLE 4 The effect of credit constraints on investment and financing-cash flow sensitivities

		ΔCash	Capex	Div	ΔD	ΔE
FC	Variables	(1)	(2)	(3)	(4)	(5)
WW index	CF^{Low}	0.351***	0.106***	0.254***	−0.135***	−0.154***
		(0.013)	(0.007)	(0.007)	(0.014)	(0.013)
	CF^{High}	0.540***	0.064***	0.099***	−0.191***	−0.106***
		(0.012)	(0.007)	(0.006)	(0.012)	(0.012)
	Diff *p-value*	[0.000]	[0.000]	[0.000]	[0.003]	[0.006]
HP index	CF^{Low}	0.358***	0.115***	0.241***	−0.172***	−0.115***
		(0.013)	(0.007)	(0.006)	(0.015)	(0.013)
	CF^{High}	0.554***	0.047***	0.090***	−0.156***	−0.153***
		(0.012)	(0.007)	(0.006)	(0.012)	(0.012)
	Diff *p-value*	[0.000]	[0.000]	[0.000]	[0.402]	[0.026]
Size	CF^{Low}	0.514***	0.053***	0.145***	−0.134***	−0.155***
		(0.012)	(0.007)	(0.006)	(0.012)	(0.012)
	CF^{High}	0.348***	0.122***	0.226***	−0.188***	−0.115***
		(0.013)	(0.008)	(0.006)	(0.015)	(0.013)
	Diff *p-value*	[0.000]	[0.000]	[0.000]	[0.004]	[0.024]
LogAge	CF^{Low}	0.533***	0.061***	0.108***	−0.212***	−0.085***
		(0.013)	(0.007)	(0.006)	(0.013)	(0.012)
	CF^{High}	0.340***	0.124***	0.268***	−0.068***	−0.200***
		(0.012)	(0.007)	(0.007)	(0.014)	(0.012)
	Diff *p-value*	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. All models include control variables and the lagged use of funds (but not reported). The correlation of residuals across the system of equations is not reported for brevity. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and 10 % levels, respectively.

Column (1) of Table 4 shows that constrained firms (high-WW, high-HP, small and young firms) save 50%–60% more than their unconstrained counterparts (low-WW, low-HP, large and mature firms). The asymmetric CF allocations to savings conditional on financial constraints are in line with our second hypothesis (Hypothesis 2) and consistent but higher than those reported by Chang et al. (2014) in the U.S. (of between 35% and 38%). This propensity to save as popularized by Almeida et al. (2004), Riddick and Whited (2009) and Bao et al. (2012), which is higher in our case of emerging market firms, indicate the primacy of maintaining or enhancing financial flexibility through holding substantial cash reserves. This finding is line with Almeida et al. (2004) and suggests that holding vast cash reserves is particularly important when access to external finance is likely to be more uncertain given the firm's current financial position (as would be the case for constrained firms) and its operating environment. As argued by Guariglia and Yang (2018) for the case of Chinese firms, firms operating in emerging markets that are characterized by limited access to external finance tend to rely mostly on self-financing sources (retained earnings and cash holdings). The need to hedge against future shortfalls explains the high propensity to save that we document in an environment beleaguered by institutional voids.

As shown in Column (2), our sampled firms only allocate 8.4% of the funds to investments. This allocation is much lower than expected and those reported by Chang et al. (2014) and Lewellen and Lewellen (2016) of 23% and 26%, respectively. The differences are somewhat surprising as emerging market firms are still heavily invested in physical capital and have limited access to external finance (Moshirian et al., 2017), which should result in higher investment-CF sensitivities (allocations of CF to investments) relative to developed economies. To the extent that emerging markets offer a unique and independent sample, our contrasting findings further

corroborate Chen et al. (2012) who report decreases in investment-cash flow sensitivity even during the financial crisis when credit constraints were supposedly more binding. Based on this finding, we, therefore, conclude that investment-CF sensitivities are not good proxies for financial constraints as they are lower rather than higher for emerging market firms that are more subject to binding credit constraints.

Column (3) shows that allocations of funds to dividend payments are similarly asymmetric and consistently lower for financially constrained relative to unconstrained firms. These results are in line with the asymmetric savings and investment behaviour we observed in Columns (1) and (2), which suggest that financially constrained firms prioritize enhancing financial flexibility ahead of investments and would similarly, as in Column (3), not pay much in dividends. The findings prevail despite the central role of dividends as signalling devices for firms operating in emerging markets that are characterized by a high degree of information asymmetry. We put forth two reasons why the sampled firms would allocate lower proportions of operating CF to dividend payments: (1) constrained firms being less-profitable have less to payout and would not pre-commit to dividends they cannot sustain, and (2) the few profitable firms would instead save rather than spend as future income-flows are highly uncertain. This conservatism arises due to the considerable wedge between internal and external costs of funds in emerging markets which reinforces the propensity to save rather than spend. Thus, only unconstrained firms with better prospects or future growth opportunities allocate a significant portion of operating CF to dividend payments as a way of signalling their quality, and in the process, reduce information asymmetry and improve access to external finance.

Next, we explore the CF allocations to debt retirements and equity repurchases for which the relevant literature is sparse, especially in emerging economies with less-developed capital markets. Columns (4) and (5) show mixed evidence across the four proxies of financial constraints as we find that financially constrained (unconstrained) firms based on the WW Index and firms-age (HP Index and firm-size) allocate a higher (lower) proportion of operating CF to debt retirements. We find similarly mixed results on equity repurchases, in Column (5), with firms identified as unconstrained (constrained) based on the WW Index and firms-age (HP Index and firm-size) repurchasing more (less) equity than constrained (unconstrained) firms. In this instance, it is not clear why the results based on the WW Index and firms-age (LogAge) categorization or classification schemes are opposite those based on HP Index and firm-size (Size). This situation obtains despite the significant positive Spearman (Pearson) correlation of 0.862 (0.821) between the WW and HP Index in Table 2. The mixed results not only highlight the difficulties encountered when attempting to measure or study the impact of credit constraints on corporate decisions, but also the need for further theoretical frameworks or models. These extensions would inform the empiricist about the underlying channels or mechanisms through which credit constraints affect real decisions.

Overall, our results suggest that financial constraints significantly affect the allocation of funds and that the propensity to save (maintaining or enhancing financial flexibility) positively correlates with credit constraints. At the same time, binding financial constraints are more likely to result in lower rather than higher investment-CF sensitivity. This observation is new and important to the literature as it helps reconcile the mixed empirical findings on investment-CF sensitivity. We argue that using a system of equations offer a better framework to study the impact of financial constraints, especially, in emerging markets where the inter-temporal and independent nature of investment and financing decisions is more apparent with limited access to external finance.

4.3 | The effects of financial constraints on CF sensitivities through the financial crisis

Building on the results in the previous section, we next use the financial crisis as a *quasi-natural experiment* to examine whether CF sensitivities vary with credit constraints before and during the 2008–09 contractions in credit supply. Table 5 summarizes the results for the pre-crisis (Before) and crisis (After) periods.

Table 5 reveals several noteworthy changes in CF sensitivities around the financial crisis. The average sampled firm appears not to alter its savings around the financial crisis, but instead, significantly increase CF allocations to investments and dividend payments. The increased allocations to investments, investment-CF sensitivity, is as expected and in line with the mainstream literature which finds that, when faced with binding credit constraints, firms increasingly rely on internal financing sources (operating CF) (see Fazzari, Hubbard, & Petersen, 2000; Guariglia & Yang, 2016). However, this increase in the correlation between investments and CF is inconsistent with Chen and Chen (2012) and Machokoto, Tanveer, Ishaq, and Areneke (2019) who document a marked decrease in investment-CF sensitivity in the U.S. and UK, respectively, for both constrained and unconstrained firms around the financial crisis. Our results differ from the two aforementioned studies

TABLE 5 Cash flow sensitivities around the financial crisis

		Before (2002–2007)					After (2008–2012)				
		ΔCash	**Capex**	**Div**	**ΔD**	**ΔE**	**ΔCash**	**Capex**	**Div**	**ΔD**	**ΔE**
FC	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
All	CF	0.446***	0.069***	0.142***	−0.161***	−0.182***	0.467***	0.101***	0.179***	−0.153***	−0.100***
		(0.016)	(0.008)	(0.008)	(0.016)	(0.014)	(0.014)	(0.009)	(0.007)	(0.015)	(0.015)
	Pre vs. crisis						[0.316]	[0.009]	[0.001]	[0.719]	[0.000]
WW index	CF^{Low}	0.324***	0.052***	0.197***	−0.243***	−0.184***	0.419***	0.129***	0.240***	−0.116***	−0.096***
		(0.025)	(0.011)	(0.012)	(0.023)	(0.021)	(0.019)	(0.013)	(0.010)	(0.023)	(0.020)
	Pre vs. crisis						[0.002]	[0.000]	[0.007]	[0.000]	[0.003]
	CF^{High}	0.584***	0.067***	0.045***	−0.157***	−0.147***	0.532***	0.080***	0.112***	−0.211***	−0.065***
		(0.019)	(0.012)	(0.011)	(0.021)	(0.018)	(0.020)	(0.013)	(0.009)	(0.020)	(0.021)
	Pre vs. crisis						[0.066]	[0.427]	[0.000]	[0.059]	[0.003]
	Low vs. high	[0.000]	[0.173]	[0.000]	[0.688]	[0.392]	[0.000]	[0.000]	[0.000]	[0.012]	[0.826]
HP index	CF^{Low}	0.328***	0.090***	0.211***	−0.188***	−0.183***	0.403***	0.142***	0.212***	−0.156***	−0.087***
		(0.024)	(0.011)	(0.011)	(0.023)	(0.020)	(0.017)	(0.012)	(0.009)	(0.021)	(0.018)
	Pre vs. crisis						[0.011]	[0.002]	[0.959]	[0.313]	[0.000]
	CF^{High}	0.559***	0.047***	0.068***	−0.167***	−0.159***	0.578***	0.043***	0.115***	−0.179***	−0.085***
		(0.020)	(0.012)	(0.012)	(0.021)	(0.019)	(0.024)	(0.014)	(0.011)	(0.021)	(0.025)
	Pre vs. crisis						[0.545]	[0.834]	[0.003]	[0.685]	[0.017]
	Low vs. high	[0.000]	[0.263]	[0.000]	[0.931]	[0.068]	[0.000]	[0.010]	[0.000]	[0.834]	[0.543]
Size	CF^{Low}	0.548***	0.056***	0.094***	−0.125***	−0.177***	0.508***	0.061***	0.188***	−0.112***	−0.130***
		(0.019)	(0.011)	(0.011)	(0.020)	(0.017)	(0.021)	(0.012)	(0.010)	(0.019)	(0.021)
	Pre vs. crisis						[0.154]	[0.755]	[0.000]	[0.648]	[0.086]
	CF^{High}	0.285***	0.095***	0.199***	−0.255***	−0.166***	0.417***	0.135***	0.153***	−0.253***	−0.041**
		(0.027)	(0.012)	(0.012)	(0.025)	(0.023)	(0.018)	(0.015)	(0.009)	(0.023)	(0.021)
	Pre vs. crisis						[0.000]	[0.034]	[0.002]	[0.963]	[0.000]
	Low vs. high	[0.000]	[0.210]	[0.000]	[0.972]	[0.372]	[0.000]	[0.000]	[0.000]	[0.002]	[0.144]
LogAge	CF^{Low}	0.541***	0.071***	0.083***	−0.197***	−0.109***	0.535***	0.073***	0.104***	−0.220***	−0.069***
		(0.021)	(0.011)	(0.010)	(0.020)	(0.017)	(0.019)	(0.012)	(0.008)	(0.018)	(0.020)
	Pre vs. crisis						[0.839]	[0.916]	[0.110]	[0.393]	[0.128]
	CF^{High}	0.357***	0.074***	0.207***	−0.133***	−0.229***	0.384***	0.149***	0.300***	−0.018	−0.150***
		(0.023)	(0.012)	(0.013)	(0.026)	(0.023)	(0.020)	(0.014)	(0.011)	(0.025)	(0.022)

TABLE 5 (Continued)

	Before (2002–2007)					After (2008–2012)				
	ΔCash	Capex	Div	ΔD	ΔE	ΔCash	Capex	Div	ΔD	ΔE
Pre vs. crisis						[0.379]	[0.000]	[0.000]	[0.001]	[0.013]
Low vs. high	[0.001]	[0.000]	[0.000]	[0.059]	[0.136]	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. Panel A presents the main models. Panel B presents the Spearman (above diagonal) and Pearson (below diagonal) pairwise correlations of the residuals across the equations. All models include control variables and the lagged use of funds (but not reported). The correlation of residuals across the system of equations is not reported for brevity. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, **, *, indicate significance at the one, five, and 10 % levels, respectively.

because emerging market firms are still heavily invested in physical or tangible capital and heavily reliant on internal capital sources, especially during contractions in credit supply, as the capital markets are comparatively less-developed.

Columns (3) and (8), for all firms, show a 26% increase in CF allocations to dividend payments from 0.142 in the pre-crisis period to 0.179 during the financial crisis. This increase is significant at 1% level and surprising as firms had to contend with binding credit constraints during the financial crisis (as evidenced by an 8% decrease in CF for our sample firms). At the same time, we also find a 6% and 44% curtailment in CF allocations to debt retirements and equity repurchases, respectively. However, the decrease is only significant for equity repurchases and not debt retirements, which similarly shows the over-reliance on equity finance in emerging markets. Our untabulated results further show that corporate debt marginally increased from 13.8% to 14.6% over the crisis period, which explains why we observe an insignificant decrease in debt retirements. This equity dependence, which ranges between 85.4%–86.2% of total assets, is synonymous with the less-developed nature of emerging capital markets (see Mu et al., 2013). Put differently, the insignificant changes in CF allocations to debt retirements could also point to difficulties in servicing debt, which is likely to be more problematic in emerging markets where most of the borrowings are in the form of bank loans with short maturities.[6]

Next, we study the differences in CF allocations between constrained and unconstrained firms around the financial crisis. As the financial crisis was primarily an exogenous credit supply shock that originated in the U.S. sub-prime mortgage crisis, we contend that this set-up resembles a *quasi-natural experiment* where the credit supply shock is reliably orthogonal to local investment and financing opportunities (see Chari, Christiano, & Kehoe, 2008; Popov & Rocholl, 2018). Hence, any changes that we observe or document around the financial crisis, in Table 5, are less likely to result from other confounding or feedback effects.

Our analyses around the financial crisis reveal several stylized changes and heterogeneity in CF allocations. Table 5 shows that unconstrained firms significantly increased savings while their constrained counterparts reduced allocations to savings. The decrease in savings for credit-constrained firms mirrors the decline in CF during the financial crisis and point to a diversion of funds towards protecting or smoothing investments. For the changes in CF allocations to investments, we only find a significant increase for unconstrained firms with their constrained counterparts experiencing an insignificant or muted change. This finding is in line with Table

4, and further shows that investment-CF sensitivity is increasingly becoming an unreliable measure of credit constraints.

Our sampled non-utility and non-financial firms significantly increased dividends during the financial crisis, except for large firms that can more easily dispense with the need to signal their quality using dividends. In line with the results in Tables 1 and 4, the increased allocation of funds to dividend payments for the other firm sub-groups (excluding large firms) highlights the central role of dividends as monitoring and signalling devices in emerging markets. As emerging markets are characterized by a high degree of information asymmetry and agency costs, dividends are the only available and viable monitoring and signalling devices given that debt is inaccessible and directly policing managers is not only costly but also fraught with institutional deficiencies. These unique aspects of emerging markets are behind the stickiness and resilience in dividend payouts we have so far documented. The finding is similar to Floyd et al. (2015) who document significant resilience in dividends around the financial crisis in the U.S. but only for banks that use the payouts to signal their profitability and solvency to key stakeholders. For our sampled firms, which are non-utility and non-financial firms, dividends assume a dual role of signalling to investors and disciplining managers by preventing the misuse of free-CF given that the governance structures in emerging markets are less-developed.

For the dynamics in CF allocations to debt retirements, we find similarly mixed and inconclusive results as those we tabulated in the previous section across different proxies of financial constraints. These findings indicate that the existing measures of credit constraints do not always lead to the same conclusions in different contexts, which calls for the development of context-specific proxies. Our final set of results show significant and consistent decreases in funds allocated to equity repurchases, with the reductions being more pronounced for unconstrained firms that are less equity-dependent and have better access to capital markets. This finding is in line with our expectations and Wesson, Bruwer, and Hamman (2015) who find similarly low levels of equity repurchases which were only allowed much later on in South Africa (from July 1, 1999 onwards). Our results suggest that the emerging share repurchases market is still in its infancy owing to several institutional deficiencies. The deficiencies take the form of rigid announcement requirements, non-cancellation of own shares repurchased, and inconsistencies in both the tax treatment and application of regulatory rules as noted by Wesson et al. (2015) in the exemplary case of South Africa that dominates our sampled emerging market countries.

Taken together, our analyses around the 2008–09 credit supply shock suggest that credit constraints have a significant effect on both investment and financing decisions in emerging markets. Our results further show the increasing unreliability of investment-CF sensitivity as a measure of financial constraints, with the CF sensitivity of cash (the propensity to save) emerging as a more reliable proxy of credit constraints that correlates closely with underlying or prevailing credit market conditions.

4.4 | Deviations from target and non-linearities in CF sensitivities

In this final part of our study, we examine non-linearities in CF sensitivities and how deviations from the target—that is being below or above the median lagged cash holdings, investments, dividends, debt, equity capital and CF—affect the allocation of funds. Table 6 summarizes the estimation results for our additional analyses.

Columns (1)–(5) of Table 6 show that firms with cash holdings (Cash) above (below) the median seem to build-up more (less) savings, allocate less (more) to investments, dividends, debt retirements and equity repurchases. This accumulation of cash reserves as shown by the lower allocations to investments in Column (2) entails cutting back or postponing current investments, which are critical for firm-growth, and consequently, employment and economic growth in emerging markets. For sub-samples based on investments (Capex), we find that firms below (above) the median allocate relatively more (less) funds to savings and debt retirements. In contrast, they allocate less (more) to investments, dividends and equity repurchases. This allocation of funds is in line with Table 4 and suggests that firms under-invest due to binding credit constraints. As our previous results show, Columns (1)–(5) (for below-target investment firms) also suggest that constrained firms attempt to hedge against future shortfalls by increasing savings and further cutting-back on current investments. On the other hand, firms that over-invest (above-target investment firms) save less, pay more dividends and have higher investment-CF sensitivity, which are all features associated with unconstrained firms rather than constrained ones as popularized in the literature (see Beatty et al., 2010; Biddle & Hilary, 2006; Fazzari et al., 1988). These differences further buttress our earlier findings that CF sensitivity cash (investment-CF sensitivity) is becoming a more (less) reliable proxy of credit constraints.

Table 6 also shows that firms with above-median dividend payments allocate fewer funds to other uses-of-funds, except for dividend payments. This finding, which is further supported by the decrease in dividends with firm-growth, suggests that dividends are important and

TABLE 6 The effects of deviating from the target and non-linearities in cash flow sensitivities

Panel A: The effects of deviating from the target						
		ΔCash	**Capex**	**Div**	**ΔD**	**ΔE**
Proxy	Variables	(1)	(2)	(3)	(4)	(5)
Cash	CF^{Below}	0.295***	0.120***	0.193***	−0.195***	−0.198***
		(0.010)	(0.009)	(0.006)	(0.015)	(0.013)
	CF^{Above}	0.546***	0.057***	0.166***	−0.137***	−0.095***
		(0.014)	(0.006)	(0.006)	(0.012)	(0.012)
	Diff *p-value*	[0.000]	[0.000]	[0.003]	[0.002]	[0.000]
Capex	CF^{Below}	0.525***	0.030***	0.126***	−0.217***	−0.102***
		(0.014)	(0.006)	(0.006)	(0.014)	(0.014)
	CF^{Above}	0.390***	0.123***	0.209***	−0.103***	−0.175***
		(0.012)	(0.009)	(0.006)	(0.013)	(0.011)
	Diff *p-value*	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Dividends	CF^{Below}	0.487***	0.115***	0.072***	−0.193***	−0.133***
		(0.012)	(0.008)	(0.005)	(0.013)	(0.013)
	CF^{Above}	0.434***	0.063***	0.226***	−0.153***	−0.123***
		(0.013)	(0.007)	(0.007)	(0.013)	(0.012)
	Diff *p-value*	[0.003]	[0.000]	[0.000]	[0.033]	[0.602]
Debt	CF^{Below}	0.528***	0.066***	0.173***	−0.121***	−0.112***
		(0.012)	(0.006)	(0.006)	(0.010)	(0.010)
	CF^{Above}	0.301***	0.115***	0.182***	−0.223***	−0.179***
		(0.014)	(0.009)	(0.006)	(0.017)	(0.015)
	Diff *p-value*	[0.000]	[0.000]	[0.282]	[0.000]	[0.000]
Equity	CF^{Below}	0.425***	0.105***	0.128***	−0.206***	−0.136***
		(0.014)	(0.008)	(0.005)	(0.015)	(0.014)
	CF^{Above}	0.468***	0.060***	0.215***	−0.136***	−0.121***
		(0.012)	(0.007)	(0.007)	(0.011)	(0.011)
	Diff *p-value*	[0.015]	[0.000]	[0.000]	[0.000]	[0.370]
CF	CF^{Below}	0.417***	0.093***	0.113***	−0.204***	−0.173***
		(0.013)	(0.008)	(0.005)	(0.015)	(0.013)
	CF^{Above}	0.484***	0.075***	0.199***	−0.131***	−0.111***
		(0.012)	(0.007)	(0.006)	(0.012)	(0.012)
	Diff *p-value*	[0.000]	[0.094]	[0.000]	[0.000]	[0.001]
Panel B: Non-linearities in the cash flow sensitivities (CF > 0)						
		ΔCash	**Capex**	**Div**	**ΔD**	**ΔE**
Models	Variables	(1)	(2)	(3)	(4)	(5)
without constraints	CF	0.511***	0.115***	0.012	−0.100***	0.028
		(0.037)	(0.020)	(0.018)	(0.039)	(0.046)
	CF^2	−0.043	−0.028	0.237***	0.059*	−0.185***
		(0.035)	(0.019)	(0.017)	(0.036)	(0.043)
	N	2,830	2,830	2,830	2,830	2,830
	R^2	0.196	0.175	0.382	0.059	0.066
With constraints	CF	0.541***	0.117***	0.048***	−0.168***	−0.125***

(Continues)

TABLE 6 (Continued)

Panel B: Non-linearities in the cash flow sensitivities (CF > 0)					
	ΔCash	**Capex**	**Div**	**ΔD**	**ΔE**
	(0.037)	(0.020)	(0.017)	(0.036)	(0.034)
CF^2	0.031	−0.022	0.325***	−0.107***	−0.558***
	(0.034)	(0.019)	(0.016)	(0.034)	(0.032)
N	2,830	2,830	2,830	2,830	2,830
R^2	0.190	0.175	0.355	0.026	0.048

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. All models include control variables and the lagged use of funds (but not reported). The correlation of residuals across the system of equations is not reported for brevity. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5%, and 10 % levels, respectively.

relatively sticky in the presence of a high degree of information asymmetry and agency costs. This finding is in line with several other studies documenting a significant effect of capital market development on corporate financing decisions (see Brown et al., 2013; Sorge et al., 2017). We further find that deviating from target debt significantly affects investment and financing decisions as firms with above (below) target debt allocate relatively more (less) to other uses-of-funds, except for savings. This way of allocating funds further perpetuates the under-invest problem that we observed for constrained firms in Table 4, especially within the Africa context where most of the corporate borrowings are in the form of bank loans with shorter maturities (see Gwatidzo & Ojah, 2014).

On the other hand, the high investments for above-target-debt firms could signal over-investment issues associated with the conflict of interest between shareholders and creditors (agency problems) as noted by Khémiri and Noubbigh (2019). We also find that equity-dependent firms accumulate more cash reserves, invest less and pay more in debt. At the same time, they retire and repurchase less debt and equity, respectively.

Our further analyses based on CF in Columns (1)–(5) of Table 6 (Panel A), which are motivated by the debate on whether CF sensitivity of cash is asymmetric (see Almeida et al., 2004; Bao et al., 2012; Machokoto & Areneke, 2020; Riddick & Whited, 2009), show that above-target firms allocate most funds to savings, investments and dividends. These firms also use some of the new funds to retire debt and repurchase equity. In Panel B, for our restricted sample of positive-cash flow firms (CF > 0), we find significant asymmetries on dividends, debt retirements and equity repurchases, but not on savings and investments. This new finding, which is free from biases associated with ad-hoc or ex-ante sample splitting approaches in the literature, suggests that negative-CF mostly drive the asymmetry reported by Riddick and Whited (2009) and Bao et al. (2012) on CF sensitivity of cash as we do not find evidence of dis-savings even at very low levels of operating CF. The finding highlights a high propensity to save that does not appear wane with increases in operating CF against a backdrop of limited access to external finance.

To summarize, as our findings suggest that binding credit constraints affect investment and financing decisions, they signal the need to hasten the implementation of pro-capital market development policies in emerging markets.

4.5 | Robustness

In this section, we implement a battery of robustness tests. First, we re-estimate our main models using several alternative techniques to facilitate comparisons with prior studies. Using different estimators enable us to gauge or assess the sensitivity of our results to mis-measurement errors associated with Tobin's q (a proxy for future growth opportunities) that could bias our inferences (see Erickson & Whited, 2000, 2002; Riddick & Whited, 2009). Table 7 summarizes the estimation results using several alternative techniques (for brevity, we only report the coefficients of CF and Tobin's q).

Our estimation results of the modified version of Equation (1), excluding the lagged independent variables, using an equation-by-equation approach *via* pooled OLS and ordinary least squares with FE appear reasonable and closer to satisfying the sources-equal-uses-of-funds constraint. The OLS and FE estimates show that firms in emerging markets, as exemplified by the eight sampled countries, have higher CF sensitivity of cash (ΔCash) and CF sensitivity of dividends (Div). In comparison, they have lower investment-CF sensitivity (Capex). On overall, the estimates based on OLS and FE are consistent with

TABLE 7 Alternative estimations of cash flow sensitivities

		ΔCash	Capex	Div	ΔD	ΔE	$\sum$Uses$_i$
	Variables	(1)	(2)	(3)	(4)	(5)	(6)
POLS	CF_{ijt}	0.284***	0.145***	0.321***	−0.085***	−0.277***	1.100
		(0.025)	(0.013)	(0.033)	(0.021)	(0.034)	
	q_{ijt-1}	−0.008*	0.003	0.016***	0.009**	−0.011*	
		(0.005)	(0.002)	(0.006)	(0.004)	(0.006)	
	N	5,940	5,940	5,940	5,940	5,940	
	R^2	0.126	0.257	0.417	0.056	0.121	
FE	CF_{ijt}	0.415***	0.086***	0.192***	−0.120***	−0.119***	0.923
		(0.022)	(0.013)	(0.023)	(0.019)	(0.029)	
	q_{ijt-1}	−0.002	0.004	0.011*	0.009*	0.000	
		(0.003)	(0.003)	(0.006)	(0.005)	(0.002)	
	N	5,940	5,940	5,940	5,940	5,940	
	R^2	0.184	0.096	0.255	0.064	0.053	
GMM3	CF_{ijt}	−1.871	0.224***	0.126***	−0.804***	−0.792	0.070
		(13.404)	(0.033)	(0.022)	(0.222)	(0.621)	
	q_{ijt-1}	1.120	−0.063***	0.043***	0.345***	0.330	
		(6.584)	(0.008)	(0.002)	(0.090)	(0.301)	
	N	5,940	5,940	5,940	5,940	5,940	
	τ	0.272	0.324	0.802	0.279	0.284	
GMM4	CF_{ijt}	0.847***	0.237***	0.128***	−0.664***	−0.051	1.922
		(0.079)	(0.033)	(0.021)	(0.106)	(0.079)	
	q_{ijt-1}	−0.214***	−0.069***	0.043***	0.277***	−0.033	
		(0.026)	(0.004)	(0.001)	(0.028)	(0.037)	
	N	5,940	5,940	5,940	5,940	5,940	
	τ	0.284	0.319	0.810	0.281	0.182	
GMM5	CF_{ijt}	0.676***	0.181***	0.125***	−0.485***	−0.207***	1.662
		(0.045)	(0.023)	(0.022)	(0.072)	(0.035)	
	q_{ijt-1}	−0.130***	−0.042***	0.044***	0.189***	0.043***	
		(0.009)	(0.002)	(0.001)	(0.015)	(0.004)	
	N	5,940	5,940	5,940	5,940	5,940	
	τ	0.290	0.349	0.793	0.284	0.346	
IV-2SLS	CF_{ijt}	0.530***	0.065***	0.151***	−0.170***	−0.076*	0.986
		(0.032)	(0.017)	(0.022)	(0.025)	(0.040)	
	q_{ijt-1}	−0.032***	0.017***	0.025***	0.032***	−0.010	
		(0.009)	(0.004)	(0.004)	(0.008)	(0.010)	
	N	3,783	3,783	3,783	3,783	3,783	
	LR *p-value*	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	
	J *p-value*	[0.671]	[0.732]	[0.001]	[0.556]	[0.845]	
IV-GMM	CF_{ijt}	0.498***	0.087***	0.169***	−0.146***	−0.140***	1.034
		(0.029)	(0.029)	(0.023)	(0.036)	(0.045)	
	q_{ijt-1}	−0.020***	0.010	0.014***	0.022	0.014	
		(0.007)	(0.011)	(0.005)	(0.014)	(0.012)	
	N	4,023	4,023	4,023	4,023	4,023	

(Continues)

TABLE 7 (Continued)

		ΔCash	Capex	Div	ΔD	ΔE	$\sum$Uses$_i$
	LR *p-value*	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	
	J *p-value*	[0.286]	[0.444]	[0.152]	[0.692]	[0.116]	
DGMM	CF_{ijt}	0.510***	0.051***	0.132***	−0.201***	−0.110***	1.003
		(0.027)	(0.012)	(0.019)	(0.023)	(0.042)	
	q_{ijt-1}	0.004**	0.000	0.002	0.003	0.008*	
		(0.002)	(0.001)	(0.001)	(0.002)	(0.005)	
	N	5,301	5,301	5,301	5,301	5,301	
	m2 p-value	[0.430]	[0.553]	[0.681]	[0.396]	[0.016]	
	J *p-value*	[0.029]	[0.270]	[0.943]	[0.569]	[0.275]	
SGMM	CF_{ijt}	0.388***	0.098***	0.206***	−0.102***	−0.138***	0.922
		(0.025)	(0.010)	(0.053)	(0.026)	(0.047)	
	q_{ijt-1}	−0.001	0.002	0.008	0.008*	0.000	
		(0.003)	(0.001)	(0.009)	(0.004)	(0.005)	
	N	5,940	5,940	5,940	5,940	5,940	
	m2 p-value	0.307	0.768	0.900	0.648	0.797	
	J *p-value*	[0.187]	[0.815]	[0.295]	[0.186]	[0.853]	
PVAR	CF_{ijt}	0.369***	0.075***	0.166***	−0.238***	−0.078	0.910
		(0.040)	(0.027)	(0.028)	(0.043)	(0.069)	
	q_{ijt-1}	−0.001	−0.002	0.002	−0.000	−0.007	
		(0.005)	(0.003)	(0.002)	(0.005)	(0.010)	
	N	4,662	4,662	4,662	4,662	4,662	
	J	87.120	87.120	87.120	87.120	87.120	
	J *p-value*	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. $\sum \text{Uses}_i = \Delta\text{Cash} + \text{Capex} + \text{Div} + \Delta\text{D} + \Delta\text{E}$. τ is an index of measurement quality of Tobin's $q[0 \geq \tau \leq 1]$, with zero indicating a poor proxy and one a very good proxy. *LR* is the Anderson canonical correlations likelihood ratio test. *m2* is a test of second-order autocorrelation in the errors. *J* is the Hansen test of overidentifying restrictions. All models include control variables (but not reported). The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, **, * indicate significance at the one, five, and 10 % levels, respectively.

our main findings, except for the CF sensitivity of changes in debt (ΔD) and equity (ΔE), which appear to be lower and higher than expected, respectively. However, as the equation-by-equation approach does not consider the inter-temporal and interdependent nature of investment and financing decisions, the results are not entirely unexpected and should be interpreted with caution. This oversight could lead to biased inferences on CF sensitivities (see Chang et al., 2014; Gatchev et al., 2010).

Next, we discuss the estimates of CF sensitivities based on the higher-order moments estimator of Erickson and Whited (2000, 2002) (GMM3–GMM5) that corrects for potential mis-measurement errors associated with Tobin's *q*, a proxy of future growth opportunities. For this part of our analysis, we estimate a modified version of Equation (1) that excludes the lagged independent variables (a static model) *via* GMM3–GMM5. Our estimation results show that τ, an index of the measurement quality for Tobin's *q* that varies between zero (poor proxy) and one (very good), ranges between 0.182 and 0.810. This range seems acceptable in our case. However, the estimates of the CF sensitivities based on GMM3–GMM5 appear to be economically implausible and in all cases violate the sources-equal-uses-of-funds or adding-up constraint (as the sum of the estimated CF sensitive exceeds one). This result highlights a possible limitation of the higher-order moments estimator of Erickson and Whited (2000, 2002), and corroborates Almeida, Campello, and Galvao (2010), Chang et al. (2014) and Lewellen and Lewellen (2016) who similarly find the estimates to be imprecise in some cases.

We now turn our focus to estimates of CF sensitivities based on instrumental variables 2SLS (IV-2SLS) (Baum et al., 2008), instrumental variables GMM (IV-GMM) (Baum et al., 2003), difference general method of moments (DIFF-GMM) (Arellano & Bond, 1991), system general method of moments (SYS-GMM) (Blundell & Bond, 1998) and Panel Vector Autoregression models (PVAR) (Abrigo & Love, 2016). These dynamic panel data estimators have been shown to perform well in modelling the dynamic nature of corporate decisions, while at the same time addressing potentially endogeneity problems (see Dang, 2013; Flannery & Hankins, 2013). The estimators in our case use instruments to correct for potential mis-measurement errors associated with Tobin's q. For the PVAR models, we first time-demean the data and then purge the panel FE using the forward orthogonal deviation or Helmert transformation. We first estimate a modified version of Equation (1) that excludes the lagged independent variables (lagged use of funds) using instrumental variables 2SLS (IV-2SLS) and instrumental variables GMM (IV-GMM). For our estimation results of Equation (1) *via* the difference GMM (DGMM) and system GMM (SGMM), we do not include the lagged independent variables of the other uses-of-funds. However, for the estimation results of Equation (1) *via* the Panel Vector Autoregression models (PVAR), we include all the lagged independent variables (for the five uses-of-funds). We use the second-to-third lags of the peer average Tobin's q (the peer average Tobin's q is calculated based on the four-digit SIC codes) as instruments for the IV-2SLS estimator and the second-to-third lags of Tobin's q as instruments for the IV-GMM estimator.[7] To reduce over-identification issues or problems associated with instrument proliferation (too many instruments) (see Roodman, 2009), we restrict our instruments to the second-to-fourth lags for the difference GMM estimations (DGMM), the third-to-fourth lags for the system GMM (SGMM), and the second-to-third lags for Panel Vector Autoregression models (PVAR).

The validity of our instruments for the difference GMM and system GMM estimations is confirmed by both the Hansen (J) and second-order autocorrelation ($m2$) tests as they show no significant evidence of serial correlation. Table 7 further shows that the sums of the estimated CF sensitivities (ΔCash + Capex + Div + ΔD + ΔE) based on difference GMM, system GMM and PVAR models are lower than one and closer to satisfying the adding-up constraint ($\sum \text{Uses}_i = 1$). In addition, and more importantly, the hierarchy or pecking order in the allocation of funds based the more efficient system GMM (SGMM) is in line with our main results and suggests that our sampled emerging market firms save most of the operating CF. When they spend, they allocate the remainder of the funds in order of proportions as followings—dividend payments first, followed by debt retirements, then equity repurchases, and lastly, investments (Capex). Based on the above additional findings from instrumental variable (IV) estimators, we conclude that our findings are robust to using alternative estimation techniques and potential mis-measurement errors associated with Tobin's q.

As a further robustness check, we also study the time-series variation in CF sensitivities. To accomplish this objective, we estimate a modified version of Equation (1) that excludes the lagged independent variables *via* SUR and Fama and MacBeth (1973) two-step procedure (FM). The Fama and MacBeth (1973) two-step procedure is implemented as follows; (1) in the first step, cross-sectional regressions are estimated for each period, and (2) then in the second step, the coefficients from the first step are averaged to obtain the coefficients for the full sample period. According to Lewellen and Lewellen (2016), using annual cross-sectional regressions (FM) corrects for both time-series and cross-sectional dependence in firm-level datasets, while at the same time allowing for the relationship between CF and uses-of-funds to vary over time. Table 8 summarizes the time-series estimates of CF sensitivities.

Table 8 shows significant time series variation in CF sensitivities. Despite this significant variation over the sample period, the CF sensitivity of cash (savings) has remained high relative to other uses-of-funds and ranges between 30.3% and 68.2%. Consistent with our previous results, debt retirements appear to have almost disappeared around the financial crisis (2007–2009), and then, rebounded post-2009. Similarly, equity repurchases peaked in 2007 just before the onset of the financial crisis and decreased significantly thereafter. These changes are consistent with Table 5 and suggest that the financial crisis had a significant impact on how firms allocate funds, even in emerging markets such as Africa that are less-integrated with the U.S., the origin of the 2008–09 financial crisis. On overall, the SUR and Fama and MacBeth (1973) two-step procedure (FM) return similar estimates of CF sensitivities, which further suggest that our results are robust to both time variations, and using different model specifications and estimation techniques.

For the analysis based on vintage or period of listings, we sub-divide the sample into three 5-year sub-periods (namely; 2000–05 (L2000–05), 2006–10 (L2006–10), and 2011–15 (L2011—15)) and categorize or classify our sampled firms based on the year of listing. Based on these sub-samples, we find significant differences in CF sensitivities, with firms listed post–2011 saving and investing relatively more than those listed in preceding sub-periods

TABLE 8 Time variations in cash flow sensitivities

		SUREG					FM				
	N	ΔCash	Capex	Div	ΔD	ΔE	ΔCash	Capex	Div	ΔD	ΔE
Year		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2000	171	0.406***	0.068	0.110***	0.045	−0.461***	0.502***	0.081**	0.184***	−0.092*	−0.236***
		(0.067)	(0.049)	(0.033)	(0.098)	(0.108)	(0.064)	(0.040)	(0.022)	(0.049)	(0.071)
2001	231	0.250***	0.025	0.417***	−0.106**	−0.202***	0.139**	0.153***	0.489***	−0.097***	−0.336***
		(0.055)	(0.035)	(0.026)	(0.052)	(0.048)	(0.059)	(0.034)	(0.059)	(0.030)	(0.068)
2002	278	0.533***	−0.020	0.052***	−0.355***	−0.081*	0.582***	−0.129***	0.083***	−0.066	0.156**
		(0.050)	(0.031)	(0.017)	(0.051)	(0.045)	(0.065)	(0.047)	(0.032)	(0.056)	(0.060)
2003	310	0.591***	−0.125***	−0.034*	−0.467***	−0.102**	0.287***	−0.071	0.078**	−0.103	−0.302***
		(0.064)	(0.040)	(0.019)	(0.072)	(0.052)	(0.090)	(0.045)	(0.034)	(0.091)	(0.087)
2004	331	0.387***	0.119***	0.042	−0.221***	−0.231***	0.335***	0.145***	0.062	−0.160***	−0.326***
		(0.041)	(0.024)	(0.028)	(0.040)	(0.037)	(0.044)	(0.037)	(0.041)	(0.042)	(0.061)
2005	340	0.132***	0.031	0.234***	−0.350***	−0.253***	0.084**	0.196***	0.405**	−0.157**	−0.337*
		(0.051)	(0.032)	(0.037)	(0.059)	(0.056)	(0.042)	(0.035)	(0.170)	(0.075)	(0.202)
2006	365	0.560***	0.042	0.121***	−0.216***	−0.061	0.364***	0.205***	0.162***	−0.230***	−0.203***
		(0.050)	(0.029)	(0.030)	(0.045)	(0.041)	(0.057)	(0.052)	(0.036)	(0.052)	(0.053)
2007	392	0.449***	0.158***	0.186***	0.032	−0.239***	0.252***	0.180***	0.394***	0.000	−0.443***
		(0.065)	(0.030)	(0.028)	(0.062)	(0.056)	(0.042)	(0.039)	(0.038)	(0.036)	(0.077)
2008	401	0.474***	0.069**	0.259***	−0.039	−0.160***	0.429***	0.058**	0.444***	−0.142***	−0.326***
		(0.049)	(0.027)	(0.022)	(0.041)	(0.049)	(0.054)	(0.029)	(0.083)	(0.035)	(0.105)
2009	444	0.453***	0.142***	0.204***	−0.084*	−0.117**	0.353***	0.184***	0.282***	−0.009	−0.219***
		(0.042)	(0.035)	(0.022)	(0.050)	(0.047)	(0.050)	(0.048)	(0.047)	(0.053)	(0.074)
2010	487	0.527***	0.105***	0.144***	−0.130**	−0.095*	0.386***	0.058*	0.296***	−0.070*	−0.308***
		(0.041)	(0.036)	(0.021)	(0.056)	(0.050)	(0.038)	(0.031)	(0.033)	(0.038)	(0.058)
2011	508	0.309***	0.114***	0.126***	−0.242***	−0.209***	0.224***	0.117***	0.267***	−0.179***	−0.133**
		(0.037)	(0.026)	(0.021)	(0.040)	(0.034)	(0.039)	(0.035)	(0.040)	(0.031)	(0.067)
2012	477	0.477***	0.146***	0.131***	−0.265***	0.019	0.240***	0.266***	0.289***	−0.184***	−0.147**
		(0.045)	(0.026)	(0.020)	(0.046)	(0.045)	(0.049)	(0.042)	(0.043)	(0.038)	(0.070)
2013	447	0.401***	0.133***	0.121***	−0.220***	−0.125***	0.307***	0.175***	0.265***	−0.145***	−0.111
		(0.042)	(0.030)	(0.021)	(0.047)	(0.037)	(0.052)	(0.042)	(0.034)	(0.041)	(0.073)
2014	412	0.484***	0.110***	0.217***	−0.144**	−0.045	0.367***	0.183***	0.227***	−0.088	−0.035

TABLE 8 (Continued)

		SUREG					FM				
	N	**ΔCash**	**Capex**	**Div**	**ΔD**	**ΔE**	**ΔCash**	**Capex**	**Div**	**ΔD**	**ΔE**
		(0.063)	(0.037)	(0.021)	(0.062)	(0.051)	(0.061)	(0.035)	(0.032)	(0.060)	(0.097)
2015	346	0.389***	0.051	0.202***	−0.171***	−0.186***	0.378***	0.279***	0.161***	−0.077	−0.217***
		(0.055)	(0.039)	(0.030)	(0.054)	(0.053)	(0.083)	(0.054)	(0.052)	(0.052)	(0.064)
2000–05	1,661	0.370***	0.033**	0.188***	−0.199***	−0.210***	0.322***	0.062	0.217***	−0.113***	−0.230***
		(0.022)	(0.014)	(0.012)	(0.025)	(0.021)	(0.052)	(0.038)	(0.041)	(0.017)	(0.049)
2006–10	2,089	0.491***	0.100***	0.200***	−0.069***	−0.140***	0.357***	0.137***	0.316***	−0.090**	−0.300***
		(0.023)	(0.014)	(0.011)	(0.023)	(0.023)	(0.017)	(0.025)	(0.028)	(0.029)	(0.020)
2010–15	2,190	0.433***	0.110***	0.153***	−0.219***	−0.085***	0.303***	0.204***	0.242***	−0.135***	−0.129***
		(0.022)	(0.014)	(0.010)	(0.022)	(0.020)	(0.036)	(0.020)	(0.023)	(0.025)	(0.014)
L2000–05	4,000	0.450***	0.050***	0.176***	−0.146***	−0.179***	0.355***	0.112***	0.232***	−0.132***	−0.234***
		(0.016)	(0.009)	(0.008)	(0.017)	(0.015)	(0.028)	(0.029)	(0.029)	(0.031)	(0.061)
L2006–10	1,740	0.432***	0.119***	0.150***	−0.248***	−0.052**	0.238***	0.177***	0.286***	−0.115***	−0.238**
		(0.024)	(0.016)	(0.011)	(0.022)	(0.024)	(0.038)	(0.024)	(0.028)	(0.018)	(0.081)
L2010–15	200	0.853***	0.019	0.018	−0.204***	0.094**	0.370***	0.317***	0.129***	−0.151*	−0.154
		(0.059)	(0.039)	(0.026)	(0.065)	(0.042)	(0.046)	(0.036)	(0.025)	(0.059)	(0.083)
2000–15	5,940	0.422***	0.087***	0.201***	−0.136***	−0.154***	0.327***	0.130***	0.256***	−0.112***	−0.220***
		(0.013)	(0.008)	(0.007)	(0.013)	(0.012)	(0.020)	(0.033)	(0.031)	(0.014)	(0.037)

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. The correlation of residuals across the system of equations is not reported for brevity. All models include control variables (but not reported). The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5% and 10 % levels, respectively.

(L2000–05, L2006–10). Firms listed in the latter period (2011–15) not only appear to allocate less funds to dividends but also to debt retirements and equity repurchases. These differences point to an increasing need to enhance financing flexibility in industries that are increasingly becoming concentrated (consolidated) as evidenced by the decline in new listings and rise in the untabulated Herfindahl–Hirschman Index (HHI) from a low of 4.5 to a peak of 10.3 over the sample period.

Next, we examine the robustness of our results to alternative sub-sampling as our sample appears to be relatively heterogeneous in terms of geographic and industrial distribution. In Panel A of Table 9, we split the sample into two sub-groups; namely, South Africa and other countries.[8] In Panel B, we split the sample into five industrial sub-groupings; namely, Industrials (IND), Health Care (HC), Consumer Goods and Services (CG&S), Technology and Telecommunications (T&T) and Others (Basic Materials and Oil & Gas). Adopting this approach enables us to assess whether the CF sensitivities that we document vary across industries and between South Africa and other countries. Using this approach, in a way, addresses the uneven distribution of the sample, with South Africa that is comparatively more developed than the rest of the other countries dominating the sample. Table 9 summarizes the estimation results for our sub-sample analyses.

Panel A of Table 9 shows that, relative to South African firms, firms in other African countries save similar proportions of operating CF (the CF sensitivity of cash as popularized by Almeida et al. (2004)). The similar CF sensitivities of cash (savings of 46%–47%) across the sub-country groupings are in line with our main results. They suggest that enhancing financial flexibility is of prime importance for firms operating in emerging markets characterized by institutional voids. Our estimates of savings between 46% and 47%, which are one and a half to three times higher than the 15% to 33% reported for U.S. firms by Chang et al. (2014) and Lewellen and Lewellen (2016), emphasizes the more central role of internal capital sources (such as retained earnings and cash reserves) in less-developed capital markets.

On the other hand, the significant differences in the other CF sensitivities (Capex, Div, ΔD and ΔE) between South Africa and other countries reflect the differences in stages of capital market development. For example, the higher investment-CF sensitivity (Capex) of 12.8% shows that credit constraints are more binding in Egypt, Ivory Coast, Kenya, Morocco, Nigeria and Tunisia relative to South Africa (with 5.7%). Similarly, South Africa appears to have a comparatively more active equity repurchases market, which again evidences a larger and more developed capital market. At the same time, the higher CF sensitivities of changes in debt (ΔD—22.3% for other countries vs. 15.8% for South Africa) are due to the comparatively higher concentration of corporate debt with shorter maturities in other African countries (55% of total debt) relative to South Africa (44%). As most of the emerging market corporate debt is in the form of bank loans with shorter maturities as reported by Sorge et al. (2017), the over-reliance on short-term debt further increases exposure to maturity mismatch and refinancing risks. This heavy reliance on short-term debt could be detrimental to firms in emerging markets as it leads to short-termism with managers focusing more on servicing and refinancing debt at the expense of other strategic or long-term goals.[9]

As a final robustness check, we examine the variations in CF allocations across broad industries or sectors. Panel B of Table 9 shows significant variations in CF allocations across our five broad industries.[10] Firms in the CG&S, Industrials (IND), and T&T sectors save more than those in other sectors as they allocate 51%–58% of their operating CF to savings. In line with our main findings, we observe that CF allocations to investments, investment-CF sensitivity, are consistently low across the five broad industries. This finding suggests that our main results are robust to sub-sampling by industry or sector.

We further find that the high allocation of funds to dividends we have documented in the previous sections is mostly concentrated in Basic Materials and Oil & Gas sectors (Others) which dominate the emerging market corporate universe. Our cross-industrial analyses also reveal that sampled firms in the T&T and Others (Basic Materials and Oil & Gas) sectors allocate the least proportion of funds to debt retirements as 55%–63% of their borrowings are in the form of long-term debt. These allocations of funds are comparatively higher than those for sampled firms in other sectors that have between 48% and 54% of their borrowings as short-term debt. This high concentration of short-term debt exposes the sampled firms to maturity mismatch and refinancing risks, and account for the spike in CF allocations to debt retirements that we documented preciously around the financial crisis (Table 5). Next, we find that sampled firms in the CG&S and Industrials (IND) sectors allocate the least proportion of funds to equity repurchases (6%–7%). In contrast, those in other sectors are more equity-dependent with allocations to equity repurchases that range from 25% to 30%. These cross-industrial variations are not unexpected and point to significant industrial heterogeneity in how emerging market firms use funds.[11]

TABLE 9 Cash flow sensitivities across countries and industries

Panel A: Cash flow sensitivities across countries							
		ΔCash	**Capex**	**Div**	**ΔD**	**ΔE**	**$\sum$Uses$_i$**
FIC	Variables	(1)	(2)	(3)	(4)	(5)	(6)
Others	CF_{ijt}	0.467***	0.128***	0.131***	−0.223***	−0.051***	0.996
		(0.011)	(0.009)	(0.005)	(0.011)	(0.010)	
	N	1,142	1,142	1,142	1,142	1,142	
	R^2	0.30	0.21	0.31	0.11	0.04	
S. Africa	CF_{ijt}	0.460***	0.057***	0.160***	−0.158***	−0.165***	0.987
		(0.013)	(0.007)	(0.007)	(0.014)	(0.013)	
	N	4,798	4,798	4,798	4,798	4,798	
	R^2	0.23	0.19	0.33	0.06	0.03	
Diff CF *p-value*		[0.660]	[0.000]	[0.001]	[0.000]	[0.000]	
Panel B: Cash flow sensitivities across industries							
SIC	Variables	(1)	(2)	(3)	(4)	(5)	(6)
Cg&S	CF_{ijt}	0.505***	0.056***	0.131***	−0.238***	−0.070***	0.992
		(0.020)	(0.011)	(0.009)	(0.022)	(0.021)	
	N	2,201	2,201	2,201	2,201	2,201	
	R^2	0.269	0.183	0.406	0.042	0.018	
HC	CF_{ijt}	0.260**	0.060*	−0.002	−0.393***	−0.289***	0.990
		(0.131)	(0.034)	(0.048)	(0.111)	(0.074)	
	N	212	212	212	212	212	
	R^2	0.269	0.195	0.037	0.407	0.103	
IND	CF_{ijt}	0.582***	0.093***	0.033***	−0.230***	−0.063**	0.998
		(0.026)	(0.019)	(0.011)	(0.027)	(0.025)	
	N	1,684	1,684	1,684	1,684	1,684	
	R^2	0.252	0.200	0.297	0.107	0.050	
Others	CF_{ijt}	0.280***	0.121***	0.288***	−0.064***	−0.248***	0.989
		(0.020)	(0.013)	(0.013)	(0.024)	(0.022)	
	N	1,371	1,371	1,371	1,371	1,371	
	R^2	0.292	0.305	0.457	0.099	0.139	
T&T	CF_{ijt}	0.511***	0.088***	0.073***	−0.024	−0.304***	0.992
		(0.045)	(0.022)	(0.020)	(0.037)	(0.039)	
	N	472	472	472	472	472	
	R^2	0.236	0.224	0.400	0.066	0.006	

Note: The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. Panel A presents the results for the sub-samples (FIC) of other countries (Others—Egypt, Ivory Coast, Kenya, Morocco, Nigeria and Tunisia) and South Africa (S. Africa). Panel B presents estimation results across the industries (SIC); namely, Industrials (IND), Health Care (HC), Consumer Goods and Services (CG&S), Technology and Telecommunications (T&T) and Others (Basic Materials and Oil and Gas). $\sum \text{Uses}_i = \Delta\text{Cash} + \text{Capex} + \text{Div} + \Delta\text{D} + \Delta\text{E}$. All models include control variables and the lagged use of funds (but not reported). The correlation of residuals across the system of equations is not reported for brevity. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

5 | CONCLUSIONS

Using a large sample of firms from eight emerging economies over the period 2000–2015, and a system of equations that account for the overlooked inter-temporal and interdependent nature of corporate decisions, we document several unique insights into how firms operating in these unique markets allocate funds to savings, investments, dividend payments, debt retirements and equity repurchases. We advance the literature by presenting new tests on asymmetry and non-linearities in CF sensitivities for all the five uses-of-funds.

First, we find that emerging firms allocate most of their operating CF to savings. When they spend, they allocate funds in order of proportions to dividend payments ahead of other uses-of-funds, followed by debt retirements, then equity repurchases, and finally, investments. This pecking order in CF allocations emphasizes the importance of maintaining or enhancing financial flexibility when access to external finance is limited. Second, dividend payments, which consistently rank just below savings, appear to be sticky-down and vital as, on average, firms increase or maintain rather than reduce or curtail the payouts during the financial crisis. A pressing signalling motive mainly drives this stickiness in dividends against deteriorating business fundamentals in an environment characterized by high agency costs and information asymmetry. Third, CF allocations to investments, investment-CF sensitivity as popularized in the literature, are very low and appear to be poor measures of financial constraints. They are consistently lower rather than higher as would be expected for supposedly constrained firms, and only increase for unconstrained firms instead of the constrained ones during the financial crisis. Fourth, CF allocations to debt retirements and equity repurchases appear to be comparatively lower and higher than those in the U.S., respectively, which reflects the less-developed nature of emerging markets. Finally, we document evidence suggesting that corporate investment and financing decision are significantly inter-temporal and interdependent, and that, if these peculiarities are overlooked as in the literature, could lead to biased inferences on CF sensitivities.

In general, our empirical findings, which offer a more holistic view of CF allocations in emerging markets, show that internal capital sources still predominate external ones. As our results show, this leads to the prioritization of savings ahead of investments, which hampers firm-growth, and consequently, employment and economic growth. Our empirical analyses further reveal that investment-CF sensitivity is not a good measure of financial constraints, even within the context of emerging markets where access to finance is limited, and during the financial crisis when credit constraints were supposedly more pronounced. CF sensitivity of cash, which until recently has been overlooked in the literature, emerges as a more reliable and informative proxy of credit constraints that appears to correlate significantly with changes in capital markets. This signals the need for a shift in research focus as economies are transiting towards intangible capital that requires considerably higher levels of financial flexibility, which can take the form of spare borrowing capacity or cash reserves.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Thompson Reuters Datastream. Restrictions apply to the availability of these data, which were used under license for this study.

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ENDNOTES

[1] See, Allayannis and Mozumdar (2004), Almeida and Campello (2007), Andrén and Jankensgård (2015), Ascioglu, Hegde, and McDermott (2008), Chen and Chen (2012), Fazzari, Hubbard, and Petersen (1988), Lewellen and Lewellen (2016), Hovakimian, Hovakimian, and Tehranian (2004), Hu and Schiantarelli (1998), Kaplan and Zingales (1997) and Moyen (2007).

[2] There is a rich literature showing that access to finance has a positive effect on innovation and economic growth (see Acharya & Xu, 2017; Beck, Fuchs, & Uy, 2009; Beck & Levine, 2004; Brown, Martinsson, & Petersen, 2013; Levine, 1997).

[3] Investments in physical capital have declined significantly in advanced economies as more firms are increasingly concentrating on innovation or research and development (Brown, Fazzari, & Petersen, 2009; Brown & Petersen, 2009, 2015).

[4] We do not use the KZ Index (Kaplan & Zingales, 1997) as in prior studies given that our untabulated results appear to be impulsive and unreliable. In addition, Hadlock and Pierce (2010) show that the KZ Index is an unreliable proxy of financial constraints.

[5] Our results are robust to mis-measurement errors associated with Tobin's q and using several alternative estimation techniques.

[6] Sorge et al. (2017) find that short-term debt constitutes as high as 51%, 63%, 42%, 78% and 49% of corporate debt in Brazil, Russia,

India, China and South Africa, respectively. Similarly, Booth, Aivazian, Demirguc-Kunt, and Maksimovic (2001) report ranges of 24% to 76% in short-term debt across ten developing countries over the period 1980–1991. They further find that most of the short-term debt is in the form of bank loans. In addition, Gwatidzo and Ojah (2014) find that firms in Africa prefer bank loans to non-bank debt as the former is availed with less-collateral and mostly based on long-standing relationships. They further find that non-bank debt is scarce and where available, it is costly and often accompanied by restrictive covenants.

[7] The peer-firm average Tobin's *q* is a suitable instrument as it is less noisy and correlates with GDP growth, a measure of long-term growth opportunities.

[8] As firm-year observations for each of the other countries are few, except for South Africa, we are unable to present and draw meaningful cross-country comparisons using our multi-equation research framework. We acknowledge this limitation in our study and point to the lack of rich datasets as one of the main reasons why there is a dearth of research in emerging markets (especially in Africa).

[9] Appendix B shows that our results are robust to controlling for macroeconomic conditions and differences in the stages of economic development across countries.

[10] Appendix C shows similar variations in cash flow and uses-of-funds across industries.

[11] Appendices D and E show that our results are not affected by the way we define the cash flow variable, a debated issued in the literature (see Chang et al., 2014; Lewellen & Lewellen, 2016). However, we also find that the two other commonly used proxies of cash flow (CF1 – operating income *plus* depreciation-to-total assets and CF2 – net income before extraordinary items *plus* depreciation *minus* dividends-to-total assets) to be more volatile and less comprehensive, hence, our focus on the cash flow measure from the statement of cash flows rather than the statement of comprehensive income.

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APPENDIX A: Variable definitions

Variable	Definition
ΔCash	Changes in cash and equivalent (WC02001)-to-total assets (WC02999).
Capex	Physical capital investments (WC04601)-to-total assets.
Div	Dividends (WC05376)-to-total assets.
ΔD	Changes in total debt (WC03251 + WC03051)-to-total assets.
ΔE	Changes in equity (WC03480)-to-total assets.
CF	Net cash flow from operating activities (NOCF)-to-total assets. NOCF=net income (WC04001) + depreciation, depletion and amortization (WC04051) +deferred income taxes and investments (WC04101) + Total other cash flow (WC04151) +extraordinary items (WC04225) + funds from other operating activities (WC04831).
CF1	Operating income (WC01250) *plus* depreciation (WC04051)-to-total assets.
CF2	Net income before extraordinary items (WC01551) *plus* depreciation (WC04051)-to-Total assets.
Cash	Cash and equivalent (WC02001)-to-total assets.
Debt	Total debt (WC03251 + WC03051)-to-total assets.
q	Market value of equity (MV) plus total debt (WC03251 + WC03051)-to-total assets.
SG	Sales growth (WC01001)
Size	Log of total assets (WC02999).
PPE	Property, plant and equipment (WC02501)-to-total assets.
LogAge	The current year less the first year that the firm appears in the database.
WW index	$-0.091\times\frac{CashFlow}{TotalAssets}-0.062\times DivDummy+0.021\times\frac{Totaldebt}{TotalAssets}$ $-0.044\times Size+0.102\times IndustrySalesGrowth-0.035\times SG$ The WW Index is based on Whited and Wu (2006).
HP index	$-0.737\times Size+0.043\times Size^2$–0.040 * *Age*. The HP Index is based on Hadlock and Pierce (2010).
KZ index	$-1.002\times\frac{CashFlow}{TotalAssets}+0.283\times\frac{Totaldebt}{TotalAssets}-39.368\times\frac{Dividends}{TotalAssets}-1.315\times\frac{Cash}{TotalAssets}$ The KZ Index is based on Kaplan and Zingales (1997).
GDPG	GDP growth (annual %).
IRS	Interest rate spread (lending rate minus deposit rate %).
INF	Inflation, consumer prices (annual %).
PVTCREDIT	Domestic credit to the private sector by banks (% of GDP).
STMKTCAP	Stock market capitalization-to-GDP (% of GDP).

[a]*Note:* The table lists the definitions of all variables used. All firm-level data is from *Thomson DataStream*, and macroeconomic variables are from The World Bank.

APPENDIX B: Cash flow sensitivities and macroeconomic conditions

Variables	Models without constraints					Models with constraints				
	ΔCash (1)	Capex (2)	Div (3)	ΔD (4)	ΔE (5)	ΔCash (6)	Capex (7)	Div (8)	ΔD (9)	ΔE (10)
CF_{ijt}	0.468***	0.080***	0.175***	−0.145***	−0.099***	0.471***	0.080***	0.180***	−0.153***	−0.116***
	(0.014)	(0.008)	(0.008)	(0.016)	(0.019)	(0.014)	(0.008)	(0.007)	(0.015)	(0.014)
q_{ijt-1}	0.000	0.002***	0.008***	0.005***	0.003**	−0.000	0.002***	0.007***	0.005***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SG_{ijt-1}	0.005	−0.002	0.018***	0.001	−0.007	0.002	−0.002	0.014***	0.008	0.007
	(0.006)	(0.004)	(0.003)	(0.007)	(0.008)	(0.006)	(0.004)	(0.003)	(0.006)	(0.006)
$Size_{ijt}$	−0.016***	−0.012***	0.011***	−0.040***	−0.024***	−0.020***	−0.012***	0.005***	−0.028***	0.000
	(0.004)	(0.002)	(0.002)	(0.004)	(0.005)	(0.004)	(0.002)	(0.002)	(0.004)	(0.004)
PPE_{ijt}	0.144***	−0.106***	−0.121***	−0.042**	0.167***	0.163***	−0.105***	−0.094***	−0.095***	0.059***
	(0.018)	(0.011)	(0.010)	(0.021)	(0.024)	(0.018)	(0.011)	(0.009)	(0.019)	(0.018)
$\Delta Cash_{ijt-1}$	−0.255***	0.004	0.032***	0.021	−0.067***	−0.239***	0.005	0.055***	−0.023*	−0.156***
	(0.013)	(0.007)	(0.007)	(0.014)	(0.017)	(0.013)	(0.007)	(0.006)	(0.013)	(0.012)
$Capex_{ijt-1}$	−0.124***	0.375***	0.035**	0.268***	−0.087***	−0.134***	0.374***	0.021	0.294***	−0.033
	(0.025)	(0.015)	(0.014)	(0.028)	(0.033)	(0.025)	(0.015)	(0.013)	(0.026)	(0.024)
Div_{ijt-1}	−0.144***	0.021	0.178***	0.222***	−0.154***	−0.143***	0.021	0.180***	0.218***	−0.160***
	(0.026)	(0.015)	(0.014)	(0.029)	(0.034)	(0.026)	(0.015)	(0.013)	(0.027)	(0.025)
ΔD_{ijt-1}	0.028**	−0.014*	−0.082***	−0.098***	0.097***	0.034**	−0.014*	−0.073***	−0.115***	0.062***
	(0.013)	(0.008)	(0.007)	(0.015)	(0.017)	(0.013)	(0.008)	(0.007)	(0.014)	(0.013)
ΔE_{ijt-1}	0.063***	−0.043***	−0.027***	0.007	0.030*	0.067***	−0.043***	−0.021***	−0.004	0.007
	(0.012)	(0.007)	(0.007)	(0.013)	(0.016)	(0.012)	(0.007)	(0.006)	(0.012)	(0.011)
$GDPG_{ijt-1}$	−0.116	0.396***	0.120*	0.403***	−0.015	−0.117	0.396***	0.119*	0.406***	−0.009
	(0.127)	(0.073)	(0.069)	(0.142)	(0.164)	(0.126)	(0.073)	(0.063)	(0.131)	(0.121)
IRS_{ijt-1}	0.035	−0.026	0.119**	0.094	−0.018	0.030	−0.026	0.112**	0.107	0.009
	(0.091)	(0.052)	(0.050)	(0.102)	(0.118)	(0.090)	(0.052)	(0.045)	(0.094)	(0.087)
INF_{ijt-1}	0.451*	−0.408***	−0.386***	0.323	0.397	0.551**	−0.405***	−0.245*	0.053	−0.153
	(0.272)	(0.157)	(0.148)	(0.303)	(0.351)	(0.269)	(0.157)	(0.135)	(0.280)	(0.260)

(Continues)

Variables	Models without constraints					Models with constraints				
	ΔCash (1)	Capex (2)	Div (3)	ΔD (4)	ΔE (5)	ΔCash (6)	Capex (7)	Div (8)	ΔD (9)	ΔE (10)
N	4,957	4,957	4,957	4,957	4,957	4,957	4,957	4,957	4,957	4,957
R^2	0.25	0.19	0.26	0.07	0.04	0.25	0.19	0.25	0.07	0.02

[a]*Note:* The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow, firm characteristics and macroeconomic factors. The correlation of residuals across the system of equations is not reported for brevity. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5% and 10 % levels, respectively.

APPENDIX C: Cash flow and uses-of-funds across industries

Panel A: Basic statistics across industries

		Variables	CF	ΔCash	Capex	Div	ΔDebt	ΔEquity	CF vs. uses
#	SIC	Metric	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	Cg&S	Mean	0.163	0.018	0.072	0.062	0.015	−0.074	−0.048
		Median	0.152	0.006	0.060	0.049	0.000	−0.073	−0.036
		SD	0.149	0.037	0.056	0.048	0.064	−0.033	
		N	2,201						
(2)	HC	Mean	0.149	0.037	0.056	0.048	0.064	−0.033	0.039
		Median	0.130	0.021	0.050	0.041	0.003	−0.040	−0.019
		SD	0.139	0.020	0.079	0.043	0.024	−0.056	
		N	212						
(3)	IND	Mean	0.139	0.020	0.079	0.043	0.024	−0.056	−0.035
		Median	0.120	0.008	0.057	0.026	0.002	−0.054	−0.023
		SD	0.152	0.011	0.096	0.053	0.013	−0.045	
		N	1,684						
(4)	Others	Mean	0.152	0.011	0.096	0.053	0.013	−0.045	−0.04
		Median	0.125	0.006	0.084	0.021	0.001	−0.035	−0.02
		SD	0.204	0.020	0.076	0.069	0.016	−0.080	
		N	1,371						
(5)	T&T	Mean	0.204	0.020	0.076	0.069	0.016	−0.080	−0.025
		Median	0.200	0.015	0.053	0.046	0.000	−0.070	0.016
		SD	0.000	0.018	0.000	0.000	0.406	0.000	
		N	472						

Panel B: Differences across industries

	Variables	CF	ΔCash	Capex	Div	ΔDebt	ΔEquity
SIC	Metric	(1)	(2)	(3)	(4)	(5)	(6)
(1) vs. (2)	Mean	0.014**	−0.019***	0.016***	0.014***	−0.049***	−0.041***
	Median	0.022*	−0.015***	0.010***	0.008***	−0.003	−0.033***
	SD	0.010**	0.017***	−0.023***	0.005	0.040***	0.023
(1) vs. (3)	Mean	0.024***	−0.002	−0.007***	0.019***	−0.009***	−0.018***
	Median	0.043***	0.010	0.015***	0.036***	0.013***	−0.020***
	SD	0.011***	0.007	−0.024***	0.009***	0.002***	−0.029***
(1) vs. (4)	Mean	0.011***	0.007***	−0.024***	0.009***	0.002	−0.029***
	Median	0.038***	0.012***	−0.012***	0.041***	0.014	−0.039***
	SD	−0.041***	−0.002***	−0.004***	−0.007***	−0.001	0.006***
(1) vs. (5)	Mean	−0.041***	−0.002	−0.004	−0.007**	−0.001	0.006
	Median	−0.037***	0.003	0.019	0.016**	0.015	−0.004
	SD	0.163***	0.000	0.072	0.062**	−0.391	−0.074
(2) vs. (3)	Mean	0.010	0.017***	−0.023***	0.005	0.040***	0.023***
	Median	0.010	0.013***	−0.007***	0.015	0.001***	0.014***
	SD	−0.013	0.009***	−0.017***	−0.010	0.011***	−0.011***
(2) vs. (4)	Mean	−0.003	0.026***	−0.040***	−0.005	0.051***	0.012

(Continues)

Panel B: Differences across industries

	Variables	CF	ΔCash	Capex	Div	ΔDebt	ΔEquity
	Median	0.005	0.015***	−0.034***	0.020	0.002***	−0.005
	SD	−0.065	0.000***	0.003***	−0.026	0.008***	0.024
(2) vs. (5)	Mean	−0.055***	0.017**	−0.020***	−0.021***	0.048***	0.047***
	Median	−0.070***	0.006**	−0.003***	−0.005***	0.003***	0.030***
	SD	0.139***	0.002**	0.079***	0.043***	−0.382***	−0.056***
(3) vs. (4)	Mean	−0.013***	0.009***	−0.017***	−0.010***	0.011***	−0.011***
	Median	−0.005***	0.002***	−0.027***	0.005***	0.001***	−0.019***
	SD	−0.052***	−0.009***	0.020***	−0.016***	−0.003***	0.035***
(3) vs. (5)	Mean	−0.065***	0.000	0.003	−0.026***	0.008*	0.024***
	Median	−0.080***	−0.007	0.004	−0.020***	0.002*	0.016***
	SD	0.120***	−0.010	0.057	0.026***	−0.404*	−0.054***
(4) vs. (5)	Mean	−0.052***	−0.009**	0.020***	−0.016***	−0.003	0.035***
	Median	−0.075***	−0.009**	0.031***	−0.025***	0.001	0.035***
	SD	0.204***	0.002**	0.076***	0.069***	−0.390	−0.080***

[a]*Note:* The table presents time-series summary statistics and pairwise correlations between the proxies of cash flow. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. $\sum \text{Uses}_i = \Delta\text{Cash} + \text{Capex} + \text{Div} + \Delta\text{D} + \Delta\text{E}$. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

APPENDIX D: Alternative proxies of cash flow

Panel A: CF1										
	Models without constraints					Models with constraints				
Variables	ΔCash (1)	Capex (2)	Div (3)	ΔD (4)	ΔE (5)	ΔCash (6)	Capex (7)	Div (8)	ΔD (9)	ΔE (10)
CF_{ijt}	0.177***	0.067***	0.166***	0.028**	−0.305***	0.230***	0.068***	0.204***	−0.062***	−0.435***
	(0.011)	(0.006)	(0.006)	(0.012)	(0.013)	(0.011)	(0.006)	(0.005)	(0.011)	(0.011)
q_{ijt-1}	0.002*	0.002***	0.006***	0.003***	0.008***	0.002**	0.002***	0.006***	0.003***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940
R^2	0.118	0.185	0.307	0.050	0.112	0.112	0.185	0.298	0.035	0.087
Panel B: CF2										
	Models without constraints					Models with constraints				
	ΔCash	Capex	Div	ΔD	ΔE	ΔCash	Capex	Div	ΔD	ΔE
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CF_{ijt}	0.230***	0.068***	0.204***	−0.062***	−0.435***	0.169***	0.083***	0.192***	0.053***	−0.118***
	(0.011)	(0.006)	(0.005)	(0.011)	(0.011)	(0.013)	(0.007)	(0.007)	(0.014)	(0.016)
q_{ijt-1}	0.002**	0.002***	0.006***	0.003***	0.008***	0.002*	0.002***	0.006***	0.003**	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940	5,940
R^2	0.112	0.185	0.298	0.035	0.087	0.107	0.188	0.310	0.052	0.044

[a]*Note:* The table presents the estimation results of a system of equations depicted by Equation (1) relating the uses-of-funds to cash flow and firm characteristics. Panel A presents the estimates based on CF1. Panel B presents the estimation results based on CF2. CF1 is operating income *plus* depreciation-to-total assets. CF2 is net income before extraordinary items *plus* depreciation-to-total assets. All models include control variables and the lagged use of funds (but not reported). The correlation of residuals across the system of equations is not reported for brevity. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

APPENDIX E: The evolution of the proxies of cash flow

		CF			CF1			CF2			Correlations	
Year	**N**	**Mean**	**Median**	***SD***	**Mean**	**Median**	***SD***	**Mean**	**Median**	***SD***	**CF&CF1**	**CF&CF2**
2000	171	0.137	0.111	0.087	0.199***	0.203***	0.096***	0.185***	0.171***	0.107***	0.768***	0.703***
2001	231	0.173	0.139	0.140	0.236***	0.198***	0.157***	0.199***	0.172***	0.166***	0.806***	0.763***
2002	278	0.167	0.140	0.102	0.221***	0.207***	0.132***	0.201***	0.177***	0.146***	0.658***	0.526***
2003	310	0.149	0.139	0.082	0.220***	0.215***	0.096***	0.185***	0.183***	0.110***	0.821***	0.638***
2004	331	0.165	0.144	0.097	0.231***	0.225***	0.110***	0.195***	0.202***	0.123***	0.626***	0.536***
2005	340	0.164	0.142	0.098	0.255***	0.232***	0.142***	0.218***	0.197***	0.149***	0.669***	0.744***
2006	365	0.176	0.158	0.107	0.269***	0.257***	0.131***	0.229***	0.213***	0.140***	0.737***	0.740***
2007	392	0.180	0.160	0.114	0.274***	0.250***	0.161***	0.235***	0.225***	0.143***	0.654***	0.670***
2008	401	0.186	0.155	0.123	0.269***	0.240***	0.152***	0.239***	0.207***	0.151***	0.741***	0.752***
2009	444	0.160	0.143	0.099	0.199***	0.201***	0.123***	0.185***	0.168***	0.115***	0.683***	0.740***
2010	487	0.147	0.136	0.088	0.200***	0.189***	0.111***	0.181***	0.166***	0.104***	0.646***	0.759***
2011	508	0.149	0.137	0.091	0.200***	0.189***	0.113***	0.188***	0.173***	0.107***	0.667***	0.751***
2012	477	0.141	0.137	0.083	0.191***	0.191***	0.110***	0.181***	0.174***	0.102***	0.638***	0.705***
2013	447	0.137	0.120	0.088	0.167***	0.173***	0.122***	0.177***	0.160***	0.108***	0.483***	0.709***
2014	412	0.144	0.123	0.100	0.164***	0.158***	0.109***	0.166***	0.156***	0.110***	0.435***	0.734***
2015	346	0.136	0.116	0.091	0.156***	0.149***	0.121***	0.158***	0.145***	0.105***	0.623***	0.783***
CF	5,940	0.156	0.138	0.100	0.214***	0.203***	0.131***	0.195***	0.178***	0.126***	0.666***	0.712***
$\sum \text{Uses}_i$		0.194	0.175	0.180	0.156	0.138	0.100	0.156	0.138	0.100		
Diff = CF-$\sum \text{Uses}_i$		−0.038	−0.037	−0.080	0.058	0.065	0.031	0.039	0.040	0.026		
Diff/CF (%)		- 24.36	- 26.81	- 80.00	27.10	32.02	23.66	20.00	22.47	20.63		
Diff *p-value*		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]		

[a]*Note:* The table presents time-series summary statistics and pairwise correlations between the proxies of cash flow. CF is net cash flow from operating activities (NOCF)-to-total assets. CF1 is operating income *plus* depreciation-to-total assets. CF2 is net income before extraordinary items *plus* depreciation *minus* dividends-to-total assets. $\sum \text{Uses}_i = \Delta\text{Cash} + \text{Capex} + \text{Div} + \Delta\text{D} + \Delta\text{E}$. The sample consists of listed non-utility and non-financial firms in selected African countries drawn from *Datastream* over the period 2000–2015. All variables used are defined in Appendix A and are winsorized at the lower and upper one percentiles. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.