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Beyond the balance sheet: SME financing strategies for fixed assets amid constraints

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ABSTRACT

This study examines how financial constraints influence the composition of financing used by small and medium-sized enterprises (SMEs) for fixed asset investment. Drawing on enterprise survey data from 42,929 SMEs across 121 countries between 2007 and 2024, we examine whether constrained enterprises rely more on internal or external sources to finance fixed asset investments. We find that SMEs reporting financing obstacles are significantly more likely to rely on external sources – such as equity, bank loans, non-bank institutions, trade credit, and informal sources like family and money lenders – to finance fixed asset investments. At the same time, the proportion of investment financed by internal funds declines as financial constraints intensify, suggesting a reallocation of internal liquidity toward short-term operational needs. Our findings remain consistent across regional, legal, and sectoral subgroups and are validated through alternative specifications, definitions of financial constraint, endogeneity-adjusted estimations, and pass falsification tests. These findings challenge the traditional pecking order expectation that constrained enterprises tend to prioritize internal funding, instead highlighting the role of collateralizability and credit rationing in shaping financing decisions. Our results imply that expanding access to diverse, collateral-friendly, and relationship-based financing instruments may be more effective in supporting SME capital investment than focusing solely on liquidity provision.

1. Introduction

Small and medium-sized enterprises (SMEs) are widely recognized as engines of innovation, employment, and economic resilience (Beck and Demirguc-Kunt, 2006; Hamadi and Heinen, 2015). However, their ability to invest in fixed assets, such as property, plant, and equipment, is frequently hindered by limited internal resources and restricted access to external finance. These challenges are particularly acute in emerging and developing economies, where formal credit markets are shallow, collateral enforcement is weak, and financial intermediation is costly or underdeveloped.[1] A central theme in the pecking order theory is that enterprises tend to rely more on internal funds to finance investment, resorting to external capital only when internal resources are

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[1] See, among others, Asiedu et al. (2013), Aterido et al. (2013), Machokoto et al. (2023), Machokoto (2024), and Wellalage and Fernandez (2019).

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insufficient. The theory emphasizes a preference hierarchy rooted in cost and information asymmetry considerations.[2] Accordingly, constrained SMEs are often assumed to be disproportionately reliant on retained earnings, particularly in emerging markets that are beleaguered by institutional voids.[3]

Yet, emerging empirical evidence suggests a more nuanced picture – one that varies across investment types, financing instruments, enterprise characteristics, and operating environments. Ferrando and Preuss (2018) find that while internal funds are often used to finance intangible assets, SMEs prefer bank loans for tangible fixed assets, likely due to their collateral value. Erdogan (2015) shows that SMEs' financing choices are influenced by factors such as enterprise size, age, and the structure of receivables and payables. Trinh et al. (2017) report that highly leveraged SMEs in Vietnam are more likely to seek new investments and rely on external financing rather than internal sources of funding. Nicolas (2022) further documents that short-term liquidity pressures can force enterprises to prioritize working capital needs over capital expenditure, leading to selective reliance on external finance for fixed assets. Similarly, Zubair et al. (2020) document evidence suggesting that during and after the Global Financial Crisis, SMEs increasingly turned to external finance, particularly bank credit, to fund their investments, suggesting adaptive shifts in financing strategies during credit contractions.

Despite these emerging and interesting insights, relatively little attention has been paid to how financial constraints influence the composition of financing, specifically, the relative shares of internal and external sources used to fund fixed assets. Much of the existing literature focuses on the level of investment or the likelihood of accessing a particular financing channel; however, less is known about how enterprises allocate among financing sources once the decision to invest has been made.[4] This question is especially relevant for SMEs, which must frequently balance short-term liquidity needs with long-term capital formation under tight financial conditions. Understanding how constrained SMEs adjust their financing mix – whether by substituting external for internal sources or `vice versa` – offers a deeper understanding of financial behavior under constraints and allows for more targeted policy interventions.

Our study addresses the above research gap by examining how financial constraints influence the composition of financing used for investments in fixed assets. Drawing on enterprise survey data from 42,929 SMEs in 121 countries between 2007 and 2024, we find empirical evidence suggesting that SMEs reporting financing obstacles are more likely to rely on external sources of finance for fixed assets than those without such constraints. At the same time, the proportion of fixed assets financed by internal sources declines as financial obstacles intensify, indicating an adaptive strategic reallocation of scarce internal liquidity toward operational needs. The external financing sources include not only those from formal channels, such as bank loans and non-bank financial institutions, but also semi-formal and informal instruments, such as trade credit, customer advances, equity injections, and borrowing from family or friends. These empirical findings remain robust to several concerns and also pass falsification tests.

While seemingly at odds with the canonical prediction of internal finance preference, our empirical findings reveal financing behavior that is more appropriately understood through the lens of credit rationing theory (Stiglitz and Weiss, 1981) and financial adaptation under constraint (Guariglia and Yang, 2018; Fazzari et al., 1988; Ferrando and Preuss, 2018). Fixed assets are generally more collateralizable and observable than working capital, making them more appealing to external financiers even in contexts of perceived credit risk (Caglayan and Machokoto, 2024; Stiglitz and Weiss, 1981). Consequently, financially constrained SMEs may reallocate internal funds toward short-term obligations while funding capital investment through more accessible or targeted external channels (Fazzari et al., 1988).

This study contributes to the SME finance literature by demonstrating that financial constraints do not merely suppress investment; they also reshape financing strategies. Rather than adhering strictly to the pecking order logic, constrained SMEs appear to apply it selectively, preserving internal liquidity for short-term needs while leveraging accessible external financing sources for long-term asset acquisition. This more flexible financing hierarchy reflects the pragmatic and context-sensitive behavior of enterprises operating under constraints. By focusing on the allocation of internal `versus` external finance across investment categories (as exemplified in our case by fixed assets), our findings underscore the need for a more nuanced understanding of how financial constraints influence capital allocation decisions. They also point to important policy implications: expanding access to non-bank financing, strengthening trade credit networks, and improving credit information systems may be more effective than narrowly focusing on liquidity provision alone. Ultimately, supporting the diversification of financing options can empower SMEs to sustain capital investment – even when formally constrained.

The remainder of the paper details the data, empirical strategy, main findings, and policy implications.

2. Data and methodology

2.1. Data

The primary enterprise-level data for this study is sourced from the World Bank Enterprise Surveys (`WBES`).[5] Country-level data is drawn from the World Bank's Worldwide Governance Indicators (`WGIs`), World Development Indicators (`WDIs`), and the

[2] See, Myers and Majluf (1984), Paul et al. (2007), and Zeidan et al. (2018).

[3] See, for example, Asiedu et al. (2013), Aterido et al. (2013), (Machokoto et al., 2020), Machokoto et al. (2023), Machokoto (2024), and Wellalage and Fernandez (2019).

[4] See, Gorodnichenko and Schnitzer (2013), Lewellen and Lewellen (2016), Machokoto (2021), Caglayan and Machokoto (2024) and Wellalage and Fernandez (2019).

[5] https://www.enterprisesurveys.org/.

Table 1
Variables definitions.

Variables	Definitions
INTERNAL	Proportion of fixed assets funded by internal funds or retained earnings [WBES Question k5a].
EQUITY	Proportion of fixed assets funded through owners' contributions or newly issued equity [WBES Question k5i].
BANK	Proportion of fixed assets funded via bank borrowings [WBES Question k5bc].
NON-BANK	Proportion of fixed assets funded by non-bank financial institutions [WBES Question k5e].
SUPPLIERS	Proportion of fixed assets funded by supplier credit or customer advances [WBES Question k5f].
OTHERS	Proportion of fixed assets funded by informal sources (e.g., money lenders, friends, or relatives) [WBES Question k5hdj].
FCON1	An index measuring financial access obstacles, ranging from 0 (no obstacle) to 4 (very severe obstacle) [WBES Question k30].
FCON2	An index ranging from 0 (no/minor obstacle), 1 (moderate), 2 (major), to 3 (very severe obstacle) [WBES Question k30].
FCON3	An index ranging from 0 (no/minor/moderate obstacle), 1 (major), to 2 (very severe obstacle) [WBES Question k30].
FCON4	Dummy = 1 if an enterprise faces minor to severe financing obstacles, 0 otherwise [WBES Question k30].
R&D	Dummy = 1 if an enterprise invests in R&D, 0 otherwise [WBES Question k5a].
SMALL	Dummy = 1 if an enterprise has fewer than 20 employees, 0 otherwise [WBES Question size].
MEDSIZE	Dummy = 1 if an enterprise employs between 20 and 99 people, 0 otherwise [WBES Question size].
YOUNG	Dummy = 1 if an enterprise is younger than five years, 0 otherwise [WBES Question b5].
MEDAGE	Dummy = 1 if an enterprise is between 5 and 10 years old, 0 otherwise [WBES Question b5].
GENDER	Dummy = 1 if an enterprise has female ownership, 0 otherwise [WBES Question b4].
AUDITED	Dummy = 1 if an enterprise's financial statements are certified by an external auditor, 0 otherwise [WBES Question k21].
CERTIFY	Dummy = 1 if the enterprise holds an international quality certification, 0 otherwise [WBES Question b8].
TECH	Dummy = 1 if an enterprise is using foreign-licensed technology, 0 otherwise [WBES Question e6].
LOCATION	Dummy = 1 if an enterprise is located in the official capital city, 0 otherwise [WBES Question a3ax].
COMPETE	Dummy = 1 if an enterprise is competing with unregistered or informal enterprises, 0 otherwise [WBES Question e11].
EXPERIENCE	Natural log of the top manager's years of experience [WBES Question b7].
SOLE	Dummy = 1 if the enterprise operates as a sole proprietorship, 0 otherwise [WBES Question b1].
PARTNER	Dummy = 1 if the enterprise operates as a partnership, 0 otherwise [WBES Question b1].
EXPORT	Dummy = 1 if an enterprise is exporting goods or services, 0 otherwise [WBES Question d3b & d3c].
FOREIGN	Dummy = 1 if an enterprise is foreign-owned, 0 otherwise [WBES Question b2b].
GROUP	Dummy = 1 if an enterprise is part of a group of companies, 0 otherwise [WBES Question a7].
CORRUPT	Dummy = 1 if an enterprise cited corruption as the biggest operational obstacle, 0 otherwise [WBES Question m1a].
COURTS	Dummy = 1 if an enterprise cited courts as the biggest operational obstacle, 0 otherwise [WBES Question m1a].
INFLATION	Annual inflation rate [sourced from WDI].
GDPGR	Annual GDP growth rate [sourced from WDI].
FINDEV	A composite measure ranking financial development based on access, depth, and efficiency of financial institutions and markets (see Svirydzenka, 2016).
INSTQUAL	A composite index aggregating the Worldwide Governance Indicators [sourced from WGIs] using principal components analysis.
CIVIL	Dummy = 1 if an enterprise is located in a civil law country, 0 otherwise (see Djankov et al., 2008).
DME	Dummy = 1 if an enterprise is located in a country classified as developed (DME) based on the Morgan Stanley Country Classification Framework, 0 otherwise.

The table presents the detailed variable definitions. The primary dataset for this study is derived from the World Bank Enterprise Surveys (WBES), which includes data from 42,929 enterprises across 121 countries spanning the years 2007 to 2024. Complementary country-level data are sourced from various sources, including the World Bank's Worldwide Governance Indicators (WGI), World Development Indicators (WDI), and the International Monetary Fund (IMF). The classification of countries follows the Morgan Stanley Capital International (MSCI) Market Framework, and legal origin information is obtained from the seminal work of Djankov et al. (2008).

International Monetary Fund (IMF). Country classifications adhere to the Morgan Stanley Capital International (MSCI) Market Framework, while legal origin data is obtained from (Djankov et al., 2008). Consistent with prior literature (see Kadzima et al., 2024; Machokoto et al., 2023; Machokoto, 2024), we exclude enterprises and countries with incomplete data, resulting in a final sample of 42,929 enterprises from 121 countries spanning the period 2007–2024. Detailed variable definitions are provided in Table 1. The country-level sample distribution is presented in Online Appendix A.1. Summary statistics and correlations are presented in Tables 2 and 3.

2.2. Methodology

To test the association between financing choices and obstacles to accessing finance, we estimate the following model.

$$y_{ijkt} = \alpha_0 + \alpha_1 \text{OBSTACLES}_{ijkt} + \boldsymbol{\beta X}_{ijkt} + \boldsymbol{\theta Z}_{kzt} + \eta_j + \eta_k + \eta_t + \epsilon_{ijkt} \tag{1}$$

where i, j, k, and t index for enterprise, industry, country, and year, respectively. The dependent variable, y, proxies the proportion of fixed assets financed by each of the six financing sources, measured by the following based on the World Bank Enterprise Surveys:

(i) **INTERNAL**: Proportion of fixed assets funded by internal funds/retained earnings [Question k5a: Last fiscal, % of fixed assets funded by: Internal funds/retained earnings].
(ii) **EQUITY**: Proportion of fixed assets funded by the owners' contributions or new equity issued [Question k5a: Last fiscal, % of fixed assets funded by: Owners' contributions or issued new equity].
(iii) **BANK**: Proportion of fixed assets funded by bank borrowings [Question k5a: Last fiscal, % of fixed assets funded by: Bank borrowing].
(iv) **NON-BANK**: Proportion of fixed assets funded by non-bank financial institutions [Question k5a: Last fiscal, % of fixed assets funded by: Non-bank financial institutions].
(v) **SUPPLIERS**: Proportion of fixed assets funded by credit from suppliers/advances from customers [Question k5a: Last fiscal, % of fixed assets funded by: Credit from suppliers/advances from customers].
(vi) **OTHERS**: Proportion of fixed assets funded by other sources (money lenders, friends, or relatives etc.) [Question k5a: Last fiscal, % of fixed assets funded by: Other (money lenders or friends or relatives etc.)].

α_0 is the constant, while α_1, $\boldsymbol{\beta}$, and $\boldsymbol{\theta}$ are the coefficients to be estimated. OBSTACLES represents obstacles to accessing finance and is proxied by:

Table 2
Summary statistics.

		Full sample			FCON4=0			FCON4=1			Differences
#	Variables	N	Mean	Std.Dev	N	Mean	Std.Dev	N	Mean	Std.Dev	Mean
(1)	INTERNAL	42,929	0.6942	0.3889	17,794	0.7450	0.3750	25,135	0.6582	0.3946	−0.0868***
(2)	EQUITY	42,929	0.0401	0.1574	17,794	0.0313	0.1442	25,135	0.0463	0.1658	0.0150***
(3)	BANK	42,929	0.1855	0.3286	17,794	0.1651	0.3198	25,135	0.1999	0.3339	0.0348***
(4)	NON-BANK	42,929	0.0192	0.1155	17,794	0.0158	0.1065	25,135	0.0217	0.1214	0.0059***
(5)	SUPPLIERS	42,929	0.0412	0.1590	17,794	0.0293	0.1391	25,135	0.0496	0.1712	0.0203***
(6)	OTHERS	42,929	0.0198	0.1126	17,794	0.0135	0.0973	25,135	0.0243	0.1220	0.0107***
(7)	FCON1	42,929	1.2149	1.2673	17,794	0.0000	0.0000	25,135	2.0750	0.9788	2.0750***
(8)	FCON2	42,929	0.6294	0.9173	17,794	0.0000	0.0000	25,135	1.0750	0.9788	1.0750***
(9)	FCON3	42,929	0.2430	0.5533	17,794	0.0000	0.0000	25,135	0.4150	0.6719	0.4150***
(10)	FCON4	42,929	0.5855	0.4926	17,794	0.0000	0.0000	25,135	1.0000	0.0000	1.0000***
(11)	R&D	42,929	0.2235	0.4166	17,794	0.2165	0.4119	25,135	0.2284	0.4198	0.0119***
(12)	SMALL	42,929	0.3761	0.4844	17,794	0.3629	0.4808	25,135	0.3855	0.4867	0.0226***
(13)	MEDSIZE	42,929	0.4217	0.4938	17,794	0.4225	0.4940	25,135	0.4212	0.4938	−0.0013
(14)	YOUNG	42,929	0.1051	0.3067	17,794	0.0883	0.2838	25,135	0.1170	0.3214	0.0286***
(15)	MEDAGE	42,929	0.1775	0.3821	17,794	0.1590	0.3657	25,135	0.1906	0.3928	0.0316***
(16)	GENDER	42,929	0.3773	0.4847	17,794	0.3942	0.4887	25,135	0.3653	0.4815	−0.0289***
(17)	AUDITED	42,929	0.5713	0.4949	17,794	0.5963	0.4906	25,135	0.5537	0.4971	−0.0427***
(18)	CERTIFY	42,929	0.2903	0.4539	17,794	0.3238	0.4679	25,135	0.2666	0.4422	−0.0572***
(19)	TECH	42,929	0.1395	0.3465	17,794	0.1467	0.3539	25,135	0.1344	0.3411	−0.0123***
(20)	LOCATION	42,929	0.4375	0.4961	17,794	0.4236	0.4941	25,135	0.4474	0.4972	0.0238***
(21)	COMPETE	42,929	0.4222	0.4939	17,794	0.3417	0.4743	25,135	0.4792	0.4996	0.1375***
(22)	EXPERIENCE	42,929	2.8905	0.6623	17,794	2.9588	0.6578	25,135	2.8422	0.6611	−0.1167***
(23)	SOLE	42,929	0.2552	0.4360	17,794	0.2069	0.4051	25,135	0.2894	0.4535	0.0825***
(24)	PARTNER	42,929	0.0708	0.2564	17,794	0.0653	0.2471	25,135	0.0746	0.2628	0.0093***
(25)	EXPORT	42,929	0.3212	0.4670	17,794	0.3570	0.4791	25,135	0.2959	0.4565	−0.0611***
(26)	FOREIGN	42,929	0.0964	0.2952	17,794	0.1132	0.3168	25,135	0.0845	0.2782	−0.0286***
(27)	GROUP	42,929	0.1694	0.3751	17,794	0.1768	0.3815	25,135	0.1642	0.3704	−0.0126***
(28)	CORRUPT	42,929	0.0514	0.2208	17,794	0.0440	0.2051	25,135	0.0567	0.2312	0.0127***
(29)	COURTS	42,929	0.0091	0.0948	17,794	0.0096	0.0976	25,135	0.0087	0.0927	−0.0009
(30)	INFLATION	42,929	0.0502	0.0597	17,794	0.0451	0.0527	25,135	0.0538	0.0639	0.0086***
(31)	GDPGR	42,929	0.0378	0.0328	17,794	0.0350	0.0333	25,135	0.0397	0.0322	0.0048***
(32)	FINDEV	21,056	0.3339	0.1516	7,171	0.3488	0.1560	13,885	0.3261	0.1486	−0.0227***
(33)	INSTQUAL	39,583	−0.1357	2.0504	16,271	0.3596	2.2195	23,312	−0.4814	1.8465	−0.8410***
(34)	CIVIL	42,929	0.7629	0.4253	17,794	0.8016	0.3988	25,135	0.7355	0.4410	−0.0661***
(35)	DME	42,929	0.1544	0.3613	17,794	0.2323	0.4223	25,135	0.0993	0.2990	−0.1330***

The table presents the summary statistics for the variables used. All variables used are defined in Table 1. The primary dataset for this study is derived from the World Bank Enterprise Surveys (WBES), which includes data from 42,929 enterprises across 121 countries spanning the years 2007 to 2024. Complementary country-level data are sourced from various sources, including the World Bank's Worldwide Governance Indicators (WGI), World Development Indicators (WDI), and the International Monetary Fund (IMF). The classification of countries follows the Morgan Stanley Capital International (MSCI) Market Framework, and legal origin information is obtained from the seminal work of Djankov et al. (2008).

(i) **FCON1**: An index measuring obstacles to accessing finance, ranging from 0 (no obstacle), 1 (minor obstacle), 2 (moderate obstacle), 3 (major obstacle), to 4 (very severe obstacle) [`Question k30: How much of an obstacle: Access to finance`].

(ii) **FCON2**: An index measuring obstacles to accessing finance, ranging from 0 (no obstacle and minor obstacle), 1 (moderate obstacle), 2 (major obstacle), to 3 (very severe obstacle) [`Question k30`].

(iii) **FCON3**: An index measuring obstacles to accessing finance, ranging from 0 (no obstacle, minor obstacle, and moderate obstacle), 1 (major obstacle), to 2 (very severe obstacle) [`Question k30`].

(iv) **FCON4**: A dummy equals one if an enterprise indicates facing minor to very severe obstacles to accessing finance and zero otherwise [`Question k30`].

$\boldsymbol{X}$ and $\boldsymbol{Z}$ are vectors of enterprise- and country-specific control variables, respectively. Industry, country and year-fixed effects are denoted by η_j, η_k and η_t. Finally, ξ represents the error term. All variables used are detailed in Table Table 1.

3. Empirical results

3.1. Baseline results

Table 4 presents regression results estimating Equation (1) for the six financing sources used in fixed asset acquisitions. Columns (1)–(6) report baseline regressions without controls, while Columns (7)–(12) include enterprise- and country-level controls to account for potential confounders.

Notably, the coefficient on `FCON1` in Columns (1) and (7) is consistently negative and statistically significant at the 1% level. The magnitude of the effect is also economically meaningful: based on the estimate reported in Column (7), financially constrained SMEs

Table 3
Correlations.

#	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	INTERNAL	1.000											
(2)	EQUITY	−0.302***	1.000										
(3)	BANK	−0.732***	−0.095***	1.000									
(4)	NON-BANK	−0.221***	−0.022***	−0.067***	1.000								
(5)	SUPPLIERS	−0.321***	−0.027***	−0.083***	−0.016***	1.000							
(6)	OTHERS	−0.217***	−0.016**	−0.071***	−0.013**	−0.006	1.000						
(7)	FCON1	−0.108***	0.046***	0.041***	0.029***	0.067***	0.067***	1.000					
(8)	FCON2	−0.091***	0.038***	0.029***	0.026***	0.058***	0.067***	0.948***	1.000				
(9)	FCON3	−0.054***	0.024***	0.004	0.018***	0.040***	0.066***	0.793***	0.897***	1.000			
(10)	FCON4	−0.110***	0.047***	0.052***	0.025***	0.063***	0.047***	0.807***	0.577***	0.370***	1.000		
(11)	R&D	−0.065***	0.026***	0.056***	0.006	0.014**	−0.000	0.006	0.000	−0.007	0.014**	1.000	
(12)	SMALL	0.061***	−0.001	−0.085***	0.006	−0.009	0.044***	0.054***	0.062***	0.063***	0.023***	−0.127***	1.000
(13)	MEDSIZE	−0.023***	−0.002	0.030***	0.003	0.004	−0.014**	−0.010*	−0.014**	−0.017***	−0.001	0.040***	−0.663***
(14)	YOUNG	0.025***	0.033***	−0.047***	−0.008	−0.012*	0.029***	0.061***	0.060***	0.054***	0.046***	−0.047***	0.133***
(15)	MEDAGE	0.023***	0.012*	−0.040***	0.001	0.004	0.014**	0.042***	0.037***	0.030***	0.041***	−0.028***	0.071***
(16)	GENDER	−0.039***	0.000	0.035***	0.019***	0.012*	−0.005	−0.030***	−0.026***	−0.025***	−0.029***	0.017***	−0.028***
(17)	AUDITED	−0.049***	0.007	0.066***	0.021***	−0.018***	−0.028***	−0.063***	−0.065***	−0.052***	−0.042***	0.146***	−0.221***
(18)	CERTIFY	−0.024***	−0.003	0.047***	0.004	−0.019***	−0.026***	−0.090***	−0.091***	−0.071***	−0.062***	0.185***	−0.264***
(19)	TECH	−0.000	0.011*	0.001	−0.001	0.001	−0.017***	−0.037***	−0.041***	−0.031***	−0.017***	0.124***	−0.108***
(20)	LOCATION	0.009	−0.022***	−0.008	−0.006	0.029***	−0.010*	0.036***	0.037***	0.030***	0.024***	0.026***	−0.026***
(21)	COMPETE	−0.048***	0.042***	−0.000	0.013**	0.052***	0.022***	0.156***	0.142***	0.110***	0.137***	0.001	0.075***
(22)	EXPERIENCE	−0.039***	−0.046***	0.065***	0.020***	0.014**	−0.033***	−0.070***	−0.050***	−0.039***	−0.087***	0.042***	−0.083***
(23)	SOLE	0.096***	0.015**	−0.105***	−0.026***	−0.039***	0.037***	0.085***	0.067***	0.062***	0.093***	−0.104***	0.193***
(24)	PARTNER	0.007	0.034***	−0.023***	−0.002	−0.009*	0.013**	0.012**	0.008	0.004	0.018***	−0.022***	−0.002
(25)	EXPORT	−0.070***	0.007	0.066***	0.017***	0.014**	0.001	−0.065***	−0.055***	−0.045***	−0.064***	0.218***	−0.193***
(26)	FOREIGN	0.022***	0.023***	−0.046***	0.006	0.015**	−0.002	−0.049***	−0.043***	−0.032***	−0.048***	0.055***	−0.119***
(27)	GROUP	−0.036***	0.018***	0.025***	0.023***	0.004	−0.003	−0.024***	−0.024***	−0.026***	−0.017***	0.076***	−0.132***
(28)	CORRUPT	−0.011*	0.008	0.003	−0.007	0.012*	0.008	0.013**	0.003	−0.007	0.028***	0.013**	−0.009
(29)	COURTS	−0.006	−0.006	0.014**	−0.009	0.002	−0.005	−0.001	0.001	0.001	−0.005	0.014**	−0.002
(30)	INFLATION	0.001	0.010*	−0.014**	−0.013**	0.026***	0.001	0.089***	0.084***	0.069***	0.071***	−0.039***	−0.005
(31)	GDPGR	−0.010*	0.031***	0.009	−0.035***	−0.006	0.010*	0.042***	0.020***	0.005	0.072***	0.003	−0.070***
(32)	FINDEV	−0.051***	0.027***	0.023***	0.002	0.050***	−0.000	0.070***	0.043***	0.021***	0.099***	0.061***	−0.101***
(33)	INSTQUAL	−0.066***	−0.048***	0.106***	0.057***	−0.023***	−0.041***	−0.200***	−0.172***	−0.129***	−0.194***	0.111***	0.002
(34)	CIVIL	−0.015**	−0.063***	0.032***	0.006	0.047***	−0.025***	−0.048***	−0.026***	−0.020***	−0.077***	0.011*	0.005
(35)	DME	−0.022***	−0.049***	0.067***	0.055***	−0.055***	−0.029***	−0.184***	−0.156***	−0.117***	−0.181***	0.096***	0.039***

#	Variables	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(13)	MEDSIZE	1.000											
(14)	YOUNG	−0.056***	1.000										
(15)	MEDAGE	−0.019***	−0.159***	1.000									
(16)	GENDER	0.014**	−0.045***	−0.026***	1.000								
(17)	AUDITED	0.062***	−0.078***	−0.066***	0.036***	1.000							
(18)	CERTIFY	0.052***	−0.106***	−0.067***	0.016**	0.196***	1.000						
(19)	TECH	0.023***	−0.034***	−0.024***	−0.011*	0.083***	0.166***	1.000					
(20)	LOCATION	−0.002	−0.010*	−0.020***	0.022***	0.009	0.010*	0.005	1.000				
(21)	COMPETE	−0.015**	0.008	0.019***	0.033***	−0.054***	−0.130***	−0.027***	0.041***	1.000			
(22)	EXPERIENCE	0.041***	−0.290***	−0.189***	0.057***	0.070***	0.086***	0.013**	0.058***	0.004	1.000		
(23)	SOLE	−0.082***	0.055***	0.055***	−0.175***	−0.126***	−0.159***	−0.064***	−0.059***	0.079***	−0.150***	1.000	
(24)	PARTNER	0.018***	0.011*	−0.003	0.018***	0.032***	−0.010*	−0.009	−0.024***	0.017***	−0.013**	−0.162***	1.000
(25)	EXPORT	0.034***	−0.085***	−0.071***	0.020***	0.124***	0.277***	0.129***	0.023***	−0.112***	0.099***	−0.169***	−0.046***
(26)	FOREIGN	−0.010*	0.013**	0.008	−0.033***	0.116***	0.114***	0.101***	0.058***	−0.057***	−0.047***	−0.114***	0.004
(27)	GROUP	0.028***	−0.031***	−0.027***	0.020***	0.137***	0.093***	0.033***	0.006	−0.016**	0.032***	−0.074***	0.019***
(28)	CORRUPT	−0.001	−0.004	0.004	−0.015**	0.006	−0.007	−0.006	−0.005	0.028***	−0.029***	0.021***	0.020***
(29)	COURTS	0.003	−0.015**	−0.004	−0.001	0.007	0.009	0.003	−0.010*	−0.008	0.001	−0.014**	−0.004
(30)	INFLATION	−0.000	0.022***	0.021***	−0.020***	−0.038***	−0.079***	−0.027***	0.077***	0.062***	−0.036***	0.013**	−0.012*
(31)	GDPGR	0.017***	0.036***	0.072***	−0.029***	0.016***	−0.058***	−0.053***	−0.042***	0.067***	−0.143***	0.156***	0.071***
(32)	FINDEV	0.043***	−0.000	0.067***	0.049***	0.042***	0.029***	−0.053***	0.006	0.116***	−0.080***	0.007	0.012*
(33)	INSTQUAL	0.017***	−0.132***	−0.097***	0.055***	0.140***	0.183***	0.081***	0.028***	−0.179***	0.236***	−0.274***	−0.052***
(34)	CIVIL	0.002	−0.013**	0.000	0.027***	−0.115***	0.002	0.010*	0.116***	0.010*	0.133***	−0.198***	−0.114***
(35)	DME	0.009	−0.068***	−0.077***	0.043***	0.147***	0.126***	0.052***	−0.084***	−0.190***	0.182***	−0.193***	−0.001

Variables	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)
EXPORT	1.000										
FOREIGN	0.194***	1.000									
GROUP	0.059***	0.103***	1.000								
CORRUPT	−0.025***	−0.005	0.002	1.000							
COURTS	0.003	0.003	0.006	−0.022***	1.000						
INFLATION	−0.057***	−0.028***	−0.016**	0.000	−0.005	1.000					
GDPGR	−0.114***	−0.022***	−0.016***	0.058***	0.002	0.197***	1.000				
FINDEV	−0.061***	−0.017***	0.041***	0.058***	0.007	0.036***	0.287***	1.000			
INSTQUAL	0.220***	0.021***	0.041***	−0.105***	−0.009	−0.204***	−0.307***	−0.169***	1.000		
CIVIL	0.078***	−0.015**	−0.051***	−0.060***	0.006	0.031***	−0.209***	−0.079***	0.169***	1.000	
DME	0.153***	−0.009	0.083***	−0.089***	−0.022***	−0.222***	−0.255***	−0.260***	0.674***	0.095***	1.000

The table presents the pairwise correlations for the variables used. ***, **, * indicate significance at the one, five, and ten percent levels, respectively. All variables used are defined in Table 1. The primary dataset for this study is derived from the World Bank Enterprise Surveys (WBES), which includes data from 42,929 enterprises across 121 countries spanning the years 2007 to 2024. Complementary country-level data are sourced from various sources, including the World Bank's Worldwide Governance Indicators (WGI), World Development Indicators (WDI), and the International Monetary Fund (IMF). The classification of countries follows the Morgan Stanley Capital International (MSCI) Market Framework, and legal origin information is obtained from the seminal work of Djankov et al. (2008).

Table 4
The impact of obstacles to accessing financing on the financing of fixed assets.

Dependent Variables	INTERNAL	EQUITY	BANK	NON-BANK	SUPPLIERS	OTHERS	INTERNAL	EQUITY	BANK	NON-BANK	SUPPLIERS	OTHERS
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FCON1	−0.0378***	0.0038***	0.0186***	0.0041***	0.0055***	0.0057***	−0.0378***	0.0034***	0.0197***	0.0040***	0.0054***	0.0054***
	(0.0015)	(0.0007)	(0.0013)	(0.0005)	(0.0007)	(0.0005)	(0.0015)	(0.0007)	(0.0013)	(0.0005)	(0.0007)	(0.0006)
Enterprise level controls	✗	✗	✗	✗	✗	✗	✔	✔	✔	✔	✔	✔
Country level controls	✗	✗	✗	✗	✗	✗	✔	✔	✔	✔	✔	✔
Industry fixed effects	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Country fixed effects	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Year fixed effects	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
# of observations	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929
Adjusted-R^2	0.111	0.028	0.102	0.036	0.052	0.026	0.118	0.032	0.113	0.036	0.053	0.028

The table presents the results estimating Equation (1). All variables used are defined in Table 1. The primary dataset for this study is derived from the World Bank Enterprise Surveys (WBES), which includes data from 42,929 enterprises across 121 countries spanning the years 2007 to 2024. Complementary country-level data are sourced from various sources, including the World Bank's Worldwide Governance Indicators (WGI), World Development Indicators (WDI), and the International Monetary Fund (IMF). The classification of countries follows the Morgan Stanley Capital International (MSCI) Market Framework, and legal origin information is obtained from the seminal work of Djankov et al. (2008). Robust standard errors reported in parentheses are calculated using the Huber White Sandwich Estimator for the covariance matrix. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

allocate approximately 5% less of their internal funds to fixed asset investments, relative to the sample mean $[\frac{\texttt{Coefficient}}{\texttt{Mean}} = \frac{-0.0378}{0.6942}]$. This finding aligns with the notion that constrained firms adjust their financing mix in response to liquidity shortages (Fazzari et al., 1988; Ferrando and Preuss, 2018), selectively preserving internal resources for short-term operations. It also reflects a departure from the strict pecking order logic (Myers and Majluf, 1984), suggesting an adaptive financial behavior consistent with credit rationing theory (Stiglitz and Weiss, 1981) in the presence of real-world frictions.

Conversely, FCON1 exhibits positive and statistically significant coefficients across all external financing sources in Columns (2)–(6) and (8)–(12), indicating that SMEs facing financing obstacles increasingly turn to external funding for fixed asset investments. The effects are economically meaningful: based on estimates in Columns (8) to (12), financially constrained firms allocate to fixed assets approximately 8%, 11%, 21%, 13%, and 27% more of their equity, bank loans, non-bank finance, trade credit, and informal funding, respectively, relative to the sample mean $[\frac{\texttt{Coefficient}}{\texttt{Mean}}]$.

These patterns are indicative of strategic reallocation under constraint: constrained firms preserve internal liquidity for short-term operations and rely on external channels for capital formation. This behavior aligns with credit rationing theory (Stiglitz and Weiss, 1981) and literature on financial adaptation under constraint (Guariglia and Yang, 2018; Fazzari et al., 1988; Ferrando and Preuss, 2018). The collateralizability of fixed assets enhances their appeal to creditors, even in high-risk environments. Equity may substitute for debt (Carpenter and Petersen, 2002), while trade credit and informal finance compensate for institutional voids (Demirgüç-Kunt and Maksimovic, 2001; Guariglia and Yang, 2018). Non-bank institutions also play a crucial role in contexts where traditional banking is underdeveloped (Guariglia and Yang, 2018; Wellalage and Fernandez, 2019).

In sum, our findings highlight the adaptive financing behavior of SMEs and the importance of diverse financing avenues.

3.2. Robustness tests

Fig. 1 further confirms the reliance on external financing sources and highlights variations in reliance on internal versus external funds across subsamples. Constrained enterprises in developed markets (DME), regions such as Oceania, North America, and Europe, and civil law countries show a more pronounced preference for external funding. These financing trends we observe suggest that institutional and regional factors significantly influence enterprises' decisions on financing fixed assets under financial constraints.

To ensure the robustness of our findings, Table 5 presents a series of additional checks. Panel A replaces our baseline measure of financing constraints (FCON1) with two alternative proxies, FCON2 and FCON3. Across these specifications, the core results remain consistent, indicating the robustness of our findings to alternative definitions of financing obstacles. Panel B addresses concerns regarding uneven representation across countries in our sample. Columns (1) and (2) report weighted regressions using country-level sampling weights, while Columns (3) to (7) exclude enterprises from the most heavily represented countries to assess whether specific national contexts disproportionately drive the results. The results remain qualitatively unchanged.

Next, to address potential selection bias, Columns (8)–(10) employ matching techniques – specifically, Propensity Score Matching (PSM) and Entropy Balancing – to ensure comparability between enterprises with and without financing obstacles. For PSM, we first estimate a probit model with FCON1 as the dependent variable, using all controls from Eq. (1) and including fixed effects. Based on the predicted probabilities (propensity scores), we match treated enterprises (FCON1=1) to control enterprises (FCON1=0) using nearest-neighbor matching. We then re-estimate Equation (1) on this matched sample in Columns (8) and (9), which report results for subsamples with non-missing weights and those satisfying the common support condition, respectively. This matching procedure enhances the comparability of the treated and control groups, facilitating the isolation of the impact of financing constraints. Additionally, in Column (10), we implement entropy balancing, which reweights the sample to achieve a covariate balance between the treated and control groups. This technique retains the full sample while correcting for observed imbalances without relying on explicit matching.[6]

[6] Online Appendix A.2 shows that covariates are well balanced across all relevant moments (mean, variance, and skewness) after applying the reweighting scheme via entropy balancing.

Table 5
Robustness tests.

Panel A:

Dependent Variables	BANK	NON-BANK	INTERNAL	EQUITY	INTERNAL	EQUITY	INTERNAL	EQUITY	INTERNAL	EQUITY	INTERNAL	EQUITY
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FCON2	−0.0454***	0.0040***	0.0227***	0.0048***	0.0063***	0.0075***						
	(0.0021)	(0.0009)	(0.0018)	(0.0007)	(0.0010)	(0.0008)						
FCON3							−0.0513***	0.0035**	0.0221***	0.0054***	0.0076***	0.0125***
							(0.0035)	(0.0016)	(0.0029)	(0.0011)	(0.0016)	(0.0014)
Enterprise level controls	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Country level controls	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Industry fixed effects	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Country fixed effects	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Year fixed effects	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
# of observations	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929	42,929
Adjusted-R^2	0.115	0.032	0.112	0.036	0.052	0.028	0.110	0.031	0.109	0.035	0.052	0.028

Panel B:

	WLS1	WLS2	PSM1	PSM2	ENTROPY	MODELS1	MODELS2	MODELS3	CONTROLS	CONTROLS	CONTROLS	ESTIMATION
Methods	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	2SLS
Dependent Variables	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FCON1	−0.0385***	−0.0383***	−0.0877***	−0.0876***	−0.0876***	−0.0376***	−0.0383***	−0.0382***	−0.0341***	−0.0386***	−0.0372***	−0.1158***
	(0.0021)	(0.0017)	(0.0044)	(0.0038)	(0.0038)	(0.0016)	(0.0016)	(0.0016)	(0.0022)	(0.0016)	(0.0017)	(0.0415)
ASIA											0.0267***	
											(0.0077)	
EUROPE											0.0236**	
											(0.0097)	
NORTH AMERICA											−0.0765***	
											(0.0142)	
OCEANIA											−0.0287	
											(0.0227)	
SOUTH AMERICA											−0.1212***	
											(0.0130)	
LOWER MIDDLE INCOME											−0.0512***	
											(0.0094)	
UPPER MIDDLE INCOME											−0.0899***	
											(0.0107)	
UPPER INCOME											−0.0695***	
											(0.0122)	
FINDEV									−0.0685***			
									(0.0239)			
INSTQUAL										−0.0114***		
										(0.0014)		
Enterprise level controls	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Country level controls	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Industry fixed effects	✔	✔	✔	✔	✔	✗	✔	✗	✔	✔	✔	✔
Country fixed effects	✔	✔	✔	✔	✔	✔	✗	✗	✗	✗	✗	✗
Year fixed effects	✗	✗	✗	✗	✗	✔	✔	✗	✗	✗	✗	✗
Country-Year fixed effects	✗	✗	✗	✗	✗	✗	✔	✗	✗	✗	✗	✗
Industry-Country-Year fixed effects	✗	✗	✗	✗	✗	✗	✗	✔	✗	✗	✗	✗
# of observations	42,929	42,929	35,220	42,924	42,929	42,929	42,929	42,929	21,056	39,583	37,797	42,929
Adjusted-R^2	0.124	0.118	0.118	0.116	0.116	0.121	0.123	0.131	0.090	0.076	0.085	0.063
Kleibergen–Paap rk LM statistic												54.390
Cragg–Donald Wald F statistic												61.350
Kleibergen–Paap rk Wald F statistic												57.570

The table reports the results from estimating Equation (1). WLS1 and WLS2 are weighted regression estimates, where WLS1 assigns weights equal to the inverse of the number of observations per country, and WLS2 uses weights equal to the inverse of the square root of the number of observations per country. ExIND, ExPER, ExCHN, ExVNM, and ExCOL represent subsamples that exclude enterprises in India (IND), Peru (PER), China (CHN), Vietnam (VNM), and Colombia (COL), respectively. PSM1 and PSM2 correspond to propensity score-matched subsamples, with PSM1 including observations where the weights are non-missing and PSM2 restricted to those satisfying the co-support hypothesis. ENTROPY denotes the entropy-balanced sample. All other variables used are defined in Table 1. The primary dataset for this study is derived from the World Bank Enterprise Surveys (WBES), which includes data from 42,929 enterprises across 121 countries spanning the years 2007 to 2024. Complementary country-level data are sourced from various sources, including the World Bank's Worldwide Governance Indicators (WGI), World Development Indicators (WDI), and the International Monetary Fund (IMF). The classification of countries follows the Morgan Stanley Capital International (MSCI) Market Framework, and legal origin information is obtained from the seminal work of Djankov et al. (2008). Robust standard errors reported in parentheses are calculated using the Huber White Sandwich Estimator for the covariance matrix. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

Additionally, in Column (11) of Panel B, we include higher-dimensional fixed effects – specifically, industry and country-year fixed effects – to control for unobserved heterogeneity and provide a more rigorous test of statistical significance (see Bebchuk et al., 2015). Column (12) addresses endogeneity concerns using an instrumental variables approach (two-stage least squares – 2SLS), where FCON1 is instrumented with its peer-level counterpart, defined as the industry-country-year average of FCON1 excluding the focal enterprise.[7] Importantly, across all robustness checks in Panels A and B of Table 5, we consistently find that enterprises facing

[7] For similar instrumental variables strategies, see Fisman and Svensson (2007), Lin et al. (2010), Lin and Man-lai Wong (2013), Hewa Wellalage et al. (2020), and Wellalage and Thrikawala (2021). Fisman and Svensson (2007) highlight the importance of controlling for industry and location effects to isolate structural factors from enterprise-level idiosyncrasies. The 2SLS diagnostics indicate strong instrument relevance: the `Kleibergen--Paap rk LM statistic` is `54.390` (rejecting underidentification), and the `Kleibergen--Paap rk Wald F-statistic (57.570)` and `Cragg--Donald Wald F-statistic (61.350)`

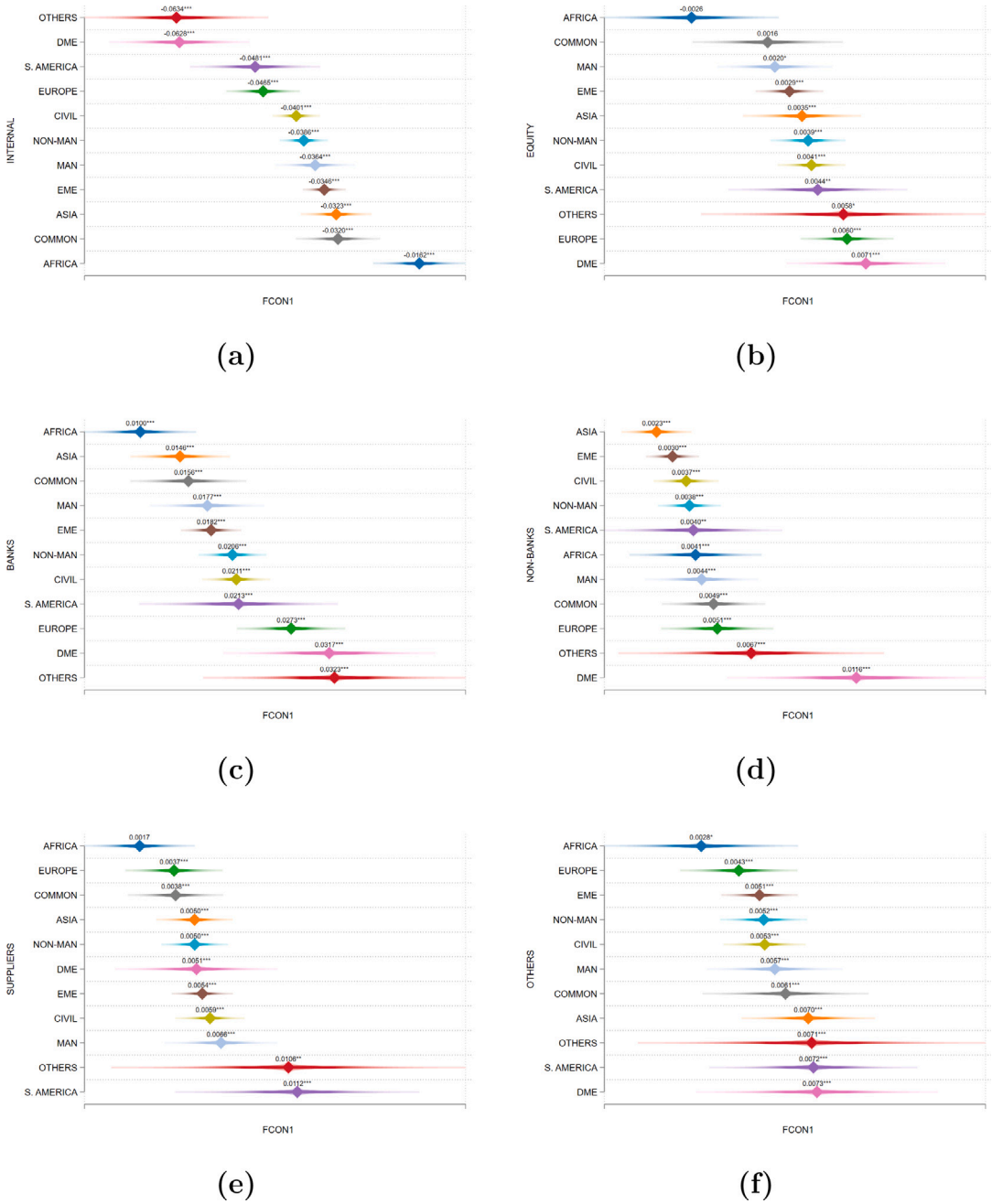

Fig. 1. Sub-sample analyses

The figure plots the coefficients for FCON1 estimating Equation (1) across various subsamples. These enterprises are categorized by legal origin [common law vs. civil law countries], economic classification [emerging markets (EME) vs. developed markets (DME)], and geographical regions [Africa, Europe, Asia, South America (S. America), and Others, which comprise Oceania and North America (N. America)]. All variables used are defined in Table 1. The primary dataset for this study is derived from the World Bank Enterprise Surveys (WBES), which includes data from 42,929 enterprises across 121 countries spanning the years 2007 to 2024. Complementary country-level data are sourced from various sources, including the World Bank's Worldwide Governance Indicators (WGI), World Development Indicators (WDI), and the International Monetary Fund (IMF). The classification of countries follows the Morgan Stanley Capital International (MSCI) Market Framework, and legal origin information is obtained from the seminal work of Djankov et al. (2008). Robust standard errors reported in parentheses are calculated using the Huber White Sandwich Estimator for the covariance matrix. ***, **, * indicate significance at the one, five, and ten percent levels, respectively, based on robust standard errors.

both exceed the `Stock-Yogo 10% critical value` of `16.38` and the conventional threshold of 10 (Staiger and Stock, 1997), mitigating concerns about weak instruments. However, since the model is just-identified, over-identification tests are not applicable.

financing obstacles rely more heavily on external financing to bridge funding gaps, as internal resources – particularly for SMEs – are often insufficient due to limited capacity for prior accumulation.

Finally, we conducted two additional tests to further validate our findings. First, in the Online Appendix A.3, we implement an omitted variables test following the approach of Oster (2019). This test yields a high value of δ, which suggests that a very high degree of selection on unobservables relative to observables (omitted variable bias) is required to invalidate our conclusions. Second, we address concerns about the potential for spurious findings through a falsification test presented in Figure A.1. For this test, we randomly assign enterprises to low- and high-obstacle groups and re-estimate Equation (1) for these placebo groups, repeating the process 2,000 times. The distribution of the resulting coefficients and `p-values` conform to theoretical expectations.[8] These additional tests attest to the robustness and generalizability of our findings.

4. Conclusion

Access to finance remains a critical constraint that limits growth and investment for SMEs, consequently leading to reliance on internal funds, especially in emerging and developing economies. Our findings reveal that financially constrained SMEs do not uniformly fall back on internal funds for investment, as conventional wisdom suggests. Instead, they tend to preserve internal liquidity for operational expenses and increasingly utilize a broad array of external financing – ranging from formal credit to informal sources – to support fixed asset acquisition. This behavior reflects a pragmatic adaptive response to financing constraints, where the tangible and collateralizability nature of fixed assets makes them more attractive to external financiers. Notably, the consistency of our findings across different contexts – geographic regions, legal traditions, income classifications, and industry sectors – reinforces their generalizability. Our findings are also robust to alternative model specifications, various definitions of financial constraint, techniques that address endogeneity concerns, and falsification tests.

By shifting the focus from whether SMEs invest under financial constraints, as is the focus in much of the extant literature, to how they fund such investments, this study advances existing theory and highlights the need for more nuanced interpretations of SME financing decisions. The policy implication is clear: broadening access to diversified and collateral-sensitive financing mechanisms – especially beyond the traditional banking sector – can help SMEs maintain long-term investment momentum even when access to finance is limited.

CRediT authorship contribution statement

Marvelous Kadzima: Visualization, Investigation, Data curation. **Reon Matemane:** Writing – original draft, Conceptualization. **Michael Machokoto:** Writing – original draft, Writing – review & editing, Visualization, Software, Formal analysis. **Tesfaye T. Lemma:** Writing – review & editing, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.frl.2025.107839.

Data availability

Data will be made available on request.

[8] The coefficients are centered around zero, p-values exceed conventional significance thresholds (> 10%), and the effect sizes are notably smaller than those observed in the actual analysis. This finding suggests that our results are unlikely to be driven by random chance.

References

Asiedu, E., Kalonda-Kanyama, I., Ndikumana, L., Nti-Addae, A., 2013. Access to credit by firms in Sub-Saharan Africa: How relevant is gender? Am. Econ. Rev. 103 (3), 293–297.

Aterido, R., Beck, T., Iacovone, L., 2013. Access to finance in Sub-Saharan Africa: Is there a gender gap? World Dev. 47, 102–120.

Bebchuk, L.A., Brav, A., Jiang, W., 2015. The long-term effects of hedge fund activism. Columbia Law Rev. 115 (5), 1085–1155.

Beck, T., Demirguc-Kunt, A., 2006. Small and medium-size enterprises: Access to finance as a growth constraint. J. Bank. Financ. 30 (11), 2931–2943.

Caglayan, M., Machokoto, M., 2024. The sensitivity of investment to internal and external funds: New emerging market evidence. Res. Int. Bus. Financ. 67, 102099.

Carpenter, R.E., Petersen, B.C., 2002. Is the growth of small firms constrained by internal finance? Rev. Econ. Stat. 84 (2), 298–309.

Demirgüç-Kunt, A., Maksimovic, V., 2001. Firms as financial intermediaries: Evidence from trade credit data. Policy Research Working Paper 2682, World Bank Policy Research Department.

Djankov, S., La Porta, R., Lopez-de Silanes, F., Shleifer, A., 2008. The law and economics of self-dealing. J. Financ. Econ. 88 (3), 430–465.

Erdogan, A.I., 2015. Determinants of working capital and investment financing patterns of smes: Evidence from Turkey. J. Appl. Financ. Bank. 5 (3), 81.

Fazzari, S.M., Hubbard, R.G., Petersen, B.C., 1988. Financing constraints and corporate investment. Brookings Pap. Econ. Act. 1 (1), 141–195.

Ferrando, A., Preuss, C., 2018. What finance for what investment? Survey-based evidence for European companies. Econ. Politica 35 (3), 1015–1053.

Fisman, R., Svensson, J., 2007. Are corruption and taxation really harmful to growth? Firm level evidence. J. Dev. Econ. 83 (1), 63–75.

Gorodnichenko, Y., Schnitzer, M., 2013. Financial constraints and innovation: Why poor countries don't catch up. J. Eur. Econ. Assoc. 11 (5), 1115–1152.

Guariglia, A., Yang, J., 2018. Adjustment behavior of corporate cash holdings: the China experience. Eur. J. Financ. 24 (16), 1428–1452.

Hamadi, M., Heinen, A., 2015. Firm performance when ownership is very concentrated: Evidence from a semiparametric panel. J. Empir. Financ. 34, 172–194.

Hewa Wellalage, N., Locke, S., Samujh, H., 2020. Firm bribery and credit access: evidence from Indian SMEs. Small Bus. Econ. 55 (1), 283–304.

Kadzima, M., Machokoto, M., Lemma, T.T., 2024. From words to finances: Unraveling the negative net debt-languages nexus. Financ. Res. Lett. 66, 105665.

Lewellen, J., Lewellen, K., 2016. Investment and cash flow: New evidence. J. Financ. Quant. Anal. 51 (4), 1135–1164.

Lin, C., Lin, P., Song, F., 2010. Property rights protection and corporate R & D: Evidence from China. J. Dev. Econ. 93 (1), 49–62.

Lin, C., Man-lai Wong, S., 2013. Government intervention and firm investment: Evidence from international micro-data. J. Int. Money Financ. 32, 637–653.

Machokoto, M., 2021. Do financial constraints really matter? A case of understudied African firms. Int. J. Financ. Econ. 26 (3), 4670–4705.

Machokoto, M., 2024. The impact of cultural orientation towards secrecy on innovation. Econom. Lett. 234 (2024), 111509.

Machokoto, M., Areneke, G., Ibrahim, B.M., 2020. Rising corporate debt and value relevance of supply-side factors in South Africa. J. Bus. Res. 109, 26–37.

Machokoto, M., Lemma, T.T., Dsouli, O., Fakoussa, R., Igudia, E., 2023. Coupling men-to-women: Promoting innovation in emerging markets. Int. J. Financ. Econ. 1–22.

Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. J. Financ. Econ. 13, 187–221.

Nicolas, T., 2022. Short-term financial constraints and smes' investment decision: evidence from the working capital channel. Small Bus. Econ. 58 (4), 1885–1914.

Oster, E., 2019. Unobservable selection and coefficient stability: Theory and evidence. J. Bus. Econom. Statist.

Paul, S., Whittam, G., Wyper, J., 2007. The pecking order hypothesis: does it apply to start-up firms? J. Small Bus. Enterp. Dev. 14 (1), 8–21.

Staiger, D., Stock, J.H., 1997. Instrumental variables regression with weak instruments. Econometrica 65 (3), 557–586.

Stiglitz, J.E., Weiss, A., 1981. Credit rationing in markets with imperfect information. Am. Econ. Rev. 71 (3), 393–410.

Svirydzenka, K., 2016. Introducing a new broad-based index of financial development. IMF Working Papers.

Trinh, H.T., Kakinaka, M., Kim, D., Jung, T.Y., 2017. Capital structure and investment financing of small and medium-sized enterprises in Vietnam. Glob. Econ. Rev. 46 (3), 325–349.

Wellalage, N.H., Fernandez, V., 2019. Innovation and SME finance: Evidence from developing countries. Int. Rev. Financ. Anal. 66 (2019), 101370.

Wellalage, N., Thrikawala, S., 2021. Does bribery sand or grease the wheels of firm level innovation: evidence from Latin American countries. J. Evol. Econ. 31 (3), 891–929.

Zeidan, R., Galil, K., Shapir, O.M., 2018. Do ultimate owners follow the pecking order theory? Q. Rev. Econ. Financ. 67, 45–50.

Zubair, S., Kabir, R., Huang, X., 2020. Does the financial crisis change the effect of financing on investment? Evidence from private SMEs. J. Bus. Res. 110, 456–463.