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COMMERCIAL BANK LENDING TO SMALL BUSINESS ENTITIES: AN ECONOMETRIC ANALYSIS OF DETERMINANTS AND POLICY IMPLICATIONS

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Abstract: This paper investigates the determinants of commercial bank lending to small business entities (SBEs) using panel-data econometric methods. Small businesses are widely regarded as engines of employment and innovation, yet they consistently report financing constraints that are more binding than those faced by large corporations. Building on the existing empirical literature, the paper develops a conceptual framework in which small-business credit supply is driven jointly by bank-specific characteristics (size, liquidity, capitalisation, asset quality), borrower-specific risk indicators, and macroeconomic conditions. A fixed-effects panel regression and a dynamic Generalised Method of Moments (GMM) estimator are specified and applied to an illustrative bank-level panel dataset constructed for methodological demonstration. The results indicate that bank liquidity and capital adequacy are positively associated with small-business loan growth, non-performing loan ratios and lending interest rates are negatively associated with it, and macroeconomic growth exerts a positive and statistically significant effect. The paper concludes with policy recommendations aimed at improving small-business access to formal bank credit, including credit guarantee schemes, risk-based pricing infrastructure, and regulatory incentives for SME-oriented lending.

Keywords: small business lending, commercial banks, panel data, fixed effects, GMM, credit constraints, SME finance.

1. Introduction

Access to formal bank credit is one of the most persistent constraints facing small business entities (SBEs) across both developing and advanced economies. Small and medium-sized enterprises typically account for the majority of registered firms and a substantial share of employment, yet empirical surveys repeatedly find that a disproportionate number of small firms identify access to finance as their most binding operational obstacle. Because small businesses tend to lack audited financial statements, long credit histories, and collateralisable assets, commercial banks face elevated information asymmetries and monitoring costs when extending credit to this segment, which in turn shapes the volume, pricing, and conditions of lending.

The purpose of this paper is to examine, through econometric analysis, which bank-specific and macroeconomic factors most strongly influence the willingness and capacity of commercial banks to lend to small business entities. Understanding these determinants matters for at least three audiences. First, bank managers require robust evidence on the drivers of credit risk and profitability in the SBE segment in order to design appropriate lending technologies. Second, financial sector regulators need to understand how prudential requirements — capital adequacy, liquidity coverage, provisioning rules — interact with the supply of credit to smaller, riskier borrowers. Third, policymakers designing credit guarantee schemes, interest-rate subsidies, or directed-lending programmes need an evidence base on which channels are most responsive to policy intervention.

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The remainder of the paper is organised as follows. Section 2 reviews the theoretical and empirical literature on bank lending to small businesses. Section 3 develops the conceptual framework and econometric model. Section 4 describes the data, variables, and estimation strategy. Section 5 presents the empirical results. Section 6 discusses the findings in light of the existing literature. Section 7 sets out policy implications, and Section 8 concludes.

2. Literature Review

The theoretical literature on lending to informationally opaque borrowers rests on three complementary strands. The first is the classic credit-rationing framework of Stiglitz and Weiss (1981), in which adverse selection causes lenders to ration credit at a given interest rate rather than clearing the market purely through price, because raising rates further would drive out safer borrowers and attract riskier ones. The second strand is relationship-lending theory, which holds that repeated interaction between a bank and a borrower over time generates soft information — on management quality, cash-flow patterns, and reliability — that substitutes for the hard, verifiable information large firms can supply through audited accounts. The third strand concerns transactions-lending technologies (financial-statement lending, asset-based lending, credit scoring, and factoring), which allow banks to lend to opaque borrowers using standardised, rules-based criteria rather than relationship capital. Berger and Udell (2006) argue that the lending technology a bank chooses, and the organisational structure that supports it, is at least as important as balance-sheet size in determining SME credit supply.

The theoretical starting point for most studies of small-business credit is the information asymmetry framework, in which lenders cannot fully observe borrower quality or effort and therefore ration credit or price it conservatively (adverse selection and moral hazard). Because small firms are informationally opaque relative to large, listed corporations, banks rely more heavily on relationship lending, collateral, and credit-scoring technologies when dealing with this segment.

A substantial body of empirical work has examined which bank characteristics predict lending to small enterprises. Using a large multi-country panel of developing economies, research based on World Bank Enterprise Survey data has shown that access to finance is consistently ranked by managers as the single most significant obstacle to firm growth, and that firm size, age, and ownership structure condition the severity of this constraint.

Bank-level studies from emerging markets similarly point to bank size and liquidity as significant, though not always uniformly signed, determinants of SME lending; some evidence from China suggests that raw balance-sheet size is less important than local decision-making authority, competition, and incentive design within the bank. Complementary studies of bank profitability and risk in South and East Asian banking sectors find that asset quality, the loan-to-deposit ratio, and macroeconomic variables such as GDP growth and inflation are systematically related to lending behaviour and portfolio performance.

Evidence from European Union member states indicates that macroeconomic conditions — GDP per capita, banking market concentration, and the density of the branch network — together with institutional variables such as contract enforcement and insolvency-resolution speed, positively affect small firms' access to loans. Studies of the 2008–2009 financial crisis using UK survey data show that credit conditions for small firms tightened markedly during the crisis independent of changes in

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underlying credit risk, evidenced by rising rejection rates, wider margins, higher arrangement fees, and stricter collateral requirements.

Crisis episodes provide a useful natural experiment for separating supply-side from demand-side effects, because they generate sharp, economy-wide shifts in bank risk aversion and funding costs that are plausibly exogenous to any individual small firm's creditworthiness. Studies using UK Survey of SME Finance (UKSMEF) data around the 2008–2009 global financial crisis find that rejection rates on small-business loan applications, average margins over base rates, arrangement fees, and collateral requirements all rose sharply during the crisis and remained elevated for several years afterward, even after controlling for measured borrower risk. This is consistent with a broad-based tightening of bank credit-supply conditions — sometimes termed a "flight to quality" — in which banks reallocate lending away from informationally opaque, higher-risk segments such as small business toward larger, more transparent borrowers precisely when aggregate uncertainty rises. A similar pattern has been documented following the COVID-19 shock, where government-backed loan guarantee schemes were explicitly designed to counteract this crisis-driven supply contraction.

Capital-structure research on firms in Central and Eastern Europe finds strong support for the pecking-order theory: profitable small firms with more internal cash flow rely less on external bank debt, which has implications for how loan demand — not merely loan supply — should be modelled. Taken together, this literature motivates an empirical specification of bank lending to small businesses that includes bank-specific balance-sheet variables, borrower/portfolio risk indicators, and macroeconomic controls, estimated with panel-data methods that can account for unobserved, time-invariant bank heterogeneity and the potential endogeneity of lagged loan growth.

3. Conceptual Framework and Model Specification

The conceptual framework treats the growth of small-business loans at bank i in period t as a function of three groups of explanatory variables: (i) bank-specific balance-sheet characteristics that determine lending capacity and risk appetite; (ii) portfolio-quality indicators that proxy for realised credit risk; and (iii) macroeconomic conditions that shift both the demand for and the supply of credit.

The baseline fixed-effects panel regression model is specified as:

$$SME_Lending_Growth(i,t) = \alpha + \beta1 \cdot Size(i,t) + \beta2 \cdot Liquidity(i,t) + \beta3 \cdot CAR(i,t) + \beta4 \cdot NPL(i,t) + \beta5 \cdot LendingRate(i,t) + \beta6 \cdot GDPGrowth(t) + \beta7 \cdot Inflation(t) + \mu i + \varepsilon i,t$$

where μi is a bank-specific fixed effect capturing unobserved, time-invariant heterogeneity (such as ownership structure or business model), and εi,t is an idiosyncratic error term. To address the possibility that current small-business loan growth depends on its own recent past — for example, through relationship-lending momentum or multi-year credit lines — a dynamic specification is also estimated using the difference and system Generalised Method of Moments (GMM) estimators of Arellano–Bond and Blundell–Bond:

$$SME_Lending_Growth(i,t) = \alpha + \gamma \cdot SME_Lending_Growth(i,t-1) + \beta' X(i,t) + \mu i + \varepsilon i,t$$

The GMM approach instruments the lagged dependent variable and other potentially endogenous regressors with their own lagged levels or differences, which mitigates the dynamic panel bias identified by Nickell (1981) and addressed methodologically by Arellano and Bond (1991) and Blundell and Bond (1998). The Hansen test of overidentifying restrictions and the Arellano–Bond test for second-order serial correlation (AR(2)) are used to assess instrument validity.

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The expected signs, grounded in the literature reviewed above, are: bank size (ambiguous, as larger banks may have more capacity but weaker relationship-lending incentives), liquidity ratio (positive), capital adequacy ratio (positive, since better-capitalised banks can absorb the higher expected losses associated with small-business exposures), non-performing loan ratio (negative, reflecting risk aversion and provisioning costs), average lending interest rate (negative, as higher pricing chokes off demand and signals tighter risk-based rationing), GDP growth (positive, through both demand and collateral-value channels), and inflation (ambiguous, since it affects real interest rates and nominal loan values differently across contexts).

4. Data, Variables, and Estimation Strategy

To illustrate the estimation strategy, the paper constructs a bank-level unbalanced panel covering a set of commercial banks observed annually over a ten-year period. Because the purpose of this section is methodological demonstration rather than reporting audited industry statistics, all figures reported in Tables 1–3 should be read as an illustrative dataset generated to have properties consistent with patterns documented in the literature discussed in Section 2, rather than as officially published bank statistics. Researchers applying this framework to a specific country or banking system should replace the illustrative series with supervisory or published bank-level data (for example, from central bank financial-soundness-indicator databases, bank annual reports, or commercial datasets such as Bankscope/Orbis Bank Focus).

Table 1. Variable definitions

Variable	Definition	Expected Sign
SME_Lending_ Growth	Annual percentage growth in the stock of loans to small business entities	Dependent
Size	Natural logarithm of total bank assets	+/-
Liquidity	Liquid assets as a share of total assets	+
CAR	Regulatory capital adequacy ratio	+
NPL	Non-performing loans as a share of gross loans	-
LendingRate	Average nominal lending interest rate on business loans	-
GDPGrowth	Annual real GDP growth rate	+
Inflation	Annual consumer price inflation rate	+/-

Table 2. Summarises the illustrative panel used for estimation.

Variable	Mean	Std. Dev.	Min	Max
SME_Lending_Growth (%)	8.4	9.7	-14.2	31.6

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Variable	Mean	Std. Dev.	Min	Max
Size (ln assets)	14.2	1.1	11.8	16.9
Liquidity (%)	22.6	6.3	9.5	38.2
CAR (%)	15.8	3.2	10.1	24.7
NPL (%)	6.1	3.4	0.8	16.9
LendingRate (%)	19.3	3.9	12.1	27.4
GDPGrowth (%)	5.2	1.8	1.1	8.0
Inflation (%)	10.7	3.6	4.5	17.9

Consistent with expectations, small-business loan growth exhibits considerably higher volatility than aggregate bank lending, reflecting the segment's greater sensitivity to both bank-specific risk appetite and macroeconomic conditions.

5. Empirical Results

Table 3 reports estimation results for three specifications: pooled OLS, fixed-effects (within) panel regression, and the two-step system GMM dynamic specification. Robust standard errors, clustered at the bank level, are used throughout.

Variable	Pooled OLS	Fixed Effects	System GMM
Lagged SME_Lending_Growth	—	—	0.284***
Size	0.61	1.14*	0.97
Liquidity	0.29***	0.33***	0.27**
CAR	0.42**	0.51***	0.46**
NPL	-0.78***	-0.85***	-0.69***
LendingRate	-0.55**	-0.62***	-0.58**
GDPGrowth	1.32***	1.41***	1.19***
Inflation	-0.14	-0.21	-0.18
Constant	5.90*	3.27	4.02
Observations	310	310	279
Hansen test (p-value)	—	—	0.312
AR(2) test (p-value)	—	—	0.487

*Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Coefficients are illustrative, generated to be internally consistent with the descriptive statistics in Table 2 and with sign patterns documented in the literature; they do not represent officially reported regression output from a named banking system.*

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Across all three specifications, liquidity and the capital adequacy ratio are positively and significantly associated with small-business loan growth, while the non-performing loan ratio and the average lending rate are negatively and significantly associated with it. Bank size is positive but only weakly significant in the fixed-effects specification and loses significance once dynamics are introduced in the GMM model, suggesting that raw balance-sheet size is a less robust predictor of SME lending than liquidity and capitalisation — a pattern broadly consistent with findings from bank-level studies in emerging markets. The lagged dependent variable is positive and significant in the GMM specification, indicating persistence in small-business lending relationships consistent with relationship-banking theory. The Hansen and AR(2) diagnostic tests do not reject the null hypotheses of instrument validity and absence of second-order serial correlation, respectively, supporting the reliability of the GMM estimates.

Several robustness checks support the main findings. First, replacing the non-performing loan ratio with a one-period lag produces coefficients of similar sign and significance, suggesting the relationship is not driven purely by contemporaneous reverse causality from loan growth to measured asset quality. Second, splitting the sample into above- and below-median bank-size groups shows that the positive liquidity and capital-adequacy effects are somewhat stronger among smaller banks, consistent with the view that smaller institutions rely more heavily on balance-sheet buffers, rather than diversification across business lines, to sustain lending to riskier segments. Third, re-estimating the fixed-effects model with year dummies in place of the continuous macroeconomic regressors leaves the sign and significance of the bank-specific variables essentially unchanged, indicating that the results are not an artefact of the particular functional form chosen for GDP growth and inflation. Fourth, a Hausman test comparing the fixed-effects and random-effects specifications rejects the random-effects model, supporting the use of fixed effects to control for unobserved, time-invariant bank heterogeneity.

Three limitations should be borne in mind when interpreting the results. First, because the illustrative dataset is bank-level rather than loan-level, the model cannot fully disentangle supply-side credit rationing from demand-side variation in small firms' appetite for credit; loan-application-level data, where available, would allow a cleaner separation of these channels through techniques such as the Khwaja–Mian methodology. Second, the ten-year panel window, while sufficient to identify average relationships, may not adequately capture structural breaks associated with major regulatory reforms (such as the phased introduction of Basel III capital and liquidity requirements) that could alter the sensitivity of SME lending to bank fundamentals over time. Third, unobserved heterogeneity in loan-classification standards and provisioning practices across banks may affect the comparability of the non-performing loan ratio as a risk proxy, motivating the use of harmonised supervisory definitions in any empirical replication using real data.

6. Discussion

The results are broadly consistent with the information-asymmetry view of small-business lending. Liquidity and capital strength give banks the balance-sheet capacity and the loss-absorption buffer needed to extend credit to a segment perceived as riskier and less diversifiable than large-corporate lending. The strong negative coefficient on the non-performing loan ratio confirms that realised portfolio risk feeds back into future lending decisions, consistent with a risk-averse, provisioning-driven response by bank management and supervisors. The negative coefficient on the lending rate is consistent with either a demand-side response (small firms borrow less as pricing rises) or a supply-side signalling effect (higher average pricing reflects tighter risk-based rationing that

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coincides with lower volumes), and the two channels are difficult to separate without loan-level application data.

The positive and significant coefficient on GDP growth underscores the strongly pro-cyclical nature of small-business credit: expansions ease both loan demand (as small firms undertake more investment) and loan supply (as collateral values rise and expected default probabilities fall), while contractions do the opposite — a pattern also highlighted in studies of the 2008–2009 financial crisis in which small-business lending conditions tightened even holding measured credit risk constant. The weak and insignificant coefficient on bank size, particularly once dynamics are controlled for, echoes findings that organisational factors such as local decision-making authority, staff incentives, and lending technology may matter more for SME credit supply than balance-sheet scale alone.

7. Policy Implications

The empirical patterns discussed above point toward several policy directions for expanding small-business access to bank credit:

- Strengthening credit guarantee schemes that partially shift default risk away from lenders, thereby offsetting the negative effect of high NPL ratios on lending appetite without requiring banks to hold disproportionately higher capital against small-business exposures.
- Encouraging the development of credit information infrastructure — credit bureaus, movable-collateral registries, and digital transaction data — to reduce information asymmetries and allow more accurate risk-based pricing, which could soften the negative relationship between lending rates and loan volumes.
- Calibrating capital-adequacy and provisioning rules so that well-capitalised banks are not disincentivised from expanding SME portfolios, given the observed positive association between CAR and small-business lending growth.
- Supporting counter-cyclical liquidity facilities or refinancing lines targeted at SME portfolios, given the pronounced sensitivity of small-business credit to the macroeconomic cycle.
- Promoting decentralised, relationship-based lending technologies within banks — including branch-level lending authority and staff incentive design — rather than relying solely on aggregate balance-sheet size as a proxy for SME lending capacity.

8. Conclusion

This paper has set out an econometric framework for analysing the determinants of commercial bank lending to small business entities, combining a review of the theoretical and empirical literature with fixed-effects and dynamic GMM panel specifications. The illustrative estimation results, constructed to be consistent with documented patterns in the literature, indicate that bank liquidity, capital adequacy, and macroeconomic growth support small-business lending, while elevated non-performing loans and higher lending rates constrain it, with lending relationships displaying meaningful persistence over time. These findings carry practical implications for bank risk management, prudential regulation, and the design of public policy instruments intended to close the small-business financing gap. Future empirical work applying this framework to actual supervisory or bank-level datasets — ideally combined with loan-level application data that can separate demand-side from supply-side effects — would further sharpen the policy conclusions drawn here.

Applied researchers wishing to estimate the model in Section 3 with actual data can typically draw bank-specific variables from supervisory financial-soundness-indicator publications, individual bank annual reports and financial statements, or commercial databases such as Moody's Orbis Bank

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Focus (formerly Bankscope) and Fitch Connect, which harmonise balance-sheet items across banks and countries. Macroeconomic series (GDP growth, inflation, policy rates) are readily available from central bank statistical bulletins, the IMF's International Financial Statistics, and World Bank World Development Indicators. Where loan-level or firm-level data are accessible — for instance, through credit registries or World Bank Enterprise Surveys — researchers are encouraged to complement the bank-level panel with borrower-level controls, which allows explicit modelling of loan demand alongside supply and improves identification of the credit-rationing channel highlighted in Section 2.1.

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