“Unlocking SME investment potential: The determinants of an effective credit guarantee scheme in Morocco”

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UNLOCKING SME INVESTMENT POTENTIAL: THE DETERMINANTS OF AN EFFECTIVE CREDIT GUARANTEE SCHEME IN MOROCCO

Abstract

This research seeks to identify the factors influencing the investment potential of SMEs following their receipt of government-guaranteed loans. To this end, an empirical methodology based on the statistical analysis of data collected from a representative sample of Moroccan companies was employed. This sample of 335 SMEs that had benefited from loans with government guarantees was selected at random to ensure its relevance to the population of SMEs in Morocco. The methodological approach is based on a regression analysis using the robust least squares (RLS) method. Firm profitability is positively related to higher investment, suggesting that government guarantees should encourage investment by profitable SMEs. Liquidity, repayment capacity and indebtedness at the time of applying for finance do not appear to influence investment. These elements can be improved after financing, which indicates that government guarantees should not penalize SMEs in difficulty. Decision-making maturity has a negative effect on investment, suggesting that young companies and entrepreneurs tend to invest more. A negative correlation is observed between company size and investment, which suggests that government guarantees should be geared towards small SMEs and young companies and entrepreneurs. Finally, managers with a large share of capital invest more, leading us to believe that government guarantees should favor this type of SME.

Keywords SMEs, investment, credit guarantee schemes, government credit guarantees, Morocco

JEL Classification G21, G23, G32, G38

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INTRODUCTION

In today's ever-changing economic landscape, small and medium-sized enterprises (SMEs) play a fundamental role in stimulating innovation, creating jobs, and contributing to economic growth. Yet, despite their importance, SMEs continue to face major challenges, particularly when it comes to access to finance. It is against this backdrop that government guarantees are emerging as a crucial element in supporting the growth and development of these businesses. Government guarantees, whether in the form of public credit guarantees, risk-sharing mechanisms, or other forms of government support, play an essential role in reducing the uncertainties associated with SME financing. They aim to boost lender confidence and mitigate the risks inherent in investing in businesses that are often considered riskier than their larger counterparts. However, despite the potential importance of these guarantees, it is imperative to carry out a thorough evaluation of their real impact on SMEs, to understand how they actually influence the investment decisions, growth and long-term viability of these businesses. Assessing government guarantees goes beyond simply acknowledging their presence. The aim is to unravel the complex mecha-

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nisms by which these guarantees interact with economic, financial, and behavioral factors to shape the investment and growth behavior of SMEs. Careful evaluation requires a thorough understanding of the incentives these guarantees offer, the effects they have on risk perception and the benefits they provide to both businesses and financial institutions.

In an economic environment where resources are limited, it is imperative to make informed decisions. This underlines the need for objective and rigorous evaluation of the effectiveness of government guarantees. Not only will this maximize the positive impact of these support mechanisms, but it will also help policymakers, researchers, and practitioners to identify areas for adjustment or improvement. This practice has attracted considerable interest among researchers and practitioners because of its potentially profound implications for SMEs' access to finance and performance. However, despite the progress made in this area, grey areas remain and call for further exploration. It is in this context that this study aims to contribute to the assessment of the impact of government guarantees on investment and SME growth in Morocco. This study is a part of this evaluation process. By examining the factors that have an impact on the investments made by SMEs that have benefited from government guarantees, the aim is to assess the determinants that can help strengthen the position of SMEs in the Moroccan economic system.

1. LITERATURE REVIEW

The impact of credit guarantee schemes on SME investment and growth has been widely explored in the literature. Dvouletý et al. (2021) have highlighted the importance of investment in physical infrastructure, business services and the development of managerial capabilities in increasing the competitiveness of SMEs. They also stressed that credit guarantee schemes aim to build customer confidence and foster a positive perception of the company. Martín-García and Morán Santor (2021) analyzed the effects of credit guarantee schemes on the commercial activity and investments of SMEs. Their findings revealed that credit guarantee schemes can be an effective tool for stimulating SME growth, especially during economic downturns. Adhikary et al. (2021) examined the impact of government credit guarantees on MSMEs. Their results showed that these guarantees have a positive effect in helping these companies to access finance and reduce risk. Akçiğit et al. (2021) investigated the short-term impact of credit guarantees on firms. Their findings highlighted the positive impact of credit guarantees on companies, notably by improving their access to finance and their financial performance. Beck and Demirguc-Kunt (2006) adopted a cross-country approach to assess the impact of credit guarantee schemes on SMEs' access to finance. Their findings showed that government guarantees promote SMEs' access to credit, thereby making a positive contribution to their investment and growth.

Ongena and Smith (2000) examined how government guarantees affect SME banking relationships using international data. Their results indicated that government guarantees increase bank confidence, potentially leading to stronger relationships and more investment. Overall, credit guarantee schemes have a positive effect on SMEs by facilitating their access to credit, reducing the risks perceived by lenders and thus stimulating their investment and growth. However, it is important to note that the effectiveness of these guarantees can vary depending on the specific context and their design. Rajan and Zingales (1998) demonstrated how companies that rely heavily on external financing might face constraints in investment capacity, but an abundance of external funding can spur investments. Chirinko (1993) reinforced this idea by noting that larger financial resources encourage heightened investment activity. Brown et al. (2009) delved deeper into this perspective by establishing a specific link between external financing, especially from banks, and levels of research and development (R&D) investment. Rampini and Viswanathan (2013) introduced the concept of larger asset collateral, tied to an increased ability to secure credit, which, in turn, encourages larger investments. Carpenter and Petersen (2002) emphasized the crucial importance of external financing for small businesses with limited internal resources, necessitating such support for their expansion efforts. Acharya and Xu (2017) broadened the scope by highlighting how lower dependence on bank funding fosters innovation investments through broader access to diverse funding sources. The work of Murillo and

Graham (2013) demonstrated how increased infusions of external capital, including those from banks, provide companies with the flexibility needed to seize investment opportunities, thereby promoting growth and innovation.

Berger and Udell (1998), Hall and Lerner (2010), and Gertler and Gilchrist (1994) underscored how profitability plays a key role in accessing external financing and spurring investment. Ahmad et al. (2023) reinforced this link by showcasing how larger, profitable firms possess the capacity for substantial investment undertakings. Ozkan (2001) and Brounen et al. (2004) highlighted how profitability influences access to diversified financing options, positively affecting investment decisions. The studies by Djankov et al. (2008) and Erel (2011) extended the analysis to encompass internal conflicts and macroeconomic conditions. They showed how profitability mitigates internal conflicts and fosters favorable financing conditions, enabling increased investment capabilities. Graham (1996) studied debt and marginal tax rates, finding high liquidity boosts firms' financial commitments, positively influencing investments. Opler et al. (1999) supported this, stating higher liquidity aids investment projects. Ozkan (2001) analyzed capital structure, noting abundant liquidity offers financing options, strengthening significant investments. Deloof (2003) explored working capital's impact on profitability, highlighting high liquidity aids larger projects. Ferreira and Vilela (2004) affirmed higher liquidity prepares firms for investment opportunities.

Carpenter and Petersen (2002) highlighted how effective repayment capacity supports the growth of small businesses by enabling access to external financing. Brounen et al. (2004) established a connection between strong repayment capacity and strong banking relationships, leading to significant investments. Almeida and Campello (2007) demonstrated that tangible assets and repayment capacity contribute to financing. Ozkan (2001) proposed that a positive repayment capacity allows for adjustments in capital structure to accommodate substantial investments. Graham (1996) emphasized that a robust repayment capacity encourages borrowing for investments, particularly for SMEs, where repayment capacity determines investment scope and builds lender trust. High debt hinders investment due to risk perception (Cheryta et al., 2018), limiting borrowing (Hovakimian et al., 2004), affecting strategic flexibility (Stewart, 1991). Baron and Ensley (2006) connected mature entrepreneurs with their ability to assess and invest in opportunities. Zacharakis and Meyer (2000) associated mature entrepreneurs with effectively mobilizing resources. Bellavitis et al. (2017) provided a nuanced perspective on how maturity influences investment performance. Harrison and Leitch (2005) observed that experienced entrepreneurs use their knowledge for informed investment decisions. Gilmore et al. (2004) established a relationship between owner-manager maturity and openness to venture capital. Rauch et al. (2009) demonstrated the correlation between entrepreneurial orientation, decision-making maturity, and overall performance. Decision-making maturity shapes investment scale, aiding assessment, strategic decisions, and growth-oriented management. In essence, decision-making maturity is pivotal in shaping investment paths and company growth.

Bierman and Smidt (1981) examined capital investment decisions and suggested that larger firms often have more resources to undertake large investment projects, due to their size and privileged access to capital markets. Beck and Demirguc-Kunt (2006) focused on access to finance for SMEs, noting that larger SMEs are in a better position to obtain finance, which influences their ability to undertake larger investments. Delmar and Shane (2003) discussed business planning and new business development, noting that larger SMEs are better equipped to develop sound business plans, which may influence the making of strategic investments. Coad and Rao (2008) highlighted the link between innovation and company growth in high-tech sectors. They observed that larger companies generally have more resources to invest in innovation and growth. This trend is also corroborated by Mazzucato and Parris (2015), who studied high-growth companies in the pharmaceutical industry and noted that larger companies invest more in research and development. Access to finance also recurs in the work of Binks and Ennew (1996), who confirmed that larger firms generally enjoy better access to financial resources, which may influence their ability to invest to sustain growth. In this way, size plays an essential role in determining the extent of investment made. Larger companies often have advantages in

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terms of resources, access to finance and ability to invest in growth and development, putting them in a favorable position to undertake more substantial investments.

Cole and Mehran (1998) observed changes in the ownership structure and performance of financial institutions, noting that managers with a significant equity stake may be more involved in the management of funds obtained through bank financing. Schoar and Zuo (2017) examined the impact of business cycles on CEO careers and management styles, suggesting that executives with a substantial equity stake may be more motivated to effectively invest borrowed funds to support firm growth. Vijayakumaran (2021) noted that managers with a substantial equity stake may be more inclined to overcome financial constraints and invest after securing bank financing. Other researchers, such as Birley and Westhead (1993), have pointed out that managers with a substantial equity stake may be more involved in investment decisions and more likely to invest in profitable projects after obtaining bank finance. Cassar (2004) noted that executives with a significant equity stake are likely to invest the funds obtained through bank financing more wisely, thereby creating long-term value. Kaplan (2014) argued that executives with a significant equity stake may be more motivated to invest borrowed funds in ways that generate high returns for themselves and shareholders. The level of management equity ownership can have a significant influence on the scale of investments made following bank financing. Directors with a substantial shareholding are often motivated to invest wisely to create value for both the company and themselves. The central objective of this study is to examine the multiple factors that influence investment in SMEs that have benefited from a government guarantee for bank financing. The approach focuses specifically on understanding the mechanisms by which these government guarantees shape the growth and investment dynamics within the SMEs concerned. Furthermore, the objective is to identify and disentangle the specific elements that impact these dynamics.

Based on this literature review, the following hypotheses can be formulated:

H1: A substantial government-guaranteed loan correlates with increased investment size.

H2: SMEs with higher profitability during government-backed loan application are prone to larger investments.

H3: Liquidity during government-backed financing application positively impacts investment scale.

H4: SMEs' repayment capacity during government-guaranteed finance application positively affects investment extent.

H5: SMEs' debt levels during finance application with government guarantee negatively affect investments.

H6: Decision-making maturity of SMEs during government-backed finance application positively influences investment scale.

H7: SME size during bank finance application with government guarantee affects investment extent.

H8: Manager's shareholding in SMEs during government-guaranteed finance application influences investment extent.

2. METHODS

To achieve these objectives, an econometric model is designed to serve as a framework for testing the research hypotheses developed from the literature review. The econometric model is structured as follows:

$$INVT = \alpha + \overbrace{\beta_1 \cdot OBTCA + \beta_2 \cdot PROF + \beta_3 \cdot LIQU + \beta_4 \cdot REPCAP + \beta_5 \cdot INDPT}^{Characteristics\ of\ the\ financing\ application} + \overbrace{\delta_1 \cdot SIZE + \delta_2 \cdot DICMAT + \delta_3 \cdot PARTI}^{Control\ variables} + \varepsilon. \quad (1)$$

INVT (Investment) reflects the investments made by the SME during the five years following the credit application at the time of financing. It is calculated from the asset growth rate, defined as the ratio of the difference in assets at the end and beginning of the period, divided by assets at the beginning of the period. *OBTCA* (Obtained Credit Amount) represents the amount of credit obtained by the SME, expressed in local currency (DH). *PROF* (Profitability) evaluates an SME's profitability using the Net Profit Margin at the time of financing application. It is calculated by dividing net profit by total revenue, multiplied by 100%. *LIQU* (Liquidity) measured by the Current Liquidity Ratio, this variable evaluates the SME's ability to repay short-term debts at the time of financing application. The ratio is calculated by dividing current assets by current liabilities. A ratio above 1 indicates sufficient liquidity to cover short-term debts. *REPCAP* (Repayment Capacity) assesses the SME's ability to repay its debts at the time of financing application. Measured by the Interest Coverage Ratio, it is calculated by dividing Earnings Before Interest and Taxes (EBIT) by interest paid. A high ratio (typically 4 or 5) indicates strong repayment capacity. *INDPT* (Total Indebtedness) reflects the overall indebtedness of the SME at the time of financing application. It is evaluated based on a company's net debt, which considers debts minus assets. *SIZE* (Size) represents the size of the SME using the total assets of the company at the time of financing application. *DICMAT* (Decisional Maturity) assesses the decisional maturity of the SME by calculating the average ages of the manager and the firm at the time of financing application. *PARTI* (Participation Rate) is measured by the manager's participation rate in the SME's capital; this variable indicates the manager's personal financial commitment to the company at the time of financing application. Table 1 provides a summary of the hypotheses and the corresponding variables they represent.

The sample consists of 335 SMEs that have benefited from credit covered by a government guarantee. The objective is to study the elements affecting the investments of companies that have benefited from government guarantees over a period of 10 years after financing. Comparing the mean and the median can give an indication of the presence of outliers. If the mean is significantly different from the median, this may suggest the presence

Table 1. Research hypotheses and variables

Source: Authors.

Variable	Hypothesis	Correlation direction
OBTCA	*H1*	Positive
PROF	*H2*	Positive
LIQU	*H3*	Positive
REPCAP	*H4*	Positive
INDPT	*H5*	Negative
SIZE	*H6*	Positive
DICMAT	*H7*	Positive
PARTI	*H8*	Positive

Table 2. Descriptive statistics

Source Authors.

Statistics	INVT	OBTCA	PROF	LIQU	REPCAP	INDPT	SIZE	DICMAT	PARTI
Mean	2409828.	1543639	15.68523	0.95668	3.667316	2624670.	12683616	31.73635	0.35744
Median	2424209.	1461328	15.74096	0.96701	3.625442	2587756.	1254644	31.66631	0.36541
Maximum	3363289.	47074732	30.99748	2.00753	8.494266	7530435.	3290725	55.77877	0.98947
Minimum	1716589.	36204.06	0.746584	0.05997	0.044970	36194.61	91824.09	10.84833	0.00585
Std. Dev.	256424.7	9878888.	5.119897	0.34598	1.566088	1468762.	7216043.	8.378045	0.19873
Skewness	0.044719	0.513741	–0.12729	–0.02736	0.108735	0.427909	0.158562	0.158034	0.21657
Kurtosis	2.996604	2.647163	2.764510	2.91602	2.891712	2.950356	2.282856	2.851853	2.64352
Jarque-Bera	0.111816	16.47379	1.678763	0.14022	0.823812	10.25781	8.582477	1.700772	4.39263
Probability	0.945626	0.000265	0.431978	0.93228	0.662387	0.005923	0.013688	0.427250	0.11121
Sum	8.07E+08	5.17E+09	5254.551	320.488	1228.551	8.79E+0	4.25E+09	10631.68	119.743
Sum Sq. Dev.	2.20E+13	3.26E+16	8755.257	39.9820	819.1792	7.21E+14	1.74E+16	23444.01	13.1920
Observations	335	335	335	335	335	335	335	335	335

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of extreme values. Looking at Table 2, the difference between the mean and the median does not appear to be very pronounced for most variables. High standard deviations may indicate significant variability in the data. The variables "OBTCA" and "INDPT" appear to have relatively high standard deviations compared to the other variables.

Skewness indicates data distribution asymmetry. Positive skewness suggests a longer right-hand tail, while negative skewness indicates a longer left-hand tail. All variables have skewness values near zero, implying symmetry. Kurtosis measures the shape of the distribution tails relative to a normal distribution. A high kurtosis may indicate thicker tails (a more leptokurtic distribution). In this case, kurtosis values are generally moderate. In summary, there appears to be evidence of possible outliers or deviations from normality for some variables, notably "OBTCA", "REPCAP" and "INDPT".

3. RESULTS

The correlation analysis provided in Table 3 can be used to examine linear relationships between independent variables. This can help to detect potential collinearity, which is the phenomenon where two or more independent variables are highly correlated, which can cause problems when modeling. The correlations between the variables appear to be low and show no clear signs of collinearity.

Overall, although there are correlations between some pairs of variables, no pair of variables shows an extremely strong correlation, suggesting that there is no severe collinearity between the independent variables. However, it is always important to consider the economic significance of the relationships between variables and to ensure that modeling is carried out carefully to avoid any potential collinearity problems. If collinearity does become a concern, techniques such as Robust Least Squares or Ridge regression or variable selection can be considered to manage the problem.

Analysis of the normality of the residuals for OLS regression is important for assessing whether the residuals (the prediction errors) of the regression model follow approximately a normal distribution. This is essential to ensure that the assumptions of linear regression are respected.

In Figure 1, the mean of the residuals is very close to zero (–3.48e-10), which is a good indication. The median is non-zero (–9473.765), suggesting a slight asymmetry in the residuals. The residuals range from –382267.7 to 742018.4, indicating a relatively wide range. A large variation may indicate potential problems. The standard deviation of the

Table 3. Correlation matrix

Source Authors.

Correlation Probability	INVT	OBTCA	PROF	LIQU	REPCAP	INDPT	SIZE	DICMAT	PARTI
INVT	1.0000								
	–								
OBTCA	–0.1396	1.0000							
	0.0105	–							
PROF	0.4615	0.0365	1.0000						
	0.0000	0.5048	–						
LIQU	0.1281	0.0149	–0.0147	1.0000					
	0.0190	0.7854	0.7884	–					
REPCAP	0.1008	0.0480	–0.0299	0.0605	1.0000				
	0.0654	0.3806	0.5851	0.2691	–				
INDPT	0.0385	0.007282	0.0139	0.0833	0.1904	1.0000			
	0.4823	0.8944	0.7991	0.1278	0.0005	–			
SIZE	–0.6362	0.0667	–0.0712	–0.1055	0.0363	–0.0323	1.0000		
	0.0000	0.2232	0.1931	0.0535	0.5077	0.5548	–		
DICMAT	–0.0223	–0.0262	–0.0810	–0.0249	0.0025	–0.0667	0.0533	1.0000	
	0.6832	0.6328	0.1390	0.6496	0.9627	0.2233	0.3303	–	
PARTI	0.1407	–0.0345	0.0845	0.0435	–0.0303	0.0139	–0.1253	0.0271	1.0000
	0.0099	0.5287	0.1226	0.4268	0.5793	0.7990	0.0217-	0.6202	

Source: Authors.

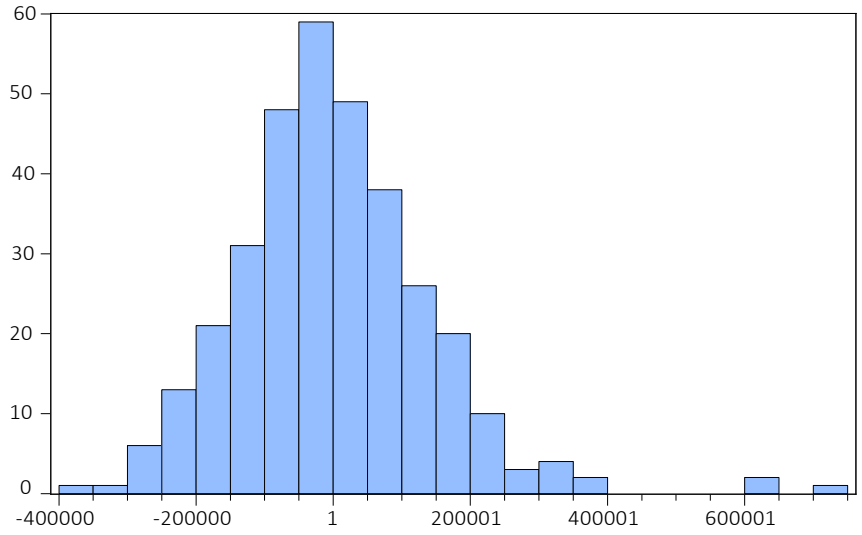

Figure 1. Normality test for OLS regression residuals

residuals is 141639.4, indicating a wide dispersion around the mean. The skewness is 0.99, indicating some positive skewness (longer tail on the right). The kurtosis is 6.75, suggesting a distribution of residuals higher than that of a normal distribution. In this case, the Jarque-Bera test has a high value of 252.76 with a very low probability (0.000), indicating that the residuals do not follow a normal distribution. Thus, the residuals do not appear to follow a normal distribution. This may have implications for hypothesis testing and confidence intervals based on the assumption of normality of the residuals. In such cases, it may be useful to investigate possible causes of this non-normality and explore alternative methods or techniques for dealing with non-normal residuals, such as transformations or robust regression methods.

Analysis of heteroscedasticity for OLS regression, which concerns the unequal variance of the residuals across different values of the independent variable, is important for checking whether one of the ordinary least squares hypotheses is violated. The Breusch-Pagan-Godfrey test is one of the tests commonly used to detect heteroscedasticity. When the model is estimated, an F-statistic is calculated to test the null hypothesis that heteroscedasticity is not present.

In Table 4, the F-statistic is 2.053929 associated with a probability (Prob. F (8,326)) of 0.0399. This probability is generally compared with a significance level to determine whether the null hypothesis should be rejected. In this case, with a probability of 0.0399, the null hypothesis was rejected at the 0.05 level, suggesting the existence of heteroscedasticity. Obs*R-squared is related to the squared correlation between the estimated residuals and the fitted values of the model. It measures the linear relationship between these residuals and fitted values. Obs*R-squared is 16.074, with a probability (Prob. Chi-Square (8)) of 0.0413. As before, this probability indicates that the hypothesis of the absence of heteroscedasticity can be rejected. Scaled explained SS measures the sum of squares explained by the model, adjusted for the number of independent variables. The value is 43.823, with a probability (Prob. Chi-Square (8)) of 0.000. Once again, a very low probability suggests strong evidence against the null hypothesis of no heteroscedasticity.

Table 4. Heteroscedasticity test (Breusch-Pagan-Godfrey) for OLS regression

Source: Authors.

Test		Probability	
F-statistic	2.053929	Prob. F(8,326)	0.0399
Obs*R-squared	16.07484	Prob. Chi-Square(8)	0.0413
Scaled explained SS	43.82350	Prob. Chi-Square(8)	0.0000

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The analysis did not identify any major concerns regarding the collinearity of the variables. However, signs of possible deviation from the assumptions of normality of residuals and homoscedasticity were found in the OLS regression. These observations lead to the adoption of a more resilient approach, namely robust least squares regression. This method allows taking account of deviations from the assumption of constant variance of the residuals and obtaining robust estimates despite possible problems with the distribution of the residuals.

Ramsey's RESET test is commonly used to evaluate regression specifications in the context of OLS. However, its use is not limited to OLS models, and it can also be applied to robust regression models. Robust least squares represent alternatives to ordinary least squares, and are more resistant to violations of the assumptions of normality and homoscedasticity of residuals.

Table 5. Ramsey RESET test for RLS regression

Source: Authors.

Test	Value	df	Probability
t-statistic	1.134285	325	0.2575
F-statistic	1.286602	(1, 325)	0.2575
Likelihood ratio	1.323572	1	0.2500

In Table 5, the test has been applied to the equation, and the null hypothesis is that the model is correctly specified, i.e. that the terms specified in the model are adequate to explain the variance in the dependent variable. The F statistic for the test is 1.286 with 1 and 325 degrees of freedom. The probability associated with the F-statistic is 0.257. The likelihood ratio test statistic is 1.323 with a probability of 0.250. These results indicate that the probability associated with the two tests (F and likelihood ratio) is greater than the 0.05 threshold generally used. This means that there is insufficient evidence to conclude that missing non-linear terms or interactions need to be added to the model to improve the fit.

Analysis of the normality of the residuals is an important step in RLS regression or any other statistical analysis. Normality of residuals is generally desired as it ensures that the underlying assumptions of the regression model are satisfied. However, with large sample sizes, minor deviations from normality may not be a major problem.

In Figure 2, the mean of the residuals is 9537.692. This gives an idea of the central tendency of the residuals. The median of the residuals is –1126.173. The difference between the median and the mean suggests some asymmetry to the right. The maximum of the residuals is 757954.8, and the minimum is –372545.2. Large extreme values may influence the apparent normality and indicate potential problems. The Skewness coefficient has a value of 0.118, suggesting a slight right skewness. However, this skewness is relatively small. The Kurtosis has a value of 3.228, which is greater than the normal kurtosis of 3 for a normal distribution.

Source: Authors.

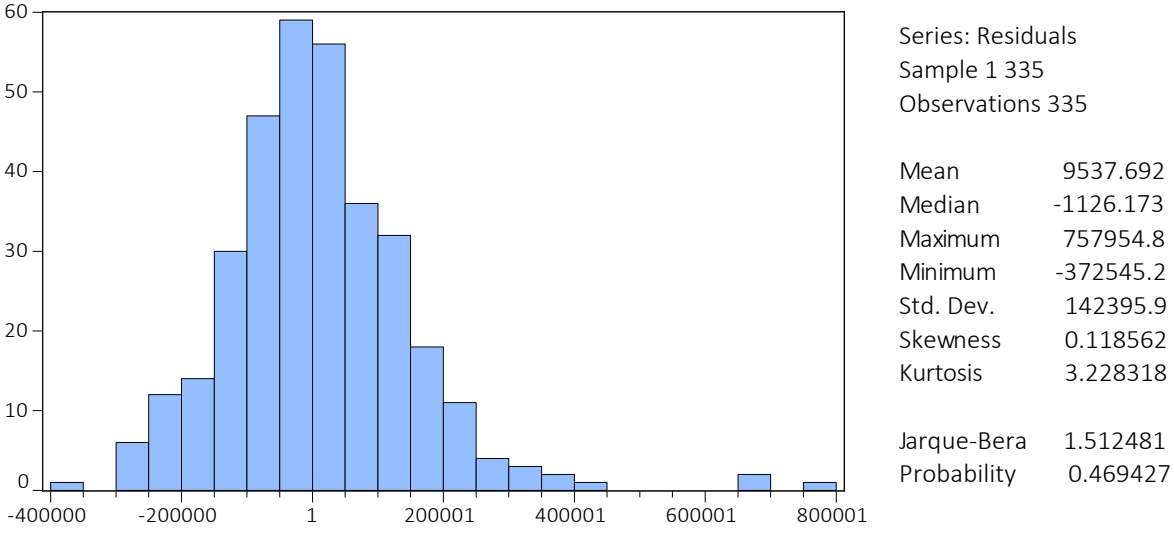

Figure 2. Normality test for RLS regression residuals

Source: Authors.

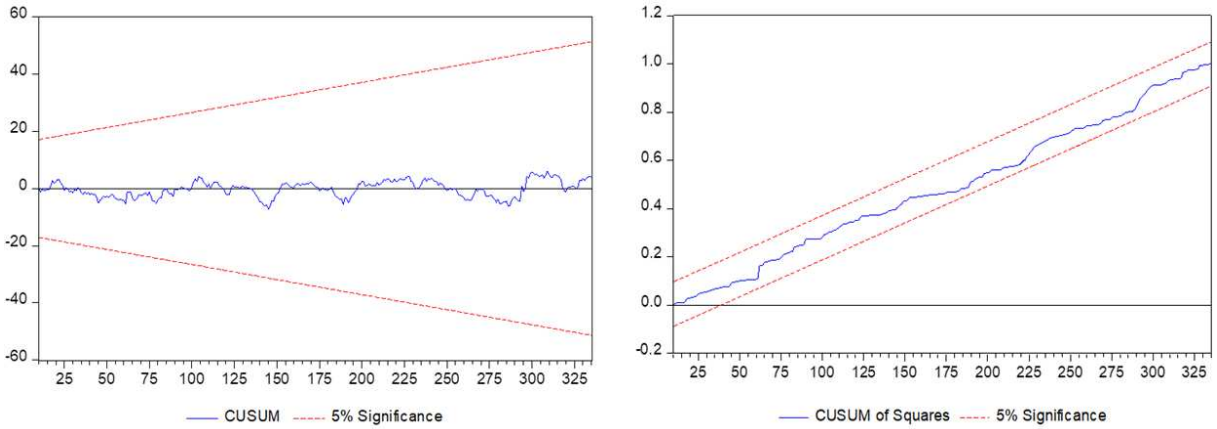

Figure 3. Stability of the model using the CUSUM test and the CUSUMSQ test for RLS regression

This suggests relatively thicker distribution tails, indicating some presence of extreme values. The Jarque-Bera test shows a statistic of 1.512, with an associated probability of 0.469. In conclusion, the statistics indicate some deviations from normality, including a slight right skewness and thicker distribution tails. However, given the sample size and relatively modest deviations, the residuals appear to be approximately normal.

In the context of robust least squares regression on cross-sectional data, the CUSUM and CUSUMSQ tests may also be relevant, although their use may differ slightly from that in the context of time series. When performing robust least squares regression on cross-sectional data, one may be interested in detecting structural changes or atypical points in the model residuals. This may indicate unusual observations that could potentially influence the results of the regression. The CUSUM and CUSUMSQ tests can be applied in a similar way in this context to identify such changes or atypical points in the residuals. However, instead of tracking changes over time, as in time series, observations are made of how cumulants or squared cumulants of residuals change as a function of individual observations in cross-sectional data.

The general approach is to calculate the cumulative residuals (or squared residuals) as you go through the observations. Accumulations that exceed critical thresholds could indicate atypical points or structural changes in the data. In Figure 3 of the RLS, it is noted that the two tests oscillate in the respective intervals, which means that there is no change in the structure of the outliers in the study.

Confidence ellipses provide a graphical representation of the confidence intervals of the coefficient estimates, allowing the uncertainty associated with these estimates to be quantified. When the coefficient estimates lie outside these confidence ellipses, this can have significant implications. Indeed, this can be interpreted as a signal of non-stability of the coefficients, meaning that the estimated values are subject to considerable variation in response to minor changes in the input data. In other words, the results obtained are less reliable and more sensitive to fluctuations in the data, which may compromise the robustness of the conclusions drawn from the analysis.

Exceeding the confidence ellipses indicates that the coefficients concerned are potentially more subject to random fluctuations or sampling errors, which may result in increased uncertainty as to their true value. Figure 4 shows confidence ellipses for the variables examined. The important aspect here is that all the variables lie within their respective ellipses, indicating that the model coefficients maintain their stability at the 5% significance level. In other words, it shows that the values of the measured variables remain consistent with the predictions of the model, which reinforces the reliability of the results obtained.

Table 6 presents the results of the regression, which aims to analyze the factors influencing investment decisions in SMEs benefiting from a government guarantee of bank financing. The method used to

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Source: Authors.

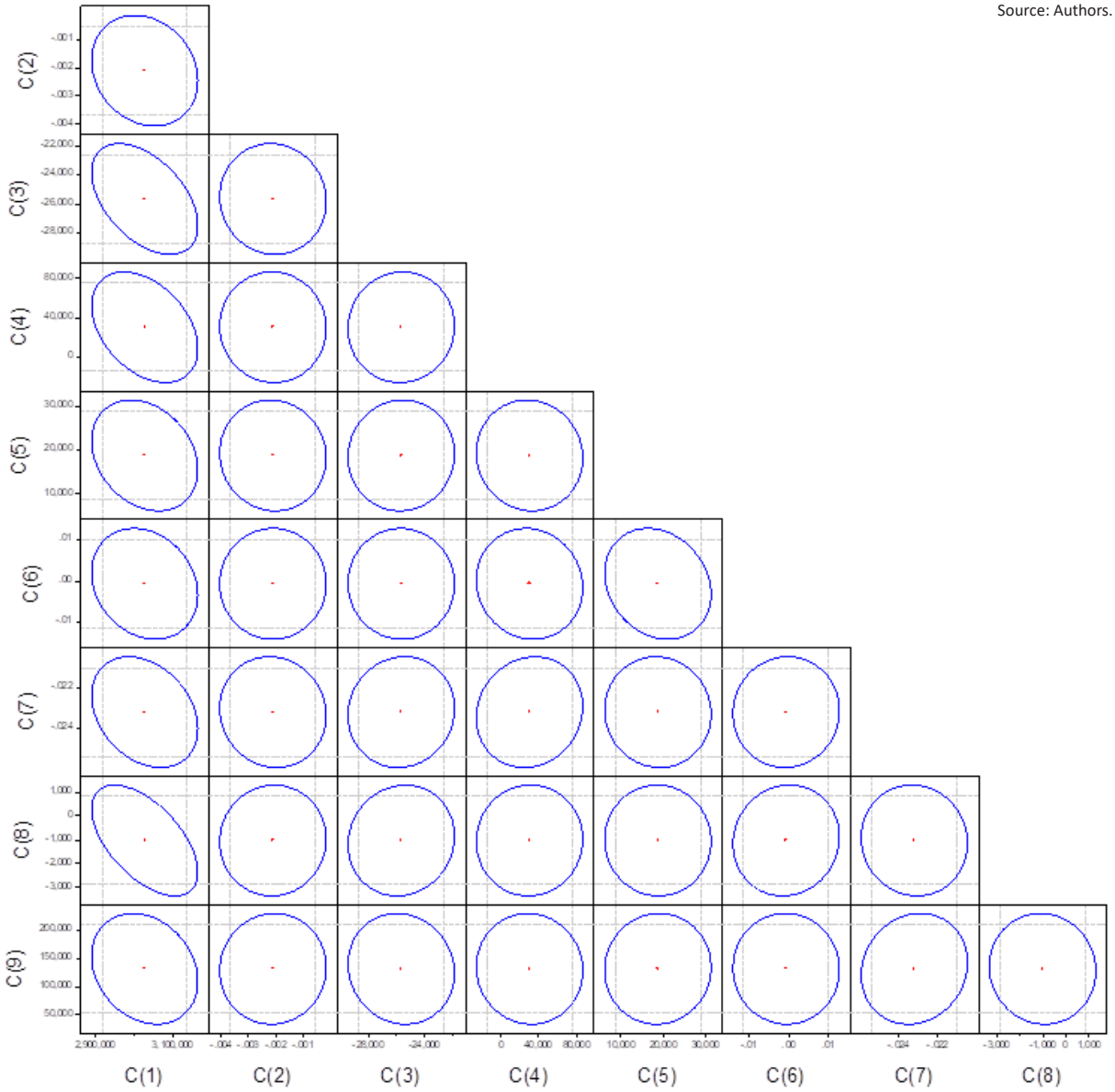

Figure 4. Confidence ellipse for RLS regression

estimate the model is the "Robust Least Squares" method with M-estimation.

Table 6. RLS regression results

Source Authors.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	3047025.	50493.90	60.34442	0.0000
OBTCA	–0.001649	0.000721	–2.286261	0.0222
PROF	26168.12	1399.074	18.70389	0.0000
LIQU	27956.30	20722.77	1.349062	0.1773
REPCAP	1033.14	4630.085	0.223136	0.8240
INDPT	0.001679	0.004944	0.339578	0.7342
SIZE	–0.022666	0.001002	–22.62334	0.0000
DICMAT	–10633.65	852.8921	–12,46775	0.0000
PARTI	115757.4	36140.18	3.203010	0.0014

The Amount of Credit Obtained coefficient shows a negative correlation at the 5% significance level (p = 0.022). However, this correlation is not consistent with hypothesis H1, which is therefore rejected. Profitability has a significant positive coefficient at the 1% level (p = 0.000), providing support for hypothesis H2. On the other hand, Liquidity has a positive but insignificant coefficient, which does not support hypothesis H3. The coefficient of Repayment capacity is close to zero and insignificant, indicating that it has no effect on investment. Consequently, hypothesis H4 is not validated. As for Total Debt, its coefficient is positive, in line with hypothesis H5. However,

this coefficient does not reach a sufficient level of significance (p = 0.734), consequently, hypothesis H5 is rejected. The coefficient associated with Size is significant at the 1% threshold (p = 0.000), but it runs counter to hypothesis H6, which is therefore rejected. Decisional Maturity has a significant coefficient at the 1% level (p = 0.000), but its results are not consistent with hypothesis H7, which is therefore not verified. Finally, Participation Rate shows a significant positive coefficient at the 1% level (p = 0.0014), thus confirming hypothesis H8.

4. DISCUSSION

The results reveal a negative correlation between the amount of credit obtained and investments, which contradicts the expected direction of correlation. This finding differs from the observations put forward by Rajan and Zingales (1998), Brown et al. (2009), and Acharya and Xu (2017), who suggested that firms relying heavily on external finance might increase their investments when these sources of finance are abundant. In contrast, the results challenge this idea by indicating that the negative correlation runs counter to these established views. Consequently, it is possible to deduce that the provision of government-backed credit does not intrinsically guarantee investment; on the contrary, it seems to indicate the opposite trend. This suggests that encouraging smaller loans could potentially yield more fruitful results in terms of stimulating investment activity among SMEs in the Moroccan context. The findings are consistent with the observations of researchers Erel (2011) and Ahmad et al (2023) – to name but a few – who found an association between firm profitability and higher levels of investment. Thus, it is clear that profitability is closely linked to more substantial investment. With this in mind, it might be wise to grant government guarantees to profitable SMEs in order to encourage their investment.

In contrast to the insignificant results concerning liquidity at the time of applying for finance, the authors of the literature review suggested that higher levels of liquidity could stimulate greater investment (Opler et al., 1999; Ozkan, 2001; Deloof, 2003). This discrepancy suggests that SMEs may need to focus their efforts on improving their liquidity position after obtaining finance. In addition, it is important to note that a good liquidity position at the time of applying for state-guaranteed credit does not necessarily guarantee that the SME will make significant investments after bank financing has been approved. The insignificant results for repayment capacity at the time of applying for financing also differ from the observations of authors who have suggested that companies with a strong repayment capacity are better prepared to undertake investments (Almeida & Campello, 2007; Carpenter & Petersen, 2002). It is also plausible to consider that these SMEs may have made efforts to improve their repayment capacity after obtaining financing. Consequently, it becomes clear that the granting of finance should not penalize companies facing such constraints. Results regarding the impact of debt at the time of applying for finance, which turn out to be insignificant, differ from the observations of Baron and Ensley (2006), Cheryta et al. (2018), and Hovakimian et al. (2004), who pointed out that heavily indebted firms could be limited in their ability to finance investments. It is conceivable that the government guarantee potentially incentivized SMEs to restructure their debts to be able to make investments. In this context, it would not be wise to penalize SMEs that face this constraint when applying for financing.

The results of this study are also inconsistent with the view put forward by the authors that decision-making maturity could have a positive impact on the scale of investment (Baron & Ensley, 2006; Zacharakis & Meyer, 2000; Rauch et al., 2009). This discrepancy suggests that in the Moroccan context, decision-making maturity may not have the anticipated effect on investment. As a result, it could be that it is younger companies and less experienced entrepreneurs who tend to invest more. With this in mind, the credit guarantee schemes should be considered with a favorable orientation towards young companies and entrepreneurs. Firm size has a significant and negative influence on investment decisions; however, this influence goes against the expectations of researchers such as Beck and Demirguc-Kunt (2006) and Mazzucato and Parris (2015). These findings highlight the

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importance of the size factor in investment choices, even if this is contrary to some previous studies. Thus, in the Moroccan context, it seems that smaller firms are more likely to undertake investments, potentially conducive to SME growth. In view of these results, the focus of credit guarantee schemes should be on small SMEs. The results of this study confirm what researchers Bierman and Smidt (1981), Schoar and Zuo (2017), and Kaplan (2014) had argued: managers with a large share of the capital tend to invest the funds from bank financing wisely. This highlights the impact of direct management involvement on investment decisions. As a result, government guarantees should be prioritized for this type of SME.

CONCLUSION

The objective of this study is to understand the relationships between SME investments benefiting from government credit guarantees and several key variables, such as the amount of credit, profitability, liquidity, repayment capacity, indebtedness, decision-making maturity, company size and the role of managers. To achieve this objective, the study uses an empirical methodology based on statistical analysis of data collected from a representative sample of businesses in Morocco. To constitute this sample, 335 Moroccan SMEs that had benefited from government credit guaranteed were rigorously selected. This selection was carried out randomly, thus guaranteeing the relevance of this sample to the wider population of Moroccan SMEs. The empirical methodology used is based on a regression analysis using the robust least squares method. The conclusions obtained call into question certain expectations and perspectives established in the academic literature. The results indicate a negative correlation between the amount of credit obtained and business investment, in contradiction with the expected correlation. The current results suggest that the availability of government credit guarantee does not intrinsically guarantee investment; on the contrary, it seems to indicate an opposite tendency. Thus, favoring smaller loans could be more effective in stimulating investment activity among Moroccan SMEs. The results confirm a positive association between firm profitability and increased levels of investment. This implies that profitability is closely linked to more substantial investment. From this perspective, the provision of government guarantees to profitable SMEs could encourage their investment.

Contrary to expectations, the results do not show a significant relationship between liquidity at the time of applying for finance and investment. This suggests that SMEs could better focus their efforts on improving their liquidity situation after obtaining financing. The results call into question the preconceived idea that companies with a solid repayment capacity are better prepared to undertake investments. It is possible that these SMEs improved their repayment capacity after obtaining finance, underlining that the provision of finance should not penalize companies facing such constraints. Contrary to previous research, the results do not show a significant relationship between indebtedness at the time of applying for finance and investment. It is conceivable that government guarantees encouraged SMEs to restructure their debts to facilitate investment. The results diverge from the idea that decision-making maturity could have a positive impact on investment. Younger Moroccan companies and less experienced entrepreneurs tend to invest more. Thus, credit guarantee schemes could benefit young companies and entrepreneurs as a priority. Contrary to expectations, company size has a negative influence on investment decisions. This suggests that small businesses are more likely to undertake investments, which could contribute to the growth of Moroccan SMEs. The results confirm that managers with a large share of the capital tend to invest the funds from bank financing. This highlights the impact of direct managerial involvement on investment decisions, which could guide the direction of credit guarantee schemes. In sum, the findings challenge some established ideas and suggest specific directions for credit guarantee schemes to effectively promote investment in Moroccan SMEs.

AUTHOR CONTRIBUTIONS

Conceptualization: Oussouadi Kamal, Cherkaoui Kenza.
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Formal analysis: Oussouadi Kamal, Cherkaoui Kenza.
Funding acquisition: Oussouadi Kamal, Cherkaoui Kenza.
Investigation: Oussouadi Kamal, Cherkaoui Kenza.
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Validation: Oussouadi Kamal, Cherkaoui Kenza.
Visualization: Oussouadi Kamal, Cherkaoui Kenza.
Writing – original draft: Oussouadi Kamal, Cherkaoui Kenza.
Writing – review & editing: Oussouadi Kamal, Cherkaoui Kenza.

REFERENCES

1. Acharya, V., & Xu, Z. (2017). Financial dependence and innovation: The case of public versus private firms. *Journal of Financial Economics, 124*(2), 223-243. https://doi.org/10.1016/j.jfineco.2016.02.010
2. Adhikary, B. K., Kutsuna, K., & Stephannie, S. (2021). Does the government credit guarantee promote micro, small, and medium enterprises? Evidence from Indonesia. *Journal of Small Business & Entrepreneurship, 33*(3), 323-348. https://doi.org/10.1080/08276331.2019.1666338
3. Ahmad, M. M., Hunjra, A. I., & Taskin, D. (2023). Do asymmetric information and leverage affect investment decisions? *The Quarterly Review of Economics and Finance*. http://dx.doi.org/10.1016/j.qref.2021.05.001
4. Akçiğit, U., Seven, Ü., Yarba, I., & Yilmaz, F. (2021). *Firm-level impact of credit guarantees: Evidence from Turkish credit guarantee fund* (Working Paper. No. 21/10). TCMB. Retrieved from https://ideas.repec.org/p/tcb/wpaper/2110.html
5. Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. *The Review of Financial Studies, 20*(5), 1429-1460. Retrieved from https://www.nber.org/papers/w12087
6. Baron, R. A., & Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice and experienced entrepreneurs. *Management Science, 52*(9), 1331-1344. http://dx.doi.org/10.1287/mnsc.1060.0538
7. Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance, 30*(11), 2931-2943. https://doi.org/10.1016/j.jbankfin.2006.05.009
8. Bellavitis, C., Filatotchev, I., & Souitaris, V. (2017). The impact of investment networks on venture capital firm performance: A contingency framework. *British Journal of Management, 28*(1), 102-119 (cit. on pp. 3, 4, 9). http://dx.doi.org/10.1111/1467-8551.12162
9. Berger, A. N., & Udell, G. F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance, 22*(6-8), 613-673. https://doi.org/10.1016/S0378-4266(98)00038-7
10. Bierman, H., & Smidt, S. (1981). *The Capital Budgeting Decision: Economic Analysis of Investment Projects*. Retrieved from https://www.routledge.com/The-Capital-Budgeting-Decision-Economic-Analysis-of-Investment-Projects/Bierman-Jr-Smidt/p/book/9780415400046
11. Binks, M. R., & Ennew, C. T. (1996). Growing firms and the credit constraint. *Small Business Economics, 8,* 17-25. Retrieved from https://link.springer.com/article/10.1007/BF00391972
12. Birley, S., & Westhead, P. (1993). A comparison of new businesses established by 'novice' and 'habitual' founders in Great Britain. *International Small Business Journal, 12*(1), 38-60. https://doi.org/10.1177/0266242693121003
13. Brounen, D., De Jong, A., & Koedijk, K. (2004). Corporate finance in Europe: Confronting theory with practice. *Financial Management,* 71-101. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=559415
14. Brown, J. R., Fazzari, S. M., & Petersen, B. C. (2009). Financing innovation and growth: Cash flow, external equity, and the 1990s R&D boom. *The Journal of Finance, 64,* 151-185. https://doi.org/10.1111/j.1540-6261.2008.01431.x
15. Carpenter, R. E., & Petersen, B. C. (2002). Is the growth

http://dx.doi.org/10.21511/imfi.21(1).2024.19

of small firms constrained by internal finance? *Review of Economics and Statistics, 84*(2), 298-309. https://doi.org/10.1162/003465302317411541

16. Cassar, G. (2004). The financing of business start-ups. *Journal of Business Venturing, 19*(2), 261-283. https://doi.org/10.1016/S0883-9026(03)00029-6

17. Cheryta, A. M., Moeljadi, M., & Indrawati, N. K. (2018). Leverage, Asymmetric Information, Firm Value, and Cash Holdings in Indonesia. *Jurnal Keuangan Dan Perbankan, 22*(1), 83-93. https://doi.org/10.26905/jkdp.v22i1.1334

18. Chirinko, R. S. (1993). Business Fixed Investment Spending: Modeling Strategies, Empirical Results, and Policy Implications. *Journal of Economic Literature, 31*(4), 1875-1911. Retrieved from https://ideas.repec.org/p/ces/ceswps/_27.html

19. Coad, A., & Rao, R. (2008). Innovation and firm growth in high-tech sectors: A quantile regression approach. *Research Policy, 37*(4), 633-648. https://doi.org/10.1016/j.respol.2008.01.003

20. Cole, R. A., & Mehran, H. (1998). The effect of changes in ownership structure on performance: Evidence from the thrift industry. *Journal of Financial Economics, 50*(3), 291-317. https://doi.org/10.1016/S0304-405X(98)00039-7

21. Delmar, F., & Shane, S. (2003). Does business planning facilitate the development of new ventures? *Strategic Management Journal, 24*(12), 1165-1185. https://doi.org/10.1002/smj.349

22. Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance & Accounting, 30*(3-4), 573-588. https://doi.org/10.1111/1468-5957.00008

23. Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2008). The law and economics of self-dealing. *Journal of Financial Economics, 88*(3), 430-465. https://doi.org/10.1016/j.jfineco.2007.02.007

24. Dvouletý, O., Srhoj, S., & Pantea, S. (2021). Public SME grants and firm performance in European Union: A systematic review of empirical evidence. *Small Business Economics, 57,* 243-263. Retrieved from https://ideas.repec.org/a/kap/sbusec/v57y2021i1d10.1007_s11187-019-00306-x.html

25. Erel, I. (2011). The effect of bank mergers on loan prices: Evidence from the United States. *The Review of Financial Studies, 24*(4), 1068-1101. https://doi.org/10.1093/rfs/hhp034

26. Fazzari, S. M., & Petersen, B. C. (1993). Working capital and fixed investment: new evidence on financing constraints. *The RAND Journal of Economics,* 328-342. Retrieved from https://ideas.repec.org/a/rje/randje/v24y1993iautumnp328-342.html

27. Ferreira, M. A., & Vilela, A. S. (2004). Why do firms hold cash? Evidence from EMU countries. *European Financial Management, 10*(2), 295-319. https://doi.org/10.1111/j.1354-7798.2004.00251.x

28. Gertler, M., & Gilchrist, S. (1994). Monetary policy, business cycles, and the behavior of small manufacturing firms. *The Quarterly Journal of Economics, 109*(2), 309-340. https://doi.org/10.2307/2118465

29. Gilmore, A., Carson, D., & O'Donnell, A. (2004). Small business owner-managers and their attitude to risk. *Marketing Intelligence & Planning, 22,* 349-360. http://dx.doi.org/10.1108/02634500410536920

30. Graham, J. R. (1996). Debt and the marginal tax rate. *Journal of Financial Economics, 41*(1), 41-73. https://doi.org/10.1016/0304-405X(95)00857-B

31. Hall, B. H., & Lerner, J. (2010). The financing of R&D and innovation. In *Handbook of the Economics of Innovation* (Vol. 1, pp. 609-639). North-Holland. https://doi.org/10.1016/S0169-7218(10)01014-2

32. Harrison, R. T., & Leitch, C. M. (2005). Entrepreneurial learning: Researching the interface between learning and the entrepreneurial context. *Entrepreneurship Theory and Practice, 29*(4), 351-371. https://doi.org/10.1111/j.1540-6520.2005.00089.x

33. Hovakimian, A., Hovakimian, G., & Tehranian, H. (2004). Determinants of target capital structure: The case of dual debt and equity issues. *Journal of Financial Economics, 71*(3), 517-540. https://doi.org/10.1016/S0304-405X(03)00181-8

34. Kaplan, S. N. (2014). *Entrepreneurial Finance and Private Equity: Course Description and Course Syllabus.* Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=11271

35. Martín-García, R., & Morán Santor, J. (2021). Public guarantees: a countercyclical instrument for SME growth. Evidence from the Spanish Region of Madrid. *Small Business Economics, 56*(1), 427-449. Retrieved from https://ideas.repec.org/a/kap/sbusec/v56y2021i1d10.1007_s11187-019-00214-0.html

36. Mazzucato, M., & Parris, S. (2015). High-growth firms in changing competitive environments: the US pharmaceutical industry (1963 to 2002). *Small Business Economics, 44*(1), 145-170. Retrieved from https://ideas.repec.org/a/kap/sbusec/v44y2015i1p145-170.html

37. Murillo Campello, J., & Graham, J. R. (2013). Do stock prices influence corporate decisions? Evidence from the technology bubble. *Journal of Financial Economics, 107*(1), 89-110. https://doi.org/10.1016/j.jfineco.2012.08.002

38. Ongena, S., & Smith, D. C. (2000). What determines the number of bank relationships? Cross-country evidence. *Journal of Financial Intermediation, 9*(1), 26-56. https://doi.org/10.1006/jfin.1999.0273

39. Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics, 52*(1), 3-46. https://doi.org/10.1016/S0304-405X(99)00003-3

40. Ozkan, A. (2001). Determinants of capital structure and adjustment to long run target: evidence from

UK company panel data. *Journal of Business Finance & Accounting, 28*(1-2), 175-198. https://doi.org/10.1111/1468-5957.00370

41. Rajan, R., & Zingales, L. (1998). Financial dependence and growth. *American Economic Review, 88,* 559-587. Retrieved from https://ideas.repec.org/a/aea/aecrev/v88y1998i3p559-86.html

42. Rampini, A. A., & Viswanathan, S. (2013). Collateral and capital structure. *Journal of Financial Economics, 109*(2), 466-492. https://doi.org/10.1016/j.jfineco.2013.03.002

43. Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. *Entrepreneurship Theory and Practice, 33*(3), 761-787. http://dx.doi.org/10.1111/j.1540-6520.2009.00308.x

44. Schoar, A., & Zuo, L. (2017). Shaped by booms and busts: How the economy impacts CEO careers and management styles. *The Review of Financial Studies, 30*(5), 1425-1456. https://doi.org/10.1093/rfs/hhw111

45. Stewart, G. B. (1991). *The Quest for Value.* New York, NY: HarperCollins. Retrieved from https://www.amazon.com/Quest-Value-Guide-Senior-Managers/dp/0887304184

46. Vijayakumaran, R. (2021). Impact of managerial ownership on investment and liquidity constraints: Evidence from Chinese listed companies. *Research in International Business and Finance, 55,* 101321. https://doi.org/10.1016/j.ribaf.2020.101321

47. Zacharakis, A. L., & Meyer, G. D. (2000). The potential of actuarial decision models: Can they improve the venture capital investment decision? *Journal of Business Venturing, 15,* 323-346. https://doi.org/10.1016/S0883-9026(98)00016-0

http://dx.doi.org/10.21511/imfi.21(1).2024.19