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The Impact of Internal Financing Sources and Bank Financing on Information Technology Investment

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Abstract

Studies show that internal financing sources (*IFS*) and bank financing (*BF*) motivate firms for investment. In line with previous studies, this study examines the impact of (*IFS*) and (*BF*) on information technology (*IT*) investment, by surveying owners of small business firms in India for data on *IFS*, *BF*, and *IT* investment. According to the findings, *IFS* and *BF* increase *IT* investment, while firm age, firm location, and owner education also enhance *IT* investment. By demonstrating the impact of *IFS* and *BF* on *IT* investment, this study contributes to the existing literature, offering its findings for investment advisors, the India government, and owners/operators of small business firms.

Key words: information technology investment; internal financing sources; bank financing; small business; India

JEL classification: J16; D81; G11

1. Introduction

Both internal financing sources (*IFS*) and bank financing (*BF*) play an important role in the overall investment decisions of firms (Vogt, 1994). However, as suggested by the pecking order theory of Myers and Majluf (1984), firms employ internally generated sources for investment before seeking external financing.

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Increasing investment in information technology (*IT*) has become necessary for Indian firms ever since the demonetization of its currency in 2016 (Biswas, 2016), which caused domestic firms to face severe challenges, including, but not limited to, accepting debt cards to sell products. *IT* investment, in the context of this study, refers to actual investment in computer(s) and software(s) to order inventory, sell products, reduce food and other wastage, collect accounts receivable (A/R), pay accounts payable (A/P), manage cash, invest in point of sales (POS) to accept credit and debit cards to collect payments, invest in security alarms to minimize theft, etc.

To determine a small business firm, different categorizing benchmarks are used. Uyar and Guzelyurt (2015) differentiated small- and medium-sized enterprises (SMEs) from larger firms by considering their ownership structure, limited financing sources, and lack of access to the capital market. However, the Business Development Bank of Canada (BDC) considers small business firms as those with fewer than 100 employees (BDC, 2013). Lahiri (2012) segmented micro-, small-, and medium-sized enterprises (MSMEs) in India based on their investment in plant and equipment. For example, investment in India's manufacturing sector based on their segments is as follows: investment in micro-firms does not exceed 25 lakh rupees (INR 2.5 million), investment in small business firms is more than 25 lakh rupees but does not exceed five crore rupees (INR 50 million), and investment in medium-sized firms is more than five crore rupees but does not exceed ten crore rupees (INR 100 million). Similarly, investment in India's service sector based on their segments goes as follows: investment in micro-firms does not exceed ten lakh rupees (INR one million), investment in small business firms is more than ten lakh rupees but does not exceed two crore rupees (INR 20 million), and investment in medium-sized firms is more than two crore rupees but does not exceed five crore rupees (INR 50 million). The average assets of the manufacturing and service firms used in this study are less than INR 50 million and less than INR 20 million, respectively, which falls into the category of small enterprises. Therefore, all the firms employed herein are considered small business firms.

Indian small business firms are financially constrained and face financing challenges (Gill et al., 2016). Joeveer (2013) and Duda (2013) suggested that financially constrained firms have excessive debt costs since high-quality banks prefer providing debt financing to strong firms at a lower interest rate (Lucas and McDonald, 1992). This leads to inequality in credit allocation that influences investment decisions (Coco and Pignataro, 1994), including those for *IT*. *IFS* reduce the probability of bankruptcy and help small business firms gain access to *BF* (Gill et al., 2016). Although previous studies showed both *IFS* and *BF* as important components of investment decisions (see Lucas and McDonald, 1992; Vogt, 1994; Hubbard et al., 1995), they did not concentrate on the relationship between *IFS* and *BF* with *IT* investment. Moreover, *IFS* improve access to bank financing by signaling the firm's quality (Gill et al., 2016), thus allowing the firm to better leverage both important sources of financing.

There are approximately 30 million SMEs in India, which are considered the backbone of its economy. They contribute 45% of industrial output, 40% of exports,

employ 60 million people, and create 1.3 million jobs every year (Shankar, 2016). Because of the high domestic unemployment rate, most Indians rely on small business/self-employment; therefore, it is important to determine the factors that enhance *IT* investment in the country's SMEs. Considering all the above factors that affect *IT* investment, this study examines the following research questions.

Do IFS enhance IT investment in the small business industry?
Does BF enhance IT investment in the small business industry?
Do IFS improve access to BFS in the small business industry?

Previous studies by Fazzari et al. (1988), Whited (1992), Vogt (1994), Coco and Pignataro (1994), Lucas and McDonald (1992), and Hubbard et al. (1995) suggested that *IFS*, credit allocation, and *BF* act as determinants of investment decisions. Ventura (2004), Holmes (2010), Lu (2016), and Sharama and Vidisha (2018) investigated the determinants of investment for business and economic development of the country. Following these studies, we concentrate on the relationships between *IFS* and *IT* investment, *BF* and *IT* investment, and *IFS* and access to *BF*. We find that *IFS* and *BF* are positively associated with *IT* investment, and *IFS* are positively associated with *BF*. By lending some support to earlier studies, our study contributes to the literature on the impact of *IFS* and *BF* on *IT* investment in the small business industry.

The structure of the paper is as follows. Section two examines the previous literature and develops the hypotheses. Section three describes the data and methodology used to investigate the research questions. Section four analyzes and shows the empirical results. Section five discusses and concludes. Section six considers the implications of the findings and limitations of the study. Section seven provides recommendations for future research.

2. Literature Review and Hypotheses' Development

2.1 *IFS* and Investment in the Firm

Small Indian business firms are financially constrained (Gill et al., 2016), have limited options to raise external financing (Joeveer, 2013; Shete and Garcia, 2011; Uyar and Guzelyurt, 2015), and therefore tend to rely on *IFS* (i.e., personal and family savings and retained earnings) to invest in the firm. López-Gracia and Sogorb-Mira (2008) argued that SMEs are more volatile and more prone to bankruptcy; therefore, these firms are less leveraged, often relying on *IFS* and short-term debts. This reliance is supported by the pecking order theory of Myers and Majluf (1984), who showed that asymmetric information between firm insiders and the capital market creates a pecking order over financing choices in which internally generated funds are preferred to external funds (Vogt, 1994). Leuz and Verrechia (2005) noted that a company with high information risk (asymmetric information) sees a correspondingly high cost of capital, because investors demand a high-risk premium on information risk. *IFS* thus act as determinants of investments

(Hubbard et al., 1995).

Financially constrained firms have limited access to external financing, and their ability to exploit wealth-improving investment opportunities is largely limited to their ability to finance these projects internally. The findings of Fazzari et al. (1988) suggested that financial factors (i.e., *IFS*) affect investments in the firm. Fazzari et al. also asserted because a firm's opportunity cost of internal funds can be substantially lower than its cost of external financing that corporate investment may depend on *IFS*. Internal funds, as the findings of Fazzari et al. (1988) and Whited (1992) also suggested, play an independent role in explaining investment spending for firms likely to face external financing constraints.

Uyar and Guzelyurt (2015) found that SMEs primarily prefer internal funding sources to invest in their firm over external financing sources. New small business firms are likely to prefer low cost and less risky financing (Osei-Assibey et al., 2012); therefore, *IFS* are useful to enhance *IT* investment. In summary, as the limited availability of literature suggests, *IFS* are a crucial factor to improve *IT* investment in small business firms. Accordingly, we have the following hypothesis.

First Hypothesis: *IFS are positively associated with IT investment in the small business industry.*

2.2 *BF* and Investment in the Firm

Carbó-Valverde et al. (2008) showed that investment is sensitive to bank loans for unconstrained firms, but not for constrained firms (i.e., firms with insufficient wealth). This may be because constrained firms lack collateral, preventing investments in them. Insufficient credit, Coco and Pignataro (1994) argued, hinders investment. Insufficient wealth, they added, is not a problem for moral hazard since poor entrepreneurs exert more effort compared with wealthy entrepreneurs.

Since interest costs are tax deductible (Karpavičius and Yub, 2016), bank debt financing plays a significant role in corporate investment. Indeed, *BF* may be the cheapest source of external funding (Petersen and Rajan, 1994, 1995). For example, the findings of Ghosal and Ray (2015) indicated that banks offer crop loans at 7% annually, while private moneylenders charge 20-30%, if not more. Lucas and McDonald (1992) showed that *BF* acts as a determinant of investments.

Although interest expenses are tax deductible, the ability of small business firms to optimally exploit investment opportunities may depend on the level of financial constraints they face. Small business firms are vulnerable, because they are more opaque compared with larger firms and thus susceptible to more credit rationing. Previous studies also suggested that bank loans stimulate corporate investment (King and Levine, 1993; Fisman and Love, 2004). In summary, the limited availability of literature suggests that *BF* enhances investment in a corporation. Hence, we present the next hypothesis.

Second Hypothesis: *BF is positively associated with IT investment in the small business industry.*

2.3 *IFS* and Access to *BF*

Firms operate in imperfect capital markets. The partial adjustment models of Spies (1974), Taggart (1977), Jalilvand and Harris (1984) and Vogt (1994) argued that external financing is a function of the deviations in the current financial structure from a firm's target and its current funding requirements. Coco and Pignataro (2012) noted that financially weak firms face greater difficulty in obtaining loans. However, Coco and Pignataro (1994) suggested that wealth is not observable by banks. Since small business firms are financially weak, they are considered riskier than larger firms (Jacobson et al., 2005); therefore, they face external financing challenges. In reducing the probability of bankruptcy by reducing the amount of debt that in turn improves access to *BF*, *IFS* play a key role. The access to *BF* is improved, as shown by Gill et al. (2017), by reducing the probability of bankruptcy.

Firms with greater internal financing are likely to have lower leverage and higher cash ratios and suffer less adverse effects related to a crisis in their business operations (Bancel and Mittoo, 2011). According to Vogt (1994), firms with greater *IFS* use them for investment first; any shortfalls in cash flow are then financed initially by debt and then by external equity. Thus, greater *IFS* increase the likelihood of *BF* access for small business firms. In summary, the literature review shows that *IFS* reduce the chances of bankruptcy (Philosophov and Philosophov, 2005) and thus increase access to *BF*. Hence, we offer the following hypothesis.

Third Hypothesis: *IFS are positively associated with access to BF in the small business industry.*

3. Methods

3.1 Research Design and Variable Measurements

This study utilizes a survey research methodology (a non-experimental field study design) to collect data, owing to its usefulness for studying sensitive opinions, attitudes, preferences, and behaviors of individuals (Gall et al., 1996). Table 1 lists measurements of all the variables, and Appendix A shows the survey questionnaire used in this study. *IT* investment is measured based on the changes over the last ten years, because there has been a dramatic growth in *IT* implementation in micro-, small-, and medium-sized firms in India during this time (Beley and Bhatarkar, 2013). We measure *IFS* by assuming small business owners have adequate (enough) funds saved through retained earnings, personal savings, and family savings for *IT* investment. Since research participants are reluctant to provide actual figures, we rely on a discrete variable (*IFS* binary). Additionally, since we are unable to get the actual borrowed amounts from research participants, we further rely on the binary variable, *BF*. We measure *BF* by assuming small businesses borrow from bank(s) controlled by the government, which charges low interest compared to private lending institutions.

Table 1. Measurement of Variables

Variable		Measurement
Information Technology Investment	*IT_INVEST*[#]	Measured as actual *IT* investment over the last ten years.
Internal Financing Sources	*IFS*	*IFS* are measured as a dummy variable where *IFS* = 1 if a small business owner has adequate *IFS* (personal and family) to invest in his or her small business firm. Alternatively, *IFS* = 0 if a small business owner does not have adequate (personal and family) *IFS* to invest in his or her small business firm. The meaning of *IFS* was explained to the research participants.
Bank Financing	*BF*	*BF* is a dummy variable. If a small business owner has bank financing, *BF* takes the value of 1; otherwise, *BF* equals 0. The meaning of *BF* was explained to research participants.
Sales	*SALES*	Measured as the firm's actual sales.
Assets	*ASSETS*	Measured as the firm's actual assets.
Market Value of the Firm	*MV*	Measured as the firm's actual market value.
Firm Performance	*FP*	Measured as actual net income divided by the firm's actual sales.
Firm Age	*F_AGE*	Measured as the firm's actual age.
Firm Location	*F_LOC*	A dummy variable with assigned value of 1 if a firm operates in an urban area and 0 if in a rural area. We use a location variable, because firms have better access to *IT* in urban areas compared with rural areas.
Owner Age	*O_AGE*	Measured as the actual age of a small business owner.
Owner Education	*O_EDU*	A categorical variable with an assigned value of: 1 = High school or less 2 = College diploma 3 = Bachelor's degree 4 = Master's degree 5 = Ph.D. degree or more
Owner Experience	*O_EXP*	The actual number of years of owner experience.
Female Gender	*FEM*	A dummy variable for whether the small business owner is female.
Industry	*IND*	A categorical variable with an assigned value of 0 = Retail/Wholesale and 1 = Production Firm.

Notes: For empirical analysis, the natural logarithm (ln) is calculated for *IT* investment, sales, assets, and market value of the firm. [#] Examples of *IT* investment are provided to research participants on the survey questionnaire. They include investment in computer(s) and software(s) to order inventory, sell products, reduce food and other wastage, collect accounts receivables, pay accounts payables, manage cash, etc. to automate a production system and inventory tracking system in the warehouse; investment in mobile/cell phones, iPhones, smartphones, etc. to order inventory, sell products, and arrange payment collections; investment in point of sales (POS) to accept credit cards and debit cards to collect payments; and investment in security alarms to minimize theft and so on.

3.2 Descriptive Data Analysis

Table 2 shows descriptive statistics.

Table 2. Descriptive Statistics

	Mean	*Standard Deviation*	*Minimum*	*Median*	*Maximum*
INVEST_IT	11.66	0.95	9.85	11.57	15.23
IFS	0.74	0.44	0	1	1
BF	0.77	0.42	0	1	1
SALES	15.39	0.91	12.61	15.40	20.67
ASSETS	14.92	1.22	10.99	14.98	19.83
MV	14.94	1.25	11	14.98	20.13
FP	0.31	0.10	0.02	0.32	0.56
F_AGE	14.64	10.49	1	12	60
F_LOC	0.77	0.42	0	1	1
O_AGE	41.07	9.45	21	40	64
O_EDU	2.71	1.10	1	3	4
O_EXP	12.66	7.89	2	11	40
FEM	0.75	0.43	0	1	1
IND	0.10	0.30	0	0	1

Variables include information technology investment (*IT_INVEST*), internal financing sources (*IFS*), bank financing (*BF*), sales (*SALES*), assets (*ASSETS*), market value of the firm (*MV*), firm performance (*FP*), firm age (*F*_AGE), firm location (*F_LOC*), owner age (*O_AGE*), owner education (*O_EDU*), owner experience (*O_EXP*), owner is female (*FEM*), and industry (*IND*).

3.3 Bivariate Pearson Correlation Analysis

The correlation coefficient matrix exhibits that *INVEST_IT* is positively and significantly correlated with *IFS*, *BF*, *SALES*, *ASSETS*, *MV*, *F_AGE*, *F_LOC*, and *O_EDU* ($\rho_{IFS,IT\_INVEST} = 0.538$; $\rho_{BF,IT\_INVEST} = 0.645$; $\rho_{SALES,IT\_INVEST} = 0.445$; $\rho_{ASSETS,IT\_INVEST} = 0.520$; $\rho_{MV,IT\_INVEST} = 0.508$; $\rho_{F\_AGE,IT\_INVEST} = 0.176$; $\rho_{F\_LOC,IT\_INVEST} = 0.341$; and $\rho_{O\_EDU,IT\_INVEST} = 0.319$; they are all significant at the 1% level), implying that *IFS*, *BF*, sales, assets, market value of the firm, firm age, firm location, and owner education positively impact *IT* investment. The correlation coefficient matrix also exhibits that *INVEST_IT* is negatively and significantly correlated with *FP* ($\rho_{FP,IT\_INVEST} = -0.294$, significant at the 1% level), suggesting that firm performance negatively impacts *IT* investment in India's small business industry (see Table 3).

Table 3. Correlations

	INVEST_IT	*IFS*	*BF*	*SALES*	*ASSETS*	*MV*	*FP*	*F_AGE*	*F_LOC*	*O_AGE*	*O_EDU*	*O_EXP*	*FEM*	*IND*
INVEST_IT	1													
IFS	0.538**	1												
BF	0.645**	0.856**	1											
SALES	0.445**	0.284**	0.302**	1										

Table 3. (cont'd)

	INVEST_IT	*IFS*	*BF*	*SALES*	*ASSETS*	*MV*	*FP*	*F_AGE*	*F_LOC*	*O_AGE*	*O_EDU*	*O_EXP*	*FEM*	*IND*
ASSETS	0.520**	0.527**	0.549**	0.682**	1									
MV	0.508**	0.519**	0.542**	0.702**	0.958**	1								
FP	-0.294**	-0.096	-0.083	-0.586**	-0.394**	-0.415**	1							
F_AGE	0.176**	0.128*	0.093	0.313**	0.321**	0.321**	-0.418**	1						
F_LOC	0.341**	0.251**	0.258**	0.263**	0.264**	0.237**	-0.191**	0.002	1					
O_AGE	-0.078	0.085	0.093	0.033	0.088	0.098	-0.079	0.316**	-0.022	1				
O_EDU	0.319**	0.173**	0.201**	0.277**	0.264**	0.237**	-0.146*	0.026	0.179**	-0.158*	1			
O_EXP	-0.089	0.024	0.003	0.088	0.152*	0.140*	-0.178**	0.508**	-0.061	0.642**	-0.102	1		
FEM	0.016	0.067	-0.016	0.077	0.075	0.089	-0.040	0.122	0.011	-0.001	-0.105	0.093	1	
IND	0.090	0.083	0.061	0.233**	0.363**	0.390**	-0.263**	0.338**	-0.158*	0.144*	-0.075	0.118	0.045	1

Notes: * $p < 0.05$, and ** $p < 0.01$; Dependent variable is information technology investment (*IT_INVEST*). Independent variables include internal financing sources (*IFS)*, bank financing (*BF*), sales (*SALES*), assets (*ASSETS*), market value of the firm (*MV*), firm performance (*FP*), firm age (*F_AGE*), firm location (*F_LOC*), owner age (*O_AGE*), owner education (*O_EDU*), owner experience (*O_EXP*), owner is female (*FEM*), and industry (*IND*).

3.4 Data Collection and Response Rate

The population data consist of small business owners living in the Indian states of Punjab, Himachal Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh. Given that the population is "abstract" (i.e., it was not possible to obtain a list of all members of the focal population), we instead obtain a non-probability (purposive) sample. In a purposive sample, participants are screened for inclusion based on criteria associated with members of the focal population (Huck, 2008). To avoid sampling bias, we chose research participants who represented the target population. For example, we chose the focal population that included owners of small business and medium-sized firms. To obtain the sample, we prepared an exhaustive list of business owners' names and telephone numbers and then distributed the surveys to research participants who agreed to participate. The purpose of the research, as well as the meaning of *IFS* and *BF*, were explained to each of them.

The majority of the surveys came from Punjab, because of the lack of cooperation from other states. The sample included approximately 1,000 research participants. In total, 259 surveys were completed over the telephone, through personal visits, or by e-mail; three were non-usable. Out of 259 surveys, 233 surveys were received from service firms, while 26 were received from manufacturing firms. The response rate was 25.90%. The remaining cases were assumed to be similar to the selected research participants. All of them were ensured that their confidentiality will be strictly maintained.

4. Empirical Models and Econometric Analysis

4.1 Empirical Models

IFS and *BF* enhance information technology investment (*IT_INVEST*) and therefore are used as the main explanatory variables. While *IFS* decrease the chances of bankruptcy (Gill et al., 2017), a firm's higher market value (*MV*) reduces the chances of losses for debt capital suppliers in case of bankruptcy and thus improves the chances of access to *BF* (Xu and Chen, 2010); therefore, both *IFS* and *MV* are expected to have a positive impact on *BF*. To examine the influence of other related empirical variables on *IT* investment, Table 1 introduces some control variables specific to the small firms. Based on the nature of this study and to address endogeneity, we use the Three-Stage Least Squares (3SLS) method and take a logit model to run an auxiliary regression for measuring the relation between binary *BF* and *IFS.*

4.2 Econometric Analysis

As both *IFS* and *BF* simultaneously explain *IT* investment, the econometric approach of this study is a linear simultaneous equations model. The following two equations explore the endogenous *IT_INVEST*:

$$IT\_INVEST_i = \alpha_0 + \alpha_1 IFS_i + \sum \beta_i X_i + \varepsilon_{1i} \tag{1}$$

$$IT\_INVEST_i = \gamma_0 + \gamma_1 BF_i + \sum \delta_i X_i + \varepsilon_{2i}\,, \tag{2}$$

and the following logit model discovers the binary relationships of *IFS* and *BF:*

$$BF_i = \theta_0 + \theta_1 IFS_i + \theta_2 MV_i + \varepsilon_{3i}\,. \tag{3}$$

In the above models, i refers to the small business firm; *IT_INVEST* represents *IT* investment; *IFS* is internal financing sources; *BF* represents bank financing; and X_i represents individual control variables corresponding to the small business firm i. All others (α, β, and γ) are parameters to be estimated using 3SLS, which are more efficient estimates than Two-Stage Least Squares (2SLS) as they assume error terms (ε_{1i} and ε_{2i}) as heteroskedastic but correlated across SLS two equations (Cameron and Trivedi, 2005). A logit model is used to estimate all three θs in model (3).

4.2.1 Hausman Specification Test (Durbin-Wu-Hausman Test)

In order to evaluate the consistency of the more efficient estimator (3SLS) over the consistent but less efficient estimator (2SLS), we perform the Durbin-Wu-Hausman test (Greene, 2012). A significant χ^2 means rejecting the null hypothesis of no systematic difference between the two estimators.

4.3 Regression Results and Discussion

Tables 4 and 5 report the estimated coefficients of Equations (1), (2), and (3).

Table 4. Three-Stage Least Squares (3SLS) Results

Dependent variable (Endogenous) = IT_INVEST		
Independent Variables	*Equation (1)*	*Equation (2)*
IFS	0.242**	
	(0.06)	
BF		0.351**
		(0.06)
SALES	0.065	0.068
	(0.08)	(0.07)
ASSETS	0.189	0.178
	(0.13)	(0.12)
MV	0.069	0.053
	(0.13)	(0.12)
FP	-0.587	-0.654
	(0.57)	(0.52)
F_AGE	0.011*	0.011*
	(0.00)	(0.00)
F_LOC	0.352**	0.345**
	(0.12)	(0.10)
O_AGE	-0.002	-0.003
	(0.01)	(0.01)
O_EDU	0.114**	0.111**
	(0.04)	(0.01)
O_EXP	-0.022**	-0.020**
	(0.01)	(0.01)
FEM	-0.019	0.004
	(0.10)	(0.09)
IND	-0.176	-0.147
	(0.17)	(0.16)
Constant	6.429**	6.740**
	(1.06)	(0.97)
N	256	256
χ^2 test	196.30**	249.66**
R^2	0.424	0.467

Notes: * $p < 0.05$ and ** $p < 0.01$; Dependent variable is information technology investment (*IT_INVEST*). Independent variables include internal financing sources (*IFS*), bank financing (*BF*), sales (*SALES*), assets (*ASSETS*), market value of the firm (*MV*), firm performance (*FP*), firm age (*F_AGE*), firm location (*F_LOC*), owner age (*O_AGE*), owner education (*O_EDU*), owner experience (*O_EXP*), owner is female (*FEM*), and industry (*IND*).

As can be seen from Table 4, *IFS* and *BF* are simultaneous determinants of *IT* investment in small business firms located in Punjab, Himachal Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh. The impact of *BF* is a little more than *IFS*, which describes the importance of receiving loans and credits from governmental and private lenders. Interestingly, the sign and magnitude of all the coefficients from other explanatory variables are very similar except for female owners of businesses (*FEM*). The results support the first and second hypotheses,

indicating that *IFS* and *BF* enhance *IT* investments in India's small business industry.

Among all the significant coefficients, firm age (*F_AGE*), firm location (*F_LOC*), and owner education (*O_EDU*) are positively associated with investing in *IT*. As firms get closer to urban areas, access to *IT* amenities facilitate investing in them. Owners with more education are also more comfortable with new technologies and therefore will invest more in *IT*. However, the negative sign of owner experience (*O_EXP*) indicates that owners with more experience are slightly against changing their business operation from comfortable and traditional methods to modern and complicated ones.

Table 5. Three-Stage Least Squares (3SLS) Results

Dependent variable = BF		
Independent Variables	*Equation (3)*	*Marginal Effects*
IFS	4.988**	0.591**
	(0.069)	(0.08)
MV	1.493**	0.061**
	(0.069)	(0.02)
Constant	-23.104**	
	(7.13)	
N	256	
χ^2 test	200.78**	
Pseudo R^2	0.726	

Notes: * $p < 0.05$ and ** $p < 0.01$; Dependent variable is bank financing (*BF*), and independent variables include internal financing sources (*IFS*) and market value of the firm (*MV*).

Table 5 shows the logistic regression results for binary *BF*. As the coefficients of the logit model do not directly measure the impact of binary variables, the marginal effects are calculated and presented in the third column of Table 5. As per our initial assumption, market value and internal resourcing of a firm do play an important role in getting access to loans and credits. Based on the logit estimation results, a 1% change in the market value of the firms increases the probability of receiving loans and credits from governmental and private lenders by approximately more than 6%. In addition, adequate *IFS* increase the probability of getting financed by a lender by 59%. Thus, the third hypothesis is supported, indicating that *IFS* do improve access to *BF* in India's small business industry.

5. Conclusion and Recommendations

The purpose of this study is to examine the impacts of *IFS* and *BF* on *IT* investment, by surveying a sample of small business owners. According to our findings, *IFS* and *BF* positively impact *IT* investments; *BF* is also positively impacted by *IFS*; moreover, firm age, firm location, and owner education also affect *IT* investments positively. The findings of this study lend some support to those of Lucas and McDonald (1992), Gill et al. (2017), Hubbard et al. (1995), Fazzari et al. (1988), and Whited (1992) in that *IFS* and *BF* act as determinants of investments.

The empirical analysis of this study reveals the following.

- Adequate *IFS* increase the chances of *IT* investment.
- *BF* increases the probability of *IT* investment.
- Adequate *IFS* increase the chances of *BF*.

In conclusion, adequate *IFS* and *BF* enhance *IT* investments in India's small business industry. Since *BF* enhances the chances of *IT* investment, the government should consider providing financing at lower interest rates to small business firms. Gill et al. (2016) showed in India that non-resident family members provide financing support to their family members to build *IFS*. Small business owners should consider receiving financial support (if available) to build *IFS* for *BF* purposes and *IT* investment.

6. Managerial Implications and Limitations

Small business owners who perceive a higher level of *IFS* and *BF* are more likely to perceive a higher level of *IT* investment in their firms. A higher level of *IFS* and *BF* may not have the same impact on each small business firm related to *IT* investment in the industry. Research participants did not provide information regarding actual *IFS* (i.e., actual financial resources of research participants such as cash holdings). Therefore, this study has relied on the perception of the participants regarding adequate *IFS*.

The findings may not apply to every small business firm nor to every small business owner in the industry. Therefore, they should be used with caution and may only be generalized to small businesses similar to those that are in this research. Although the results show a positive impact of *IFS* and *BF* on *IT* investment, there is no necessary causal relationship between the independent and dependent variables.

7. Future Research

This research was limited to parts of India, and therefore the generalizability of its results and implications require further research, including both a quantitative and qualitative nature to be conducted not only among other regions of India and demographics, but also in other countries. Future studies can improve the methodological focus and framework by collecting data from a larger number of small business firms and by including among the investigated variables other qualifying elements such as corporate governance, actual cash holdings, debt to assets ratio, and so on.

Appendix

(1) Please describe your firm:
☐ Production ☐ Service

(2) Please describe your company location:
☐ Urban ☐ Rural Area

(3) Please indicate your gender:
☐ Male ☐ Female

(4) Please indicate your age:
Owner age: _____Years

(5) Please indicate the highest level of your education:
☐ High school or less
☐ Two-year college diploma
☐ Bachelor's degree
☐ Master's degree
☐ Ph.D. degree or more

(6) Please indicate the number of years you have been involved in this business:
Years: _____

(7) Please indicate the age of your firm:
Firm age: _____Years

(8) Do you have adequate internal (personal and family) financing sources to invest in your firm?
☐ Yes ☐ No

(9) Please describe your total assets:
INR: _____

(10) Please describe your sales:
INR: _____

(11) Please indicate your net income per year:
INR: _____

(12) Where does your firm borrow funds from?
☐ Banks ☐ Private Financial Institutions

(13) Please describe market value of your firm:
INR: _____

(14) Please describe actual total information technology investment over the last 10 years to manage cash, inventory, accounts receivables, and accounts payables efficiently (INR). Examples of information technology investment: Investment in computer(s) and software(s) to order inventory, sell product, reduce food and other wastage, collect accounts receivables, pay accounts payables, manage cash, etc.; and to automate production system and inventory tracking system in warehouse; investment in mobile/cell phones, iPhones, smart phones, etc., to order inventory, sell products, and arrange payment collections; investment in point of sales (POS) to accept credit cards and debit cards to collect payments; and investment in security alarms to minimize theft, etc.

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