Final report

Formal and informal finance

Firm growth in Ghana

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FORMAL AND INFORMAL FINANCE: FIRM GROWTH IN GHANA

Emmanuel Amissah, Agyapomaa Gyeke-Dako

1. INTRODUCTION

The importance of small and medium scale enterprises cannot be overlooked in the Ghanaian economy. Indeed research has established that informal firms can serve as the engine of economic development (Beck et al., 2006, Triki et al., 2011). It is estimated that the informal sector absorbs nearly 80% of the Ghanaian workforce (Homerku, 1998). These firms usually make up the informal sector. The informal sector started growing fast after the structural adjustment program which took place in the mid-1980s and led to a large scale retrenchment of labour. Government consistent freeze on formal sector employment, private sector inability to compete with their foreign counterparts coupled with the relatively low levels of education[1] in Ghana has made it virtually impossible for the formal sector to fully absorb majority of the unemployed persons. Indeed Nyamekye (2009) provides evidence to show that the size of the informal sector has grown from being twice that of the formal sector in the 1980s to being five and a half times that of the formal sector in the 1990s. This shows how the informal sector and thus informal firms are gradually taking over the Ghanaian economy.

Over the years, studies have documented many constraints faced by firms especially in developing countries including infrastructure, energy, access to markets and macroeconomic instability. However, a fast growing literature has revealed financial constraints to firms as the most binding of these constraints (Carpenter et al ., 2002, Guariglia 2008, Beck et al., 2006, Beck et al., 2013, Ayyagari et al., 2006, Quartey, 2008). The issue of financial constraints may be especially serious for informal firms who may not have been in existence for long and may lack collateral. These firms may have two options; formal finance and informal finance. Informal finance may require less information to get funds from lenders due to less rigorous information requirement but is normally limited in supply and hence, come at a higher interest rate. Formal finance on the other hand can help firms overcome financial constraints because of its abundance and expert advice on how to manage their firms, but may be difficult for informal firms to take advantage of given the collateral requirements. This makes access to finance quite complex for informal firms.

Therefore, our interest here lies in examining these interesting but controversial financing options available to informal firms. Specifically, this study adds to the recent strand of studies by using firm level data on Ghana to examine financing options and how that can impact firm growth. We extend the literature by looking at only informal firms that are essential to the growth of development of developing countries. Using different techniques, our results show that bank financing promotes firm growth. Our result is robust when we even control for other firm characteristics. A policy implication for this study is that Ghana's economic reform should be targeted towards creating a broader formalized financial system that is capable of taking care of the needs of the different groups of firms. Hence, apart from the efforts being made by government to formalize the activities of microfinance institutions, formal financial institutions should be made more efficient. Formalising the activities of informal financial institutions will

[1] According to the GSS(2008), 31 percent of Ghanaians who are 15 years and above have never attended school, 55.7 percent have basic education while only 13.6 percent have secondary education or higher.

not just make it easy for savings to take place but also expose the banks to competition. Also, Major steps should be taken to educate the informal sector as to what the requirements of bank finance are to enable the informal sector benefit from bank financing.

We also observe that bank financing has greater impact on large firms compared to small firms in Ghana.

Our results have several implications. First, it provides a strong basis for policy direction. This outcome provides government and key stakeholders with an understanding and hence policy directed towards promoting the growth of these informal firms (mainly small and medium scale enterprises) as these firms' growth can be a strong vehicle for economic development.

The right environment and the required initiatives can be created for informal firms to access this form of finance. The right environment can include tax incentives to formal institutions who lend to a greater number of informal firms, locating branches in regions that have more informal firms and making their services accessible to these firms. Required initiatives for informal sectors to formally streamline their activities will ameliorate the information asymmetry problems. Following these well-directed government initiatives and support, the right platform will be created for such informal firms to grow. This study is also in direct response to the current need of the Ghanaian economy, as the national consensus from the recently held national economic reform at Senchi [2] highlighted the strong need for the state to encourage and promote indigenous entrepreneurship as well as providing further steps to support Small and Medium scale Enterprises.

These findings introduce a policy gap that can help informal firms improve as well as contribute to the growth of the Ghanaian economy. Stakeholders, governments should introduce measures to improve the relationship between formal financial institutions and the informal sectors. Formal financial institutions provide relationship finance which aid the growth of firms in other areas aside finance. Their experience over time through working with other firms far exceed that of informal finance institutions hence making them a preferred choice for a long term relationship finance. Their knowledge about industry survival abilities, surviving start ups and many more firm related attribute will indeed be beneficial to the growth of informal firms. Alternatively, Government can make use of state owned formal financial institutions to foster this relationship. By prioritizing their aims to service the financial needs of the informal sector will go a long way to generate the needed contribution from this sector.

The paper is structured as follows: section 2 explores the data and present some summary statistics. Section 3 presents the methodology used for the study. In Sections 4 and 5, we present the results and discussion of the results respectively. Section 6 presents the conclusion.

2. DATA AND SUMMARY STATISTICS

We use the enterprise survey dataset on informal firms in Ghana conducted in 2013 by the World Bank to investigate financing patterns and how they impact informal firm growth in Ghana. The survey has information on non-registered business activities which cover most SMEs' in Ghana. The survey provides information on 729 firms. Industries covered in the survey

[2] This was a three day consensus building by major stakeholders to brainstorm on ways to address the economic issues facing Ghana. It was organised by the Ghana government in May 2015.

are manufacturing (365) and services sectors (364)[3]. Firms captured in the survey are a fair representation across the major urban areas in Ghana. Out of the 729 firms, 176 (24%) firms were based in Accra, 189 (26%) were based in the North (Kumasi and Tamale), 184 (25%) firms were based in Tema, and 180 (25%) firms in Takoradi. The survey questionnaires provide a wider range of information about the firms captured. The survey questionnaires cover 10 sections including sales and supply, finance, business productivity, labour, crime, registration and business environment, business general information and ownership, business activity and location. These details allow us to also make use of firm size, ownership structure and financing types to investigate our main objective. To examine the best form of financing that produces higher firm growth, we look at the overall relevance of finance as a constraint for these firms.

Using information on the constraints faced by firms, we explore the overall finance as a binding constraint to firm growth in comparison to the other constraints. We identified that finance was the biggest obstacle faced by informal firms in Ghana. Out of the 8 factors[4] highlighted as constraints to firm growth, 264 firms (representing 38%) considered finance as their major constraint to the growth of business. This was the highest amongst the 8 factors. In addition to this, more than half of all the firms in the data identified finance as constraint when managers of these firms were asked if finance was a constraint.[5] This confirms that indeed finance plays an important role in the smooth running of these firms individually.

Table 1: regional, sectoral and financing options

Regions	**Frequency**	**Percent**
Accra	176	24.14
North	189	25.93
Takoradi	180	24.69
Tema	184	25.24
Sector	**Frequency**	**Percent**
Manufacturing	365	50.07
Services	364	49.93
Financing options	**Frequency**	**Percent**
Internal Finance	618	86.19
Operational finance	40	5.58
Money lenders finance	4	0.56
Microfinance	24	3.35
Bank finance	12	1.67
Informal finance	19	2.65

[3] Manufacturing sectors include food products, beverage, wearing apparel, leather products, furniture and metal products, household (consumer) products, and other manufacturing. Service sectors include communication services, professional services, household services, food and beverage services, selling of wearing apparel services, selling of other goods.

[4] The 8 factors identified by the firms were Limited access to finance, Limited access to land, Corruption, Crime, Problems with the electricity supply, Problems with the water supply, Limited access to technology, inadequately educated workforce. Out these 8, limited access to finance, Problems with the electricity supply and limited access to land were the 3 highest factors indicated by the firms.

[5] Out of 729 firms, 314 firms (53%) indicated finance as a constraint and 278 (49%) indicated finance was not a constraint. The other 137 firms had no response for these questions.

To examine the relationship between firm financing patterns and firm growth, we explore the rich data for the complete view of the financing options available to the firms. There are 6 different forms of financing used by informal firms in Ghana. Firms make use of Internal Finance, Operational finance, Money Lenders, Microfinance Institutions, Bank Finance, and Informal Finance[6]. Of these, internal finance is the most commonly used form of financing. 85% of the firms in the survey use Internal Finance. This is acceptable given that firms in the survey are all informal firms who may not have the right provision to borrow from formal sources. This is a similar phenomenon in other developing countries where predominantly most firms make use of Internal Financing compared to alternative options (See Allen et al., 2005; Ayyagari et al., 2010, Girma et al., 2012, Guariglia et al., 2013). Even with regional analysis, this pattern is consistent across all the regions. For Operational Financing, the north has the highest percentage of firms who use this kind of finance.

Table 2: Distribution of financing option across regions

Region	Internal Finance	Operational finance	Money lenders finance	Microfinance	Bank finance	Informal finance	Total
Accra	156	10	1	3	2	4	176
North	150	14	0	8	3	4	189
Takoradi	149	8	0	8	5	8	180
Tema	163	8	3	5	2	3	184
Total	618	40	4	24	12	19	729

We also observe that for finance from Money Lenders, majority of Tema firms make use of this form of finance, while Takoradi has the highest percentage of firms who use Bank financing and Informal Financing options. For Internal Finance we observe a very slight difference across the region. Tema firms had a slight majority of less than 2% compared with the other regions. For firm size[7], 75 % of the larger firms use more of Bank Financing compared to small firms but 66% of small firms use finance from Microfinance Institutions. With reference to Internal Financing and Operational Financing, 51% of large firms use a little over of Internal Financing and 70% of Operational Financing. For Informal Financing, 53% of small firms make use of Operational Finance. There is an equal percentage of usage when we looked at money lenders as a source of financing across firm size.[8]

[6] Informal Finance captures financing from family and friends. Bank Finance covers financing from commercial banks. Internal Finance is finance through retained earnings from the business; Operational Finance is finance from suppliers and customer trade credit, Money Lenders is finance from business and individuals predominately of the Money Lenders Association Ghana, Micro Financing is finance from small size institutions.

[7] Following Zingales et al (2001) Firm size is determined by using the average cost of labour.

[8] We do similar analysis of firm financing across Ownership, firm age and educational level of the largest owner.

Table 3: Distribution of financing option across firm characteristics

	Internal Finance	Operational finance	Money lenders finance	Microfinance	Bank finance	Informal finance	Total
Firm size							
small firm	48.38	30	50	66.67	25	52.63	47.7
large firm	51.62	70	50	33.33	75	47.37	52.3
AGE							
less than 5 years	31.67	17.5	0	37.5	8.33	52.63	31.04
b/n 5 and 20 years	61.83	65	75	54.17	66.67	47.37	61.52
greater than 20 years	6.5	17.5	25	8.33	25	0	7.44
OWNERSHIP							
Joint partnership	10.05	7.5	0	4.17	0	26.32	9.92
Sole proprietor	89.95	92.5	100	95.83	100	73.68	90.08
LEGAL STATUS							
Non registered firms	97.52	100	100	100	91.67	100	97.72
registered	2.48	0	0	0	8.33	0	2.28
EDUCATION							
No Education	11.09	28.21	0	8.7	16.67	5.26	11.83
Primary Education	45.02	38.46	75	52.17	50	42.11	45.07
Secondary Education	31.32	23.08	25	30.43	16.67	36.84	30.7
Vocational Training	8.81	0	0	8.7	0	5.26	8.03
Tertiary Education	3.75	10.26	0	0	16.67	10.53	4.37

3. METHODOLOGY

The empirical model

We examine the relationship between financing type and firm growth by estimating the following model:

$$S_i = \alpha_0 + \beta_1 BF_i + \beta_2 A_i + \beta_3 LS_i + \beta_4 FS_i + \beta_5 OWN_i + \beta_6 COM_i + \beta_7 EDU_i + \beta_8 POW_i + \gamma_R + \gamma_I + \varepsilon \quad (1)$$

We use log of sales as the main dependent variable (S). More productive firms generally have higher sales and higher sales promote firm growth. Therefore, sales of firms are commonly used in the finance literature as a measure of firm productivity (eg. Helpman et al., 2004, Helpman et al., 2008, Yeaple, 2006). We use different measures of it including average total sales, highest total sales, lowest sales, busiest month total sales. We also employ labour productivity as an alternative measure. Subscript i represent each firm. Our main independent variable is defined on the basis of past financing sources, current financing sources, and financing sources of new investment[9]. First, to capture past financing pattern, we construct a Past Finance Dummy. It takes the value of 1 if firm financed day to day operation of the business in the previous years

[9] We follow a similar approach by Allen et al., 2005, Ayyagari et al., 2010.

with bank loan which represents a formal form of financing, and 0 if financing came from an informal source. Bank loans include financing from banks and microfinance institutions. This captures the formal financing pattern versus informal financing. This is represented by BF in the baseline regression. For robustness, we use different variables to measure our main independent variable. We use Bank Dummy as an alternative independent variable which takes the value of 1 if firm currently has a bank loan. This variable takes on the value of 0 if firm currently does not have bank loan. Alternatively, we also construct another measure which captures how firms finance new investment. This variable, Investment Financing Dummy, takes on a value of 1 if new investment is financed with bank loan and 0 otherwise. All estimations are done in the presence of other control variables (age, firm size, ownership, legal status, level of competition, regional dummy) that impact firm growth and productivity. For the dependent variable, we use different measures of sales growth. A represents the age of the firm. The Age variable is a categorical variable captured in the following order; 1 for firms that are less than 5 years old, 2 for firms that are between 5 and 20 years old and 3 for firms that are more than 20 years old (See Girma et al.,2012, Ayyagari et al., 2010, Guariglia et al., 2011 for similar classification). LS represents the legal status of the firm. It is a dummy variable that identifies firms that are legally registered with the state and those that are not. Registered firms are better recognised in the goods and labour market compared to the non- registered ones (Christensen et al., 2004). OWN captures the ownership structure of the firm. It is a dummy variable that takes the value of 1 if the firm is a sole proprietor and 0 if otherwise[10] (For similar examples, see Xu et al., 2009, Shliefer, 1998, Megissons et al.,2001). Firm's size is represented by FS. For most constraints that affect firms' growth negatively, small-sized firms tend to have greatest slump in their growth (Beck et al, 2005). Small-sized firms are likely to be more constrained financially than large ones. Following Zingales et al., 2001, we compute the FS variable using labour cost. It is represented by a dummy variable that takes on 1 if the firm's cost is greater than the average labour cost and 0 if the firm's labour cost is less than the average labour cost. EDU captures the level of education of the largest owners of the firm[11]. For firms with highly educated managers, it is expected that on average such firms will be well managed (Magoutas et al., 2012). In this study, we use a categorical variable to represent the EDU variable which takes on the value of 1 if the largest owner has no education to 5 where the largest owner has a tertiary level of education. Given the current higher power outages in Ghana[12], we control for it by including a dummy variable to capture it. It takes on the value of 1 if firms identified electricity outages as a constraint to their business and 0 otherwise. It is represented by POW in the baseline regression. Also, the more competitive the industrial environment is, the more difficult it is for informal firms to survive especially if they are small and young. Thus, we also control for this by using a dummy variable which takes the value of 1 if the firm is located in a city centre and 0 otherwise. γ_R *and* γ_I represent regional and industry specific characteristics that may have been omitted. We first use the Ordinary Least Square estimation technique as a first step to examine this relationship. Reverse causality should not be a major issue in this study given that our aim is to examine which financing pattern is associated with high firm growth. However, if a firm's ability to obtain finance is influenced by certain firm characteristics such as ownership personality (for example education qualification) and these firm characteristics also influence firm growth, then there may be issues with endogeneity. We therefore explore other two estimation technique to deal with this. First, we use the instrumental variable technique by instrumenting for the Bank financing dummy variable with collateral through Two Stage Least Squares (2SLS) estimation. The firm's ability to present collateral influences their ability to receive financing. However, collateral is not directly related to firm's growth making it a good instrument (Boot et al., 1994, Ayyagari et al., 2008). We use the Heckman selection model as an

[10] Because the survey covers only informal firms, the data is dominated by sole proprietor and partnerships.

[11] Primarily, the largest owner has the greatest influence on decision making in the business.

[12] See Asamoah et al., (2014) for a study on power fluctuations on SME's profitability.

additional robustness test. The model is relevant given that bank financing decision by the firms may not be random. Sometimes based on preferences, they make the decision to choose a particular form of financing. They self-select and hence draws are not random from the population but from a specific sample. If this is the case then the estimates from the OLS will be biased (Li et al., 2007). The error term will no longer be white noise.

The Heckman Selection technique involves a two-step approach. In step 1, we estimate a self selection equation to draw justification for self- selection. In step two, we estimate the variable drawn from the selection on our dependent variable. Following Ayyagri et al., 2010, we estimate the selection equation below using collateral as our instrument:

$$BF = 1 \; if$$

$$= \alpha_0 + \beta_1 Collateral + \beta_2 A + \beta_3 LS + \beta_4 FS + \beta_5 OWN + \beta_6 COM + \beta_7 EDU + \beta_8 POW + \gamma_R + \gamma_I + \epsilon > 0 \quad (2)$$

Equation 2 is our selection model and out of it we obtain the inverse Mills ratio to adjust second step of the Heckman model:

$$S = \alpha_1 + \delta_1 BF + \delta_2 A + \delta_3 LS + \delta_4 FS + \delta_5 OWN + \delta_6 COM + \delta_7 EDU + \delta_8 POW + \sigma_R + \sigma_I + \theta + \varepsilon \quad (3)$$

Where θ is the inverse Mills ratio accounting for the omitted variable bias.

4. RESULTS

Table 4 below presents results from equation 1. We find a positive association between formal financing and firm performance. Across all columns, the bank financing variable (Past finance dummy) is positive and also strongly significant for the different indicators for dependent variable[13]. This indicates the relevance of bank financing to informal firms in Ghana. Control variables also mostly had the right signs and significant. Firm's size was positive for all and significant in column 2 to 5. This indicates a positive association between firm size and firm performance. The bigger firms have a higher growth. We also obtained a stronger relationship for education level of the largest owner. This supports the literature on the impact of education in work place.

The Age variable was positive and mostly significant indicating that there is positive impact on those firms that manage to survive and remain in the industry. Formal registration of the business (represented by legal) seems to be beneficial to those firms who had done so. However, the impact of competition, ownership and electricity outages were not significant even though it had the right signs in some cases.

[13] All column of the result table were significant at 1% except column 3 which was significant at 10%. We attribute this to the loss of sample due to missing data for average sales variable.

Table 4: Firm growth and financing-baseline regression-Past Finance Dummy

VARIABLES	TSMP (1)	TS (2)	ATS (3)	TSSM (4)	TSBM (5)
Past Finance Dummy	**0.379*** **	**0.400*** **	**0.277***	**0.512*** **	**0.380*** **
	(0.114)	**(0.107)**	**(0.162)**	**(0.117)**	**(0.105)**
Age	0.131	0.176**	0.226*	0.130	0.147*
	(0.087)	(0.078)	(0.129)	(0.090)	(0.086)
legal status	0.649	0.659*	0.137	0.708*	0.567
	(0.536)	(0.365)	(0.393)	(0.397)	(0.365)
firm size	0.126	0.210**	0.340**	0.215*	0.319***
	(0.116)	(0.103)	(0.158)	(0.113)	(0.111)
Ownership	-0.031	0.087	0.083	0.179	0.212
	(0.155)	(0.154)	(0.187)	(0.166)	(0.158)
Competition	0.031	-0.002	-0.214	-0.115	-0.092
	(0.100)	(0.094)	(0.154)	(0.103)	(0.101)
education level	0.144**	0.167***	0.247***	0.107*	0.180***
	(0.058)	(0.055)	(0.083)	(0.058)	(0.058)
electricity outage	-0.022	-0.072	0.074	0.046	-0.058
	(0.109)	(0.101)	(0.163)	(0.111)	(0.108)
Constant	5.043***	5.669***	5.087***	5.138***	5.438***
	(0.303)	(0.293)	(0.423)	(0.308)	(0.309)
Observations	563	573	256	567	564
R-squared	0.063	0.095	0.110	0.086	0.088

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. TSMP is Total Sales of the Main Product, TS-Total sales, ATS-Average Total Sales, TSSM-Total Sales of the Slowest Month, TSBM-Total Sales of the Busiest Month.

As robustness, we investigate whether our financing variable is not driving the results. Also, given that the Past finance dummy variable was capturing firms and their financing behaviour in the past, we introduce two new alternative measures to capture current and future financing behaviour. In table 5 we present similar results of equation 1 but with bank finance dummy as the financing variable. This captures the current financing behaviour of the firms and establishes that our previous results are still robust. As we can see, we obtain similar results. We find a positive relationship between bank financing and firm growth. In columns 2, 4 and 5 our result for bank financing is also statistically significant. Once again results confirm that formal forms of finance were associated with higher firm performance. Alternatively, we use Investment finance dummy, which captures how new investment was financed. Results of this estimation can be found in the second column of table 5. Our bank financing variable is positive in all cases except for column 3. This is also statistically significant in columns 1 and 2. Confirming our results that formal financing options are more relevant to firms in their growth.

Table 5: Firm growth and financing-baseline regression-Bank Dummy & Investment Finance Dummy

VARIABLES	TSMP	TS	ATS	TSSM	TSBM
	(1)	(2)	(3)	(4)	(5)
Bank Dummy	0.150	0.328**	0.226	0.383**	0.310**
	(0.153)	(0.147)	(0.206)	(0.154)	(0.143)
Investment Finance Dummy	0.077**	0.072**	-0.055	0.044	0.040
	(0.035)	(0.029)	(0.037)	(0.044)	(0.032)
Controls	Age, legal status, firm size, Ownership, Competition, education, electricity outages				

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. TSMP is Total Sales of the Main Product, TS-Total sales, ATS-Average Total Sales, TSSM-Total Sales of the Slowest Month, TSBM-Total Sales of the Busiest Month.

We also examine the robustness of our results with a change to the dependent variable. We use a more direct measure of firm efficiency. Labour productivity growth is used in place of our sales variable as dependent variable. We estimate equation 1 using all three indicators of formal financing respectively with labour productivity as the dependent variable in each case. From the results in table 6, Bank financing is positively associated with higher firm performance. For each of the bank financing variables, we obtain a positive relationship.

Table 6: Firm growth and financing-baseline regression-Labour Productivity Growth (LPG)

VARIABLES	**LPG**	**LPG**	**LPG**	**LPG**
	(1)	**(2)**	**(3)**	**(4)**
Investment Finance Dummy	**0.079***			
	(0.042)			
Bank Dummy		**0.028**		
		(0.178)		
Past Finance Dummy				**0.281****
				(0.135)
Constant	6.372***	4.361***	6.372***	5.501***
	(0.462)	(0.322)	(0.462)	(0.342)
Controls	Age, legal status, firm size, Ownership, Competition, education, electricity outages			
Observations	237	497	237	498
R-squared	0.185	0.110	0.185	0.117

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. LPG- Labour Productivity Growth

Our results so far have shown that Bank financing is positively associated with firm performance. However, we need to ensure that this is not influenced by the large firms in the

sample (Beck et al., 2006)[14]. Like the outliers in the sample of many large informal firms they could drive the results. Therefore we explore the relationship between financing and firm growth for the respective firm sizes. We estimate equation 1 for large firms and small firms respectively. Interestingly, the result from table 7 shows, that our earlier result is robust against any possible size effect. We obtain a positive coefficient for all the estimations indicating a positive relationship between bank financing and firm performance. A closer look at the coefficient estimate reveals bigger estimate for large firms. For example, in column 1, a unit change in our bank finance (Past Finance Dummy) will lead to 45% change in firms' performance all other things being equal for larger firms compared to 27% change in firms' performance. A similar pattern is observed in the other columns.

Table 7: Firm growth and financing-The Size effect

			Large firms		
VARIABLES	**TSMP**	**TS**	**ATS**	**TSSM**	**TSBM**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Past Finance Dummy	**0.446****	**0.463*****	**0.377**	**0.646*****	**0.427****
	(0.190)	**(0.175)**	**(0.245)**	**(0.178)**	**(0.171)**
			Small firms		
VARIABLES	**TSMP**	**TS**	**ATS**	**TSSM**	**TSBM**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Past Finance Dummy	**0.269****	**0.296****	**0.027**	**0.340****	**0.305****
	(0.134)	**(0.132)**	**(0.209)**	**(0.156)**	**(0.129)**
Controls	Age, legal status, firm size, Ownership, Competition, education, electricity outages				

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. TSMP is Total Sales of the Main Product, TS-Total sales, ATS-Average Total Sales, TSSM-Total Sales of the Slowest Month, TSBM-Total Sales of the Busiest Month.

4.1 Robustness tests

4.1.1 Firm performance and financing options-Instrumental Variable regression

Despite the robust results evidenced above, there is also a plausible case of endogeneity in the relationship examined above. A firm with a good firm performance is more likely to obtain bank finance and other forms of finance. If we wish to pursue a causal relationship, then we need to address the bi-causal nature of the relationship between financing options and firm performance. Furthermore, the presence of other characteristics that can influence a firm's ability to obtain finance and their growth contributes to the issue of endogeneity. As described in section 3, we use an instrumental variable technique to deal with this problem. We estimate a 2SLS regression

[14] In a paper by Beck et al., (2006), they showed how the impact of legal and financial constraints on firm's growth depended heavily on firm size. Small firms were greatly constraints by such problems.

with collateral[15] as an instrument. In table 8, after instrumenting for past finance dummy, the result is indifferent to the ones in table 4. We observe a positive sign for our bank financing variable in the case of all the 4 different dependent variables. In column 2, 4 and 5, we have statistically significant coefficient that are a bigger than that of the coefficients in table 4. The magnitude effects are even larger in the estimation. Our results here confirm our earlier results are robust and hence formal financing promotes the growth of informal firms in Ghana.[16]

Table 8: Firm growth and financing-Instrumental Variable regression[17]

VARIABLES	TSMP (1)	TS (2)	ATS (3)	TSSM (4)	TSBM (5)
Past Finance Dummy	**0.215**	**0.419****	**0.375**	**0.592*****	**0.436****
	(0.184)	**(0.183)**	**(0.249)**	**(0.182)**	**(0.172)**
Age	0.134	0.176**	0.228*	0.129	0.146*
	(0.087)	(0.077)	(0.126)	(0.089)	(0.084)
legal status	0.634	0.661*	0.146	0.717*	0.573
	(0.530)	(0.362)	(0.386)	(0.394)	(0.362)
firm size	0.134	0.209**	0.336**	0.211*	0.317***
	(0.115)	(0.101)	(0.153)	(0.111)	(0.110)
Ownership	-0.022	0.086	0.076	0.173	0.208
	(0.155)	(0.152)	(0.182)	(0.165)	(0.157)
Competition	0.019	-0.000	-0.208	-0.108	-0.087
	(0.099)	(0.094)	(0.149)	(0.102)	(0.101)
education level	0.140**	0.167***	0.247***	0.110*	0.182***
	(0.058)	(0.055)	(0.081)	(0.057)	(0.057)
electricity outage	-0.018	-0.073	0.070	0.042	-0.061
	(0.108)	(0.100)	(0.159)	(0.111)	(0.108)
Constant	5.507***	5.664***	5.069***	5.121***	5.967***
	(0.315)	(0.290)	(0.411)	(0.303)	(0.308)
First stage F-stat	389.734	443.447	454.341	434.584	389.734
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	563	573	256	567	564
R-squared	0.060	0.095	0.109	0.085	0.088

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. TSMP is Total Sales of the Main Product, TS-Total sales, ATS-Average Total Sales, TSSM-Total Sales of the Slowest Month, TSBM-Total Sales of the Busiest Month.

[15] Collateral is represented by a variable that measures collateral requirement for loan. It captures both personal and physical guarantee required to qualify for a loan.

[16] Almost all the control variables had the right signs and significant.

[17] We estimate this for the other two bank financing variables (Bank Dummy and Investment Finance Dummy) and result were similar to that of table 5 and 6. However, in the case of the Investment Finance Dummy, the instrument did not pass the test of weak instrument. First stage results can be found in the Appendix.

Table 9: Firm growth and financing-Heckman Selection regression

VARIABLES	TSMP (1)	SE (2)	TS (3)	SE (4)	ATS (5)	SE (6)	TSSM (7)	SE (8)	TSBM (9)	SE (10)
Past Finance Dummy	**0.364****		**0.417*****		**0.157**		**0.477*****		**0.343*****	
	(0.147)		**(0.128)**		**(0.350)**		**(0.148)**		**(0.132)**	
Age	0.132	0.039	0.184**	-0.053	0.342	-0.057	0.145	0.063	0.140	0.008
	(0.087)	(0.120)	(0.086)	(0.123)	(0.372)	(0.090)	(0.110)	(0.122)	(0.096)	(0.119)
legal status	0.629*	-0.323	0.660**	-0.007	-0.928	0.579*	0.883**	0.517	0.716**	0.527
	(0.330)	(0.370)	(0.291)	(0.426)	(2.665)	(0.311)	(0.410)	(0.544)	(0.362)	(0.542)
firm size	0.085	-0.710***	0.291	-0.720***	0.404	-0.029	-0.108	-0.811***	0.082	-0.716***
	(0.221)	(0.156)	(0.258)	(0.163)	(0.351)	(0.111)	(0.310)	(0.163)	(0.266)	(0.157)
Ownership	-0.032	0.010	0.080	0.065	0.642	-0.290*	0.079	-0.222	0.123	-0.238
	(0.172)	(0.223)	(0.165)	(0.223)	(1.411)	(0.172)	(0.230)	(0.246)	(0.205)	(0.245)
Competition	0.030	0.021	0.022	-0.185	-0.018	-0.102	-0.168	-0.111	-0.120	-0.067
	(0.101)	(0.136)	(0.118)	(0.140)	(0.562)	(0.103)	(0.134)	(0.139)	(0.113)	(0.137)
education level	0.138**	-0.089	0.178***	-0.084	0.245	0.002	0.057	-0.094	0.142**	-0.088
	(0.064)	(0.071)	(0.063)	(0.072)	(0.160)	(0.056)	(0.082)	(0.071)	(0.072)	(0.071)
electricity outage	-0.008	0.228	-0.089	0.145	0.366	-0.151	0.088	0.100	-0.034	0.072
	(0.125)	(0.140)	(0.111)	(0.146)	(0.762)	(0.108)	(0.137)	(0.144)	(0.117)	(0.142)
Collateral		-0.550***		-0.332		0.120		-0.182		-0.226
		(0.204)		(0.222)		(0.174)		(0.231)		(0.223)
lambda	0.205		-0.428		-2.851		1.513		1.207	
	(0.961)		(1.253)		(6.819)		(1.281)		(1.195)	
Constant	5.458***	1.645***	5.686***	1.821***	6.870	0.249	5.042***	1.696***	5.909***	1.696***
	(0.308)	(0.393)	(0.291)	(0.402)	(4.344)	(0.304)	(0.384)	(0.410)	(0.333)	(0.406)
Observations	648	648	648	648	648	648	648	648	648	648

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. TSMP is Total Sales of the Main Product, TS-Total sales, ATS-Average Total Sales, TSSM-Total Sales of the Slowest Month, TSBM-Total Sales of the Busiest Month, SE-Selection Equation. Lambda coefficient captures the effect of selection.

We examine the robustness of the estimation in table 8. The key variable in the 2SLS estimation is the instrument-in this case which is collateral (Colin et al, 2010). If this instruments is not valid then the results above is also not valid. Using the first stage F-stat, we test for the weak instrument. In all 5 columns, our estimations are valid as the test of weak instrument is satisfactorily met.

4.1.2 Heckman selection model

Selection effect is a likely problem in this study as described in section 3[18]. Therefore, we investigate the impact of financing options on firm performance again but this time we control for selection bias. We estimate the Heckman two-stage selection model using equations 2 and 3 in section 3. From table 9, the results show that formal financing is positively associated with firm growth. Coefficient estimates of the past finance dummy are positive and significant. This result improves on the results in table 3 with bigger coefficients for the bank financing variable in columns 2 and 4.[19]

5. DISCUSSION

In this section, we explore how our results fit into the literature on financing and firm growth. Our investigation reveals that formal finance significantly supports firm growth in the case of Ghana. While the data and descriptive statistics showed a predominant use of informal finance by the firms captured in the survey, our regression results revealed that formal financing promoted firm growth. This result is quite similar to a few studies in this field. In his study on Ghana, Aryeetey (1998) showed that external finance from banks was so essential and was indispensable for small and medium scale industries despite the use of internal sources of funding. He argued that these informal sources of finance were unstable sources since such informal institutions failed from time to time. Delivery of credit by these sources was equally not appropriately done. This study was mainly descriptive and therefore our study contributes to the literature on Ghana by providing a more detailed analysis of financing and firm growth relationship using different estimation techniques and robustness checks. Ayyagari et al. (2010) used a similar survey data by the World Bank to show evidence of a positive association between bank finance and firm growth in China. Using a series of technique including the Heckman selection, they show how bank financing promotes reinvestment rate and productivity growth. Similar to Ayyagari et al. (2010), Cull et al., (2005) find that greater access to bank financing is associated with higher reinvestment in China. They also explore different external forms of financing in the presence of inefficiencies and provide evidence to support formal financing in China. Despite these important studies, our study still contributes to the literature with our unique way. Our study covered only informal firms in Ghana unlike these other studies[20].

Our results do not completely discard the important role of internal financing on firm growth. In our results on firm size, we obtain a positive relationship between firm growth and firm size for both large and small firms. However, the coefficient estimate for the small firms was much smaller. This suggests the relevance of other sources of financing especially to the development of small firms. This result is similar to the study by Girma et al. (2009). They provide evidence to

[18] See Li et al. (2007) for a summary and examples of other studies that apply the selection model to control for the impact of selection bias on the coefficient estimates.
[19] We estimate the selection model using the bank dummy and investment finance dummy variable and results were still consistent.
[20] See Cheng et al. (2006), Fan et al. (2009) for similar results on bank financing and firm growth.

support the fact that formal financing has a greater influence on growth of large firms while internal finance was relevant to the growth of small firms in China.

6. Conclusion

The focus of this research was to identify exactly which of these forms of financing promote firm growth and hence provide a research led policy initiative. Also, given that these two types of financing provide unique benefits, identifying which channel operates in Ghana for the informal firms would lead to policy recommendations to promote the use of the other channels. This outcome will help to identify whether there is substitute or complementary relationship between formal and informal forms of financing in Ghana.

Using firm level data covering 720 informal firms in Ghana, we investigate the relationship between firm financing and their performance. We explore the formal financing versus informal financing and how they affect firms. Using different estimation techniques and controlling for endogeneity we observe that formal finance is positively associated with firm growth. In the presence of different measures of firms' performance and using bank finance to proxy for formal finance, we identify that bank finance promotes firm growth especially for large firms. Contrary to popular view that informal finance is suitable to SME's, this result presents a key policy.

These findings can help governments and stakeholders create a suitable environment for the general growth of informal firms. Formal finance is generally considered to be a preferred option for big firms. But in this study, we have shown that policy makers in developing countries like Ghana can boost growth of informal firms by creating easy access to formal finance for informal firms. Firstly, Governments in partnership with the bank of Ghana can create incentive that encourages formal financing institutions to lend financial support to informal firms. Formal finance institutions with several years of experience in financing and working with more firms than informal finance institutions can provide more than just finance to informal firms who need more education in their financial management and choices. Such support will provide greater output and growth sales. Secondly, as policy initiative, government can provide education to these informal firms on how to manage their business in such a way to make them attractive to formal finance institution to invest. These policy recommendations must be implemented together to avoid coordination failure. A state where the formal financial institutions make the provision (incentives by government) to accommodate this informal firms equally matched by informal firms also making the investment to position their business to work with formal financial institutions would prevent the possibility of one group shirking. This is why government's intervention is important.

Another policy recommendation is for government to properly streamline the informal financial sector as they are still relevant to the very small firms confirmed by our results. In providing support for such sectors to thrive, there should be clarity on regulations governing their activities but more important key milestones to monitor their development to improve their support to the informal sector. Firms and financial institutions can take up new opportunities when some of these obstacles are removed by policy makers. It could also attract new firms to set up in Ghana.

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Appendix

First stage results for table 8.

VARIABLES	TSMP	TS	ATS	TSSM	TSBM
	(1)	(2)	(3)	(4)	(5)
Collateral	0.203***	0.819***	0.868***	0.820***	0.818***
	(0.083)	(0.039)	(0.052)	(0.039)	(0.039)
Age	0.002	0.004	0.008	0.009	0.009
	(0.024)	(0.024)	(0.032)	(0.023)	(0.024)
legal status	-0.029	-0.037	0.007	-0.039	-0.040
	(0.072)	(0.068)	(0.107)	(0.064)	(0.063)
firm size	0.055*	0.057**	0.050	0.066**	0.064**
	(0.03)	(0.029)	(0.046)	(0.030)	(0.030)
Ownership	0.018	0.020	0.037	0.025	0.025
	(0.040)	(0.040)	(0.044)	(0.039)	(0.039)
level of Competition2	-0.068**	0.70**	-0.046	0.073***	0.074***
	(0.027)	(0.027)	(0.041)	(0.027)	(0.027)
education level	-0.021	0.022*	0.014	-0.224	-0.022
	(0.014)	(0.014)	(0.018)	(0.013)	(0.014)
electricity outage	0.012	0.006	0.005	0.015	0.016
	(0.03)	(0.029)	(0.048)	(0.029)	(0.029)
Constant	0.203**	0.207**	0.082	0.185**	0.0184**
	(0.083)	(0.083)	(0.091)	(0.081)	(0.081)
Observations	563	573	256	567	564
R-squared	0.349	0.349	0.109	0.377	0.372

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All regressions include regional and industry dummies. TSMP is Total Sales of the Main Product, TS-Total sales, ATS-Average Total Sales, TSSM-Total Sales of the Slowest Month, TSBM-Total Sales of the Busiest Month.

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