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Gender differences in financial inclusion amongst entrepreneurs in Zimbabwe

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Abstract Using a large sample of micro, small and medium enterprises (MSMEs) data in Zimbabwe, this paper investigates gender gap prevalence in financial inclusion. It further assesses existence of gender heterogeneity in the returns to financial inclusion amongst MSMEs. We construct composite indices that measure the entrepreneurs' financial inclusion. Using Tobit and OLS regressions, we find statistically weak evidence of female financial exclusion in the formal financial sector after controlling for background characteristics and the industry of the entrepreneurs. On the other hand, female entrepreneurs are no less likely to be financially included in the informal financial markets than their male counterparts. Moreover, financial inclusion in informal financial markets by female entrepreneurs is associated with higher firm performance vis-à-vis their male counterparts.

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1 Introduction

There has been increased interest in female entrepreneurship in recent years, largely due to the growth in the number of female entrepreneurs globally (Jennings and Brush 2013). The rise in female entrepreneurship is of special concern to developing countries as a potent instrument to effect poverty reduction due to the substantial positive linkages between female entrepreneurs' income and household consumption and expenditure. Indeed, female entrepreneurs have been found to commit a larger proportion of their income for household consumption and expenditure than their male counterparts (e.g. Pitt 2014; Pitt and Khandker 1998). It therefore follows that if female-owned enterprises would grow; there would be a marked improvement in other indicators of household welfare. Recent randomized field experiments in developing countries, however, largely indicate that in comparison with their male counterparts, female-operated enterprises underperform in terms of turnover, growth or survival prospects (e.g. Berge et al. 2013; de Mel et al. 2008; and Klinger and Schündeln 2011) which complicates the task of

poverty reduction through the development of female-owned enterprises.

Gender differentials amongst entrepreneurs in the degree of financial inclusion which is defined as access and usage of financial services that enables one to save, borrow, conduct transactions, as well as manage risk has been proposed as an explanatory variable for the female-operated enterprises' underperformance (e.g. Allen et al. 2016; Cull et al. 2007; Demirgüç-Kunt and Klapper 2012). It is noted that financial exclusion of female entrepreneurs has starved their enterprises of the wherewithal to take advantage of business opportunities, or to weather systemic or idiosyncratic shocks to their enterprises (Demirgüç-Kunt et al. 2008; Demirgüç-Kunt and Maksimovic 1998). Furthermore, some authors posit that the exclusion of female entrepreneurs from formal financial markets has led to the growth of predominately non-governmental organization (NGO)-led informal financial institutions and arrangements offering a wide range of unregulated financial services such as Savings And Credit Co-operatives (SACCOs), Accumulating Savings and Credit Associations (ASCAs) and Rotating Savings and Credit Associations (ROSCAs), largely targeting female entrepreneurs in developing countries (Honohan 2004; Morduch 1999). Concomitant to the rise of the informal financial products targeted at females, there has been an increase in randomized controlled trials testing the efficacy of financial inclusion on the enterprises operated by female entrepreneurs (e.g. Berge et al. 2013; de Mel et al. 2008). The studies, however, largely indicate that female entrepreneurs tend to benefit less from initiatives meant to increase financial inclusion than their male counterparts.

Whilst extant studies have shed light on gender and financial inclusion in developing countries, this paper expands on those studies by providing an analysis of the gender differentials in returns to financial inclusion in both formal and informal financial markets. This paper uses data collected by the FinMark Trust (FMT) in their FinScope MSME (2012) survey on a representative sample of 3222 Micro, Small and Medium Enterprises (MSMEs) operating in Zimbabwe. Specifically, this paper seeks to answer the following questions: Firstly, are female entrepreneurs disadvantaged in terms of financial inclusion in both the formal and informal financial markets? Secondly, what is the relationship between financial inclusion in both formal and informal financial markets and firm performance? Finally, how does gender affect the relationship of financial inclusion in both formal and informal markets to firm performance?

This paper offers three major findings. Firstly, we find a statistically weak negative association between being female and inclusion in the formal financial markets. Rather than the gender of the entrepreneur, it is the entrepreneurs' education, age, initial capital, firm age and location in urban areas that have strong and positive statistical association with inclusion in the formal financial markets. Secondly, when we consider the informal financial markets, female entrepreneurs are no less likely to be financially included than their male counterparts. Finally, we find that whilst financial inclusion has a high association with firm performance, there is no gender difference in the relationship between financial inclusion in the formal financial markets and firm performance. On the other hand, female financial inclusion in informal financial markets has a statistically significant higher relationship with firm performance.

The arrangement of the rest of this paper is as follows. The next section reviews relevant strands of the literature and clarifies the hypotheses to be tested in this paper. Section 3 details the design of the study, whilst Sect. 4 provides the descriptive analysis. Section 5 specifies the regression models and presents the estimation results. Finally, Sect. 6 concludes.

2 Literature review and hypotheses

Research on Micro, Small and Medium Enterprises (MSMEs) has indicated that female-owned MSMEs underperform in comparison with male-owned MSMEs (e.g. Berge et al. 2013; de Mel et al. 2008; Sirec and Mocnik 2012; Watson and Robinson 2003; Welch et al. 2008). Gender differences in financial inclusion have been proposed as one of the explanatory factors for the female entrepreneurs' underperformance (e.g. Allen et al. 2014, 2016; Brush et al. 2003; Cull et al. 2007; Demirgüç-Kunt and Klapper 2012; Dupas and Robinson 2013; Hansen and Rand 2011; Stefani and Vacca 2013).

Empirical findings on the impact of gender on of financial inclusion are, however, ambivalent. Specifically, Hansen and Rand (2011) examined credit constraint differentials between male and female

manufacturing entrepreneurs using firm-level data from eight Sub-Saharan African countries and concluded that enterprises owned by female entrepreneurs are less likely to be credit constrained compared to their male counterparts. Similarly, Aterido et al. (2011) concluded that there is no gender difference in financial inclusion. However, in the US evidence from small service firms show that women-owned firms paid higher interest rates to be financially included than firms owned by men (Coleman 2000) and were more likely to be asked to provide a co-signer (Davis and Long 1999).

Proponents of the gender gap in financial inclusion note that female entrepreneurs typically face special problems that exclude them from formal financial markets (Carter and Shaw 2006; Coleman and Robb 2009). They note that formal financial institutions have rigid and specific requirements, such as collateral or proof of residence, for one to be financially included, which female entrepreneurs are generally unlikely to be able to satisfy. This is partly due to existing land and property rights and cultural norms that discriminate against them (e.g. Demirgüç-Kunt et al. 2013; Fletschner 2008). Furthermore, it is proposed that in most of the cases, formal financial institutions face information asymmetry emanating from lack of credible information on women leading to MSME financial inclusion for women suffering disproportionately from these constraints (Buvinic and Berger 1990). Typically, female entrepreneurs generally do not have a track record of engagement with formal institutions such as through formal employment. Such engagements with formal institutions normally leave an audit trail of information that can be used by formal financial institutions to offer services. As a result of these constraints, female entrepreneurs are likely to be excluded from formal financial markets.

In light of the challenges noted above, there has been growth of largely informal NGO-led financial institutions and arrangements offering a wide range of unregulated financial services largely targeting female entrepreneurs in developing countries (Honohan 2004; Morduch 1999) In Zimbabwe, for example, a large number of NGOs provide tailor-made informal financial products such as SACCOs, ASCAs and ROSCAs. This has probably significantly increased the extent of female financial inclusion in the informal financial markets but not in the formal financial markets. We therefore propose the following hypothesis linking gender to financial inclusion in the formal financial markets:

Hypothesis 1 Female entrepreneurs are less likely to be financially included.

Financial inclusion is directly linked to firm performance (e.g. Akoten et al. 2006; Banerjee and Duflo 2014; de Mel et al. 2008; Fafchamps 2004). In general, financial inclusion enables small enterprises to meet short-term commitments and allows greater capacity utilization. Financial inclusion in both formal and informal financial markets is likely to improve the cash flow position of MSMEs. Specifically, Honjo and Harada (2006) investigated the effects of financial inclusion on the growth of Japanese Small and Medium Enterprises (SMEs). They concluded that cash flow arising from financial inclusion has an impact on the growth of younger SMEs. These results are also echoed by several other authors (e.g. Elston 2002; Fazzari et al. 1988; Heshmati 2001; Petersen and Rajan 1994). Given this background, we formulate the following hypothesis linking firm performance of female entrepreneurs and financial inclusion in both formal and informal financial markets:

Hypothesis 2 Financial inclusion improves firm performance for female entrepreneurs.

The growth of informal financial institutions tailored specifically to the needs of female entrepreneurs as noted by Honohan (2004) and Morduch (1999) amongst others is likely to contribute to higher returns to financial inclusion in the informal financial markets by the female entrepreneurs. Besides providing financial services on terms that are specifically favourable to female entrepreneurs, the NGO-led financial institutions typically provide trainings amongst other ancillary activities to female entrepreneurs. The favourable terms that are provided by informal financial arrangements specifically targeting female entrepreneurs are likely to mean that female entrepreneurs will have higher returns to financial inclusion in the informal financial markets than their male counterparts. Given this background, we postulate that female entrepreneurs' use of these products that are specifically tailored to their needs is likely to be associated with higher firm performance than that of their male counterparts. We therefore propose the

following hypothesis linking the returns to informal financial inclusion to the gender of the entrepreneur:

Hypothesis 3 Financial inclusion in the informal financial markets for female entrepreneurs is associated with higher returns than that of their male counterparts.

3 Study design

3.1 Data

Our study is based on data collected by FinMark Trust in their FinScope (2012) survey on MSMEs in Zimbabwe. The data on financial inclusion in Zimbabwe that we use in this study cover a representative of Micro, Small and Medium Enterprises (MSMEs) in Zimbabwe, employing not more than 75 employees. This data set is comprised of a total of 3222 MSMEs. From that we have a sample of 2950 entrepreneurs with complete background information. The 2950 entrepreneurs comprise of 1590 females and 1360 males. The total number drops to 1916 and 1795 when we look at the turnover and profits, respectively, since some of the entrepreneurs did not respond to these questions.

Zimbabwe provides an interesting case to study due to the fact that there has been a rise in MSMEs as a result of the contraction of the formal employment since the late 1990s. Specifically, the rise in MSMEs has also been accompanied by a rise in female entrepreneurship. Consequent to the rise of MSMEs, there has been an increase in informal financial services such as SACCOs, ASCAs and ROSCAs, targeting MSMEs with a view to enhance their growth prospects. Zimbabwe, therefore, provides a fertile ground to study the gender differences in financial inclusion and the returns thereof.

3.2 Measurement of financial inclusion

In our study, we are interested in measuring financial inclusion, which we defined as the entrepreneurs' knowledge and/or usage of formal and informal financial products to save, borrow, conduct transactions, as well as manage risk. We measure the entrepreneurs' financial inclusion by way of indices created from questions asked in the questionnaire and denote the index as F_i. F_i can therefore be the index of the measure of the knowledge and/or usage of formal financial products or informal financial products.

We measure financial inclusion in the formal financial markets from 53 questions in the questionnaire that cover banking and insurance products that are available to entrepreneurs in Zimbabwe. These products range from banking products such as various banking accounts, usage of debit or credit cards, amongst others, and the various insurance products such as property insurance amongst others. The formal financial products under consideration in this paper come up to a total of 53 in the questionnaire. For each product, the questionnaire asks whether the entrepreneur currently owns or owned in the past the mentioned financial product. Our index of formal financial inclusion is simply the sum of those questions that the entrepreneur, i, in question answered *Yes*. We give the financial products equal weight in the construction of the index due to the thin line between the financial products and the subjectivity involved in attaching importance to certain products from the perspective of the MSMEs. The exact formal financial products are provided in Appendix 1. It therefore implies that for formal financial products:

$F_i = \#\{$Questions that the entrepreneur answered *Yes* to the knowledge and usage of formal financial products$\}$.

Accordingly, the index or financial inclusion in the formal financial markets for each entrepreneur, i, only takes non-negative integer values up to and including 53. F_i for financial inclusion in the formal financial markets is censored at 0 and 53 as it is theoretically possible for an entrepreneur to have more formal financial products than those that are indicated by the questionnaire.

Similarly, we measure the index of financial inclusion in the informal financial markets by summing the questions that the entrepreneur, i, answers *Yes* to the knowledge and/ or usage of the informal product in question. The informal financial products range from saving mechanisms such as unregulated SACCOs, ASCAs and ROSCAs as well as informal insurance products such as burial society membership. There are a total of 12 questions asked in this category, and they are provided in Appendix 2. In this case, the index of informal products, F_i, is measured as follows:

$F_i = \#$ {Questions that the entrepreneur answered *Yes* to the ownership or knowledge of informal financial products}.

The index of financial inclusion in the informal financial markets therefore ranges from 0 to 12, and likewise, it is censored at 0 and 12.

3.3 Measurement of firm performance

We measure firm performance using three measures which are turnover, profit and the number of workers that the entrepreneur employs. Turnover and profit are measured as categorical variables which imply that they are both censored at the first category and at the highest category. The censoring is due to the design of the questionnaire which took into account the fact that the entrepreneurs are less likely to know the exact amount of turnover or profit that they earn but would likely know the band in which the turnover or profit falls into (see., Cameron and Trivedi 2005). Similarly, the number of workers is censored at 0 as no firm can have a negative number of workers.

We are aware of the existence of other firm performance measures such as job satisfaction and goal attainment amongst others. However, they are subjective, and furthermore, we do not have data relating thereto. On this basis, we do not include those other measures of firm performance.

4 Descriptive analysis

4.1 Background characteristics of the entrepreneurs

As shown in Table 1, our sample consists of a total of 2950 entrepreneurs of which 1590 are female and 1360 are male. The preponderance of female entrepreneurs in our sample is consistent with the recent studies that chronicle the rise in female entrepreneurship in recent years (e.g. Jennings and Brush 2013). The table also reveals that, on average, female entrepreneurs tend to be younger than their male counterparts, with respective average ages of 38 and 41 years. Furthermore, female entrepreneurs on average tend to have lower education levels and prior business education than their male counterparts. These lower levels of education and prior business training are likely to be explanatory factors for low business performance of female entrepreneurs and probably lower levels of financial inclusion.

Table 1 reveals that statistically, female-operated enterprises tend to be younger than those of their male counterparts. This is consistent with studies that note that female entrepreneurship is a more recent phenomenon in both developed and developing countries (see, e.g. Jennings and Brush 2013). Consistent with studies that note that female entrepreneurs tend to be more capital constrained than their male counterparts (e.g. Carter and Shaw 2006; Coleman and Robb 2009), the table indicates that in our sample female entrepreneurs started their businesses with lower capital than their male counterparts. The lower levels of initial capital probably also explains the relative underperformance of female entrepreneurs.

4.2 Financial inclusion and firm performance

Table 1 also shows unconditional financial inclusion indices and firm performance by gender. It reveals that knowledge and/or usage of formal financial products amongst MSMEs in Zimbabwe is generally low, averaging less than one formal financial product for both female and male entrepreneurs. This implies that out of the 53 formal financial instruments that are under consideration in this paper, both male and female entrepreneurs use less than one product on average. It is noteworthy that the formal financial inclusion index for female entrepreneurs, which averages 0.52, is lower than that of male entrepreneurs that averages 0.77. Our descriptive analysis therefore implies that on average female entrepreneurs are less included in the formal financial markets. The regression analysis to be presented in the next section will reveal how much of this inclusion is due to the gender of the entrepreneur since we have already seen that male and female entrepreneurs are statistically different in background characteristics.

When we consider informal financial services such as microfinance and burial societies' membership, we see that there is generally higher uptake of such products for everyone. The index for financial inclusion in the informal financial markets averages 5.19 and 5.26 for female and male entrepreneurs, respectively. This result suggests that for MSMEs in Zimbabwe, informal financial institutions and arrangements fill the gap

Table 1 Characteristics of entrepreneurs and their enterprises

	Obs	Female [F]	Male [M]	F–M Difference (s.e.)
Number of observations	2950	1590	1360	
Age [Years]		38.35	40.91	−2.56***
				(0.48)
Married		0.66	0.87	−0.21***
				(0.02)
Entrepreneur is household head		0.43	0.92	−0.49***
				(0.01)
Education [8 ascending categories]		4.09	4.43	−0.34***
				(0.06)
Prior business training		0.55	0.69	−0.15***
				(0.02)
Family-owned business		0.42	0.48	−0.06***
				(0.02)
Household members in business		0.08	0.07	0.01
				(0.01)
Firm age [Years]		6.67	8.28	−1.61***
				(0.28)
Initial capital [11 ascending categories]		2.33	2.72	−0.38***
				0.04)
Urban		0.47	0.30	0.16***
				(0.02)
Formal financial index [0–53]		0.52	0.77	−0.25**
				(0.11)
Informal financial index [0–12]		5.19	5.26	−0.07
				(0.06)
Turnover [19 ascending categories]		6.69	7.89	−1.20***
				(0.14)
Profit [19 ascending categories]		4.89	5.94	−1.05***
				(0.13)
Workers		0.61	1.22	−0.61***
				(0.10)

The fifth column shows the results of two-tailed *t* test for the difference in the means. ***, **, and * indicate the 1, 5, and 10 % levels of significance

for the formal financial institutions. There is, however, no statistically significant gender difference in the uptake and knowledge of such services and products. This is probably due to the proliferation of NGO-led microfinance institutions targeting female entrepreneurs only (see, e.g. Honohan 2004; Morduch 1999).

In terms of firm performance, Table 1 also displays that consistent with recent studies such as Berge et al. (2013), de Mel et al. (2008), Klinger and Schündeln (2011), Sirec and Mocnik (2012), Watson and Robinson (2003) and Welch et al. (2008) amongst others, female entrepreneurs tend to underperform in comparison with their male counterparts in terms of performance indicators such as turnover, profit and the number of workers employed.

In the succeeding sections, we shall specify econometric methods that link gender and financial inclusion as well as reveal the gender heterogeneities in the returns to financial inclusion.

5 Estimation strategy

Firstly, we are interested in the impact of gender on the inclusion in both formal and informal financial

markets. Our dependent variable, F_i^*, which denotes the entrepreneur's financial inclusion in formal or informal financial markets is measured by an index as noted before. F_i^*, therefore, takes on non-negative integer values below the maximum value of the index denoted by λ. F_i^* is therefore censored below zero and above the maximum value that the index takes which rules out standard regression methods such as the ordinary or nonlinear least squares (Cameron and Trivedi 2005). We, therefore, resort to the two-limit Tobit regression model. The formulation is given in terms of an index function as follows:

$$\begin{aligned} &F_i = X_i'\beta + \varepsilon_i \\ &\text{in which, } F_i = 0 \quad \text{if } F_i^* \le 0 \\ &F_i = \lambda \quad \text{if } F_i^* \ge \lambda \\ &F_i = F_i^* \quad \text{if } 0 < F_i^* < \lambda \end{aligned} \tag{1}$$

λ is the maximum value of the index. It takes the value of 53 in the case of financial inclusion in the formal financial markets and the value of 12 in the case of financial inclusion in the informal financial markets. $\mathbf{X_i}$ is a vector of the entrepreneur and enterprise background characteristics, as well as province and industry dummies. It includes the entrepreneur's background characteristics such as age, gender, marital status, education and whether the entrepreneur had prior business training. All these control variables form part of the assessment that is used by financial services providers in granting a service to potential clients. We also included industry dummies since financial services providers might be willing to provide services to certain industries and not others. Specifically, we are interested in the impact of gender on F_i. We run that regression and present the results in Table 2.

The second question of this paper looks at the relationship between financial inclusion and the firm performance of the entrepreneurs. Given the potential bidirectional causality between firm performance and financial inclusion, we firstly run the regression of firm performance on financial inclusion since we do not have an instrument for the financial inclusion index. We therefore run a regression between Y_i, which is an indicator of the performance of the firm such as turnover, profit or the number of workers, and F_i. Since Y_i is censored, due to the design of the questionnaire, we use the Tobit model to run Eq. 2 below:

$$Y_i = \alpha + \beta F_i + \varepsilon_i \tag{2}$$

As noted above, Y_i is the outcome variable and F_i is the index of financial inclusion. β is the homogeneous relationship of financial inclusion to firm performance. Consistent with Hypothesis 2 and prior studies such as Heshmati (2001), we expect β to be positive and statistically significant. We run this regression and present the results in Panels A and B of Table 3 which presents the gender homogeneous impact of financial inclusion on firm performance.

The final question concerns, whether female entrepreneurs have the same return to financial inclusion as their male counterparts. To capture the gender heterogeneous impact of financial inclusion on firm performance, we modify the regression in Eq. 2 as follows:

$$Y_i = \alpha + \beta F_i + \delta(Female \times F_i)_i + \varphi Female_i + \varepsilon_i \tag{3}$$

We are interested in the coefficient δ, which is the gender heterogeneous impact of financial inclusion on firm performance. Consistent with Hypothesis 3, we expect to find δ to be positive. We run this regression and present the results in Panels C and D of Table 3 which shows the gender heterogeneous impact of financial inclusion on firm performance.

We also run a variants of Eqs. 2 and 3, which also includes, $\mathbf{X_i}$, (where as before, $\mathbf{X_i}$ is a vector of the entrepreneur, enterprise background characteristics, province and industry dummies) and present the results in Table 4 for robustness check. Panels A and B of Table 4 show the gender homogenous impact of financial inclusion on firm performance, whilst Panels C and D show the gender heterogeneous impact of financial inclusion on firm performance.

5.1 Estimation results

Table 2 shows the impact of gender on financial inclusion in both formal and informal financial markets. Columns (I) and (II) present the results of the two-limit Tobit model, whereas Columns (III) and (IV) present the results of the OLS regression for robustness check. From Column (I) of the table, we see that female entrepreneurs are less likely to be financially included in the formal financial markets by a factor of 0.918. The association between gender and financial inclusion in the formal markets is, however,

Table 2 Impact of gender of financial inclusion

Variables	(I) Tobit	(II)	(III) OLS	(IV)
	Formal index [0–53]	Informal index [0–12]	Formal index [0–53]	Informal index [0–12]
Female	−0.918*	0.120	−0.148	0.118
	(−1.69)	(1.40)	(−0.92)	(1.40)
Age [Years]	0.123***	0.000	0.019***	0.000
	(5.29)	(0.03)	(5.47)	(0.06)
Married	−0.261	0.107	−0.219	0.112
	(−0.47)	(1.33)	(−1.10)	(1.41)
Entrepreneur is household head	−0.238	0.163*	−0.150	0.165*
	(−0.44)	(1.84)	(−0.89)	(1.90)
Education [8 ascending categories]	1.356***	0.124***	0.207***	0.123***
	(6.38)	(4.65)	(4.36)	(4.72)
Prior business training	0.673	0.013	0.043	0.014
	(1.52)	(0.19)	(0.34)	(0.21)
Family-owned business	0.497	0.019	0.035	0.017
	(1.24)	(0.28)	(0.31)	(0.24)
Household members in business	0.826	0.353***	0.044	0.350***
	(1.41)	(2.88)	(0.27)	(2.87)
Firm age [Years]	0.123***	0.015***	0.026***	0.015***
	(4.06)	(3.23)	(2.66)	(3.18)
Initial capital [11 ascending categories]	1.366***	0.114***	0.419***	0.113***
	(6.92)	(3.57)	(6.06)	(3.60)
Urban	2.184***	−0.057	0.490**	−0.058
	(2.83)	(−0.62)	(2.03)	(−0.63)
Constant	−21.525***	3.265***	−1.999***	3.302***
	(−6.49)	(11.28)	(−4.37)	(11.61)
R-squared	0.0964	0.0227	0.0941	0.0876

Sample size is 2950 (1590 females and 1360 males). Robust *t* statistics in parentheses: *** significant at 1 %, ** significant at 5 %, * significant at 10 %. We also include in the regression province and industry dummies

statistically weak. It, in some manner, partially supports Hypothesis 1 of this study that female entrepreneurs are marginally excluded from the formal financial markets since they might not be able to meet the requirements of formal banking institutions to access their services. This result is somewhat contrary to the findings of Hansen and Rand (2011) whose study largely focuses on countries in East and West Africa. The different findings with our paper might be due to existing land and property rights and cultural norms that discriminate against women in Southern Africa. This indicates that there is need to put in place formal financial services sector regulations that would enable women to access financial services without the rigorous requirements such as collateral or proof of residence which women are typically at a disadvantage in Zimbabwe. It is noteworthy that the statistical association of gender and financial inclusion in Column I of the table is weak, and indeed, the robustness check in Column III of the Table shows no statistical significant association.

Columns (I) and (II) of Table 2 reveal that it is the other background characteristics of the entrepreneur rather than the entrepreneurs' gender that has high statistical association with inclusion in the formal financial markets. As Table 1 supports, female and

Table 3 Regression of financial inclusion and firm performance

Variables	(I) Turnover [8 categories]	(II) Profit [8 categories]	(III) Number of workers
Homogeneous impact of financial inclusion on firm performance			
Panel A			
Formal index [0–53]	0.232***	0.222***	0.348***
	(3.16)	(3.29)	(3.91)
Panel B			
Informal index [0–12]	0.307***	0.348***	0.649***
	(6.97)	(8.16)	(6.52)
Gender heterogeneous impact of financial inclusion on firm performance			
Panel C			
Formal index [0–53]	0.339**	0.326***	0.428***
	(2.47)	(3.04)	(3.31)
Female × Formal index	−0.195	−0.192	−0.186
	(−1.28)	(−1.52)	(−1.14)
Female	−1.033***	−0.952***	−2.635***
	(−6.11)	(−5.93)	(−7.94)
Panel D			
Informal index [0–12]	0.169***	0.228***	0.552***
	(2.96)	(3.99)	(4.23)
Female × Informal index	0.262***	0.236***	0.196
	(3.05)	(2.81)	(1.03)
Female	−2.603***	−2.397***	−3.983***
	(−5.35)	(−5.04)	(−3.58)
Observations	1916	1795	2950

Robust *t* statistics in parentheses: *** significant at 1 %, ** significant at 5 %, * significant at 10 %

male entrepreneurs have statistically different background characteristics which potentially give rise to the differences in formal financial inclusion also noted in Table 1. Indeed, Columns (I) and (II) of Table 2 show that the other background characteristics play a larger role in financial inclusion than gender per se. Specifically, it is education, age, firm age and location in urban areas that have high and positive statistical association with inclusion in the formal financial markets. The finding that it is other background characteristics that have high statistical association with inclusion in the formal financial markets is consistent with the findings of Aterido et al. (2011) amongst others. The importance of background characteristics other than gender in influencing formal financial inclusion of entrepreneurs in Zimbabwe points that in line with Table 1, if policy makers in Zimbabwe are interested in gender equality in financial inclusion, they should also target young entrepreneurs and young firms with policies to improve financial inclusion as female entrepreneurs are comparatively younger and operate younger firms than their male counterparts.

Columns (II) and (IV) of Table 2 show that when we consider informal financial markets, and there is no statistically significant association between gender and financial inclusion. Indeed, female entrepreneurs are no less likely to be excluded from the informal financial markets than their male counterparts. This result is therefore somewhat consistent with the finding enunciated above where we find statistically weak association between gender and financial inclusion in the formal financial markets. This finding suggests that the relative underperformance of female entrepreneurs compared to their male counterparts is not because of discrimination per se and, as such,

Table 4 Regression of financial inclusion and firm performance (with full controls)

Variables	(I) Turnover [8 categories]	(II) Profit [8 categories]	(III) Number of workers
Homogeneous impact of financial inclusion on firm performance			
Panel A			
Formal index [0–53]	0.074**	0.082**	0.191***
	(2.34)	(2.47)	(3.90)
Panel B			
Informal index [0–12]	0.234***	0.278***	0.562***
	(6.26)	(7.64)	(4.95)
Gender heterogeneous impact of financial inclusion on firm performance			
Panel C			
Formal index [0–53]	0.119*	0.133**	0.250***
	(1.81)	(2.57)	(3.01)
Female × Formal index	−0.074	−0.084	−0.139
	(−1.06)	(−1.34)	(−1.40)
Female	−0.425***	−0.294*	−0.964*
	(−2.66)	(−1.85)	(−1.95)
Panel D			
Informal index [0–12]	0.126**	0.195***	0.500***
	(2.52)	(3.86)	(3.35)
Female × Informal index	0.213***	0.168**	0.147
	(3.03)	(2.39)	(0.70)
Female	−1.651***	−1.308***	−2.114*
	(−4.07)	(−3.28)	(−1.68)
Observations	1916	1795	2950

Robust *t* statistics in parentheses: *** Significant at 1 %, ** significant at 5 %, * significant at 10 %. This regression also includes full controls as specified in Table 2

policies to bridge the gap in performance between the two should focus not only on financial inclusion but rather on other important determinants such as business knowledge and training.

Table 3 shows the regression of financial inclusion in both formal and informal financial markets on firm performance. Panels A and B of the table show the gender homogenous impact of financial inclusion on firm performance. Consistent with prior studies such Heshmati (2001) amongst others, we find that financial inclusion is positively related to measures of firm performance such as turnover, profit or the number of workers. Our finding is significant at the one per cent level of significance. This finding therefore supports Hypothesis 2 of this study, which notes that financial inclusion improves firm performance. The results from Panels A and B of Table 3 therefore imply that firms which are financially included are also the ones that are performing well. It must be pointed out that this result does not imply causation, as it could well be that it is firms which perform well that tend to financially included.

Panels C and D of Table 3 show the gender heterogeneous effect of financial inclusion on firm performance. Two interesting points are apparent from Panels C and D in Table 3. Firstly, Panel C of Table 3 shows that there is no statistically significant gender heterogeneity of the effect of financial inclusion in the formal markets on firm performance. Secondly, Panel D of Table 3 shows that female entrepreneurs' financial inclusion in the informal financial markets is associated with higher firm performance *vis-à-vis* their male counterparts. This relationship is statistically significant at the one per cent level of significance for turnover and profits.

This finding therefore supports Hypothesis 3 of this study, which notes that female financial inclusion in the informal financial markets is likely to be associated with higher firm performance than that of their male counterparts. This finding is, however, not universal in the literature. A large number of randomized experiments using small samples have found a negative impact of gender on returns to credit or other financial services (e.g. Berge et al. 2013; de Mel et al. 2008).

The results in Table 3 are also mirrored in Table 4 which shows the variant of Eq. 3 with full controls as specified in Eq. 2. This suggests that female entrepreneurs have higher returns to informal financial inclusion than their male counterparts.

Our finding, however in the context of Zimbabwe, speaks to the fact that the offering of financial services targeting specifically women is likely to bridge the gap in firm performance between male and female entrepreneurs. This is so because female entrepreneurs have higher returns from being financially included in the informal financial markets than their male counterparts. With time, female entrepreneurs will therefore be able to catch-up with the performance of their male counterparts.

6 Conclusion

On the basis of data from FinMark Trust, FinScope survey on Zimbabwean MSMEs, we analysed the relationship between gender and financial inclusion in the formal and informal financial markets. Furthermore, we also analysed the existence of gender heterogeneities in the returns to financial inclusion amongst the entrepreneurs. To measure financial inclusion, we created indices that measure the entrepreneurs' knowledge and usage of such services in both the formal and informal financial markets.

Our findings indicate that there is generally low financial inclusion in the formal financial markets in Zimbabwe. Furthermore, there is statistically weak financial exclusion of female entrepreneurs from the formal financial markets. This result runs contrary to studies such as Hansen and Rand (2011) who finds no evidence of female financial exclusion. We associate the difference in the findings to the existing land and property rights as well as cultural norms that potentially discriminate against women in our context. However, it is imperative to note that the female financial exclusion in our study is statistically weak. Rather, it is other background characteristics that are more important in explaining gender disparities in the formal financial markets. The importance of background characteristics other than gender in influencing formal financial inclusion of entrepreneurs in Zimbabwe suggests that, to improve gender equality in formal financial inclusion amongst entrepreneurs in Zimbabwe, policies to improve formal financial inclusion need not only target female entrepreneurs per se. The policies should also target other groups where female entrepreneurs statistically differ from male entrepreneurs, such as young entrepreneurs and those that operate young firms.

When we consider the informal financial markets, there are generally higher levels of financial inclusion. Furthermore, we find that female entrepreneurs are no less likely to be financially included in the informal financial markets than their male counterparts.

Consistent with studies such as Heshmati (2001), our findings indicate that financial inclusion is positively related to firm performance. When we consider gender heterogeneities in the impact of financial inclusion on firm performance, our findings suggest that there is no gender difference in the returns to formal financial services. However, when we look at the gender differences in the returns to informal inclusion, our results indicate that female entrepreneurs have higher returns than their male counterparts. This result runs contrary to recent randomized experiments that find female financial inclusion to be associated with lower returns in terms of firm performance (e.g. Berge et al. 2013; de Mel et al. 2008). Our finding therefore indicate that the efforts by institutions that specifically target female entrepreneurs with informal financial inclusion are well directed as they will in some cases reduce the performance gap between male and female entrepreneurs.

To further understand gender and financial inclusion in developing countries, more studies need to be carried out to test the external validity of the findings presented herein. Furthermore, panel data sets could be employed to analyse the dynamics of gender and financial inclusion in developing countries.

Appendix 1: Financial products considered for the formal financial inclusion index

Product number	For each product listed below, the questionnaire asks whether the entrepreneur currently owns or owned in the past the mentioned financial product
	Type of bank account
1	Savings account
2	Current/cheque account
3	Deposit account (fixed term or notice deposit)
4	Call account/investment account
5	POSB savings account
6	Loan account with building society
7	Loan account with POSB(Peoples Own Savings Bank)
8	Bank account outside Zimbabwe
9	Cooperative account/village bank
10	Loan from a bank
	Financial products
11	ATM card/Debit card
12	Cheque card
13	Credit card, i.e. Visa, Master Card
14	A savings book
15	Garage card/petrol card
16	Internet banking
17	Cell phone banking (not SMS notification but to check balances, transfer money or pay third parties)
18	Car or vehicle loan from a bank directly or via a dealer
19	An overdraft facility
20	Mortgage bond
21	Store credit card (OK etc.)
	Personal risk insurance
22	Personal accident insurance
23	Life insurance or cover
24	Disability insurance or cover
25	Workman's compensation
26	Dreaded disease insurance
27	Taxi commuter insurance (covers you when you travel in a taxi)
	Health insurance
28	Medical Aid/medical scheme
29	Hospital plan
30	Funeral plan or cover
31	Household insurance
32	Home contents insurance
33	Home property/building insurance
	Business insurance
34	Business contents insurance for office equipment
35	Business contents insurance for specialised tools and machinery
36	Property/structure of business premises insurance
37	Accidental damage to goods in transit
38	Legal insurance/assistance cover, Legal Aid, Legal Wise
39	Crop insurance
40	Loss of earnings insurance
41	Professional indemnity cover
42	Public liability/liability insurance
	Portable effects insurance
43	Cell phone insurance
44	Jewellery, camera, watch insurance
	Other insurance and investments
45	Motor vehicle insurance
46	Travel insurance
47	Insurance that pays your loan or borrowing when you die, lose your job or are disabled
48	Educational insurance (include investments and policies taken at a bank or insurance company)
49	Key man insurance
50	Pension or provident fund
51	Money market account
52	Shares
53	Unit trusts

Appendix 2: Financial products considered for the informal financial inclusion index

Product number	For each product listed below, the questionnaire asks whether the entrepreneur knows
1	Burial societies
2	Savings clubs/rounds
3	Saving at home
4	Buying livestock or other materials
5	Lending to others, e.g. chimbadzo
6	SACCO's
	For each product listed below, the questionnaire asks whether the entrepreneur uses

Product number	For each product listed below, the questionnaire asks whether the entrepreneur knows
7	Burial societies
8	Savings clubs/rounds
9	Saving at home
10	Buying livestock or other materials
11	Lending to others, e.g. chimbadzo
12	SACCO's

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