

Entrepreneurial returns to education in Zambia: formal education versus vocational training

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Abstract

Purpose – This study aims to analyse informal sector returns to formal education, vocational training and prior knowledge in entrepreneurship in Zambia. It estimates and compares the effect of these three forms of education on entrepreneurship choice and success. Additionally, the study examines how poor health influences income potential and participation in the informal sector.

Design/methodology/approach – The study uses Zambia's 2022 Labour Force Survey data and uses a quantile regression sample selection method to address sample selection bias and individual heterogeneity. The study includes health condition variables as key elements of human capital. The study estimates a two-equation model: one for entrepreneurship participation (selection equation) and another for entrepreneurial income (outcome equation).

Findings – The study finds that formal education, vocational education and prior entrepreneurship knowledge all influence the choice to become an entrepreneur in Zambia, with formal education having the strongest effect. Returns to education increase across the income distribution, with formal education yielding the highest returns. Additionally, poor health negatively affects income potential and informal sector participation.

Originality/value – This study focuses on the often-overlooked informal sector returns to education, contrasting with previous research that has focused primarily on wage sector returns. By incorporating the health dimension into human capital, the study offers new insights into how education benefits entrepreneurs and how health influences their income and participation in the informal sector.

Keywords Returns to education, Quantile regression, Self-employment, Health condition, Entrepreneurial returns, Informal sector, Self-employment, Informal sector

Paper type Research paper

1. Introduction

This study seeks to analyse entrepreneurial returns to education and the effect of education on entrepreneurship choice. Since Becker's (1962) foundational work, the returns to education have been a central topic in labour economics. However, the existing literature



(Patrinos, 2024; Lovenheim and Smith, 2023) is largely centred on wage employment, with less attention given to how education benefits those in the informal sector. Although education has traditionally been linked to wage-sector outcomes, it also plays a significant role in shaping individuals' decisions to pursue entrepreneurship and the resulting entrepreneurial income (Hessels *et al.*, 2020).

Entrepreneurs have become an important group of labour market participants in many countries, particularly in developing countries, where formal unemployment rates are higher. In Zambia, for instance, over 76% of the labour force is self-employed, compared to just 23.7% in formal employment (Zambia Statistics Agency, 2023). Recognising the role of entrepreneurship in economic development and job creation, many governments now view the informal sector as a key means of addressing unemployment and poverty. In Zambia, the government established the Ministry of Small and Medium Enterprises Development in 2021 to empower entrepreneurs, especially small and medium enterprises, to create jobs and drive economic growth within the informal sector.

Entrepreneurs play a significant role in labour markets globally, yet studies on returns to education have largely overlooked them. According to the human capital theory (Mincer, 1974), education enhances entrepreneurial income by providing skills like risk assessment and networking, resulting in higher returns for more educated individuals (Block *et al.*, 2013). Although the human capital theory does not establish a causal link between education and entrepreneurship choice, education can influence this decision. Educated individuals are better equipped with business-relevant skills, such as financial literacy and marketing, which help reduce barriers to entrepreneurship entry (Kolstad and Wiig, 2015).

In addition to receiving less attention in the literature, studies (Van Praag *et al.*, 2013) that have attempted to determine returns to education for entrepreneurs have mainly concentrated on estimating average entrepreneurial returns to formal education. However, formal education is not the only determinant of entrepreneurial income and choice; vocational training and prior knowledge in entrepreneurship also impact outcomes and should be considered when estimating returns to education (Chen and Pastore, 2024).

This study extends the traditional definition of education by incorporating vocational education and prior knowledge in entrepreneurship to analyse the full benefits of education to those working in the informal sector. Prior knowledge in entrepreneurship is expected to equip individuals with business skills and knowledge that those with only formal education may not possess. Additionally, determining returns to vocational education presents an opportunity in the labour economics literature to understand how individuals who opt for vocational training benefit from this form of education in the informal sector.

The World Bank's (2021) Human Capital Index highlights that poor health substantially reduces individual productivity and income, with Zambia showing pronounced disparities in health outcomes across socioeconomic groups. Health, like education, directly affects productivity, as healthier individuals are more capable and less reliant on flexible work arrangements (World Bank, 2021). Consequently, the human capital framework should incorporate health to assess its impact on entrepreneurial income. Previous studies on entrepreneurial returns to education have overlooked health and narrowed the definition of human capital to education and experience. This limited definition limits understanding of the broader factors influencing entrepreneurial outcomes.

Against this background, this study sought to answer the following questions. It sought to establish whether formal education influences entrepreneurship participation in Zambia and which education level has the highest effect. It further sought to establish whether entrepreneurial returns to different levels of formal education are positive and which level yields higher returns, as well as whether these returns differ across the income distribution.

The study also sought to establish whether vocational education and prior entrepreneurial knowledge generate positive entrepreneurial returns. Furthermore, it sought to establish whether the health condition of entrepreneurs affects entrepreneurial income and participation and if there are gender inequalities in entrepreneurial returns to education in Zambia.

The rest of this study is structured as follows. Section 2 discusses the theoretical model and empirical literature. Section 3 describes the methods, data and variables, while descriptive statistics are discussed in Section 4. The empirical findings are presented in Section 5, and the conclusion and policy recommendations are presented in Section 6.

2. Theoretical model and empirical literature review

2.1 Theoretical model

Several theoretical economic models explain the determinants of entrepreneurship participation and entrepreneurial income. Key theories include the human capital theory (Mincer, 1974) and the basic integrated theories of entrepreneurial choice and performance (Lucas, 1978).

2.1.1 The human capital theory. The human capital theory (Mincer, 1974) serves as a foundational framework for analysing the relationship between human capital endowment and individual economic well-being. The theory posits that individuals invest in education and work experience to achieve higher future income, making education and work experience key predictors of workers' income. Although originally applied to wage income, the theory has been extended to entrepreneurship outcomes, linking human capital endowment to entrepreneurial participation and performance.

Le (1999) builds on Mincer's framework and argues that education not only enhances managerial skills but also increases the likelihood of choosing entrepreneurship. Le's (1999) perspective aligns with Lucas's (1978) general equilibrium model, which asserts that educational attainment directly influences the choice of entrepreneurship by improving managerial abilities and risk assessment skills. Together, these contributions (Mincer, 1974; Le, 1999; Lucas, 1978) emphasise the important role of human capital in shaping entrepreneurial outcomes.

2.1.2 Basic integrated models of entrepreneurial choice and performance. The basic integrated models of entrepreneurial choice and performance (Lucas, 1978) explain how education enhances entrepreneurial abilities, leading to higher income, larger firms and elevated socioeconomic status. These models argue that education increases the expected utility of entrepreneurship, thereby encouraging participation and performance. However, the basic integrated models of entrepreneurial choice and performance fail to address the selection problem, as entrepreneurial income is relevant only for those who choose entrepreneurship. This study addresses this gap using a quantile regression sample selection model, accounting for selection into entrepreneurship.

A significant limitation of both the human capital theory and the basic integrated models of entrepreneurial choice and performance is their narrow definition of human capital, which focuses solely on education and work experience. This restrictive perspective has shaped the theoretical and empirical foundations of most studies on returns to education, leading to conclusions that neglect other key components of human capital, such as health. To address this gap, this study expands the conceptualisation of human capital endowment to include health conditions alongside education as key determinants of entrepreneurship choice and income. By incorporating health as one of the key components of human capital, the study offers a more comprehensive analysis of human capital's role in influencing entrepreneurial outcomes.

The inclusion of the health condition of the individual in the definition of human capital extends Mincer's (1974) definition of human capital endowment. The inclusion of the health

condition is backed by the fact that health is a key component of human capital and affects individuals' productivity and income in the labour market (World Bank, 2021). According to Ali and Khan (2023), health affects individuals' productivity because healthy individuals can execute their work more efficiently and can exert more effort into work than unhealthy individuals. As such, health and the capacity to adequately perform job requirements are closely related.

In extending the definition of human capital endowment, the study used two categories of health variables: bad health and worse health. This classification allowed the study to capture non-linear effects of health status on entrepreneurial outcomes. Bad health conditions represent a moderate reduction in human capital, affecting an individual's productivity, but still allowing for participation in economic activities. Conversely, worse health conditions denote a more severe depletion of human capital. Thus, as argued by Ali and Khan (2023), individuals in worse health conditions may require frequent medical attention and physical limitations, thereby reducing their likelihood of engaging in entrepreneurial activities.

Moreover, while several theories explore gender income inequalities and the factors contributing to such inequalities, these theories have predominantly focused on wage-sector returns to education and have largely been tested in developed economies. For instance, Phelps's (1972) theory of statistical discrimination suggests that employer biases may result in reduced pay for women in the labour market. This notion is further reinforced by the glass ceiling hypothesis, which describes the invisible but tangible barriers preventing qualified women from achieving higher incomes (Ozturk and Simsek, 2019). Ebewo *et al.* (2025) show that female entrepreneurs in emerging markets face financial exclusion, restrictive social norms and limited access to decision-making networks. While these theories have been studied in developed countries, their relevance to informal-sector entrepreneurship in African economies like Zambia remains underexplored.

2.1.3 Theory of planned behaviour. This study further analysed the theory of planned behaviour (TPB) (Ajzen, 1991) to analyse determinants of entrepreneurial intentions from a behavioural economics perspective. The TPB suggests that entrepreneurial intentions are shaped by attitudes, subjective norms and perceived behavioural control. Attitudes reflect how individuals evaluate entrepreneurship, with human capital, particularly education, playing a central role. For instance, formal education enhances cognitive skills and entrepreneurial knowledge, fostering positive attitudes, though it may also increase the opportunity cost of self-employment. In contrast, vocational training develops technical skills and labour readiness, lowering entry barriers and increasing the perceived benefits of entrepreneurship.

The second TPB element, subjective norms, highlights the role of societal expectations in influencing entrepreneurship intentions. In Zambia and similar emerging economies, formal education is associated with white-collar employment, influencing individuals to pursue conventional careers rather than entrepreneurship activities. This societal expectation may discourage entrepreneurial ventures among the highly educated, highlighting the need to consider social norms when evaluating education's impact on entrepreneurship choice and performance.

The third TPB component, perceived behavioural control, reflects individuals' confidence in their ability to start and manage businesses. For instance, formal education enhances perceived control by providing essential skills such as financial literacy and strategic planning. In contrast, limited exposure to these competencies can hinder confidence and capacity to manage or scale a business, thereby reducing entrepreneurial participation. While the TPB explains psychological drivers of entrepreneurial intentions, it overlooks the role of education in influencing skill development, income and job creation. This study addresses

this gap by incorporating human capital theory in assessing the impact of formal and vocational education on entrepreneurial performance and returns.

Building on these theoretical foundations, the study combined human capital theory, integrated models of entrepreneurial choice and performance, and the TPB to examine determinants of entrepreneurial participation and returns to education. Human capital and integrated models explain how education, experience and health shape entrepreneurial abilities, income and participation, especially in developing countries with a thriving informal sector. The TPB adds a behavioural perspective, capturing attitudes, social norms and perceived control that influence whether human capital translates into entrepreneurship choice. By using these theories, the study presents a novel analysis of how different types of education affect returns in Zambia's informal sector.

2.2 Empirical literature review

Empirical evidence on informal sector returns to education in Africa remains limited, despite the sector accounting for 60% of the urban labour force in developing economies ([Etim and Daramola, 2020](#)). [Corrêa et al. \(2024\)](#) observe that most research on this subject is concentrated in developed economies, with Africa and Latin America significantly underrepresented. The few available studies generally suggest that education influences entrepreneurial outcomes.

In Kenya, [Torm \(2024\)](#) found that entrepreneurial returns to education were 21% for self-taught entrepreneurs and 16% for those trained by family members. However, the study was confined to postsecondary education and reported only mean effects, overlooking heterogeneity across the income distribution. Similarly, [Kolstad and Wiig \(2015\)](#), using educational reforms in Malawi as instruments, found that each additional year of schooling increased entrepreneurial income by 21% and raised the probability of entrepreneurship entry. However, their analysis excluded vocational education and did not assess differences across entrepreneurial groups.

Findings from West, Central and Southern Africa are more mixed. [Adebayo \(2022\)](#) showed that entrepreneurship education in Nigeria improved income and participation, while [Ncanywa \(2024\)](#) reported that incubation models in South African universities enhanced youth entrepreneurship. Both studies, however, failed to account for heterogeneity of educational returns or determine which educational level yields higher returns. Thus, limiting their policy relevance. In contrast, [Dia Kamgnia and Bergaly Kamdem \(2022\)](#) documented a negative relationship between education and entrepreneurial income in Cameroon, suggesting diminishing benefits where labour markets are structurally constrained. Nevertheless, the authors did not examine the mechanisms behind these negative outcomes or whether they persisted across the income distribution.

Gender-differentiated evidence is also documented. [Wignall et al. \(2024\)](#) found that technical education increased women's probability of self-employment in Sierra Leone and Cameroon by up to 15%, while men continued to experience stronger overall gains. The authors further showed that technical education narrowed gender income gaps, raising women's average earnings by 10%–12% relative to men. However, their study relied on mean estimates and focused narrowly on gender equity, overlooking broader educational effects on entrepreneurial income across the distribution.

Beyond Africa, the literature is comparatively more developed. [Dvoulety et al. \(2021\)](#) reported that each additional year of schooling increased entrepreneurial income by 6.7% in the Visegrad countries (Czech Republic, Hungary, Poland and Slovakia) and improved entry into entrepreneurship. [Chen and Pastore \(2024\)](#) likewise highlighted the role of vocational education and prior entrepreneurial knowledge in influencing entrepreneurial choice and

success, stressing the importance of evaluating all forms of education. [Kurczewska et al. \(2020\)](#) found that tertiary education was associated with higher entrepreneurial income, with prior informal sector experience further enhancing returns, though their logistic models captured only mean effects.

Experimental work by [Coelho et al. \(2018\)](#) confirmed that exposure to education enhanced entrepreneurial intentions among university students, though their analysis did not account for variation across education levels or quantify economic returns. More recently, [Ahn and Winters \(2023\)](#) found that in the USA, each additional year of schooling raises entrepreneurial income by 2.9%, primarily through improved opportunity recognition. However, both studies remain limited by their reliance on average effects and offer limited insights into how education benefits entrepreneurs across the income distribution.

To address the existing gaps in both the theoretical and empirical literature, this study draws several hypotheses. It hypothesises that the returns to formal education, vocational education and prior knowledge in entrepreneurship are positive for Zambian entrepreneurs. It is further hypothesised that individuals with higher educational attainment are more likely to choose entrepreneurship. The study further hypothesises that the returns to formal education vary by educational level, with higher educational levels yielding the highest returns. The study also hypothesises that entrepreneurial returns to education differ across the income distribution, with the highest returns observed at the upper tail of the income distribution. Further, entrepreneurs in bad or worse health conditions are expected to make lower incomes and are less likely to participate in entrepreneurship. Finally, the study hypothesises that female entrepreneurs in Zambia make lower entrepreneurial income compared to their male counterparts.

By testing these hypotheses, the study makes the following contributions to the literature. Firstly, it deviates from the classical approach of determining mean returns to education for entrepreneurs by taking into account differences in individual abilities at different income levels. The study further broadens the definition of education by including vocational education and prior knowledge in entrepreneurship in analysing returns to education for entrepreneurs. The study further contributes to the literature by broadening the conceptualisation of human capital endowment to include individuals' health conditions in the definition of human capital.

Additionally, this is the first study to apply [Arellano and Bonhomme's \(2017\)](#) quantile regression sample selection model in estimating entrepreneurial returns to education, advancing beyond mean-based approaches that neglect variations across the income distribution and fail to address selection bias. It is also the first to integrate health conditions into a quantile regression framework to assess how health affects entrepreneurial returns at different points of the income distribution. Considering that the informal sector remains a vital yet understudied component of economic activity in African economies ([Bodjongo and Kamdem, 2024](#)), this study generates new insights into the impact of education and health on entrepreneurship outcomes in a developing-country context. Finally, the study tests the glass ceiling hypothesis in Zambia's informal sector, highlighting gender-based disparities in returns to education among entrepreneurs in Zambia.

3. Methods and data

3.1 Data, dependent and explanatory variables

3.1.1 Data. This study used the 2022 Labour Force Survey (LFS) data for Zambia. The LFS data were obtained from the Zambia Statistics Agency. The LFS data contained valuable data about individuals working in the informal sector, such as monthly income earned from entrepreneurship activities and other individual-level socio-demographic indicators. As suggested by [Cameron and](#)

[Trivedi \(2022\)](#), the statistical analyses were restricted to those observations for which complete data were available. The final number of entrepreneurs included in the data set was 3,318.

3.1.2 Dependent and explanatory variables. Two equations were implemented within the quantile regression sample selection framework. The dependent variable in the first equation, the entrepreneurship participation equation, was a binary indicator of entrepreneurship, taking a value of 1 for individuals engaged in self-employment, and 0 otherwise. The dependent variable in the second equation, the entrepreneurship income equation, was the logarithm of gross monthly income earned from entrepreneurial activities.

Education was categorised into three types: formal education, vocational training and prior entrepreneurial knowledge. Formal education included four levels: “primary or none” (reference), “junior secondary,” “senior secondary,” and “tertiary,” encompassing postsecondary qualifications. Vocational training was coded as 1 for individuals who had received it and 0 otherwise, with the same coding applied to prior entrepreneurial knowledge. Prior entrepreneurial knowledge captured the practical experience acquired before engaging in entrepreneurship. This variable was derived from an individual’s experience working in an established enterprise or exposure to a family business. According to [Song et al. \(2025\)](#), this form of education develops practical entrepreneurial skills, enhances understanding of markets and customer needs and complements both formal and vocational education in building individuals’ capacity to participate effectively in entrepreneurial activities.

The health condition variable was captured in three categories. The first category was “good health” (reference category) and represented entrepreneurs who never experienced any health problems during the survey year. The second category was “bad health,” which represented individuals who fell sick two or three times in a month. The third health condition category was “worse health,” which included entrepreneurs who were frequently ill.

Additional independent variables included whether the respondent operated a registered business and whether they managed more than one business. Socio-demographic variables comprised marital status, childcare, household expenditure, location (urban/rural), age and gender (1 = male; 0 = female, reference category). Age-squared was included to capture a potential U-shaped relationship with entrepreneurial income.

3.2 Methods

This study applied the quantile regression sample selection model of [Arellano and Bonhomme \(2017\)](#) to analyse entrepreneurial returns to education and its effect on entrepreneurship participation. The method addresses two key econometric challenges. Firstly, education is not randomly assigned, as individuals pursue formal or vocational education based on factors such as innate ability or ambition, which also affect entrepreneurial outcomes. Secondly, entrepreneurial income is only observed for those engaged in entrepreneurship, creating a sample selection problem. Ignoring these issues risks biased estimates.

The [Arellano and Bonhomme \(2017\)](#) model addresses these challenges simultaneously. It adjusts for the influence of personal background on education choices and corrects for selection bias arising from income being observed only among entrepreneurs. Unlike conventional models that focus on average effects, it estimates the entire income distribution. This approach is particularly suitable for this study because entrepreneurial income is highly unequal, with many entrepreneurs earning very little and a small group earning exceptionally high returns ([Ahn and Winters, 2023](#)). By capturing this heterogeneity, the model shows whether education primarily benefits those at the bottom, favours only top performers, or has uniform economic benefits for entrepreneurs.

Overall, the [Arellano and Bonhomme \(2017\)](#) model offers many advantages. It reduces bias from self-selection, corrects for the fact that only entrepreneurs report income and captures the unequal ways education affects entrepreneurial outcomes. These advantages made the results of this study more reliable and more useful for policy.

Empirically, the [Arellano and Bonhomme's \(2017\)](#) model was applied as follows:

$$Y^* = X'\beta(U) \quad (1)$$

$$D = 1\{V \leq p(Z)\} \quad (2)$$

$$Y = Y^* \quad \text{if } D = 1 \quad (3)$$

From [equations \(1\) to \(3\)](#), Y denotes the entrepreneurial outcome for individual i , observed only if the selection indicator $D_i = 1$, where $D_i = 1$ if the individual chooses entrepreneurship and $D_i = 0$ otherwise. The vectors X and Z are explanatory variables, where X is assumed to be a strict subset of Z (exclusion restriction). The uniformly distributed variable U denotes the rank of the individual in the conditional distribution $Y^*|X$, while the uniformly distributed V represents a normalised error term. The explanatory vector, X_i , includes education (formal and vocational education and prior knowledge in entrepreneurship), and other additional control variables that are defined in the preceding subsection.

However, the parameter of interest is β_τ , which should measure the entrepreneurial returns to education at the τ^{th} quantile of the income distribution. To obtain the estimated returns to education, the following objective function in [equation \(4\)](#) was solved by fitting the [Arellano and Bonhomme \(2017\)](#) model in Stata version 18.5 and running the `arhomme` Stata command:

$$\hat{\beta}_\tau = \underset{b \in B}{\operatorname{argmin}} \sum_{i=1}^N D_i \left[\widehat{G}_{\tau i} (Y_i - X_i' \beta)^+ + (Y_i - X_i' \beta)^- \right] \quad (4)$$

From [equation \(4\)](#), $\hat{\beta}_\tau$ represents the τ^{th} conditional quantile of entrepreneurial income, with X_i representing explanatory variables. The terms $(a)^+ = \max(a, 0)$ and $(a)^- = \max(-a, 0)$ decompose residuals into their positive and negative components. The model then applies asymmetric weights to over-predictions and under-predictions, allowing the estimator to target specific points of the income distribution, such as the lower, median or upper quantiles, rather than focusing solely on the mean.

The application of the objective function in [equation \(4\)](#) proceeded in three stages. Firstly, a selection equation $\{P(D_i=1|Z_i)=\Phi(Z_i'\gamma)\}$ was estimated using a probit model to predict the probability that an individual chose entrepreneurship, with γ containing the coefficients associated with control variables in the selection equation. The function $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution, which maps the linear combination $Z_i'\gamma$ into a probability between 0 and 1. This step produced the estimated propensity scores $\{\hat{p}_i=P(D_i=1|Z_i)\}$ for each individual, reflecting their likelihood of choosing and participating in entrepreneurial activities.

The study applied a Gaussian copula parameter $(\widehat{G}_{\tau i})$ to model the relationship between the unobserved determinants of entrepreneurship choice and the unobserved determinants of entrepreneurial income. The estimated $(\widehat{G}_{\tau i})$ “rotates” the population quantile into the

corresponding quantile in the selected sample (Biewen and Erhardt, 2021). Using this approach, quantile regressions were estimated at the 25th, 50th, 70th and 90th percentiles of the income distribution. This method also decomposed income variations into positive and negative parts, producing more accurate estimates of how education affects entrepreneurship participation and income across the income distribution.

To ensure robust inference, a nonparametric bootstrap procedure was used, following Biewen and Erhardt (2021), instead of the subsampling method used by Arellano and Bonhomme (2017). The bootstrap involved drawing independent resamples from the original data and repeating the full estimation, including selection correction, copula estimation and quantile regression across multiple replications. Standard errors and quantile-based confidence intervals were derived from the bootstrapped estimates, addressing both sample selection and endogeneity concerns.

4. Descriptive statistics

Table 1 presents descriptive statistics for the variables used in the empirical analysis. Out of the 3,318 self-employed individuals in this study's sample, 52% were men (1,648) and 48% were women (1,502). These proportions indicate that the probability of becoming self-employed in Zambia is higher for men than for women.

The descriptive statistics for entrepreneurs' income in Zambian Kwacha (ZMW), the official currency in Zambia, reveal that Zambian entrepreneurs earn an average of ZMW 2,267.1 a month. The statistics further reveal that entrepreneurial returns to education in Zambia differ by level of formal education and by type of education. For instance, entrepreneurs with formal education exhibit the highest mean income, ranging from ZMW 2,791.6 to ZMW 4,291.9 for those with junior secondary and tertiary education, respectively. Nonetheless, descriptive findings on average income do not factor in differences in individual ability. Hence, descriptive statistics findings cannot signal any causal effects of education on entrepreneurial income and participation.

The statistics also show that a higher proportion of individuals who attained formal education were at the primary education level, which had a share of 41.4%. The proportion of those who attained junior secondary education level was 26.7%, while 27.4% were at senior secondary education level. Expectedly and consistent with the literature, fewer individuals attained tertiary education, with only 4.5% of the total sample attaining this level of education. This observation is expected and is consistent with findings by Rumbley *et al.* (2022), who established that educational attainment at the global level remains low at the tertiary level.

The descriptive statistics further reveal that the informal sector in Zambia is predominantly young, with a mean age of 39 years. This statistic is expected because youth formal unemployment is highest, as only 35% of ready-to-work youths are employed (Zambia Statistics Agency, 2023), hence the informal sector is the best next option for most youths in Zambia.

5. Results and discussion

This section presents and discusses empirical findings on the effect of education on entrepreneurial income and its effect on the choice to become an entrepreneur. The section first discusses the impact of education on entrepreneurship choice and then presents estimates on entrepreneurial returns to education.

5.1 Education and entrepreneurship choice

Table 2 shows that all types of education positively influence the decision to pursue entrepreneurship. Formal education, in particular, has a stronger and statistically significant

Table 1. Descriptive statistics ($n = 3,150$)

Variable	Descriptive statistics for continuous variables	
	Mean	SE
Age	39	12.9
Income	2,267.1	10,434.3
Log of income	6.2	1.7
<i>Income by type of education</i>		
Primary education	1,458.7	3,510.6
Junior secondary education	2,791.6	17,508.3
Senior secondary	2,828.4	9,444.3
Tertiary education	4,291.9	5,976.2
Vocational education	2,319.4	3,206.7
Prior knowledge in entrepreneurship	2,360.1	10,763
<i>Log of income by type of education</i>		
Primary education	5.97	1.7
Junior secondary education	6.16	1.8
Upper secondary	6.56	1.8
Tertiary education	7.59	1.4
Vocational education	6.75	1.7
Prior knowledge in entrepreneurship	6.27	1.7
<i>Descriptive statistics for categorical variables</i>		
Variable	No.	%
Primary education	1,303	41.4
Junior secondary education	842	26.7
Senior secondary	862	27.4
Tertiary education	143	4.5
Vocational education	168	5
Prior knowledge in entrepreneurship	3,108	93.7
Bad health	395	12
Worse health	215	6.5
Married	2,183	65.8
Child care	1,190	36.3
Head of house	2,176	65.6
Rural	1,510	45.5
Registered business	286	9
<i>Gender distribution</i>		
Women	1,502	48
Men	1,648	52

Source(s): Authors' own work

effect across all levels. The likelihood of choosing entrepreneurship increases with higher levels of formal education, highlighting an intensifying effect. For example, individuals with tertiary education have the highest probability of engaging in entrepreneurship at 62.4%, compared to 40.9% for those with senior secondary education. This finding highlights the importance of tertiary education in entrepreneurial decision-making.

The results further reveal that the impact of formal education on entrepreneurship choice is weaker at the junior secondary level, where the probability of choosing entrepreneurship in Zambia is only 23.9%. This finding aligns with the propositions of the basic models of entrepreneurial choice and performance, as well as empirical literature (Block *et al.*, 2013),

Table 2. Determinants of entrepreneurship choice in Zambia

Variable (DV = entrepreneurship choice)	Coef.	SE
Junior secondary	0.239**	0.074
Upper secondary	0.409***	0.078
Tertiary	0.624**	0.208
Bad health	-0.078	0.093
Worse health	-0.494***	0.106
Age	0.009**	0.002
Vocational education	0.163	0.165
Prior learning	0.157	0.112
Married	0.27***	0.057
Constant	0.343*	0.145

Note(s): *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$
Source(s): Authors' own work

which suggests that higher education levels increase the likelihood of self-employment than lower levels.

Another noteworthy finding is that vocational education and prior knowledge in entrepreneurship have a positive, albeit statistically insignificant, effect on entrepreneurship choice. This finding suggests that these forms of education alone may not be sufficient conditions to drive individuals towards informal sector participation. Instead, Zambia's informal sector is more favourable to entrepreneurs with formal education, with the probability of choosing entrepreneurship increasing for individuals with higher levels of formal education. As [Van Praag et al. \(2013\)](#) found, formal education strengthens managerial skills and business acumen, both of which are essential for entrepreneurial success.

A novel contribution of this study is its estimation of the impact of health conditions on entrepreneurship choice. Consistent with theoretical expectations, poor health significantly reduces the likelihood of selecting entrepreneurship. Specifically, individuals in worse health conditions are nearly half as likely (49.4%) to choose entrepreneurship, indicating that Zambia's informal sector is less accommodating for entrepreneurs facing health challenges. This finding is attributed to the lack of health insurance products and schemes designed to support individuals within the informal sector.

5.2 Entrepreneurial returns to formal education

[Table 3](#) reports results on entrepreneurial returns to formal education, showing positive and heterogeneous effects across Zambia's entrepreneurial income distribution. Consistent with the descriptive statistics, coefficients for educational levels are lowest for junior secondary education and highest for tertiary education, with returns rising from the lower to upper tails of the income distribution. At the 25th percentile, returns to senior secondary education are 44%, increasing to 49.1% at the median and 72.8% at the 75th percentile. Entrepreneurs with junior secondary education show positive but insignificant returns at the 25th percentile, rising to 20.5% at the median, and 38.1% and 47.8% at the 75th and 90th percentiles, respectively. Thus, the findings suggest that any level of formal education, even basic education, provides essential skills that improve business performance for less successful entrepreneurs.

Entrepreneurs with junior secondary education are expected to exhibit insignificant returns at the bottom of the income distribution due to the nature of the businesses that they engage in. For example, in Zambia's biggest trading market (Soweto Market), many

Table 3. Modified quantile regression sample selection model results – returns to formal education

Variable (DV = log of profit)	q25		q50		q75		q90	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Junior secondary	0.136	0.097	0.205*	0.091	0.381***	0.106	0.478***	0.109
Senior secondary	0.44***	0.117	0.491***	0.123	0.728***	0.149	0.707***	0.129
Tertiary	1.36***	0.268	1.419***	0.153	1.212***	0.208	1.239***	0.243
Age	0.052**	0.018	0.05**	0.018	0.056*	0.027	0.05*	0.021
Gender dummy	0.586***	0.107	0.813***	0.073	0.834***	0.112	0.769***	0.154
Bad health	-0.318*	0.156	-0.269	0.156	-0.087	0.152	-0.039	0.132
Worse health	-0.303	0.159	-0.613***	0.138	-0.694**	0.228	-0.693*	0.289
Married	-0.071	0.115	-0.111	0.083	-0.16	0.111	-0.182	0.145
Child care	-0.107	0.093	0.083	0.079	0.207*	0.104	0.254*	0.122
Head of house	0.332**	0.104	0.253**	0.09	0.236	0.129	0.237	0.127
Rural	0.165	0.1180555	0.237*	0.096	0.229**	0.088	0.460***	0.103
Registered business	0.709***	0.132	0.597***	0.123	0.381*	0.151	0.468**	0.179
Household expenses	-0.139	0.088	-0.214**	0.069	-0.196*	0.092	-0.021	0.112
More than one business	-0.053	0.232	0.056	0.183	-0.13	0.241	0.131	0.303
Age squared	-0.0004*	0.0002	-0.0003	0.0002	-0.0003	0.0003	-0.0002	0.0002
Constant	3.333***	0.436	4.066***	0.447	4.872***	0.636	5.584***	0.558

Note(s): *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ **Source(s):** Authors' own work

entrepreneurs operating small stalls, selling vegetables or second-hand clothes, are less educated (Zambia Statistics Agency, 2023). Limited education constrains their financial management, customer reach and credit access, thereby corresponding to the lower and insignificant entrepreneurial returns observed at the 25th percentile for junior secondary education. In contrast, those with senior secondary education who operate licensed small shops in different parts of Zambia demonstrate better business practices, resulting in moderate returns, as reflected in the median and 75th percentiles of the income distribution.

Table 3 further shows that returns to tertiary education are nearly three times higher than those of senior and junior secondary education. For example, at the 25th percentile, returns to tertiary education reach 136%, rising to 141.9% at the median, whereas returns to senior secondary education at these percentiles are 44% and 49.1%, respectively. This result aligns with findings from studies (Dvoulety *et al.*, 2021; Kurczewska *et al.*, 2020; Hessels *et al.*, 2020) in developed countries, which have also documented higher entrepreneurial returns for highly educated individuals.

Moreover, Table 3 reveals that returns to both senior secondary and tertiary education rise sharply from lower percentiles to the median and then gradually decline towards higher percentiles. For instance, returns to tertiary education decrease from 141.9% at the median to 121.2% at the 75th percentile, while senior secondary education shows higher returns at the 25th and 50th percentiles, which decline at upper percentiles. This pattern is expected because highly educated entrepreneurs are more likely to favour white-collar employment or non-monetary benefits, such as flexibility or autonomy, leading them to limit direct business involvement or delegate tasks (Block *et al.*, 2013). Nonetheless, higher education levels consistently exhibit positive and significant effects on entrepreneurial income across quantiles, supporting Michelacci and Schivardi (2020) by showing that more educated individuals attain higher returns from their education.

This study reveals substantial within-group variations in returns to formal education. Income disparities between top and bottom quantiles are more pronounced among entrepreneurs with junior and senior secondary education than those with tertiary education, indicating higher inequalities at lower education levels. Measuring education by attained levels rather than years of schooling highlights these variations and shows that using years of schooling may mask within-group differences in entrepreneurial income. The use of educational level dummies demonstrates that tertiary education consistently yields the highest entrepreneurial income across all quantiles, followed by senior secondary education, while junior secondary education yields the lowest returns. These findings emphasise the importance of distinguishing education levels in analysing entrepreneurial outcomes.

5.3 Returns to vocational education and prior knowledge in entrepreneurship

A key contribution of this study is expanding the definition of education to include vocational education and prior learning, forms of education often overlooked in previous studies. Table 4 shows that entrepreneurial returns to vocational education are positive and vary across the income distribution. The returns to vocational education are lower at the 25th percentile (46.4%) and higher at the median (59.5%), with upper-percentile returns being insignificant. These findings align with human capital theory and integrated models of entrepreneurial choice and performance, demonstrating that vocational education enhances entrepreneurial skills and outcomes across different income levels, highlighting its importance alongside formal education.

The low and insignificant returns to vocational education at higher income percentiles in Zambia are expected and are explained by structural and social factors. One major factor is the restricted progression within the vocational education system. For instance, the Zambia Qualifications Authority (2016) caps vocational qualifications

Table 4. Modified quantile regression sample selection model results – returns to vocational education

Variable (DV = log of profit)	q25		q50		q75		q90	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Vocational education	0.464*	0.207	0.595**	0.217	0.008	0.139	-0.0597	0.244
Age	0.042*	0.019	0.038	0.021	0.038*	0.016	0.042	0.023
Gender dummy	0.574***	0.098	0.907***	0.09	0.824***	0.113	0.707***	0.131
Bad health	-0.276	0.145	-0.218	0.134	-0.06	0.179	-0.06	0.148
Worse health	-0.214	0.156	-0.407**	0.152	-0.529**	0.195	-0.232	0.408
Married	-0.149	0.081	-0.236**	0.083	-0.302**	0.106	-0.438**	0.148
Child care	-0.143	0.097	0.083	0.077	0.102	0.097	0.195	0.1
Head of house	0.375***	0.107	0.205	0.113	0.273*	0.11	0.358*	0.142
Rural	0.025	0.092	0.117	0.103	0.021	0.115	0.418**	0.148
Registered business	0.884***	0.144	0.806***	0.147	0.444**	0.161	0.522*	0.2081
Household expenses	-0.102	0.093	-0.226**	0.084	-0.13	0.094	0.013	0.12
More than one business	-0.132	0.265	0.048	0.215	0.162	0.258	0.015	0.282
Age squared	-0.0004	0.0002	-0.0002	0.0002	-0.0002	0.0001	-0.0001	0.0002
Constant	3.936***	0.437	4.789***	0.491	6.06***	0.414	6.577***	0.464

Note(s): *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source(s): Authors' own work

at the diploma level, restricting progression to higher education and specialised skills that could increase income. Consequently, income gains from vocational training rise slowly, particularly at the top of the income distribution. Additionally, vocational education is often viewed as lower status compared to formal education, discouraging full investment in skill development. These structural limitations and social perceptions contribute to lower entrepreneurial returns from vocational education, especially among entrepreneurs in lower income percentiles.

One approach to stimulate returns to vocational education is to expand vocational education to undergraduate and postgraduate levels. This expansion can enhance returns by providing access to specialised knowledge, practical skills and leadership training. Aligning with the human capital theory, advanced vocational training can increase the stock of productive skills in the informal sector, thereby boosting entrepreneurial outcomes. In developing countries like Zambia, a more skilled vocational workforce can promote innovation, improve business performance and stimulate economic growth. Extending vocational education to higher levels can therefore raise returns for vocationally trained entrepreneurs, ultimately contributing to a more balanced and inclusive economic landscape.

Similarly, an analysis of returns to prior entrepreneurial knowledge showed that Zambian entrepreneurs with entrepreneurial knowledge experience increasing returns across the income distribution. Consistent with other forms of education, returns to prior entrepreneurial knowledge are lowest at the lower end of the income distribution and reach their peak at the 75th percentile. These findings align with the assumptions of [Mincer's \(1974\)](#) human capital theory, which posits that experience (prior knowledge) has a positive impact on income. Consequently, entrepreneurs who have gained experience by working in an established business or assisting in the operation of a family business are likely to earn 37.7% more at the 25th percentile, with returns increasing to 54.8% at the 75th percentile, compared to those without prior entrepreneurial knowledge.

5.4 Comparative analysis of returns to formal education, vocational education and prior knowledge in entrepreneurship

To determine which type of education yields higher entrepreneurial returns, comparisons across education types were made. Tables 3 and 4, along with results on returns to prior entrepreneurial knowledge, show that formal education yields higher returns for Zambian entrepreneurs than other forms of education. At upper percentiles, returns to vocational education and prior knowledge rise more slowly than formal education, whereas at lower percentiles (25th and 50th), returns to junior and senior secondary education levels increase at lower rates than those for vocational education and prior knowledge. For example, returns to junior secondary education are insignificant at the 25th percentile, compared to 46.4% for vocational education, rising to 59.5% at the median. These findings highlight the differential impact of the various forms of education on entrepreneurial income across the income distribution.

Similarly, entrepreneurs with senior secondary education experience lower income premiums at lower income percentiles compared to their counterparts with vocational education. Those with senior secondary education only achieve higher income when positioned above the median percentile compared to those with vocational education. For instance, at the 75th and 90th percentiles, entrepreneurs with senior secondary education enjoy income premiums of 72.8% and 70.7%, respectively. These differences denote that entrepreneurs with vocational education are comparatively better off than those with junior or senior secondary education among lower-income earners. Thus, the results highlight that vocational education is an improvement over both junior and senior secondary education levels, although its advantages diminish as individuals progress beyond the median income threshold.

The findings reveal two key benefits of education for entrepreneurs. Firstly, all three forms of education positively affect entrepreneurship choice and income, with formal education exerting the strongest influence. Secondly, comparisons across quantiles highlight the importance of using education level dummies, which capture heterogeneous returns rather than assuming uniform educational effects. As noted in the empirical literature review, previous research in Zambia and many developing countries has not adequately explored the benefits of education for entrepreneurs. Therefore, this study provides pioneering insights by establishing the significance of human capital investment for entrepreneurship, particularly within Zambia's informal sector, and serves as a valuable reference point for similar contexts in developing economies.

5.5 Exogenous explanatory regressors

To address potential omitted variable bias, the study incorporated a broad set of explanatory variables and identified significant gender disparities in entrepreneurial income across education types and income percentiles. The results show that men with formal education earn considerably more than women, with income premiums for men reaching as high as 83.4% at the 75th percentile. The gap is even wider among vocationally educated individuals, with men earning 90.7% more than women at the median. These findings, consistent with prior studies (Collischon, 2023; Ellass, 2024), demonstrate that gender income gaps extend beyond the formal wage sector into informal entrepreneurship. The results support the glass ceiling hypothesis, suggesting that female entrepreneurs in Zambia face invisible barriers that restrict their income, particularly at higher income levels. These barriers appear even more pronounced in the informal sector than previously documented in the formal wage sector (Collischon, 2023).

The findings also provide evidence of statistical discrimination, particularly in vocational education, where limited access to vocational education for Zambian women contributes to lower entrepreneurial income outcomes. For instance, only 30.5% of vocational graduates in Zambia in 2020 were women (TEVETA, 2022), reflecting limited access to training and opportunities. Overall, the results suggest that formal education and vocational education, including prior entrepreneurial knowledge, disproportionately benefit men in the informal sector, reinforcing structural gender inequalities in entrepreneurial income. Comparatively, the results presented in Tables 3 and 4 show that male entrepreneurs earn more than women across quantiles and the different types of education. Moreover, the gender income gap is most pronounced among individuals with vocational education, followed by those with formal education.

Moreover, the age of the entrepreneur is positively correlated with income changes across the different education levels. However, this effect is more pronounced and consistent across quantiles for entrepreneurs with formal education, showing an average increase of 5% per additional year of age. The higher and consistent significance of age coefficients on entrepreneurial income for formally educated entrepreneurs across quantiles can be attributed to the cumulative investment in formal education, which enhances entrepreneurial skills (Allen and Belfi, 2020).

Novel to this study is the broadening of Mincer's (1974) definition of human capital endowment to include health within the traditionally limited scope of human capital. Consistent with the theoretical framework of this study, the findings presented in Tables 3 and 4 reveal that adverse health conditions impose significant income penalties on entrepreneurs. This finding is evidenced by the consistently negative coefficients for health condition variables. For instance, formally educated entrepreneurs in worse health conditions face income penalties of 61.3% at the 50th percentile, with penalties increasing to 69.4% and 69.3% for entrepreneurs at the 75th and 90th percentiles, respectively. The income penalty for formally educated entrepreneurs in worse health at the 90th percentile is statistically significant at the 10% level, indicating that even at a more relaxed threshold, being sick and absent from the business is more detrimental to high-earning entrepreneurs compared to those at the lower end of the income distribution.

Similarly, the analysis indicates that adverse health conditions negatively impact entrepreneurs' income prospects, irrespective of their educational background. Specifically, vocationally educated entrepreneurs experience income reductions of up to 40.7% and 52.9% at the median and 75th percentiles of the income distribution, respectively, when in worse health conditions. Although the coefficients for bad health conditions across quantiles for those with vocational education are not statistically significant, they are negatively signed across the income distribution for all three types of education, suggesting penalties for entrepreneurs in this health condition. These findings align with the World Bank's (2021) Human Capital Index, which concludes that individuals in poor health are likely to experience diminished productivity and income.

5.6 Robustness checks

The robustness checks results using unlogged income models, as shown in Table 5, confirm that education significantly and positively affects entrepreneurial income. For instance, tertiary-educated entrepreneurs earn ZMW 649.54 at the 25th percentile versus ZMW 5,936.88 at the 90th percentile, while senior secondary-educated entrepreneurs earn ZMW 62.91 at the 25th percentile compared to ZMW 2,130.35 earned by those at the top of the income distribution. These results also show that formal education yields higher returns than vocational education or prior entrepreneurial knowledge across income quantiles.

Table 5. Robustness checks results

Variable (DV = absolute profit)	q25		q50		q75		q90	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
<i>Alternative results for formal education, vocational education and knowledge in entrepreneurship</i>								
Junior secondary	10.16	14.22	46.78	32.47	309.69**	100.16	1,092.72***	269.2
Senior secondary	62.91**	20.57	193.97**	68.56	895.46***	158.98	2,130.35***	476.93
Tertiary	649.54**	251.05	1,627.77***	355.79	2,619.44***	711.4	5,936.88***	1,615.29
Vocational education	101.6*	43.3	537.67*	224.7	93.62	317.3	-672.2	1,039.14
Prior knowledge	36.06*	17.95	120.93*	49.24	421.4*	195.58	1,229.31*	581.37
<i>Alternative results by gender: men</i>								
Junior secondary	-22.48	34.15	92.38	109.26	577.33	403.19	2,011.42**	712.97
Senior secondary	44.34	40.51	204.62	130.18	1,018.67**	365.34	2,852.4**	1,006.11
Tertiary	555.39	346.92	1,708.32**	533	3,133.8**	997.44	6,939.95**	2,619.46
Vocational education	282.14	167.48	966.59***	273.87	309.43	571.1	-835.57	1,676.93
Prior knowledge	111.45*	48.16	247.91*	107.72	833.27	569.16	1,425.84	1,528.57
<i>Alternative results by gender: women</i>								
Junior secondary	22.74	16.36	17.76	34.85	282.12	145.52	741.42*	308.94
Senior secondary	70.43***	18.26	216.35***	60.25	666.72***	180.18	1,821.28**	637.4
Tertiary	592.78*	232.85	1,200.26***	306.44	2,681.38*	1,161.04	3,855.67	2,001.85
Vocational education	17.859115	51.62	56.36	96.81	-224.78	377.42	-1,106.88	3,167.93
Prior knowledge	17.138348	19.92	71.32	51.02	235.21	144.55	469.55	509.57

Note(s): *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source(s): Authors' own work

Alternative results further reveal persistent gender disparities, with male entrepreneurs consistently earning more than females. For example, at the 75th percentile, males with senior secondary education earn ZMW 1,018.67 versus ZMW 666.72 for females, widening further at the 90th percentile to ZMW 2,852.4 compared to only ZMW 1,821.28 for women. Robustness checks on entrepreneurship participation similarly indicate positive effects for all education types, with formal education having the strongest influence on entrepreneurship choice. These robustness check estimates mimic original findings and show no noticeable diversion from the findings of this study, hence validating its findings.

5.7 Limitations of the study

While this study provides novel insights into informal sector returns to education in Zambia, it is subject to the following limitations. It does not account for regional variations, potentially overlooking sub-national differences in how education affects entrepreneurial outcomes. The reliance on publicly available data may exclude marginalised entrepreneurs, which could limit the representativeness and generalisability of the findings. Methodologically, this study is the first to apply [Arellano and Bonhomme's \(2017\)](#) quantile regression with sample selection correction in the context of entrepreneurial returns to education. Consequently, future research should replicate this approach to assess the robustness of these findings and further validate the model's applicability. Additionally, the classification and measurement of health variables may have limitations that require further exploration. Future studies should address these limitations by incorporating complementary data sources and adopting longitudinal designs to capture the evolving educational returns in the informal sector.

6. Conclusion and policy recommendations

This study aimed to analyse entrepreneurial returns to education and the effect of education on entrepreneurship choice. Adopting a quantile regression sample selection empirical approach, the study establishes that formal education, vocational education and prior knowledge in entrepreneurship positively influence the choice to pursue entrepreneurship. However, formal education exerts a stronger effect on this decision across all educational levels, with higher levels of formal education having the most significant effect.

The income equations reveal that entrepreneurial returns across all three types of education are positive, with formal education yielding the highest economic benefits across income levels, followed by vocational education, and with prior knowledge in entrepreneurship yielding the lowest returns. A notable contribution of this study is its acknowledgement of health as a key component of human capital endowment, which the study finds to have direct effects on both entrepreneurship participation and income. This finding broadens the conventional human capital framework by recognising the significance of health in influencing entrepreneurial outcomes.

The study provides the following policy recommendations based on its findings. To address the relatively low entrepreneurial returns to junior and senior secondary education, it is recommended that the curricula at these levels be revised to incorporate components of entrepreneurship, financial literacy and practical business skills. Such curricula reforms would better equip students for entrepreneurial ventures, whether they proceed to tertiary education or transition directly into the informal sector. To achieve this reform, continuous professional development should be provided to teachers so that they are adequately trained to deliver entrepreneurship and business-related content effectively.

To improve entrepreneurial returns to vocational education, particularly at higher income percentiles, the government should expand vocational education beyond the diploma level to include undergraduate and postgraduate pathways. This expansion would provide a more comprehensive educational trajectory for those in the vocational track, preventing the need for them to abandon vocational education in pursuit of further academic qualifications.

To maintain the significant and positive returns to tertiary education across all income percentiles, the government should expand access to tertiary education, enabling more Zambians to attain this level and subsequently reap its benefits. Given that tertiary education in Zambia is not free, the government should introduce low-interest loans to assist aspiring entrepreneurs in accessing higher education.

To improve the health and entrepreneurship outcomes of individuals working in the informal sector, policy efforts should be directed towards increasing access to quality health services for informal sector entrepreneurs who are excluded from formal health insurance systems. Tailored health insurance schemes should be developed to cater to this group. Additionally, targeted occupational health initiatives such as mobile health screenings, workplace safety education and mental health awareness should be introduced to promote the well-being and productivity of entrepreneurs. To ensure that entrepreneurs with health problems are not driven out of business, the government should introduce subsidies for entrepreneurs with adverse health conditions as well as create business support networks for them.

Finally, to address persistent gender disparities in entrepreneurial income, mentorship programmes specifically designed for female entrepreneurs should be implemented. These programmes should connect female entrepreneurs with experienced and successful mentors who can provide guidance, networks and support. Furthermore, deliberate programmes aimed at keeping girls in school should be strengthened, as improving female educational attainment is an important step towards ensuring that more women benefit from the higher entrepreneurial returns associated with higher education levels.

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