The moderating effect of gender on the relationship between apprenticeship and self-employment: evidence from a developing country

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Abstract

Purpose – This study aims to examine the association between apprenticeship training and self-employment and how gender moderates the association.

Design/methodology/approach – Secondary data from the World Bank's Skills Towards Employment and Productivity (STEP) survey on Ghana were analysed using a binary choice (logit regression) model. The STEP survey drew its nationally representative sample from the working-age population (15–64 years) in urban areas.

Findings – After controlling for several factors identified in the literature as determinants of self-employment, the results indicate that completing apprenticeship training increases the likelihood of being self-employed. However, women who have completed apprenticeship training are more likely to be self-employed than men.

Originality/value – By examining the moderating effect of gender on the association between apprenticeship training and self-employment, this study has offered new evidence that policymakers can use to promote self-employment, especially among women, to reduce the entrepreneurial gap between men and women.

Keywords Youth unemployment, Informal training, Learning-by-doing, TVET, Moderated relationship

Paper type Research paper

1. Introduction

Over the past three decades, there has been a growing interest amongst policymakers and academics to understand the correlates of self-employment and entrepreneurship so that

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appropriate policy interventions can be put in place to promote them (Rico and Cabrer-Borrás, 2018). In a world development report on the changing world of work, the World Bank (2019) noted that despite demographic transitions, structural change, technological progress and global volatility, self-employment and traditional farming had remained the dominant sectors employing most of the workforce. According to the International Labour Organisation (ILO) statistics database, the self-employment rate for the world stood at 46.5% in 2019. Broken down by the ILO's country classification scheme, the self-employment rate for the same year constituted 12.2% of all employment in high-income countries, 39.4% in upper-middle-income countries, 51.4% in middle-income countries, 54.0% in low- and middle-income countries, 63.5% in lower-middle-income countries and 80.3% in low-income countries. Across the sub-regions, the self-employment rate in Sub-Saharan Africa has been the highest but on a downward trend, from a high of 81.7% in 1991 to a low of 75.0% in 2019 (ILO, 2021).

In a cross-country time-series panel data analysis, Baker *et al.* (2018) found that the differences in the share of self-employment across European countries were related to policy and institutional factors such as unemployment benefits, tax wedge and minimum wage. Explaining international variations in self-employment rates, Parker and Robson (2004) found that self-employment rates in Organisation for Economic Cooperation and Development countries are negatively related to unemployment benefits and positively related to tax rates. In many African countries, the declining trend in self-employment has been linked to the youth's inability to obtain employable skills (Filmer and Fox, 2014), igniting policy discussion on how to equip the African youth with employable skills to enter wage employment or self-employment. As the policy discussion on self-employment continues, apprenticeship training has been identified as a viable solution. In line with this, the World Bank (2019) observed that "International experience with the 'productive inclusion' of poor vulnerable young people reveals that a wide array of programs is available to connect them to wage employment and self-employment. Interventions may include [. . .] coaching, apprenticeships, internships, and various forms of training" (p. 130). In arriving at this recommendation, the World Bank suggests the need for more country-specific studies because the empirical evidence on the outcomes of the various programmes has been mixed depending on profiling, design and contexts.

In response to this clarion call, this study examines whether completing apprenticeship training is associated with self-employment. Although self-employment is an opportunity available to men and women, there appears to be a gender influence: men are more likely to be self-employed than women (Blanchflower, 2000). In the labour market, Chung and van der Lippe (2020) have cited flexibility and work–life balance as the concerns that make employment gendered. Examining gender differences in solo self-employment, Bari *et al.* (2021) found that self-employed women are more concerned about gendered flexibility – that is, more likely to work reduced hours, to work from home and for reasons associated with caring or family responsibilities. In this regard, the second objective of this study is to investigate how the relationship between apprenticeship training and self-employment is influenced by gender. The study context is Ghana. The choice of Ghana is firstly informed by two characteristics of the country that typify many African countries:

(1) the sizeable but declining trend of self-employment rate; and

(2) the growing young adult unemployment and underemployment (Fox *et al.*, 2016).

Consistent with the Sub-Saharan African trajectory, Ghana's self-employment rate has been declining continuously over the past three decades. From nearly 89.56% in 1991, the self-employment rate declined to 86.89% in 2001 and further dipped to 79.19% and 72.25% in

2011 and 2019, respectively (ILO, 2021). The second reason for choosing Ghana is to offer complimentary evidence to broaden the understanding and generalisation of a similar study conducted by Hardy *et al.* (2019) on Ghana, which focused narrowly on a government-sponsored apprenticeship programme to the neglect of the relatively common traditional (private) apprenticeships.

In focusing the study on Ghana, it has departed from Hardy *et al.*'s (2019) study in three significant respects. First, unlike Hardy *et al.*'s (2019) study, this study argues that the unique nature of the government-sponsored apprenticeship programme that was the focus of their research makes it a subsidised version of the traditional apprenticeship, which does not lend the findings to generalisation even in Ghana. Thus, broadening the scope of the current study to all forms of apprenticeship training, including the traditional apprenticeships dominating Africa and other parts of the world, is a step in the right direction. With this broader scope, the study can extend the generalizability of the findings to the larger literature. Second, unlike Hardy *et al.*'s (2019) study, which is experimental and has the advantages of establishing causal relationships and limiting the analysis to transition from wage employment to self-employment, this study's design is ex post facto, which allows it to examine the determinants of self-employment in general and not transitions into self-employment. Finally, and unique to this study, the moderating effect of gender on the association between completing apprenticeship training and self-employment is investigated to provide granular detail for gender-based policy options.

By pursuing the study objectives from these different perspectives, the findings make two important contributions to literature and practice. First, it offers empirical evidence from the Sub-Saharan African context to bolster the view that apprenticeship training is positively associated with the probability of self-employment (a positive coefficient of 0.819 significant at a 1% level of significance). This indicates that Ghana, and Sub-Saharan African countries with similar structures, can increase the self-employment rate by promoting and supporting the youth to complete apprenticeship training. Second, the significant interaction effect between gender and apprenticeship training shows a moderation effect indicating that women apprentices are more likely to go into self-employment than men (a significant coefficient of 0.565). This implies that apprenticeships targeted at women can help to reduce the entrepreneurial gap between men and women and impact their lives.

The ensuing sections discuss the literature review on apprenticeship and youth self-employment and the methodology adopted for the study. The results are presented and discussed to highlight the study's contributions, with appropriate conclusions and recommendations in the final section.

2. Literature review

2.1 Apprenticeship and youth unemployment

Available literature in Africa and many parts of the world, including Europe, indicates that apprenticeships have existed for ages (Alet and Bonnal, 2011). However, it is only in the recent three decades that increasing research attention has been paid to this ageless topic. One reason for this renaissance has been linked to the rapid increase in youth unemployment, especially after the Great Recession of the late 2000s (Markowitsch and Wittig, 2022). In Europe, for example, many countries started to consider apprenticeships as the policy option for solving youth unemployment and set up systems to improve and diversify apprenticeships. Consequently, the European Alliance for Apprenticeships (EAfA) was founded in 2013 to unite governments and key stakeholders around the tenets of strengthening the quality, supply and overall image of apprenticeships across Europe.

In Africa, particularly Ghana, skills shortage has been identified as another reason for the rise in policy interest in apprenticeships (Hardy *et al.*, 2019; Ayentimi *et al.*, 2018). One in every five businesses in Ghana cites skills shortage as a major obstacle (Honorati and De Silva, 2016). The skills deficit has been attributed to the limited schools' capacity to absorb all pupils of school-going age, and financial constraints or poor academic performance that block others from the mainstream educational system (Ajayi, 2013). Therefore, apprenticeships are an alternative to the formal educational system and address the skills gap challenge (Page *et al.*, 2020). In 2016/2017, approximately 22% of the working-age population in Ghana participated in apprenticeship training (World Bank, 2020). The typical apprenticeships training has been in the areas of auto electrician and mechanic, fashion design and dress-making, hair styling and grooming, masonry, plumbing, carpentry, electrical wiring and repairs, metal fabrication and welding, glazier work, transport and haulage, catering, etc.

As an instructional programme, apprenticeship training differs from other post-secondary education programmes in many respects and offers several advantages (Lerman *et al.*, 2009). One distinctive feature of apprenticeship training is that it is a job with training; that is, apprentices are engaged in the production process under a trainer and mentor at the same time while acquiring adequate occupational competence for certification (Ezenwakwelu *et al.*, 2019). The advantages that come with this uniqueness are numerous. Among others, it presents an opportunity to earn wages while learning, which can provide some initial capital to enter into self-employment. As apprenticeship takes place in a real-work context, it allows the apprentice to acquire not only professional or occupational skills that bring theoretical and practical knowledge together, but also equips them with other work-related skills such as communication, problem-solving, resource allocation, teamwork and soft skills to deal with supervisors and co-workers (Ezenwakwelu *et al.*, 2019).

2.2 Impact of apprenticeship on labour market outcomes and social considerations

Entrepreneurship researchers maintain that successful apprenticeship training increases the probability of both wage employment and self-employment (World Bank, 2019; Odora and Naong, 2014). The theoretical arguments that support the positive association between apprenticeship training and self-employment are based on the human capital theory, which recognises apprenticeship as one of the means of developing human capital for work. In West Africa, it is estimated that 80% of the skills imparted in the informal economy are transferred through apprenticeship (ILO, 2008). Several European studies have also shown that the unemployment rate is lower among youngsters who enter the labour market as apprentices. Bonnal *et al.* (2002), for example, found that apprentices are more likely to experience a smoother transition to employment after graduation.

According to the World Bank's Skills Towards Employment and Productivity (STEP) survey, Ghana's system of apprenticeships provides training to many people. Honorati and De Silva (2016) estimated that nearly 40% of self-employed and 25% of wage employees in Ghana have received apprenticeship training. A recent experiment conducted by Hardy *et al.* (2019) evaluated the impact of a government-sponsored apprenticeship programme in Ghana on youth employment transitions. They found that apprenticeships shift youth from wage employment to self-employment albeit the income from self-employment does not fully offset the loss of income from wage employment.

Although apprenticeships have positive impacts on national economies, it is socially perceived as "low status", and associated with lower occupations than those associated with higher education (Hogarth *et al.*, 2012). In some countries, like Germany and Switzerland, apprenticeship is highly regarded (Mazenod, 2016; Brockmann *et al.*, 2010). However, in many other countries, including South Africa and England, apprenticeship stigmatisation still exists

(Decker, 2019; Odora and Naong, 2014; Hogarth *et al.*, 2012). According to Ryan and Lőrinc (2018), the phrase "looked down" was repeatedly mentioned by their interviewees to illustrate the extent to which young people felt stigmatised about apprenticeship. In light of these stigmatisations, there have been calls for more research on apprenticeships (Hogarth *et al.*, 2012) and some responses to these calls to give voice to the stigmatised (Ryan and Lőrinc, 2018). This article responds to this call by contributing fresh evidence highlighting the importance of apprenticeship as a panacea to youth unemployment and women empowerment.

2.3 Determinants of self-employment

Apart from apprenticeships that is linked to self-employment, the literature on the determinants of self-employment has identified several other correlates of self-employment. Synthesizing some of these studies, Georgellis and Wall (2005) note that the determinants revolve around six themes, with the underlining model being the rational choice theory which stipulates that a rational agent chooses self-employment if the expected utility of doing so exceeds the expected utility of salaried employment. According to Georgellis and Wall (2005), the first theme of the determinants revolves around using the expected earnings differential between self-employment and salaried employment to predict whether to become self-employed or not. This strand of the literature concludes that the higher the earning differential, the more likely an individual will enter self-employment (Rees and Shah, 1986; Fujii and Hawley, 1991; Taylor, 1996). The second theme emphasises the issue of liquidity constraints (i.e. lack of sufficient start-up capital and/or insufficient access to credit markets) and hypothesises that the probability of self-employment increases with lower liquidity constraints (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Lindh and Ohlsson, 1996).

The third theme focuses on the intergenerational transfer of human capital and entrepreneurial ability and predicts that offspring whose parents are self-employed have a higher probability of becoming self-employed (Dunn and Holtz-Eakin, 2000; Taylor, 1996; Hout and Rosen, 2000). The fourth theme draws attention to opportunities in the labour market and highlights issues such as unemployment, low wages, job insecurity and ethnic or racial discrimination as critical determinants of self-employment (Taylor, 1996; Fairlie and Meyer, 1996; Borjas and Bronars, 1989). The penultimate theme examines the possible effect of government policy on self-employment and argues that differential tax treatment or government policy towards wage employment and self-employment may make one more attractive (Bruce, 2000; Fan and White, 2003). The final theme considers non-pecuniary benefits such as job satisfaction, life satisfaction, and independence as important in choosing between salaried employment and self-employment (Taylor, 1996; Blanchflower and Oswald, 1998; Blanchflower, 2000).

In a more recent literature survey, Simoes *et al.* (2016) focused on the individual determinants of self-employment to identify 12 critical factors that were subsequently grouped into seven categories as follows:

(1) basic individual characteristics (gender, age, marital status and children);
(2) family background (parents and spouse);
(3) personality characteristics;
(4) human capital (education and experience);
(5) health condition;
(6) nationality and ethnicity; and
(7) access to financial resources.

The empirical analysis in this study draws heavily on these classifications to explain a few of the variables that are key to this study. The next section discusses the association between self-employment and individual factors like gender, education and personality.

2.3.1 Gender. From most studies on the determinants of self-employment, gender has emerged as a critical determinant with different theoretical perspectives to back the mixed findings. On the one hand, the well-established facts that men are less risk averse (Croson and Gneezy, 2009; Parker, 2008; Dohmen *et al.*, 2011; Baffour *et al.*, 2019), less satisfied with their jobs (Clark, 1997), more prone to seek external finance, less discriminated against in the credit market (Sena, *et al.*, 2012), more likely to have more social capital (Koellinger *et al.*, 2013), driven by higher potential returns and more engaged in sectors with higher self-employment rates (Leoni and Falk, 2010) have been used to support the argument that the propensity to enter self-employment is greater for men than women (Stefanović and Stošić, 2012). On the other hand, the fact that women have a higher likelihood of suffering employer discrimination (Rosti and Chelli, 2005; Williams, 2012) and more desire for flexibility (Wellington, 2006; Gurley-Calvez *et al.*, 2009) have been used to support the argument that women are more likely to enter self-employment, whereas in Germany, the rates of self-employment do not differ much between men and women (Georgellis and Wall, 2005).

2.3.2 Education. From the theoretical standpoint, the relationship between education and self-employment is inconclusive. The opposing views are that individuals with higher educational levels are:

- less likely to be self-employed because they are more likely to have better job opportunities in the wage-employment sector (Van der Sluis *et al.*, 2008);
- more likely to be self-employed because they are more able to identify self-employment opportunities; and
- more likely to be self-employed because they tend to have greater managerial ability and skills which are needed to succeed in self-employment occupations (Lucas, 1978).

Mirroring these opposing views, the empirical studies have reported mixed results, although most report a positive influence of education on self-employment (Borjas and Bronars, 1989; Bates, 1995; Kim *et al.*, 2006; Zissimopoulos *et al.*, 2010).

2.3.3 Personality. Personality traits studies have investigated the relationship between people's innate or acquired characteristics and their attitude towards risks. They concluded significant associations between some personality traits and risk aversion (Baffour *et al.*, 2019). Most studies on self-employment also conclude that the probability of entering self-employment is lower for individuals with higher levels of risk aversion (Ekelund *et al.*, 2005; Ahn, 2010; Macko and Tyszka, 2009; Brown *et al.*, 2011). Although there is no consensus on the dimensions measuring personality traits in psychology, most empirical studies that have linked self-employment to personality traits tended to use the big-five factor model and other measures that capture grit (perseverance and passion for long-term goals), overconfidence, optimism, need for achievement, need for autonomy, self-efficacy, assertiveness and taste for variety as measures of personality traits (Koellinger *et al.*, 2013; Macko and Tyszka, 2009; Rauch and Frese, 2007; Croson and Minniti, 2012; Caliendo and Kritikos, 2008; Åstebro and Thompson, 2011).

3. Methodology

3.1 Data

This study relies on data from the World Bank's STEP survey on Ghana conducted in 2013. The World Bank's STEP surveys are designed to collect rich data sets to understand the

interplay among skills, employment and productivity. A detailed description of the design of the survey, constructs and implementation standards for data quality is provided by Pierre *et al.* (2014). Nevertheless, it is worth mentioning that the survey is nationally representative. It draws its sample from the working-age population (15–64 years) in urban areas using a four-stage sample selection process. In the first stage of the sample selection process, the primary sampling units (PSUs) are uniquely defined by regions (stratified) and enumeration areas are selected. In the second step, large PSUs are partitioned into smaller areas for random selection and subsequent listing of the targeted respondents. The third step uses a systematic random sampling method to select households. In the final step, individuals are chosen from the sampled households using a random approach. At the end of the sampling process, 2,987 of the targeted 3,000 individuals were sampled, representing a 99.6% response rate. However, based on the selected variables, the eventual sample size used for this study is 1,236.

As far as the purpose of this study is concerned, the STEP data is the most comprehensively available secondary in Ghana that allows a broad investigation of the association between apprenticeship and self-employment. Another data set in Ghana that has been used by Hardy *et al.* (2019) is experimental data conducted to evaluate the impact of government-sponsored apprenticeship training programmes on youth unemployment in Ghana. However, this experimental data, though not publicly available, focuses narrowly on government-sponsored apprenticeships and do not include self-sponsored apprentices, who are in the majority. Therefore, the STEP data were selected for its broader coverage. The survey provides data on a wide range of issues, including the usual demographic characteristics of individuals, such as gender, age and marital status. Human capital factors include education, experience, apprenticeship, personality characteristics and access to financial resources. Guided by the research objectives and the literature reviewed, 20 variables were selected from the STEP data for the analysis. These variables are defined in Table 1.

3.2 Empirical model specification

As described in Table 1, the outcome variable in this study is self-employment, a binary categorical variable. Appropriate to the objectives of this study, three logit models [i.e. equations (1–3)] are estimated. The first model (Model 1) aimed to determine the effect of gender (and other socio-demographic factors) on the probability of self-employment. Model 2 is estimated by adding *apprenticeship* to Model 1 to capture the effect of completing an apprenticeship on the likelihood of being self-employed. In the final model, the interactive effect of gender and apprenticeship on the probability of self-employed is examined as Model 3 (controlling for other factors) to determine whether gender strengthens or weakens (i.e. moderates) the relationship between apprenticeship and self-employment. The chosen logit models have been applied frequently and widely in similar studies investigating the determinants of self-employment (Belay, 2023; Safarov and Abdurazzakova, 2022; Bari *et al.*, 2021; Livanos, 2009). Compared to the probit model, the logit model is more robust to outliers and can handle non-linear relationships between the independent and the dependent variables.

In a linearised form, the transformed logit models are specified as follows:

$$y_i = \alpha_0 + \alpha_1 gender_i + \sum \alpha_j X_{ji} + \varepsilon_i \tag{1}$$

$$y_i = \beta_0 + \beta_1 gender_i + \beta_2 apprenticeship_i + \sum \beta_j X_{ji} + \varepsilon_i \tag{2}$$

Table 1.
Variable definitions and measurement

Variable	Definition	Measurement
Dependent variable		
Self_emp	Self-employment dummy	1 if self-employed; 0 otherwise
Control and independent variables		
Age	How old respondent is in completed years	Age in completed years
Age^2	The squared of how old the respondent is in completed years	Age in completed years squared
Has_spouse	Marital status	Value is 1 if the respondent has a spouse, 0 otherwise
Hh_size	Household size, excluding non-relatives	Count of household members, excluding non-relatives
Tenure_diff	Additional years required to do well on the job	Difference between tenure and time needed to do a job well
Time_needed	Time to learn to do a job well with experience and education needed	Years required to learn to do the job well with experience and education needed
Auto_avg	Autonomy and repetitiveness of work	Average of autonomy and repetitiveness at work scores
Think	Cognition	Frequency of tasks involving at least 30 min of thinking score
Ses	Socioeconomic status at age 15	Value is 1 if the socioeconomic status is rated low; 2 if middle and 3 if high
Asset_index	Asset wealth	Constructed index for asset wealth based on dwelling characteristics and available assets
Shocks	Negative economic shocks suffered before the age of 15	Number of economic shocks before age 15
Education (ISCED)	Highest educational level completed	0 if ISCED is pre-primary; 1 if primary or first stage of basic; 2 lower secondary or second stage of basic; 3 if upper secondary or post-secondary (non-tertiary); 5 if tertiary
Gender	Sex of the respondent	Value is 1 if female, 0 otherwise
Apprenticeship	Has respondent completed apprenticeship training?	Value is 1 respondent has completed an apprenticeship
Risk	Risk-taking propensity	Average responses to the questions after reverse coding (responses range from 1 “almost never” to 4 “almost always”)
Grit_av	Perseverance and passion for long-term goals	Average responses to the questions on grit (responses range from 1 “almost never” to 4 “almost always”)
Decision_av	Decision-making	Average responses to the questions on decision-making (responses range from 1 “almost never” to 4 “almost always”)
Hostile_av	Hostile bias	Average responses to the questions on hostile bias (responses range from 1 “almost never” to 4 “almost always”)
Discount	Temporal preference	Average responses to the questions on temporal preference in decision making (responses range from 1 “almost never” to 4 “almost always”)

Source: Authors’ own work

$$y_i = \gamma_0 + \gamma_1 gender_i + \gamma_2 apprenticeship_i + \gamma_3 apprenticeship_i{*}gender_i + \sum \gamma_j X_{ji} + \sum \gamma_k Z_{ki} + \varepsilon_i \quad (3)$$

where i represents individual and y is the dependent binary outcome variable which takes the values of 1 if self-employed and 0 otherwise. *Gender* is a binary variable taking the value of 1 if female and 0 if male. *Apprenticeship* is a dummy variable that takes the value of 1 if an individual respondent has completed apprenticeship training or 0 otherwise. The as, βs and γs are the vectors of unknown parameters. The remaining variables defined in Table 1 are represented by two vectors, X and Z. The ε is the error term.

The regression coefficients of Models 1–3 are estimated using the maximum likelihood method and exponentiated to find marginal effects. Since the dependent variable in the linearised logit models is the log of the odds that an individual will be self-employed, a given slope coefficient indicates the change in the probability of being self-employed as the corresponding independent variable changes by a unit, or changes from the base category (Livanos, 2009).

4. Results

The descriptive statistics of the variables used in the analysis are presented in Table 2 according to gender. For the categorical variables, frequency is used while for the continuous variables, mean, standard deviation, minimum and maximum are used. Regarding gender, there were more females self-employed than males (i.e. 38% of the males and 59% of the females). For apprenticeship, the proportion of males who completed apprenticeship (i.e. 32%) is approximately equal to the proportion of females who completed apprenticeship (i.e. 33%). The average household size and age were 3.4 (3.1 for males and 3.8 for females) and 34 years (35 years for males and 33 years for females), respectively. The effects of these variables and other independent variables on self-employment are examined through the logit models in the next section.

Table 3 displays the results of the econometric analysis which is organised into three models. Model 1 shows the base results when apprenticeship training and personality traits are not introduced. Model 2 augments Model 1 by introducing apprenticeship training, whereas Model 3 adds the interactive term between apprenticeship training and gender to Model 2 after incorporating the personality characteristics of the individuals. The coefficients reported in Table 3 are marginal effects. From the results presented in Table 3, the significant control variables maintain their signs across the three models, suggesting that the results are robust. In particular, the significant positive coefficients of gender in all three models (i.e. 0.195 in Model 1, 0.193 in Model 2 and 0.168 in Model 3 at a 1% significance level) indicate that females are more likely to be self-employed than males. Specifically, the coefficient of gender in Model 3 means that the probability of females being self-employed is 16.8% higher than the probability of males being self-employed, all other factors held constant. Similarly, the coefficients of age (i.e. 0.034 in Model 1, 0.027 in Model 2 and 0.026 in Model 3 at a 1% level of significance) and age squared (i.e. −0.0003 in Models 1 and 2 and −0.0002 in Model 3) confirm an inverse "*U*" relationship between self-employment and age, corroborating the argument that although age positively influences the probability of self-employment, a threshold exists above which the association is reversed to negative (Levesque and Minniti, 2006). The significant positive coefficients of marital status (i.e. 0.062 in Model 1, 0.053 in Model 2 and 0.057 in Model 3 at a 5% level of significance) indicate that having a spouse is associated with a higher probability of being self-employed. From the coefficients of tenure_dif (i.e. −0.045 in Model 1, −0.049 in Model 2 and −0.046 in Model 3) and time_needed (i.e. −0.017 in Model 2 and 0.016 in Model 3), it can be deduced that the

Variable	Category/statistic	Male Freq.	Male %	Female Freq.	Female %	All Freq.	All %
Categorical							
Gender	Male	695	100.00	–	–	695	56.47
	Female	–	–	538	100.00	538	43.53
Self_emp	Yes	262	37.54	316	58.74	578	46.76
	No	436	62.46	222	41.26	658	53.24
Completed apprenticeship	Yes	224	32.09	179	33.27	403	32.61
	No	474	67.91	359	66.73	833	67.39
Has_spouse	Yes	339	48.57	271	50.37	610	49.35
	No	359	51.43	267	49.63	626	50.65
ses	Low	136	19.48	77	14.31	213	17.23
	Medium	429	61.46	314	58.36	743	60.11
	High	133	19.05	147	27.32	280	22.65
Education	Pre-primary	15	2.15	7	1.30	22	1.78
	Primary	48	6.88	32	5.95	80	6.47
	Lower sec	239	34.24	233	43.31	472	38.19
	Upper sec	231	33.09	163	30.30	394	31.88
	Tertiary	165	23.64	103	19.14	268	21.68
Age	Mean	35.03		33.30		34.28	
	Std dev	11.73		10.43		11.21	
	Min/max	15/64		15/64		15/64	
Age_square	Mean	1,365		1,217		1,300	
	Std dev	930.3		795.2		876.7	
	Min/max	225/4,096		225/,4096		225/4,096	
Hh_size	Mean	3.13		3.84		3.44	
	Std dev	2.26		2.22		2.27	
	Min/max	1/15		1/15		1/15	
Tenure_diff	Mean	2.67		2.79		2.72	
	Std dev	0.591		0.49		0.55	
	Min/max	1/3		1/3		1/3	
Tenure_needed	Mean	3.29		2.62		3.00	
	Std dev	1.34		1.37		1.39	
	Min/max	1/6		1/6		1/6	
Auto_avg	Mean	1.11		1.18		1.14	
	Std dev	0.71		0.73		0.72	
	Min/max	0/3		0/3		0/3	
Think	Mean	1.46		1.06		1.29	
	Std dev	1.17		0.73		1.14	
	Min/max	0/3		0/3		0/3	
Asset_index	Mean	0.26		0.39		0.32	
	Std dev	0.88		0.87		0.88	
	Min/max	−1.96/2.59		−1.85/2.84		−1.96/2.84	
Shocks	Mean	0.78		0.66		0.73	
	Std dev	1.11		0.99		1.06	
	Min/max	0/8		0/6		0/8	
Risk	Mean	1.67		1.69		1.68	
	Std dev	1.13		1.09		1.11	
	Min/max	0/4		1/4		1/4	
Grit_av	Mean	2.86		2.76		2.81	
	Std dev	0.59		0.58		0.58	
	Min/max	1/4		1/4		1/4	

Table 2.
Descriptive results

(*continued*)

Variable	Category/statistic	Male Freq.	Male %	Female Freq.	Female %	All Freq.	All %
Decsion_av	Mean	3.09		2.96		3.03	
	Std dev	0.59		0.61		0.63	
	Min/max	1/4		1/4		1/4	
Hostile_av	Mean	2.21		2.22		2.22	
	Std dev	0.72		0.74		0.73	
	Min/max	1/4		1/4		1/4	
Discount	Mean	1.61		1.57		1.59	
	Std dev	1.02		0.95		0.99	
	Min/max	1/4		1/4		1/4	

Source: Authors' own work

Table 2.

probability of being self-employed decreases the higher the additional years required by a respondent to do well on the job.

Furthermore, the results indicate that the nature of work is associated with the probability of being self-employed. According to the coefficients of "auto_avg" and "think" in Model 3, individuals engaged in employment with higher autonomy and repetitiveness or frequently involved in at least 30 min of thinking have 22.9% and 2.3% more chance of being self-employed, respectively. The level of education is negatively associated with the probability of being self-employed, suggesting that individuals with a higher level of education are less likely to engage in self-employment, perhaps because they may prefer paid employment for job security or they are more likely to have better job opportunities in the wage-employment sector (Van der Sluis *et al.*, 2008). Regarding risk aversion, the results confirm that individuals who are more risk-averse are 2.3% less likely to be engaged in self-employment. Grit has a significant positive coefficient of 0.049, meaning that individuals with grit are 4.9% more likely to be self-employed. As reported in Wolfe and Patel's (2016) multi-country study, the positive association between grit and self-employment could be due to several reasons, one of which is that grit can influence an individual's perception of ability or "can-do" spirit, which is important for self-employment. Another reason why grit might be important is that it can influence individuals' efforts towards skills development, knowledge and competencies, which are relevant for self-employment.

Referring to the main variables of interest that address the objectives of this study, the results in Models 2 and 3 show that the coefficients of apprenticeship (i.e. 0.131 in Model 2 and 0.094 in Model 3) are positive and significant at a 1% level of significance. This indicates that completing apprenticeship training increases the probability of being self-employed by 13.1% based on the results in Model 2. However, from the results in Model 3, the coefficient of the interaction term between apprenticeship and gender (i.e. 0.086) is significant and positive at 10%, indicating that while completing an apprenticeship training can provide a positive influence in general on all individuals' likelihood of engaging in self-employment, it plays a stronger role in females. It increases the probability of a female apprentice being self-employed by 8.6%. Thus, this finding confirms the moderation effect of gender on the association between completing apprenticeship training and being engaged in self-employment.

The predictive margins of the probability of being self-employed between female apprentices and male apprentices versus their counterparts who have not completed apprenticeship training are presented in Figure 1. This figure illustrates the differences in the likelihood of self-employment for males and females if they have completed apprentices or not {i.e. *probability* [No Apprenticeship and Male(No#Male)] = 0.362, *probability*

Variable	Model_1 *dy/dx*	Model_2 *dy/dx*	Model_3 *dy/dx*
Gender (female)	0.195*** (0.024)	0.193*** (0.023)	0.168*** (0.028)
Age	0.034*** (0.007)	0.027*** (0.007)	0.026*** (0.007)
Age-squared	−0.0003*** (0.000)	−0.0003*** (0.000)	−0.0002*** (0.000)
Has_spouse	0.062** (0.008)	0.053** (0.027)	0.057** (0.027)
Hh_size	−0.008 (0.005)	−0.007 (0.006)	−0.008 (0.006)
Tenure_dif	−0.045* (0.025)	−0.049** (0.025)	−0.046* (0.025)
Time_needed	−0.010 (0.010)	−0.017* (0.010)	−0.016* (0.010)
Auto_avg	0.232*** (0.016)	0.226*** (0.153)	0.229*** (0.0157)
Think	0.029*** (0.011)	0.024** (0.011)	0.023** (0.011)
Socioeconomic status (base category is high)			
Low socioeconomic status (ses)	−0.059 (0.038)	−0.062* (0.038)	−0.059 (0.037)
Middle socioeconomic status (ses)	−0.062** (0.028)	−0.063** (0.027)	−0.057** (0.027)
Asset_index	−0.002 (0.014)	0.001 (0.014)	0.003 (0.139)
Shocks	0.011 (0.011)	0.011 (0.011)	0.009 (0.011)
Educational level (base category is pre-primary)			
Primary education	−0.195** (0.088)	−0.182** (0.092)	−0.205** (0.092)
Secondary education	−0.167** (0.072)	−0.166** (0.589)	−0.187** (0.077)
Post-secondary/non-tertiary	−0.025*** (0.073)	−0.206*** (0.079)	−0.226** (0.077)
Tertiary education	−0.509*** (0.076)	−0.441*** (0.083)	−0.448*** (0.082)
Apprenticeship		0.131*** (0.029)	0.094*** (0.036)
Gender × apprenticeship			0.086* (0.049)
Risk			−0.023** (0.010)
Grit_av			0.049** (0.199)
Decision_av			−0.009 (0.018)
Hostile_av			−0.002 (0.011)
Discount			0.024 (0.015)
Observations	1,236	1,236	1,236
Pseudo R^2	0.321	0.334	0.344

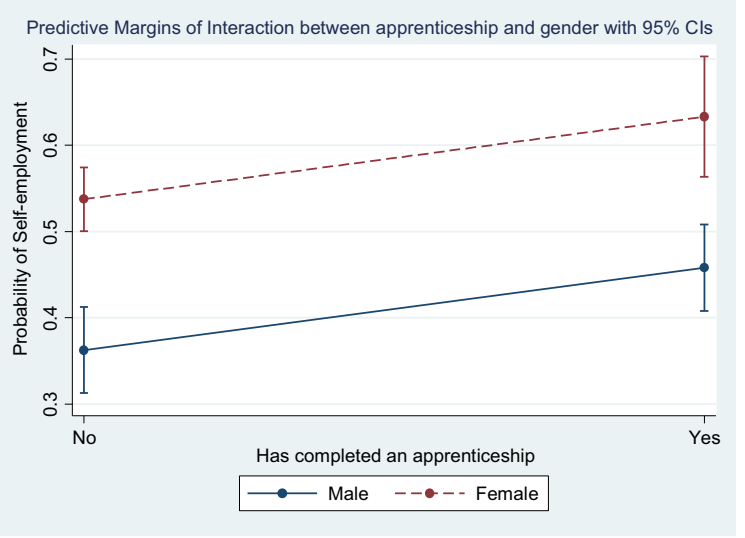
Notes: Standard errors are in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Source: Authors' own work

Table 3.
Logit regression output

[No Apprenticeship and Female(No#Female)] = 0.537, *probability* [Apprenticeship and Male (Yes#Male)] = 0.458 and *probability* [Apprenticeship and Female(Yes#Female)] = 0.633}. The results show that males or females who have completed apprenticeships have a higher probability of being self-employed than those who have not. This conclusion is supported by the upward slopes of the lines for males and females, meaning that males and females who have not completed apprenticeship (No) have a lower probability of being self-employed as compared to those who have completed (Yes). Comparing the relative slopes of the male and female lines, it can be observed that the female line is slightly steeper than the male, indicating that, female apprentices are more likely to be self-employed than male apprentices.

5. Discussion and implications

This study aimed to analyse the effect of completing an apprenticeship programme on the probability of becoming and how this effect differs for males and females. Using logistic regression, it is found that females are 19.5% more likely to be self-employed regardless of whether they have apprenticeship training or not. However, males or females who have completed apprenticeships are 9.4% more likely to be self-employed than those who have not completed apprenticeship training. Furthermore, females who have completed an



Source: Authors own work

Figure 1. Predicted probabilities of self-employment for males and females who either completed apprenticeship training or did not

apprenticeship training have 8.6% more chance of being self-employed than their counterpart males who have also completed an apprenticeship training. These findings address the study's objectives and add fresh evidence to the existing literature regarding the interactive effect of gender and apprenticeship on self-employment. This implies that apprenticeships targeted at women can help to reduce the entrepreneurial gap between men and women and impact their lives.

From previous studies, self-employment can provide many economic benefits, such as job creation, reduction in unemployment, poverty alleviation and economic growth and development (Brown *et al.*, 2011). However, available statistics on self-employment rates show a dwindling trend, prompting policymakers and academics to investigate factors associated with self-employment. To contribute empirical evidence to this area, this study focused on traditional apprenticeship training, which is widespread in West Africa (Monk *et al.*, 2008). The analysis found that approximately 47% of the respondents were self-employed, 33% had completed apprenticeship training and women accounted for 44%. Contrary to what most studies in advanced countries have found (Fossen, 2012; Georgellis and Wall, 2000), women are found to be more likely to be self-employed than men in Ghana. In line with Justo and DeTienne (2008), it is argued that Ghanaian women are more likely to be self-employed because they are more prone to seek flexible employment due to their caregiving responsibility and need to balance work and family responsibilities.

In line with the extant literature, the findings further revealed that age has an inverse *U* relationship with self-employment (Fairlie, 1999; Dunn and Holtz-Eakin, 2000; Blanchflower, 2004; Georgellis *et al.*, 2005a, 2005b; Parker, 2008; Andersson and Hammarstedt, 2010a; Caliendo *et al.*, 2014). This finding suggests that individuals' attitudes towards self-employment may be changing with age in a manner that there is a threshold age above which the positive influence of age on self-employment is explained by the desire for flexibility, accumulated human and social capital and wish to postpone retirement age (Kerr and Armstrong-Stassen, 2011; Van Solinge, 2014) is reversed to negative because older

people might feel they have less time to recoup their investment and/or become weaker in terms of physical and mental agility (Hintermaier and Steinberger, 2005).

Consistent with prior literature, which argues that self-employment is mainly associated with risk-taking (Taylor, 1999) and risk aversion is negatively related to self-employment (Ekelund *et al.*, 2005), the findings from this study show that individuals who are more risk averse are less likely to be self-employed. Furthermore, the result corroborates earlier studies on the association between personality traits and self-employment (Caliendo *et al.*, 2014). Grit, an individual's trait, is positively associated with self-employment, as reported in other studies (Wolfe and Patel, 2016).

The findings for apprenticeship revealed that individuals who have completed apprenticeship training are more likely to be self-employed than those who have not. As argued in the literature review, this positive association could be due to two main factors. First, because apprenticeship takes place in a real-work context, it allows the apprentices to acquire entrepreneurial skills to start and manage their businesses upon completion of the training. Second, because apprenticeship provides an opportunity to earn wages while learning, it can provide the apprentices with initial capital to enter self-employment (Ezenwakwelu *et al.*, 2019). In addition, the findings revealed that the association between apprenticeship and self-employment is stronger for women than men, suggesting that apprenticeship training that is targeted at women may be more beneficial in producing more self-employment than men.

These findings on apprenticeships are particularly important because they hold several valuable insights and implications for policymaking. Before discussing the implications, it is important to state that following the Great Recession of the late 2000s and the attendant youth unemployment, there has been a reawakening of policy interest in apprenticeships. In 2013, the EAfA was formed to unite governments and key stakeholders around the tenets of strengthening the quality, supply and overall image of apprenticeships across Europe (Markowitsch and Wittig, 2022). Since then, the EAfA has been working to improve the overall image of apprenticeships with renewed interest and commitment in recent years, leading to the relaunch of apprenticeship support services in February 2023 (European Commission, 2023). In Africa, the ILO has been working in the area of decent jobs for youth with a spotlight on the quality of apprenticeships in five West African countries, Benin, Cote d'Ivoire, Mali, Niger and Togo (Ganou *et al.*, 2020). Through the Council for Technical and Vocational Education and Training, the Government of Ghana has implemented the National Apprenticeship Programme (NAP) in selected districts to provide options to the growing numbers of youth who are unable to progress to secondary school (Hardy *et al.*, 2019).

For policymakers, the findings of this study imply that self-employment can be promoted through apprenticeship training programmes and not necessarily through the traditional education system, especially when the apprenticeship is found to increase the probability of self-employment and the level of formal education is negatively related to self-employment. Based on this, policymakers in developing countries, especially Ghana, may want to, in the immediate to short term, scale up the NAP or implement policies and programmes that will provide physical, financial and moral support for informal apprenticeship training, given that the formal Technical and Vocational Educational Training (TVET) may cost much more. However, in the short to long term, policymakers may consider reviewing the current educational system to improve the TVET or implement innovations in the higher educational sector that allow students to gain the occupational competence that brings theory and practice together in the apprenticeship setting.

Furthermore, the insight provided by the moderation effect of gender implies that female apprentices are more likely to be self-employed than their male counterparts. This provides an opportunity for women's economic empowerment, especially when the evidence suggests

that female engagement in self-employment can offer substantial economic benefits in under-developed and developed nations (Mammen and Paxson, 2000). In this regard, policymakers can design and implement policies and programmes that will encourage women's participation in apprenticeship so that they can eventually become self-employed and contribute to national development.

Apart from its practical importance, the study's findings add valuable insights from a Sub-Saharan African context to the empirical literature on self-employment, highlighting the role of gender as an amplifier of the positive effect of apprenticeship on self-employment, especially for women, suggesting an avenue for closing the entrepreneurial gap between men and women. This contribution to the empirical literature on apprenticeships ties into the broader literature on women's empowerment through entrepreneurship and self-employment.

6. Conclusion

This study sought to analyse the determinants of self-employment, particularly the influence of apprenticeship training on self-employment and how gender moderates the relationship. After controlling for several relevant individual factors identified in the literature, the major findings are that:

- completing apprenticeship training increases the likelihood of being self-employed by 9.4 %; and
- the positive association between apprenticeship and self-employment is stronger for women, an indication that gender moderates the relationship between apprenticeship training and self-employment.

In view of these major findings, the study concludes that apprenticeship training in Ghana should be promoted. To do this, it is recommended that appropriate policies must be put in place to destigmatise, support and make apprenticeship more attractive and effective.

In arriving at the above conclusion and recommendations, it is also important to acknowledge the limitations of this study which exposes new opportunities for future research. First, as a single-country study, it bears reminding that the generalisability of the findings to other study contexts may be limited. So, future research can replicate this study in different contexts to provide additional evidence on this subject. Second, as a non-experimental cross-sectional study, it is impossible to interpret the result as causal but correlational, which is still useful information for understanding the covariates of self-employment. Thus, it may be value-adding for future research to use experimental data. Finally, the study considered gender as a moderator of the relationship between apprenticeship and self-employment. However, it may be helpful for future studies to explore other factors that might influence this relationship as moderators or mediators. This research path will help uncover the nuances of how apprenticeship influences self-employment and provide deeper understanding and policy options for promoting self-employment through apprenticeship training.

Notwithstanding the study's limitations, the insights offered by the findings can be used to promote self-employment, especially among women, to reduce the entrepreneurial gap between men and women and impact the lives of the underprivileged who are not able to advance in formal education.

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