

DETERMINANTS OF EDUCATION-JOB VERTICAL MISMATCH IN URBAN GHANA

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ABSTRACT

This paper explores the determinants of education-job vertical mismatch in urban Ghana. It uses cross section data from the World Bank Skills toward Employment and Productivity (STEP) surveys of working age urban population and applies the self-Assessment method of measuring the incidence of education-job mismatch. The study employs the method of multinomial logit to ascertain whether over and undereducated individuals possess a relatively worse bundle of skills than workers who are adequately matched to their jobs in terms of formal education. It identifies gender, marital status, education, skills, occupation and time to proficiency as significant determinants of mismatch. The study adduce evidence to the transient nature of mismatch as reflected in time to proficiency's negative relationship with overeducation and positive link with undereducation. Given the competitiveness of the national and global economic environment, the study provides some policy thoughts towards addressing challenges of skill mismatch.

Keywords: Education-Job Mismatch, Overeducation, Undereducation, Multinomial Logit, STEP

INTRODUCTION

Labour market analysis predicts a perfect alignment of workers acquired skills, education, and those demanded by firms as the outcome of education and training. This notion is however far from reality as empirical studies and evidences point to a divergence in the skill set of workers and the skill needs of employers. The challenges of ensuring the convergence of skills and education outcomes in the labour market has thus triggered renewed interest in across the world to ascertain the various forms of mismatches that are always present in labour markets, underlying determinants and effects on labour market outcomes.

OECD (2012) describes skills as “the new global currency” of the 21st -century economies, stressing the fact that no serious economy will survive with substandard workforce and skill-deficient human capital. The critical role that education and skills play in development has been identified as a priority area in internationally agreed development goals. For instance, the Sustainable Development Goals (SDG) 4 projects that by the year 2030, all countries must increase the number of working youth and adults to access relevant skills, including technical and vocational skills for employment, decent jobs and entrepreneurship.

The issue of skills is also worth considering given the macroeconomic and microeconomic dividends that it inures. Perry et al. (2014) posit the view that better and developed skills enable individuals to perform better and improve economic processes within a defined set-up or economic structure. Beyond the productivity enhancing trait of individuals, better skills affect post-hire outcomes in the form of higher wage premium; improved skill-set serves as an escape tool from unemployment (see Hanushek et al., 2014). At the aggregate level, better skills facilitate

technological adoption and innovation and enhance potential for faster economic growth (Cicone & Papaioannou, 2009)

Given the fact that education is essential to improvements in poverty and welfare (Nsawah-Nuamah, 2010; Rolleston, 2011), facilitates entry into more lucrative occupations and improve earnings and earnings inequality (e.g. Kingdon & Söderbom, 2008), it can be assumed that an individual chooses a particular level and type of education that will manifest the expected outcome. This expectation is hardly met for the ordinary Ghanaian youth and urban job seeker who instead of picking up decent and career-oriented jobs, roam on the streets in search of their dream but unavailable jobs. Confounded with this situation, the observed worker optimises his or her choice variables either by succumbing to a low-profile indecent job that is unrelated to his level and type of education or upgrades him or herself through additional educational investment as a hedge against unemployment (Szirmai et al., 2013; Hyéfouais, 2016). This presupposes that the employment problem in Ghana does not manifest itself as open unemployment but skill underemployment, job mismatch and vulnerable employment and thus raises questions about the market relevance of education in harmonising labour market transitions.

The Government of Ghana through the help of donor partners have initiated several policies and programmes such as Free Compulsory Universal Basic Education (FCUBE) and Free Senior High School (Free SHS) aimed at expanding schooling, at all levels. This move has been grounded on the perceived high private returns to education in general, and at higher levels of education, and the importance of education as an equity enabler (Ackah et al., 2014; Nsawah-Nuamah, 2010; Sackey, 2008). The ability of the Ghanaian economy to absorb the increased supply of skilled labour remains a concern to policy makers and researchers. However, studies on the incidence and determinants of education-job mismatch in Ghana rarely exist despite the fact that a large body of literature on over / undereducation is available (e.g. Hartog, 2000; McGuinness, 2006; Leuven & Oosterbeek, 2011).

Although the debate on education- job mismatch predates time, the empirical evidence is usually grounded within a developed economy context, with relatively sparse evidence for developing countries, and in particular for Sub-Saharan Africa (SSA). This study attempts to fill this empirical gap and to limited literature of the subject on Ghana which mirrors many SSA countries. Similar work by Darko and Abrokwah (2020) examined the effects of educational mismatch on earnings in Ghana using cross sectional data to show increased incidence of undereducation over the period 1998-1999 to 2012-2013.

From SSA perspective, the work of Herrera and Merceron (2013) on ten African found that 14.8-25.0% of employed workers aged 15 years and older are undereducated while 20.7-21.3% is overeducated between 2001-2005. This studies seeks find answers to the following questions: what factors predispose individual workers towards over / under education? To what extent are the mismatches transitory or permanent? What is the role of skills (cognitive and technical skills) in determining mismatch?

This study aims to build on previous research to investigate the determinants of education-job vertical mismatch in Ghana using cross-sectional data from the World Bank STEP survey collected in 2013. The worker-self assessment method is used to derive the measures of overeducation and undereducation.

Walking through the Literature

Theoretical Perspectives on Skills Mismatch

A plethora of theories abound for explaining mismatch but in this study, the argument is limited to four main theories namely human capital theory, assignment theory, heterogeneous skill theory and institutional theory. Human capital theorist suggests that individuals' productivity determines his or her earnings rather than the essential attributes of the job they occupy. The worker productivity - the value of their marginal product is a function of their human capital composition that is made up of elements such as education, experience, innate ability among others (Becker, 1975). By virtue of this, investment in human capital is considered optimal if the net present value of future earnings is positive. Differences in labour market outcomes and success on the job from a human capital perspective is thus seen as a function of differences in education, work experience, skills, level of training among others. Overeducation is therefore seen as a short run phenomenon for an observed worker given the fact that further investments can change one's position on the mismatch ladder.

In the assignment theory, educational mismatches imply skill mismatches (Allen & Van Der Velden, 2001). Thus, workers underreport their required education due to poor matching triggered as a result of disconnect between possessed knowledge or skills and required ones for the job. Consequently, workers whose level of education exceeds the job requirement threshold are unable to fully utilise their skills given the fact that they are prone to be less productive than their peers whose educational level commensurate the requirements of the job. The heterogeneous skill theory on its part suggests a weak link between education and skills mismatch. Premised on the assumption that skill endowment and ability vary among individuals even in the face of equal level of educational attainment, the theory postulates that it is possible to have overeducated workers being under-skilled and vice versa.

The institutional theory projects the view that job characteristics are the primer for earnings and labour market success. The foundational underpinning of the theory's argument is on the fact that due to the encumbrances employers face in assessing individual productivity at the point of hiring; they resort to the use of job specific characteristics to make their decision. For this reason, successful job match is an interplay of employer -employee actions. Whereas an individual's employability is contingent on the amount of training ex post or ex-ante his or her recruitment that of the employer is dictated by the training cost they will have to bear after initial recruitment. Consequently, the more educated the prospective worker is at the point of initial hiring, the lower the associated training cost, and the greater the chances of being employed. The spill over effect of such interplay is that prospective workers may intentionally choose to be overeducated as a defence against unemployment and thus maintains one's place in the queue for the desired job.

Empirical Literature

Empirically, whilst some perceive mismatch as transitory on the grounds of substitutability between experience and education, there is also the argument of "no escape trap" for overeducated workers especially and thus mismatch seen as a long-term phenomenon. Key proponents of the transient argument (Sicherman (1991); Alba-Ramirez (1993); Buchel (2002) and their argument gained ground within the career mobility theory. Its predictions are that you do not stay at the same position forever and that being overeducated does not mean it is so indefinitely. There-

fore, overeducated workers have the opportunity to progress in their career and move to jobs that matches their skill and qualification set.

The advocates of permanency of the mismatch phenomenon posit the evidence that overeducation correlates with lower job satisfaction and negatively affects worker productivity and welfare in general. Consequently, overeducated workers may be prone to high labour turnovers and lower earnings, a situation that is demotivating and career retrogressing (Rubb, 2003; Dolton and Vignoles, 2000). In terms of demographics, no clear pattern emerges for males and females relative to marriage. In Groot and Maassen van den Brink's (2000) meta-analysis, they find overeducation to be more common among females than males. Sloane et al. (1996); Dolton and Vignoles (2000) observe similar patterns. Groot (1996), on the other hand, finds that married males are more likely to be over-educated. Frank (1978), finds higher incidence of overeducation among women and posits that women often do not have much of a choice as male husbands determine their location based on job offers available to them. Hung (2008) finds that marriage reduces the probability of being overeducated for women while it has no effect on men. Sloane et al. (2000) find that the presence of children in the household present differential effects across gender in that younger children reduce overeducation for males and raise overeducation for females, as they make more compromises in the labour market.

Overeducation is often seen as a short-term problem resulting from a lack of co-ordination in the adjustment of schooling requirements and schooling investments between firms and individuals (Duncan & Hoffman, 1981). However, some studies have found that for a large group of workers overeducation is a long-term phenomenon (e.g. Sloane et al., 1999; Dolton & Vignoles, 2000). Overeducated workers earn less than equally educated workers who are employed in a job that matches their education, whereas undereducated workers who are employed at a job level that is higher than their level of education, earn more (Hartog, 2000). In the literature on overeducation, it is often argued that, apart from the attained level of education, job characteristics also determine a worker's productivity (e.g. Sicherman, 1991).

Skill mismatch can arise from structural changes in the economy via innovation and technological change (Perry et al., 2014). This suggest that individuals lacking those skills become unemployed or at worst accept jobs that do not match their skill portfolio. Socio-demographic factors also affect the level and incidence of mismatch. Desjardins and Rubenson (2011) posit the view that the more experience a worker is, the greater the likelihood of avoiding entry-level jobs and the better able they are to signal their skills for high paying and highly skilled jobs. They argue that women have a greater propensity of being under-skilled relative to men in the presence of labour market discrimination, or where childbearing and home-keeping activities are rife. When higher-skilled workers are employed in a lower-level job, their productivity will be restricted, whereas being employed in a higher-level job contributes to a worker's productivity. However, others state that the lower productivity of the overeducated workers may indicate the relatively lower ability of these workers compared to the higher-skilled workers who found a job at a proper level (Sloane, 2003).

Econometrics Analysis

Conceptual Issues

Essentially, different methods and techniques have been employed to conceptualise the measurement of mismatch. Whilst no unanimity rule exists for a particular choice, the three key methods of worker-self assessment, realised matches and job assessment approach have had

wide empirical appeal. Though fraught with its peculiar shortcomings, the worker-self assessment has been used extensively in studies that measure educational mismatch as proxy for skill and occupational mismatch (e.g. Korpi and Tahlin (2009); Buchel (2002); Oosterbeek (1991)).

The statistical or realised match approach has also had strong appeal from scholars such as Verdugo and Verdugo (1989); Bauer (2002); Croce and Ghignoni (2012). The key issue in the usage of this approach has been whether to use the mean or mode in estimating the required years of education. This has however been less contentious as both approaches have been employed in some cases for robustness checks.

Interestingly, the methods that seem to be less subjective in nature has not been vigorously pursued and utilised by researchers. Specific mention can be made of Rumberger (1987); McGoldrick and Robst (1996) as key actors having employed the approach. That notwithstanding, some studies (e.g Chevalier & Lindley, 2009); Groeneveld and Hartog (2004) have employed a mixed approach-composition of job assessment, realised matches and worker-self assessment in their estimations.

Data Source

The paper uses dataset drawn from the World Bank STEP Survey collected in 2013 to provide quantitative estimates of the determinants of education-job mismatch. The Ghana Skills Toward Employment and Productivity (STEP) Measurement Program was collected by the World Bank in 2013 and consists of two survey instruments that collect information on the supply and demand for skills. The STEP household survey is thus a collection of background information on randomly selected individuals within the household aged between 15 to 64 detailing their history of acquired skills, educational attainment, work status and history, family background, and health.(World Bank, 2015).

An important aspect of the STEP surveys which was administered in 12 other countries including Kenya, Colombia and China is the use of different skill concepts that extends beyond educational attainment to include human capital indices more comprehensively. The sampling frame for the Ghana STEP is made up of urban households and individuals aged between 15 and 64 years who are either working or otherwise. It is an exclusive supply side data as it is limited to only the employee. Three broad types of skills are measured namely, cognitive, non-cognitive and job-relevant skills. Cognitive skills are defined as the “ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought.” Whilst cognitive skills involve numeracy, literacy and the ability to solve abstract problems, non-cognitive skills relate to multiple traits spanning social, emotional, personality, behavioural and attitudinal factors. The third strand of skills are task-related (such as computer use, driving skills use) which is a mixture of cognitive and soft skills.

Model Specification and Estimation

The study examines the determinants of mismatch within a multivariate framework where each regressor is evaluated in terms of its causal effect, holding all other factors constant. Following Leuven and Oosterbeek (2011), all the responses which reported required education to be higher than the actual attained education are coded as under- education, all those which say that the required education are less than the worker’s attained education are coded as over-education, and the remaining responses are interpreted as correct matches. The option of a simultaneous es-

timination of the probability of overeducation and undereducation makes the specification of the multinomial logit model a preferred choice.

Given that there is no explicit ordering of the dependent variable's categories, the study adopts the unordered model. The set of regressors ranges from personal biological traits, human capital characteristics, skill endowments, household background as well as traits of occupation and sector of economic activity. A multinomial model is thus estimated with the matched category as the base outcome and the results are interpreted as the likelihood of being in either of the remaining mismatch categories relative to being well matched.

Following Aleksynska and Tritah (2013); Herrera and Merceron (2014), the conceptual model for the determinants of labour skills mismatch (herein referred to as education-job mismatch) is given below with specific modifications:

$$Y_{ij} | X_i = \frac{e^{\beta_i X_i}}{\sum_{j=1}^3 e^{\beta_i X_i}} \quad (1)$$

Where; Y_{ij} is the probability that a worker i is in one of the three j th education-job match categories: undereducated, correctly matched, or overeducated. The vector X_i includes individual specific characteristics. The general expression is given as

$$pr(Y_i / X_i) = \frac{\exp(\beta_j x_i)}{\sum_j \exp(\beta_j x_i)} \quad (2)$$

$$pr(i) = \frac{\exp(V_i)}{\sum_{j=1}^J \exp(V_j)} \quad (3)$$

Where; $pr(i)$ is the probability of the decision maker choosing alternative " i " and V_j is the systematic component of the utility of alternative " j "

Assume E_o , E_u , E_r where E_o is overeducation, E_u is undereducation and is E_r required education;

The probability of each alternative is given as:

$$pr(E_o) = \frac{\exp(V_{E_o})}{\exp(V_{E_o}) + \exp(V_{E_u}) + \exp(V_{E_r})} \quad (4)$$

$$pr(E_u) = \frac{\exp(V_{E_u})}{\exp(V_{E_o}) + \exp(V_{E_u}) + \exp(V_{E_r})} \quad (5)$$

$$pr(E_r) = \frac{\exp(V_{E_r})}{\exp(V_{E_o}) + \exp(V_{E_u}) + \exp(V_{E_r})} \quad (6)$$

Where $pr(E_o)$, $pr(E_r)$, $pr(E_u)$ are the probabilities of the decision maker being over, adequately or undereducated respectively.

V_{E_o} , V_{E_U} and V_{E_R} are the systematic components of the utility for overeducation alone, undereducation and adequately educated respectively.

In a more explicit form, the model is specified as

$$pr(Y_i/X_i) = \frac{\exp(V_i)}{\sum_{j=E_o, E_R, E_u}^J \exp(V_j)} \quad (7)$$

Two different empirical models are estimated: a baseline model without controls and a skill-augmented model. They are presented in equations 8 and 9.

Model 1: Baseline model (without controls)

$$mismatch_{i=3} = \alpha_0 + x_i' \beta + \varepsilon_i \quad (8)$$

As already indicated, the dependent variable is polytomous in nature as it assumes three (3) possible states - well matched (reference category), overeducated and undereducated. Equation 8 is the baseline model where there are no controls. x_i' is a vector of explanatory variables such as gender, time to proficiency, occupational groups, education, marital status, socioeconomic status at age 15, age and parental involvement in education. β represents a vector of coefficients of explanatory variables.

Model 2: Model with control for Skills

$$mismatch_{i=3} = \alpha_0 + x_i' \beta + s_i' \gamma + \varepsilon_i \quad (9)$$

In equation 9, the baseline model is augmented with skills to examine how an observed worker's skill endowment predisposes him or her to being mismatched. s_i' represents two set of skills: cognitive skill, extrapolated from a factor analysis of numeracy, literacy and writing skills and computer skill intensity (decomposed into low, medium and high usage, with no usage as reference category). γ represents the coefficients of the skills variable and thus examines the partial impact of the skill variables on the predisposition of an observed worker being mismatched, ceteris paribus.

Measurement of Variables for Estimation

Dependent Variable

The study adopts the self-assessment approach for measuring mismatch, which has a strong appeal (Van der Velden and Van Smoorenburg, 1997) as it focuses on how an individual perceives the jobs in the labour market (Duncan & Hoffman, 1991; Sloane et al., 1999; Linsley, 2005). There are however some limitations associated with this measure including workers giving wrong information about their education levels as observed by Hartog (2000) and the failure to effectively analyse the context of education level that a worker has with respect to the job that he or she performs (Battu et al., 2000). Under the self-assessment approach, if a worker's highest

educational attainment is the same as that defined by him/her as required by a given job, he/she is classified as well matched (see Farooq, 2011; Verhaest et al., 2015). If an educational attainment is higher (lower) than that required by a job, he/she is classified as overeducated (undereducated).

Independent Variables

The model controls for demographic, productive and socioeconomic characteristics of the individuals such as age, gender, marital status, education, occupation, time to proficiency, cognitive skills and computer literacy (Table 1).

Variable	Operational Definition and Measurement
Dependent Variable	
EDUMATCH1	Educational mismatch 0-Perfectly matched; 1-Undereducation; 2-Overeducation
Explanatory Variables	
Age	Age of the individual measured in years
Agesq	Age squared measured in years
Female	Gender variables as dummy:0=Male; and 1=Female
Married	Marital dummy:0=Unmarried and 1=Married
Education	Categorical dummies: No formal education, Primary, Lower secondary, Upper Secondary, and Tertiary
Time proficiency	How long it takes for an observed worker to catch up on the job measured in months
Socioeconomic status	The variable is captured in three categories: "low ses", "middle ses", and "high ses" and is captured in the form of three categorical dummies with low ses as the reference dummy
Occupational type	Based on the International Standard Classification of Occupation (ISCO, 2008) classification and STEP aggregation, five main occupational groups are captured; Highly Skilled White Collar, Low Skilled White Collar, Craft and Related Trade Workers, Elementary Occupations and Skilled Agriculture.
Parental involvement	It is captured as a dummy with zero (0) being "No Active Involvement" and one (1) "Active Involvement"
Cognitive skills	Measured as composite index constructed through a factor analysis of three skill measures-reading, writing and numeracy skills.
Computer use	It is the intensity score of computer usage. It is captured in three categorical dummies namely low usage, medium usage and high usage, and is a composite and aggregated score of the computer usage was constructed. The reference category is no usage (0).

DISCUSSION OF EMPIRICAL RESULTS

Prior to the multinomial estimation, we carry out Independence of Irrelevance Alternative (IIA) test to validate the choice of reference category of the dependence variable in the estimation process (Hausman & McFadden, 1984). The results of the IIA test reported in the appendix suggest that *IIA has not been violated, meaning the multinomial logit is appropriate*. The study reports the marginal effects and outcome of variables that are statistically significant only. Model (1) is the baseline model without controls and Model (2) shows the controls for skills in determining mismatch.

Baseline without controlling for skills

Table 2 presents multinomial logistic regression results for the baseline model in a form of marginal effect to suggest that age and parental involvement have no significant effect on education mismatch in urban Ghana. In contrast, gender, marital status, level of education, time to proficiency and occupation has significant effect on education mismatch in urban Ghana. From gender perspective, females are less likely to be undereducated but more likely to be overeducated relative to males with stronger marginal effect. This suggests that in urban Ghana, female workers who are well matched in terms of formal education are more likely to be overeducated relative to men but are less predisposed to be undereducated and thus corroborating similar study on Macedonia by Kupets (2015). It however contrasts findings in Georgia that records a lower likelihood of overeducation among women and another by Herrera and Merceron (2014) who concluded from a study among urban workers in selected African countries that men have a higher probability than women of being mismatched.

Difference in gender probabilities might stem from duplicity of factors ranging from work-family balance, gender discrimination in the labour market, occupational choices and field of study. Traditionally, the multiple roles of home care/management and work-family life reconciliation by Ghanaian women tends to push them into a trap of statistical discrimination as lauded to by hiring agents who may be profit optimising. Consequently, most women find themselves represented in non-standard employment and might switch from full-time to part-time employment (Spareboom, 2014; Connolly and Gregory (2008) which in most cases involves occupation downgrading making them highly prone to the risk of overeducation relative to their male counterparts. Again, there is the possibility that some fields of study (such as Humanities, Arts and Law), which are more prone to be exposed to overeducation tendencies in the labour market may have greater women representation (Barone & Ortiz, 2010; Betti et al., 2011; Jauhainen, 2011; Wirz & Atukeren, 2005). These evidences potentially explain the higher overeducation but lower undereducation tendencies for females relative to males in urban Ghana.

In urban Ghana, married individuals are more likely to be undereducated than single and never married (Table 2). Being married do not significantly affect the chances of being overeducated; the story assumes a variant posture in the case of undereducation. In all cases of mismatch (over and undereducated), being divorced/separated relative to those who are single and never married tends to increase the chances of being mismatched either in the form of undereducation or overeducation. Within the category of divorced/widowed workers, the tendencies for overeducation are more pronounced than undereducation (9.3% as against 3.8% as evident in Table 2).

Table 2 MARGINAL EFFECTS ESTIMATE OF THE DETERMINANTS OF EDUCATION-JOB MISMATCH IN GHANA			
		Model 1: Baseline Model	
Variables	Required education	Undereducation	Overeducation
Female	-0.023	-0.087***	0.111***
Time to Proficiency	0.023**	0.021***	-0.044***
Age	-0.002	0.006	-0.004
Agesq	-0.000	-0.000	0.000
Occupation(High skilled white collar as reference dummy)			
Low Skilled White Collar	-0.186***	-0.076*	0.261***
Crafts & Related Trades	-0.169***	-0.124**	0.294***
Elementary Occupation	-0.303***	-0.162***	0.465***
Skilled Agriculture	-0.304***	-0.184***	0.488***
Education: No formal education as reference dummy			
Primary Education	-0.624***	0.105**	0.518***
Lower secondary	-0.382***	-0.118**	0.500***
Upper secondary	-0.343***	-0.227***	0.570***
Higher(Tertiary)	-0.391***	-0.272***	0.662***
Married	0.079*	0.114	-0.091*
Parental involvement	0.053	0.032	-0.061
Number of Observations is 2,987. *** p<0.01, ** p<0.05, * p<0.1;n=2063			

This finding contrasts the study by Kupets (2015) who found in Armenia that married individuals are less likely to be overeducated than both single and divorced workers but gains support with empirical findings from Georgia where marital status is statistically significant for undereducation. The implication of our findings is that married people may have the burden of economic responsibility shared among the partners and therefore an observed married worker may not necessarily overeducate herself since the income earned from the required education could be supplemented by additional family income. In such a case, they could leverage other human capital endowments like experience rather than additional educational investment. Resultantly, their tendencies to be overeducated are less and undereducation is high. The reverse might hold for single and divorced workers who may require additional educational investment beyond the minimum required level in order to boost earnings and maintain job/income security.

Irrespective of how long or short it takes urban workers to learn on the job, the results affirm the statistical robustness of time to proficiency in explaining mismatch. For both over and undereducated, time to proficiency explains mismatch but in opposite directions. Whereas it in-

creases the incidence of undereducation, it minimises the extent of overeducation. From Table 2, relative to those with less than one-month proficiency in their field of work, workers who spent over six months to catch up have 13.7% likelihood of being undereducated and 25.1% less chance to be overeducated. This means that the longer it takes urban workers to upgrade their skills, the lower the degree of being mismatched. The observed positive relationship with undereducation and negative with overeducation suggests that workers that are more educated may require less on-the-job training and therefore have shorter time to proficiency while less educated workers may supplement their formal education with job experience often acquired through on-the-job training and thus requiring longer time to proficiency. This could imply that overeducation might be transitory since workers with different years of education could be made to perform the same or similar task if their human capital can be augmented to perform the same job. This finding corroborates the argument of Sloane et al. (1996) with the view that workers that require a long time to proficiency in view of potential losses from a bad match are more placed to be overeducated.

There appears to be mixed evidence on the role of education in determining mismatch. Whilst at all levels of education, there is a significant probability of being overeducated; education seems to reduce the likelihood of being undereducated as indicated in the baseline model (Table 2). In the absence of controls, observed urban workers with primary education relative to those with no formal education are 48.9% more likely to be overeducated compared to 11.1% chances of being undereducated. A key observation is that the higher the level of education, the greater the likelihood of being overeducated (48.9% for primary, 49.5% for lower secondary, 57.4% for upper secondary and 68.9% for tertiary level-as evident in Table 2). Intuitively, workers respond to the signalling prospects and benefits of higher education-higher incomes, job security, secured tenure etc- and therefore might undertake more educational investment to maintain their position in the job queue and potential for career progression. This finding is line with Herrera and Merceron (2014) work on ten African countries confirm that having a high level of education correlates with overeducation whereas urban workers with low level of education correlates with undereducation. The evidence also confirms Flisi et al. (2014) whose studies on selected European countries that having a higher level of education implies higher possibilities of overeducation rather than being matched.

The type of one's occupation greatly affects the mismatch probabilities in urban Ghana. The directional impact of this variable seems to be at opposites with respect to undereducation and overeducation relative to being well matched (Table 2). All occupational groups significantly have lower mismatch tendencies with regard to undereducation but in the case of overeducation, the tendencies are high in determining mismatch relative to highly skilled white-collar jobs. Whereas low skilled white-collar workers have the least incidences of over and undereducation (8.4% and 24.5% in Table 2), the skilled agriculture group have the highest predisposition of mismatch-both in the case of over and undereducation (19.7% and 48.1% respectively in Table 2).

Further evidence from the baseline results shows that urban workers in low-skilled white-collar occupations have higher predisposition of being overeducated relative to their counterparts in the high skilled group. This evidence gains support from Flisi et al. (2014) in a study on selected European countries that the higher the skill of the occupation, the lower the likelihood of being overeducated rather than matched. This suggests that those in the lower-skilled group may need additional educational investment to enhance their signalling potentials and use overeducation as a hedge for job security as postulated by the job competition theory. Consequently, rather

than suffering low job satisfaction/remuneration and potential of being displaced, overeducation becomes a defensive necessity for the low-skilled worker. Conversely, the high-skilled category workers might as a choice leverage their high human capital signalling trait and not necessarily pursue higher education beyond what is required for the job since the higher echelons of job benefits may accrue to them.

The Effect of Controlling for Skills

Table 3 presents the results of the multinomial logit with controls for two types of skills- cognitive skills and job-specific skills. The cognitive skill variable is a composite index constructed through a factor analysis of three skill measures-reading, writing and numeracy skills. The job-specific skill is indexed by the intensity of computer skill usage on a scale of zero (0) to four (4) indicating no skill usage to high skill usage.

Cognitive skills significantly explain overeducation but not so for undereducation. The results show that the more adept urban workers are in their cognitive ability (reading, writing and numeracy), the less likely they are to be overeducated and more prone to being well matched. Indeed, with no statistically significant effect of cognitive skills on undereducation urban Ghanaian workers are responsive to their skill endowments in terms of their status of being mismatched or otherwise.

Whilst computer skill use does not significantly explain undereducation tendencies, it showed statistically significant effect on overeducation in an inverse direction. Relative to urban workers without computer usage, those who use computer in medium and high intensities have significantly lower chances of being mismatched specifically being overeducated (Table 3). In terms of the impact on overeducation, the likelihood increases with the intensity of the skill use. Of all the computer skill use groups, it is only the high-skilled intensity category that shows positive and significant likelihood of being well matched. This supports the view that workers with better skills tend to obtain matched jobs, while less talented counterparts are more likely to get jobs for which they are overqualified in terms of formal education. This evidence confirms Autor et al. (2003) findings that the adoption of computer-based technologies alters job skill demands to favour workers who hold a comparative advantage in computer skills.

Model 2: Control for Skills			
Variables	Required education	Undereducation	Overeducation
Female	0.001	-0.066***	0.065***
Time to Proficiency	0.021**	0.019***	-0.041***
Age	0.001	0.010**	-0.011*
Agesq	-0.000	-0.000*	0.000*
Occupational Groups(High skilled white collar as reference dummy)			
Low Skilled White Collar	-0.172***	-0.047	0.220***
Crafts &Related Trades	-0.145**	-0.095*	0.239***

Elementary Occupation	-0.277***	-0.134**	0.412***
Skilled Agriculture	-0.279***	-0.149**	0.429***
Education(No formal education as reference dummy)			
Primary Education	-0.564***	0.098**	0.465***
Lower secondary	-0.325***	-0.156***	0.482***
Upper secondary	-0.309***	-0.297***	0.607***
Higher(Tertiary)	-0.410***	-0.338***	0.748***
Married	0.013	0.003	-0.016
Cognitive Skills	0.033*	0.043**	-0.076***
Computer Skills Intensity(No usage as reference dummy)			
Low Usage	0.028	0.048	-0.077*
Medium Usage	0.066	0.067	-0.133*
High Usage	0.093*	0.117*	-0.211***
Number of Observations is 2,987. *** p<0.01, ** p<0.05, * p<0.1;n=2058			

Another compelling evidence in the face of controls for both cognitive skills and computer skills generates mixed results for the explanatory power of time to proficiency in explaining mismatch possibilities. Whereas the impact diminishes in the face of cognitive skill control, it magnifies in the presence of computer skills control. This variable captures the temporariness or otherwise of mismatch. If it is positively related to undereducation and negatively related to overeducation, then it implies that overeducation is transitory and the reverse is valid. As we control for skills in the model, females tend to exhibit positive overeducation traits relative to males, with shrinking magnitude and no statistically significant effect. The impact on undereducation tendencies however remains statistically significant and maintains the same direction, albeit with lower magnitude effect compared to the baseline model.

Similar to the findings in the baseline model, married workers relative to unmarried demonstrate positive and significant undereducation traits with an even higher magnitude effect of 0.041 in the skill-controlled model against 0.038 in the baseline model. In terms of overeducation however, the signs differ with lower likelihood for married workers relative to the reference category, although statistically not significant. On the contrary, those who are widowed relative to the single or never married appears to have greater mismatch possibilities both for over and undereducation. Intuitively, it could be inferred that possession of the right cognitive ability and computer skills reduces the job-matching friction and therefore dissipates the potential for education over and above the required level.

Even in the face of controls, occupational groups still matter in determining mismatch. For all occupational groups except the low skilled white collar, the size of the marginal effect on overeducation diminishes compared to the baseline model (although the sign and statistical significance remains consistent). Being in a low skill white-collar job relative to high skilled white collar consistently increases the chances of being overeducated. In a similar fashion, being in crafts and related trades significantly and consistently decreases the chances of urban workers

being mismatched. This effect however increases in magnitude with further controls for cognitive and computer skills usage in the case of undereducation. For overeducation, the effect seems to be in congruence with the findings in the baseline model.

Education continues to be a decisive element in influencing mismatch possibilities. In the face of skills control, workers with primary education and lower secondary relative to those with no education demonstrate positive and significant overeducation traits but the magnitude of this effect is lower compared to the baseline model. This means the addition of skills compensates for education at that level and hence reduces the likelihood of being excessively mismatched (see Table 3). For upper secondary and tertiary level workers, the introduction of skills exacerbates their mismatch tendencies given their higher overeducation marginal effects compared to the baseline model (76.4% as against 68.9%). The intuitive induction for this observation is in tandem with the arguments proffered in the baseline model.

CONCLUSIONS AND POLICY THOUGHTS

We have examined the determinants of educational mismatch for employed workers in the urban Ghanaian labour market. The empirical analysis was based on cross-sectional data from the World Bank STEP survey conducted in 2013. The worker-self assessment approach to measuring educational mismatch was used.

The present analysis has revealed that job mismatch is a multidimensional phenomenon influenced by a set of personal, employment and job specific characteristics. The recorded incidence of overeducation in most cases does not lend credence to the fact that the educational expenses be lowered. The key implications from this study are that the issue of mismatch present itself more of overeducation within the Ghanaian context. This finding suggests that there are more people within the Ghanaian labour market space whose level of education is higher than what is required on the job and consequently cannot find the appropriate job placement. As a policy measure in this regard, it is proposed that demand for higher skill jobs be stimulated so that talents and excess education do not go waste. This could be done through investments in new technologies and products activated through financial incentives. The evidence also shows the significance of time to proficiency in determining mismatch, implying that no matter the level of education attained, there is still some level of on-the-job training and competency-based upgrading that must be done to fit the worker to the job. On hindsight of overeducation coupled with the above evidence, it can be implied that the focus of training agents (educational and vocational bodies) should be more on the quality of attained skills and not necessarily about large numbers that are turned out.

One potential limitation and grey area for future research is to examine the mobility dimension of mismatch. Given the possibility that some available jobs may require certain skills which may be available but cannot be filled due to labour immobility, policymakers at both the national and the local level must, of course, factor mobility in when assessing mismatches and pondering an appropriate policy response and employers also have a role to play in overcoming mismatch caused by lack of mobility.

Another area of interest in the future will be to examine the relationship between education mismatch among graduates and different field of studies over time. This is however contingent on the availability of a panel data which requires more than one wave of data collection. This will provide grounds for comparative evidence on how mismatch differs along the course of study and degree of welfare implications that may be associated.

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APPENDIX

HAUSMAN IIA TEST (On the basis of the Reported Results)

Test: Ho: difference in coefficients not systematic

$$\chi^2(36) = (b-B)'[(V_b - V_B)^{-1}](b-B)$$

$$= 4.16$$

$$\text{Prob} > \chi^2 = 1.0000$$

($V_b - V_B$ is not positive definite)

Implication

A significant test is evidence against Ho.

If $\chi^2 < 0$, the estimated model does not meet asymptotic assumptions.

From the test, since the $\chi^2 > 0$, the estimated model meets asymptotic assumptions and thus IIA has not been violated, meaning the multinomial logit is appropriate.