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Job creation fragility and transition to work in Uganda: Evidence from parametric and non-parametric duration models

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Abstract

Job creation continues to be a prime objective of governments both in developed and emerging nations. However, transition to work represents a crucial yet insufficiently explored aspect within the domain of labour and employment planning. With a strong emphasis on job creation, this study explores the factors that influence the length of the transition period to first employment in Uganda. Using a combination of parametric and non-parametric duration models, the results show that the transition period to first employment is influenced by the country's ability to create jobs and the skills of the labour force. According to the study, the country's existing capacity for employment generation is associated with a lengthier transition period. This is due to the extremely constrained job creation environment and the high level of economic fragility. The study also showed that individuals who worked as technicians experienced unemployment for shorter periods than people who worked as professionals. The study consequently urges the government of Uganda to make employment creation a priority by incorporating employment targets into the nation's macroeconomic framework. Second, government policy should encourage the uptake of technical and vocational skilling, which is consistent with a shorter transition period to employment.

1. Introduction

The study investigates the drivers of the transition¹ duration to employment with a major focus on job creation. Job creation remains one of the top priorities of governments in both developed and developing countries. However the transition to work is equally another complicated subject matter in the field of labour and employment planning (Manacorda et al., 2017). Transitioning to work is a critical stage in an individual's working life and thus, the probability of ever finding stable employment is of particular concern. Lengthy transition duration imposes a range of costs both to the individual and the society as well. With the rising fragility of the global economy especially in terms of economic growth and job creation, many people especially the youths and women are at high risk of joblessness, underemployment, informality, and low wages due to a lengthy transition period to work (Mathys, 2019).

According to UNICEF (2019), the drivers of the transition to employment are both proximate and the underlying causes, and these shape labour market outcomes. Proximate causes are the demand and supply side factors that affect the transition length to employment. The main demand side factor is the availability of jobs and to substantially improve the labour market outcomes, the economy should be able to create adequate, productive and decent work opportunities for the labour market entrants. On the other hand, supply factors include the availability of skills and competencies demanded by the labour market. The underlying factors are the macro, meso, and micro factors that influence the demand and supply sides of the labour market via their effect on the proximate factors. These may include, family background,

¹The International Labour Organization (2005) defines school-to-work transition as the passage of a young person from the end of schooling to the first fixed-term or satisfactory employment. The European Centre for Development of Vocational Training defines transition to work as the process of moving from education or training to employment. The OECD (1996) defines the transition from school to work, as the period between the end of compulsory education and reaching full-time and stable employment. Mastercard Foundation defined school-to-work transition as a process in which youth acquire the skills to make decisions in their job search that maximize their options and enable them to start an employment trajectory that improves their livelihood. In this study, we defined transition to work in line with the International Labour Organization (2005).

individual attributes, institutions, markets, and culture to mention but a few (UNICEF, 2019). However, many studies on transition length to employment have focused more on the supply side as well as the underlying factors (Egessa *et al.*, 2021; Malombo, 2020; Awad, 2020; Kintu *et al.*, 2019; Kakooza *et al.*, 2019; Ssewanyana *et al.*, 2018; Lakuma *et al.*, 2016, and Byamugisha *et al.*, 2014) among others. Very few and in many cases qualitative studies have examined the job creation capacity and its impact on transition length to employment. Investments aimed at increasing the attainment of higher levels of education and building a skills base may not yield optimal benefits if there are not enough productive and decent work opportunities in the economy. This may instead result in large numbers of educated unemployed youths, underemployed and discouraged. Job creation is thus very critical in achieving economic and social development goals such as poverty reduction and improved standards of living. This demonstrates why job creation remains one of the top priorities of governments and policy makers both in developed and developing countries (Bandiera *et al.*, 2022).

The prioritization of employment creation is informed by a predominant supposition that employment creation reduces poverty directly by increasing household incomes, and indirectly by stimulating the economy through the creation of demand (Merotto, 2019). It is presumed that employment creation promotes stability by reducing incentives to participate in conflicts, and by legitimizing the state, as well as supporting the institutions and processes critical for the effective functioning of a state thereby enhancing economic activity and further employment growth. In this way, employment creation can contribute to a virtuous cycle of poverty reduction and improved stability, with mutually reinforcing outcomes (NPA, 2017 & 2022; UNICEF, 2019; and Awad, 2020).

The unprecedented slowdown of the global economy has already hit hard Uganda's economic growth in all the major economic sectors and this has decelerated the job creation capacity of the country. The disconnect between economic growth and job creation predates the recent global shocks and has been discussed earlier (Bbaale, 2013). However, over the past decade, a lot has continued to change. Economic growth is no longer high enough to create more and better jobs. The economy registered a decline in real GDP growth, especially after the COVID-19 pandemic. Output growth in the services sector dropped from 9 % in FY2018/19 to 3.5% in FY2020/21. Similarly, industry output growth declined from 5.8 % in FY2018/19 to 2.8 % in FY2020/21 with a slight improvement to 3.8% in FY2021/22 (NPA, 2022). The Employment and Skills Status Report (ESSR) by the National Planning Authority (NPA, ESSR 2022) indicates that during the period 2015/16 and 2019/20, Uganda's economy created approximately 1,600,000 jobs, translating into an average of 320,000 new jobs created per year, while during the period 2020/21 and 2021/22, the economy created about 603,000 new jobs translating into an average of 301,600 new jobs created per year. This illustrates vast fluctuations in the employment creation capacity of Uganda's economy which has implications on the transition duration to work (NPA, 2022).

The country's total formal sector jobs are estimated at 2.3 million and the public sector employs about 4.0 percent of the labour force (400,000 public servants), contributing about 17 percent of the total formal sector jobs (NPA, 2022). Agriculture and fishing remain the concentration areas of private sector employment accounting for about 69.4 percent of the total private sector jobs, manufacturing only accounts for 5.6 percent of total private sector employment, trade and repairs (8.9 percent), hotels and restaurants (2.0 percent), transport and communication (2.3 percent), construction (2.0 percent) while education (3.0 percent). The majority of Uganda's labour force is employed in the informal sector (about 85 percent of total employment representing about 13.3 million working population. The informal sector in Uganda generates more wage employment than paid-employment opportunities but largely operates small and micro enterprises (Byamugisha *et al.*, 2014). Additionally, the informal sector entities are characterized by a lack of final accounts, they are unregistered and do not have permanent addresses. Therefore, many new labour market entrants that fail to make it to the very few formal sector jobs end up wandering in the informal sector resulting in underemployment, underpayment and other sorts of exploitation. With this kind of job creation fragility, it is important to investigate its impact on the transition duration to employment to contribute to the debate and also inform government policy on reducing the transition period.

Most studies that have analyzed the transition to work have mainly focused on individual characteristics such as gender, age and education, but little is done to establish the extent to which the job creation capacity affects the transition dynamics. Yet, understanding the dynamics of the transition to employment is crucial in informing government priorities as well as managing and enhancing efficient resource use. The ease with which young people can find work has a lifelong impact on both the lives of individuals and the general labour market prospects (Mathys, 2019). Lengthy transition durations translate into negative labour market outcomes in terms of increased poverty and vulnerability, lower employability, lower wages and a higher number of people remaining out of the labour force also known as the "discouraged labour force" (Manacorda *et al.*, 2017). On the other hand, young people who can find decent employment are more likely to establish positive pathways throughout their working lives. However, finding employment remains problematic in many developing countries including Uganda, especially for the young generation (Mathys, 2019). Previous studies have highlighted the role of both macro and micro-level factors in determining the transition to employment duration in Uganda (Ahaibwe & Kasirye, 2015; UBOS, 2016; Egessa *et al.*, 2021). Nevertheless, the extent to which job creation affects the school-to-work transition has not received much attention, especially in the context of

a developing country like Uganda where the labour force continues to grow at a rate faster than the rate of job creation. Statistics show that Uganda has one of the youngest and fastest-growing populations in the world and is among the top four (4) globally (NPA, 2022). This is coupled with limited backward and forward linkages that have reduced the speed of labour movement from agricultural subsistence activities and non-wage work. Economic growth and the structural transformation registered in the past have not resulted in a sufficient structural transformation in employment. The demand for wage workers in the private sector has not kept up to speed with the growth in the labour force. More jobs have continued to come from smaller firms, and fewer jobs are coming from large firms (Merotto, 2019). The rationale of this study is to examine the determinants of transition duration to work in Uganda with a major focus on job creation.

2. Empirical Literature

Several empirical studies have examined the drivers of transition to work length both globally and regionally. Although at the domestic level, some substantive work has been done, the majority have focused on studying individual characteristics such as educational attainment, gender, age, and place of residence among others (Bandiera et al., 2022; Egessa et al., 2021; Malombo, 2020; Awad, 2020; Kintu et al., 2019; Kakooza et al., 2019; Ssewanyana et al., 2018; Lakuma et al., 2016, and Byamugisha et al., 2014). In addition, most of these studies have concentrated on the supply side factors with less effort towards understanding the demand side of the labour market.

In a recent study by Izzo et al. (2022), the role of Universities in student transition to work was analysed using qualitative techniques. The authors found that the role of universities in engagement, motivation and supporting students in the university-to-work transition is paramount. However, the study was mainly qualitative and lacked econometric rigour. On the other hand, Cheong & Narayanan (2020) studied the factors affecting the transition from university to work in Malaysia using probit estimation techniques and data from 441 employed graduates. They showed that the transition process is eased by mostly personal endeavours such as post-graduate studies and also found a negative association between having a public university qualification and the time taken to secure the first permanent job. However, the study was not based on a nationally representative sample, the findings were merely a reflection of the attributes favoured in the urban job market and did not look at the link between the length of the transition period and longer-term career outcomes.

Similarly, Pastore et al. (2021) investigated the determinants of the school-to-work transition in Italy and some other European countries using a Cox survival model. They established that the length of the transition to a stable job in Italy was around 30 months compared to less than one year in other European countries. They further found that women had a longer transition period than men and that a tertiary degree increased the hazard rate. However, in this study, unobserved heterogeneity was not controlled for the unobserved effects other than covariate effects that influence the transition duration length. Mathys (2019) provided an analysis of youth labour market transitions across a set of 60 countries using quantitative and descriptive approaches. The study found large variations across countries in the school-to-work transition with observed gender gaps implying that the completion of the transition process is easier for young men than for young women. However, the study was mostly qualitative and lacked methodological rigour.

Alikaj & Shehaj (2016) investigated the determinants of transition from school to work in Albania using survival analysis models and established that the field of education, age, and family background are important determinants of the transition towards the first job in Albania. Relatedly, Salas-velasco (2007) studied the time it takes to obtain the first job in nine European countries using duration models and noted significant differences between Northern and Southern Europe in the difficulty of getting a first job. The findings indicated that individual characteristics like the field of study and other socioeconomic backgrounds, as well as individual job search, have a relationship with the likelihood of finding a job. However, the study did not control for unobserved heterogeneity other than covariate effects that influenced the transition length. Corrales-herrero & Rodriguez-Prado (2004) studied the transition duration for Spain using a discrete proportional hazard model. Their findings indicated that the duration to a first good job was highly correlated with educational attainment and the field of study. However, like other reviewed works, this study did not also control for unobserved heterogeneity and its definition of transition duration success in terms of getting a good and full-time job lasting at least more than six months leaves out so many people, especially the youths who get into part-time employment. Evidence from Sub-Saharan Africa shows that youths face several challenges when negotiating their move to first employment mainly because of their under educational achievement which makes them engage in low-quality jobs to secure their living (Awad, 2020). Nilsson (2019) studied the school-to-work transition in developing countries and found that, education was not always associated with shorter durations to first employment, and that women experienced longer transitions. Manacorda et al. (2017) analysed the pathways from school to work in the developing world using the proportional hazard Weibull distribution as well as the Generalised Least Squares (GLS) estimation. The findings indicated that the transition durations were slightly shorter in low and middle-income countries than in advanced

economies. Available empirical evidence from Kenya shows that the type of course studied at the university and the overall score attained by graduates are very significant determinants of the transition from school to work (Malombo (2020). The study showed that graduates who studied STEM courses in Kenya were 68% less likely to remain unemployed after graduation compared to graduates who studied non-STEM programs.

Evidence from Uganda indicates that most scholars have mostly focused on the individual characteristics of people in transition and have concentrated mostly on the supply side factors with less effort towards understanding the demand side of the labour market. For example, Tulibaleka *et al.* (2021) explored the experiences and implications of transitioning from school to work for university graduates and they found that upon graduation, young men and women needed family support for their transition to work, otherwise, they risked prolonged unemployment and falling into the Not in Employment, Education or Training (NEETs) category. While the study was appealing, it was only conducted around Kampala city and thus not nationally representative. Secondly, the authors relied on mere qualitative and exploratory methods which lack empirical rigour. On the other hand, Ssewanyana *et al.* (2018) investigated the drivers for early labour market transitions of young women in Uganda and found that education attainment impacted early labour market entry in the first three years. However, the study was only limited to young women and was not purposely undertaken to determine the transition length to employment and the factors that account for the differences.

Similarly, Byamugisha *et al.* (2014) analysed the labour market transitions of young women and men in Uganda and found education and training to increase the productivity and employability of young people, but young men had higher chances than women of completing the transition to stable and satisfactory employment. However, the study focused on the supply-side intermediation to enhance the school-to-work transition necessitating the need to investigate the demand side as well. However, Kintu *et al.* (2019) identified strategies for facilitating the transition of TVET graduates to the world of work in Uganda. They found the use of employment agencies, provision of start-up capital as well and industrial attachment programs significant. However, the study was more qualitative and did not provide insights into the determinants of school-to-work transition. Lastly, Geo-Jaja (1988) analyses information asymmetry and the role of education and institutional factors in the transition process and concludes the need to improve and increase information flow between the educational system and the world of work.

In conclusion, the review of literature has demonstrated a lack of convergence among scholars about determinants of transition to work both at the macro and micro level, however, it has provided valuable insights into the multifaceted nature of this critical life stage and demonstrates that successful transition is influenced by a combination of individual, educational, economic, sociocultural and labour market frictions factors. Many studies have stressed the crucial role of education in facilitating the transition process whereby higher levels of education and vocational training are generally associated with a faster transition into employment (Malombo, 2020; Nilsson, 2019; UBOS, 2016; O'Higgins, 1997; Salas-Velasco, 2007). Others have stressed the misalignment between the skills acquired in education and those demanded by the labour market as a significant challenge in facilitating a faster transition into employment (Kintu *et al.*, 2019; Allison, 1982; Malombo, 2020; NPA, 2022).

A substantial body of literature stresses the role of gender disparities in the school-to-work transition, whereby young women often face wage gaps, occupational segregation, and barriers than males especially in male-dominated industries (Egessa *et al.*, 2021; Kintu *et al.*, 2019; Malombo, 2020; Allison, 1982). On the other hand, a couple of studies find that access to mentorship, career guidance, and support services significantly enhance the transition experience making the young people navigate the complexities of the labour market. Young people from disadvantaged backgrounds, including low-income families, often face more substantial barriers and have reduced access to quality employment opportunities (UNICEF, 2019; Byamugisha *et al.*, 2014; Cheong & Narayanan, 2020; Mortensen, 1970; Malombo, 2020). Yet another body of literature concludes that beyond formal education, employability skills such as problem-solving, communication, and adaptability are highly valued by employers and thus enhance the transition process (Awad, 2020; Lakuma *et al.*, 2016; Pastore *et al.*, 2021; Kakooza *et al.*, 2019; Tulibaleka *et al.*, 2021; Lakuma *et al.*, 2016; Egessa *et al.*, 2021).

However, despite considerable attention to literature about school-to-work transitions, the importance of job creation in facilitating the transition process is under-studied. While formal education is a critical aspect of the transition, some literature overly emphasizes educational factors and has tended to focus on the transition experiences of a specific demographic, often young adults, especially in Western, industrialized nations. Some studies have heavily relied on self-reported data, which is subject to social desirability or recall bias and most adopt qualitative techniques. Therefore, there exists an outstanding gap in unpacking the underlying dynamics and pathways through which job creation influences the transition process which this study addresses.

3. Methodology

3.1 Theoretical framework

The theoretical framework of this study is underpinned by the Standard Search and Matching theory by Mortensen & Pissarides (1999). The theory provides a rationale for the existence of equilibrium unemployment by focusing on the search and matching aspect. Workers searching for jobs, firms searching for workers, and both sides being matched with each other. According to the theory, the labour market is subject to friction implying that workers and firms cannot meet instantaneously but must go through a time-consuming search process. The theoretical framework of the Search and Matching model considers the probability of leaving unemployment as a product of two probabilities: the probability of receiving an employment offer and the probability that the employment offer is accepted.

The probability of receiving a job offer is determined by factors that make a job seeker more attractive to potential employers in terms of personal characteristics, family background, educational attainment and specialisations as well as factors like macroeconomic conditions. The probability that the employment offer is acceptable depends on factors such as the cost of continuing the job search, the individual reservation wage, family background and personal characteristics as well as macroeconomic conditions. Thus, each person compares the wage offer to his reservation wage and the optimal search strategy consists of either accepting the job offer if the wage offer is greater than the reservation wage or rejecting it otherwise (Mortensen & Pissarides, 1999).

However, the search and matching framework has been criticized for being unable to match job seekers and job vacancies since it was largely theoretical and based on calibrations. From an empirical point of view, most researchers have modelled transition durations by postulating the standard duration or the Hazard models. The hazard model is a popular way of analysing duration data since it can handle censored durations as well as time-varying covariates and allows the examination of duration dependencies. The standard duration of the Hazard model thus provided the analytical framework adopted in this study and is elaborated in the section that follows.

3.2 Analytical framework

The analytical framework of this study is based on the hazard-based duration models as presented by Allison (1982) to establish whether job creation capacity explains the current transition period to work in Uganda. The hazard-based duration model represents a class of analytical methods which are appropriate for modelling data that have an end-of-duration occurrence as their focus, given that the unemployment duration has lasted for some specified time (Allison, 1982 and Wheatley-Price et al., 2020). The main objective of the duration model is to evaluate the behaviour of a continuous non-negative variable, T , that provides information about the time spent in the target state until an event occurs, that is, the duration to the first job (Corrales-herrero & Rodriguez-prado, 2004). We define the hazard function as,

$$h(j_t) = P(T = t_j/T \geq t_j) \quad (1)$$

Equation (1) measures the probability that an individual exits the state at time t_j , conditional to not having left till the moment immediately before. The hazard function is also related to the survival function, which represents the probability that an individual is in the state at least for duration t_j , in line with Wheatley-Price et al., (2020), that is,

$$S(t_j) = P(T \geq t_j) \quad (2)$$

To understand the performance of the time (T) variable, non-parametric methods (Kaplan-Meier estimator) can be used to estimate the survival function and help to identify the factors that affect the duration, but they do not provide accurate estimates due to the non-control of the correlation among variables. For this reason, parametric hazard models such as the Weibull regression, Gompertz regression and Cox proportion regression are adopted in this study in line with Collett (2003), Lawless (2003) and Kleinbaum & Klein (2005).

For example, one of the defining characteristics of the Cox regression is to separate the time effect, (t) from other factors' effect collected into a vector of explanatory variables X , in specifying the hazard function as,

$$h(t; x) = h_0(t)\rho(x) \quad (3)$$

where $h_0(t)$ is an unknown baseline hazard function that expresses the behaviour of the hazard function for a mean

individual (*when* $\rho(x) = 1$) and $\rho(x)$ is a function of a set of explanatory variables (x) usually defined as $e^{-x\beta}$ as adopted by Corrales-herrero & Rodriguez-Prado, (2004). In this specification, the effect of the explanatory variables is to multiply the hazard by a factor which does not depend on duration (t). According to Allison (1982) and Lawless (2003), the discrete-time hazard function in the time interval (j) to leave the state can be written as:

$$\log[-\log(1 - h(t_j; x))] = \theta(t_j) + x\beta \quad (4)$$

Equation (4) is the discrete Cox-regression model sometimes called the complementary log-log model. However, there are other commonly used non-proportional discrete hazard models such as the logistic model as in equation (5):

$$\text{logit}(h(t_j; x)) = \theta(t_j) + x\beta \quad (5)$$

One feature of the model presented in equation (5) is that the hazard function is not constrained to belong to a specific parametric family. It is therefore possible to specify a distinct parameter for each duration interval. In equations (4) and (5), $\theta(t_j)$ provides information about duration dependence and it can be specified through a parametric or a non-parametric function.

Because the conventional assumptions on the form of the baseline hazard can bias the estimated effects, we initially considered a flexible hazard function that allows non-monotonic variation in the hazard rates. Alternatively, we have tried to look for the best suitable parametric function to the sequence of the $\theta(t_j)$ in line with Corrales-herrero & Rodriguez-prado, (2004). As such, the models presented in equations (4) and (5), assume that all the differences existing among individuals can be explained by the set of covariates.

However, since it is not possible to observe all the factors suitable to differentiate individuals, it is important to control for unobserved heterogeneity, otherwise, failure of its control may bias the baseline hazard as well as the estimated effects of the covariates. Unobserved heterogeneity is typically controlled for by using a parametric random distribution (Kaplan & Meier, 1958). A gamma distribution is a parametric distribution that is the most widely used for correcting unmeasured heterogeneity.

As a standard practice in duration models, we allow for unobserved heterogeneity incorporating a positive-valued random variable ϵ that is assumed to have a gamma distribution. The continuous hazard function therefore becomes,

$$h(t; x/\epsilon) = h(t; x)\epsilon \quad (6)$$

where $h(t; x)$ is the hazard rate depending on observable characteristics x and ϵ is an unobservable individual effect with unit mean, finite variance and distributed independently of t and x . By the same arguments, the discrete-time proportional hazard model with unobserved heterogeneity becomes,

$$\log[-\log(1 - h(t_j; x))] = \theta(t_j) + x\beta + \epsilon \quad (7)$$

where ϵ is the $\log \epsilon$ and for the logit model with unobserved heterogeneity becomes,

$$\text{logit}(h(t; x)) = \theta(t) + x\beta + \epsilon \quad (8)$$

Equations (7) and (8) provided the underlying analytical framework adopted by this study to understand the determinants of the transition length to the first-time full-time job and also establish if there is evidence of duration dependence after controlling for unobserved heterogeneity. The shape of the hazard function has important implications for duration analysis. It can take the: (1) Parametric shape (Weibull distribution); (2) Non-parametric shape (Kaplan-Meier Estimator), or (3) Semi-parametric (Cox Hazards Function) shape. Thorough scrutiny of the data was undertaken to determine the most appropriate technique for analysis in this study.

3.3 Data sources and variables

The study utilized the latest two sets of the Uganda National Household Survey (UNHS 2029/20 and 2016/17) collected by the Uganda Bureau of Statistics (UBOS). This was supplemented by the findings of the Labourforce Survey 2020/21 and the School to Work Transition Survey 2015/16 also collected by UBOS. The dependent variable of the study was Transition duration to work which was defined as the period it takes an individual to find the first fixed-term employment from the start of the job search exercise given the legal and minimum working age group. The main explanatory variable

or predictor variable of this study is “*Job Creation*” which we proxied by the *Jobs Growth Index*². Other control variables adopted include age; gender; marital status; education status; skills status; residence of the labour force (urban and rural), and occupations (professionals, technicians, craft workers, machine operators and elementary occupations). The definitions, measurement and *a priori* expectations of all the variables are highlighted in Table A1 under annexes.

4. Empirical results and discussion

4.1 The Non-Parametric results

The dependent variable of the study is the transition period (number of periods it took individuals to find a job) and the event (failure) of the study is transiting into employment or finding a job. Individuals were tracked from the 1st to the 60th periods (in months). They either found a job (the event occurred) or are still looking for work (censored). The number of subjects was 1,665; the time at risk (periods summed over the subjects) was 5346 (*see Table A2*). The number of failures in this study was 407 or 24% of the sample had failed while the incidence rate was 7.6 percent (*see Table A3*). Before estimating the parametric methods, we first compute the survivor function of the non-parametric estimate also called the Kaplan-Meier survival estimate in line with Kaplan & Meier, (1958) and Lakuma et al. (2016) which considers the right-censored spells. The Kaplan-Meier survival estimate function shows that the probabilities of transition duration are strictly nonincreasing over time. The Kaplan-Meier survival estimate indicates that as time lapses, the probability of individuals finding a job goes down from 90 percent in period one to 35 percent in period 7. At the end of the first analysis period, more than 90 percent are still surviving implying they have not found a job (*see Figure A.1*).

The Kaplan-Meier survival estimate functions for groups were also presented to differentiate between variables influencing the transition duration. The findings of the Kaplan-Meier survival functions for groups show that comparing the educated and the non-educated, educated people had a slightly lengthy transition period than the non-educated (*see Figure A.2*). This was in line with the study expectations since the non-educated often accept any job offer that avails its self since they do not possess any qualifications. Similarly, comparing the male and females, the females had a slightly higher transition period than their male counterparts and this was also in line with the study expectations. Given the cultural settings in Uganda, the males are taken to be more muscular and hardworking and have the responsibilities of looking after their families for those heading households therefore, they tend to accept any job offer regardless of the terms.

Comparing the rural and urban dwellings, the transition period is longer for the urban dwellers than is for their rural counterparts. The findings show that, at the end of period two, about 92 percent of the urban residents are still surviving, meaning that have not successfully found a job while only about 85 percent of the rural residents are still surviving, or have not successfully found a job. The findings are also expected due to a high urban unemployment rate and also since people living in rural areas are mostly farmers, and largely uneducated, they tend to easily get integrated into the rural economy either directly as farmers or indirectly through agriculture-related activities. In the same regard, the married and the non-married experienced significantly different probabilities of transition into employment. The marrieds have a lower transition probability than the non-marrieds and this can be linked to the differences in the responsibilities. The married have several ‘*push*’ (family responsibilities) and ‘*pull*’ (commitment to work) factors that facilitate their transition to work.

The observations used in the study were lined up from the first (1st) to the seventh (7th) period and we used seven (7) periods in the study (*see Table A4*). The results of the survival function as presented in the survival function indicate that at the end of the first period, about 91 percent of the sample were still surviving implying that they had not yet experienced the event of transiting into employment (*see Table A5*). The findings further show that even after period 6, an equivalent of five (5) years, more than two-thirds of the sample (66.2 percent) had not found or transited into employment. To ascertain whether there are no differences in the survival functions or the cumulative incidence of the event among the different individuals, we adopted the log-rank test approach. The results of the log-rank test confirmed that the survival functions are significantly different for all variables considered (*see Table A6*). The log-rank test compares the distribution of time until the occurrence of an event under the Null hypothesis that survival functions are equal. According to the results, the survivor functions equality for age groups, married versus non-married, females against males, educated versus non-educated, skilled versus non-skilled and rural versus urban residents were all rejected.

² We constructed the Jobs Growth Index at the industry level (for the 25 sub-sectors in line with Uganda’s National Systems of Accounts -NSA) using two sets of Uganda National Household Surveys (UNHS2019/20 & UNHS2016/17). To construct this index, we obtained the total number of jobs that were available in the survey year 2016/17 and survey year 2019/20. We divided the difference between the jobs of 2019/20 and 2016/17 with the jobs of 2019/20 to get this index.

4.2 The Parametric results

The parametric results of the study are presented in two parts; first, we present the parametric hazard ratios and then the parametric coefficients with their interpretation. Both the hazard ratios and the parametric coefficients formed the basis of the parametric estimations. In this study, the hazard rates and regression coefficients for three models (Weibull, Gompertz and Cox proportion) were produced and the selection of the most suitable model was based on a model selection criterion presented in Table 1.

Table 1: Model Selection Criteria

	Weibull regression model	Gompertz regression model	Cox proportion regression model
Akaike crit. (AIC)	48.891	58.328	114.319
Chi-square	18.077	11.591	5.330
Prob > chi2	0.006	0.072	0.502
SD dependent var	1.743	1.743	1.743
Mean dependent var	2.091	2.091	2.091

Source: Stata output computed by author

The selection of the most suitable model for analysis was based on both the Akaike Information Criterion (AIC) and the overall model statistical adequacy as provided by the Chi-square. The AIC is an estimator of prediction error implying that it provides information about the relative quality of each of the statistical models relative to others, hence providing a means for selecting the most suitable model. A statistical model with the lowest AIC offers the best fit and is thus selected. Results in Table 1 indicate that the Weibull regression model has the least AIC at 48.891 compared to the Gompertz regression model at 58.328 and the Cox proportion regression model at 114.319. Besides, the Chi-square of the Weibull regression model is significant at 1 percent, compared to the Gompertz regression model which is significant at 10 percent and the Cox proportion regression model which fails on statistical significance. Therefore, the Weibull regression model was chosen in favour of the others and the analysis of the results follows in the subsequent sub-sections.

4.2.1 Results of parametric hazard ratios

A hazard ratio is an outcome measure popularly used in time-to-event analysis and illustrates the probability that if the event being investigated has not already happened, it will occur in the next time interval. In other words, the hazard ratio measures how rapidly the subjects are failing or dying (in our case transiting into employment). A reduction in the hazard ratio means that survival is prolonged. A hazard ratio greater than 1 means that an increase in the explanatory variable is associated with a positive effect on the hazard function making it more likely for the event to happen (shorter duration of finding a job).

On the other hand, hazard ratios that are less than 1 imply that an increase in the explanatory variable is associated with a negative effect on the hazard function making it less likely for the event to happen (longer duration of finding a job associated with such explanatory variables). For the categorical variables like gender, occupations, skills and education in the context of this study, subtracting the hazard ratio from 1 provides a measure of the percentage change in the hazard between this variable and the reference category. Following the model estimations, the hazard ratios are presented in Table 2.

Table 2: Hazard ratios

Variable	Weibull regression hazard rates	Gompertz regression hazard rates	Cox proportion regression hazard rates
Age	0.966	0.971	0.975
Sex	6.153***	3.894**	2.470*
Residence	0.463	0.589	0.764
Marital Status	1.982	1.753	1.374
Job Creation	0.699***	0.748*	0.820
Education	0.538	0.596	0.721
Skills	7.810***	4.183**	2.505
Professionals	.406***	.217***	.792***
Technicians	22.015***	17.816***	8.692***
Craft workers	4.753***	4.4289***	3.794***
Machine Operators	1.765	1.743	1.972

*** $p < .01$, ** $p < .05$, * $p < .1$

While some hazard ratios for some covariates were statistically significant, some others were not. The hazard rates for, Sex, job creation and skills and occupations were significant and thus we proceed and interpret them based on the Weibull model. The hazard ratio for Sex is 6.15 and is significant at 1 percent. This implies that males have higher hazard rates than females making it hard for the event (finding a job) to occur for females. This implies that men have a higher probability of transiting into employment faster than women.

The hazard rate on the job creation variable is 0.699 and is significant at 1 percent. This implies that the current job creation capacity is associated with a higher hazard rate '*Ceteris Paribus*'. This finding implies that the current job creation capacity in the country is associated with a longer transition duration. This is so because of the very constrained job creation environment coupled with a high degree of economic fragility. The hazard rate for possession of skills is 7.810 and is significant at 1 percent implying that, individuals possessing skills are associated with an increase in the hazard rate. This means that the event is likely to happen (finding a job) for individuals possessing skills more than those who do not possess any (skills) as the base category. The probability of transition into employment is higher among those who worked as technicians and craft workers compared to those who as elementary workers (the base category). However, the probability of transition into employment is slower among those who worked as professionals compared to those who worked as elementary workers (the base category). The findings correlate with earlier studies such as Alikaj & Shehaj (2015); Omanyo & Ochieng (2020); Mathys (2019) Nilsson (2019); Tulibaleka *et al.* (2021); Egessa *et al.* (2021) and Pastore *et al.* (2021).

4.2.2 Results of parametric coefficients

Although results have been produced for the three different parametric regression models, results of the Weibull regression were favoured as highlighted earlier. A positive coefficient means that as the independent variable increases the time-to-event (meaning that it lowers the transition duration). However, a negative coefficient implies that the independent variable reduces the time-to-event, (meaning that it increases the transition duration making the event less likely to happen). The results that informed the analysis are presented in Table 3.

Table 3: Parametric regression model results

Variable	Weibull regression coefficients	Gompertz regression coefficients	Cox proportion regression coefficients
Age	-0.013	-0.017	-0.021
Sex	3.622***	2.621**	1.696
Residence	-0.324	-0.179	-0.113
Marital Status	1.022*	0.729	0.366
Job Creation	-0.544**	-0.447**	-0.32
Skills	2.056***	1.431**	0.919

Education	-0.62	-0.517	-0.326
Professionals	-2.361***	-2.344***	-1.333***
Technicians	3.843***	3.606***	2.162***
Craft workers	2.491***	2.436***	1.333***
Machine Operators	1.592***	1.557***	0.679

*** $p < .01$, ** $p < .05$, * $p < .1$

The results indicate that gender is a significant determinant of the length of the transition period. The males are associated with a faster transition into employment than the females, implying that females take longer and find it harder to find a stable job. This might be an indication of labour market discrimination based on sex. As regards marital status, the married experience a faster transition into employment compared to the non-married (reference category). The findings show that these two categories experience significantly different transition durations into employment and this can be linked to the differences in the responsibilities of the two categories which indirectly influence the decision to take the job.

Job creation is a significant determinant of the length of the transition period. However, the effect is found to be in reverse order. Although the coefficient on Job creation (-0.544) is significant at 5 percent, the impact is negative. This finding implies that the current job creation capacity in the country is associated with a lengthy transition duration into employment. This is very realistic since the country's job creation capacity has been very constrained with a high degree of fragility. A report by the National Planning Authority on '*Strategies for job creation*' indicated that the overall job creation of Uganda was dismal, with estimated employment intensity of growth at 0.04, which indicated that, for a percentage point increase in GDP, the economy only created 400 instead of 10,000 (NPA, 2017). The dismal, insubstantial and fragile job creation agenda across all sectors of the economy has continued to constrain the absorption of the increasing labour force into employment. Additionally, evidence shows that the country's total formal sector jobs are estimated at 2.3 million only. The public sector employs only about 400,000 public servants, contributing about 17 percent of the total formal sector jobs (NPA, 2022).

The coefficient on skills is 2.056 positive and is significant at 1 percent implying that, possession of skill increases the time-to-event (transition into employment). This means that the event is likely to happen (finding a job) for individuals possessing skills more than those who do not possess any (skills) as the base category. This is also in line with study expectations since skilled individuals are in high demand both in the public and private sectors and tend to get employment faster than those who do not possess any kind of skill. The occupation of individuals is also a significant determinant of the length of the transition period. The occupation variable was broken into professionals, technicians, craft and operators and each was created as a binary variable with elementary occupations as the base category. The findings showed that individuals who worked as professionals had a higher unemployment duration thus they terminated their unemployment slower than those who worked as elementary workers (the base category). However, individuals who worked as technicians and craft workers had a lower unemployment duration thus they terminated their unemployment faster than those who worked as elementary workers (the base category). This was in agreement with Alikaj & Shehaj (2015) and Corrales-herrero & Rodriguez-Prado (2004) who found that vocational courses offer better situations in the labour market than humanities. However, the study contradicts findings by Corrales-herrero & Rodriguez-Prado (2004); Salas-velasco (2007); Byamugisha *et al.* (2014) and Kintu *et al.* (2019) that gender does not significantly drive the transition to employment duration.

To establish whether the Weibull regression model was identified, stable and robust, we adopted Bootstrap Methods to assess the stability and robustness of the parameter estimates and establish if there are potential identification issues and results presented in Table A10 under annexes. The bootstrap results provided the confidence intervals which represent the range of values that the parameters were likely to fall within. The Bootstrap standard error distribution provided an estimate of the variability in the parameters and a larger Bootstrap standard error indicates greater uncertainty in the parameter estimate. The conclusion from this analysis was that the Weibull PH regression model was identified, stable and robust.

5. Conclusion and policy recommendations

In this study, we have analyzed the drivers of the transition duration to employment with a major focus on job creation using data from both the School to Work Transition Survey and the National Household Survey collected by the Uganda Bureau of Statistics. Both parametric and non-parametric techniques have been adopted. The number of subjects was 1,665; the time at risk or the periods summed over the subjects was 5346, the number of failures was 407 while the incidence rate was 7.6 percent. The Kaplan-Meier survival estimate which considers the right-censored spells indicated that the probabilities of transition duration are strictly nonincreasing over time indicating that as time lapses, the probability of individuals finding a job goes down from 90 percent in period one to 35 percent in period 7 the last period of our analysis.

The Kaplan-Meier survival functions showed that more than 90 percent of the individuals were still surviving implying they had not found a job at the end of the first analysis period. The Kaplan-Meier survival estimate functions for groups showed that educated people had a slightly higher transition period than the non-educated, and females had a slightly higher transition period than their male counterparts. The urban dwellers had a higher transition period than their rural counterparts. The married had a lower transition probability than the non-married. The results of the log-rank test indicated that the survival functions were significantly different for all variables considered and the equality of survival functions for the different age groups, married versus non-married, females against males, educated versus non-educated, skilled versus non-skilled and rural versus urban residents are all rejected.

The parametric estimated regression results indicated that job creation is a significant determinant of the length of the transition period although the effect was found to be in the reverse order. The findings indicated that job creation capacity in the country is associated with a longer transition duration into employment. This was justified by the very dismal and fragile job creation capacity of the country. Gender was also found to be a significant determinant of the length of the transition period as males were associated with a faster transition into employment than females. Regarding marital status, the married experienced a faster transition into employment compared to the non-married. The possession of skills was found to significantly affect the transition length as individuals possessing skills terminated unemployment faster than those who did not possess any skills. On Occupations, the findings showed that individuals who worked as professionals had a higher unemployment duration thus they terminated their unemployment slower than those who worked as elementary workers (the base category). However, individuals who worked as technicians and craft workers had a lower unemployment duration as they terminated their unemployment faster than those who worked as elementary workers (the base category).

In line with the above, the study recommends the need for the government of Uganda to prioritise employment creation by integrating employment targets into the country's macroeconomic framework. Employment creation should be a key performance indicator of the government and should be regularly reported. This will help to absorb the huge unemployed population, especially the youth and also reduce the lengthy transition durations. Secondly, government policy should encourage the uptake of technical and vocational training, which may be more aligned with available work opportunities and is therefore associated with faster transitions to employment. This can be through developing and operationalizing a Ugandan TVET brand as well as a TVET marketing and publication campaign to attract youths into TVET education.

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Appendices

Table A1: Variable Definition, Measurement and A priori Expectations

Variable and symbol	Definition	Measurement	A priori Expectations
Event	The event is an outcome that affects all individuals (job seekers) at some point during the transition to work period.	The event was measured by the transition to employment. The event of the study was finding a job. Individuals either found a job (the event occurred) or were still looking for work (censored).	The event is an outcome variable
Time (t)	Time is the dependent variable of this study and measured the transition period (in terms of the number of periods it took individuals to find a job)	Time was measured in terms of months. Individuals were tracked from the 1 st to the 60 th periods (in months)	Time is the dependent
Age	Refers to the period of a person's body	Cumulative Age of the Household Member	An increase in age is associated with a longer transition length.
Sex	Sex is the biological characteristic that distinguishes individuals as male or female.	In the context of this study, individuals were either Male or female	Females are associated with faster transition length.
Residence	Refers to the place or location where an individual lives, occupies or resides.	Dummy Variable (Urban or Rural) Residence	Rural residents are associated with faster transition length.
Marital status	Refers to an individual's legal or social relationship status in terms of marriage. It indicates whether a person is currently married, single, divorced, separated, widowed, or in another type of marital arrangement.	Dummy Variable (Married or Non-Married)	Non-married associated with faster transition length.
Education	Refers to the highest level of education that an individual has completed or achieved.	Dummy Variable (Educated or Not-Educated)	Educated associated with longer transition length.
Job creation	Refers to the process of generating new employment	Derived as the difference between the total number of jobs	Job creation is associated with

	opportunities within an economy or labour market	in the survey year 2019/20 and 2016/17.	shorter transition length.
Job Creation Index	It is a metric used to assess and quantify the level of job creation and employment growth. It is often employed to gauge the health and vitality of the labour market.	Derived as a quotient between the difference in the total number of jobs in the survey year 2019/20 and 2016/17 and the total number of jobs in the survey year 2019/20	Job creation is associated with shorter transition length.
Occupation	Refers to the specific job or profession that an individual engages in to earn a living or pursue a career and reflects their employment, role, and the tasks they perform in their work.	In this study, individuals worked as:	
		Professionals	Professionals associated with longer transition length.
		Technicians	Technicians associated with shorter transition lengths.
		Machine operators	Machine operators associated with shorter transition lengths.
		Craft Workers	Craft Workers are associated with shorter transition lengths.
		Elementary Workers	Base category

Table A2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Event	35264	.964	0.185	0	1
Age	35264	34.212	17.458	14	108
Sex	35264	1.537	0.499	1	2
Residence	35264	1.753	0.431	1	2
Marital status	35264	0.532	0.499	0	1
Education	35264	1.854	0.353	1	2
Managers	35192	0.003	0.059	0	1
Professionals	35192	0.023	0.15	0	1
Technicians	35192	0.007	0.084	0	1
Clerical Workers	35192	0.002	0.041	0	1
Skilled agriculture	35192	0.073	0.26	0	1
Machine operators	35192	0.016	0.127	0	1
Job creation	1645	1044.3	436.97	512	1645
Log_Jobs	1645	9.158	1.611	6.8	11.12
Jobs_growth_Index	1645	0.15	0.307	-0.58	0.82

Table A3: Table: Analysis time

Category	total	per subject			
		mean	min	median	max
no. of subjects	1665				
no. of records	1665	1	1	1	1
(first) entry time		0	0	0	0
(final) exit time		3.210811	1	3	7
subjects with gap	0				
time on gap if gap	0				
time at risk	5346	3.210811	1	3	7
failures	407	.2444444	0	0	1

failure _d:	event
analysis time _t:	time

	time at risk	incidence rate	no. of subjects	Survival time		
				25%	50%	75%
total	5346	.0761317	1665	5	7	.

Figure A.1: Kaplan Meier Survival Estimate

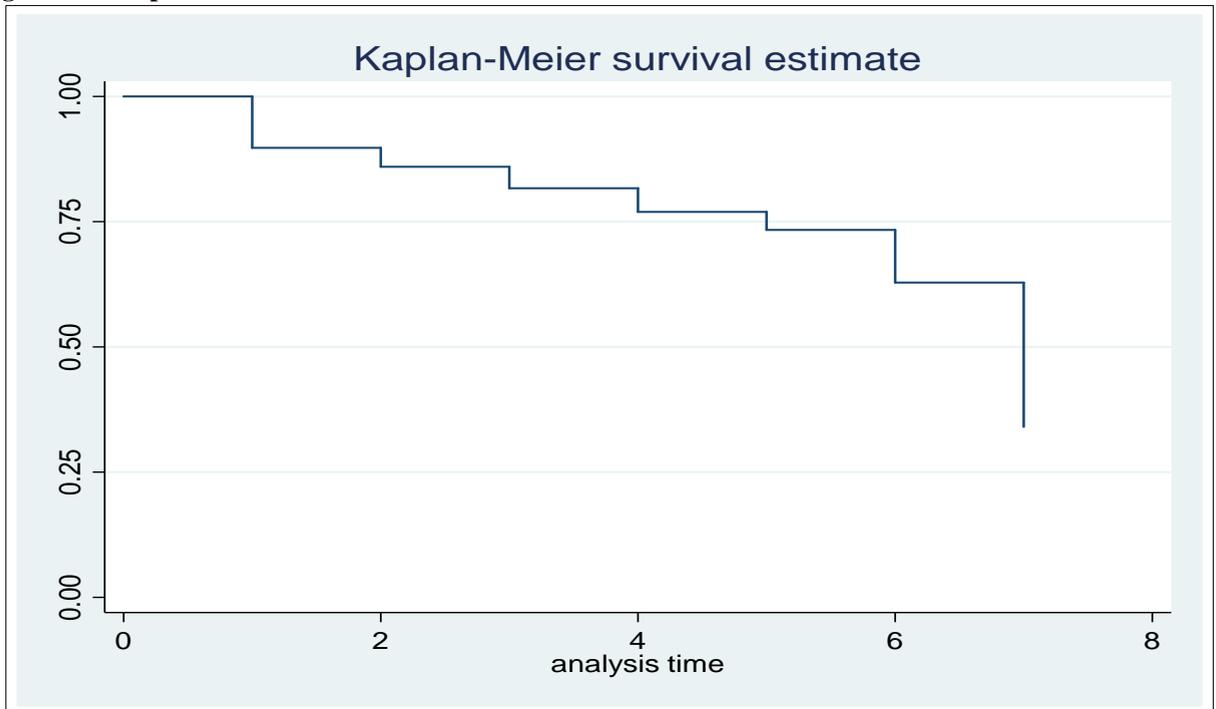


Figure A.2: Kaplan-Meier Group estimates of survival functions

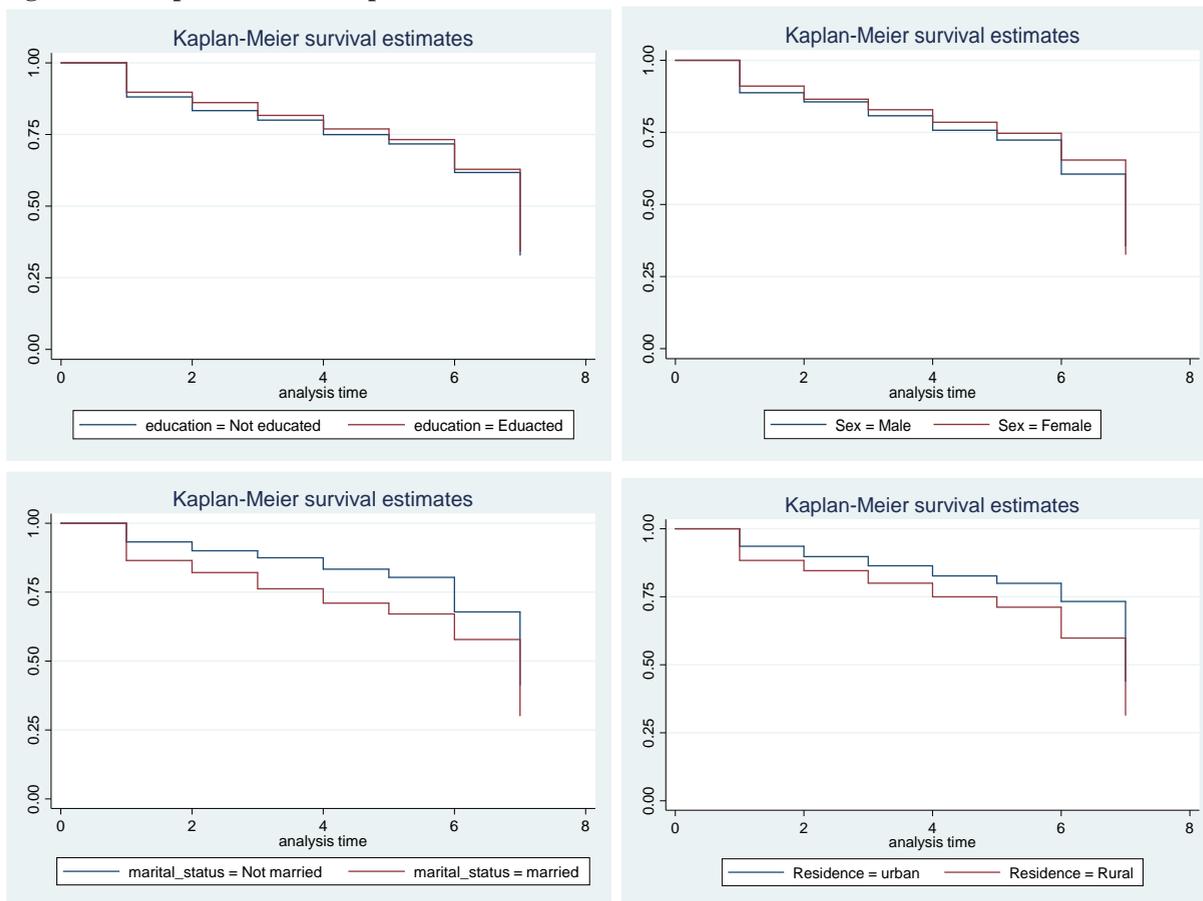


Table A4: Tabulation of time

For how long have you been without work and trying to find a job or start a business after	Freq.	Percent	Cum.
Less than 3 months	437	26.25	26.25
3 months to less than 6 months	244	14.65	40.90
6 months to less than 1 year	254	15.26	56.16
1 year to less than 3 years	336	20.18	76.34
3 years to less than 5 years	115	6.91	83.24
5 years or more	213	12.79	96.04
Don't know	66	3.96	100.00
Total	1,665	100.00	

Table A5: Survival function Table

Time	Beg. Total	Fail	Net Lost	Survivor Function	Std. Error	[95% Conf. Int.]
1	1665	174	263	0.8955	0.0075	0.8798 0.9093
2	1228	52	192	0.8576	0.0088	0.8393 0.8740
3	984	50	204	0.8140	0.0103	0.7928 0.8333
4	730	43	293	0.7661	0.0120	0.7415 0.7886
5	394	19	96	0.7291	0.0141	0.7003 0.7557
6	279	40	173	0.6246	0.0195	0.5851 0.6615
7	66	29	37	0.3501	0.0397	0.2734 0.4278

Table A6 Log-rank test for equality of survivor functions

	Events	Events
Residence	observed	expected
urban	75	104.520
Rural	339	309.480
Total	414	414.000
chi2(1) = 12.53		
Pr>chi2 = 0.0004		

Table A7: Weibull PH regression

Variable	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	-.013	.032	-0.40	.686	-.076	.05	
Sex	3.622	1.278	2.83	.005	1.118	6.127	***
Residence	-.324	.725	-0.45	.655	-1.745	1.097	
Marital Status	1.022	.529	1.93	.053	-.015	2.058	*
Job Creation	-.544	.211	-2.57	.01	-.958	-.13	**
Skills	2.056	.74	2.78	.005	.605	3.506	***
Education	-.62	.861	-0.72	.471	-2.309	1.068	
professionals	-2.361	.21	-11.24	.006	-1.949	2.772	***
technicians	3.843	.466	8.25	.009	2.931	4.756	***
Craft workers	2.491	.223	11.19	.001	2.055	2.927	***
Machine Operator	1.592	.368	4.33	.004	.87	2.313	***
Constant	-1.681	2.401	-0.70	.484	-6.386	3.025	
ln_p	.842	.176	4.79	.006	.497	1.187	***
Mean dependent var		2.091	SD dependent var			1.743	
Akaike crit. (AIC)		48.891	Chi-square			18.077	
Prob > chi2		0.006					

*** $p < .01$, ** $p < .05$, * $p < .1$

Table A8: Gompertz PH regression

Variable	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	-.017	.033	-0.51	.612	-.083	.049	
Sex	2.621	1.167	2.25	.025	.335	4.908	**
Residence	-.179	.699	-0.26	.798	-1.549	1.191	
Marital Status	.729	.518	1.41	.159	-.285	1.744	
Job Creation	-.447	.214	-2.09	.037	-.865	-.028	**
Education	-.517	.851	-0.61	.543	-2.184	1.15	
Skills	1.431	.656	2.18	.029	.145	2.717	**
professionals	-2.344	.21	-11.16	.006	-1.932	2.756	***
technicians	3.606	.462	7.81	.001	2.701	4.511	***
Craft workers	2.436	.222	10.96	.004	2.001	2.872	***
Machine operators	1.557	.369	4.23	.002	.835	2.279	***
Constant	-.763	2.248	-0.34	.734	-5.169	3.643	
gamma	.433	.158	2.74	.006	.124	.743	***
Mean dependent var		2.091	SD dependent var			1.743	
Akaike crit. (AIC)		58.328	Chi-square			11.591	
Prob > chi2		0.072					

*** $p < .01$, ** $p < .05$, * $p < .1$

Table A9: Cox Regression results

Variable	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	-.021	.032	-0.66	.507	-.084	.042	
Sex	1.696	1.151	1.47	.141	-.56	3.953	
Residence	-.113	.698	-0.16	.872	-1.481	1.256	
Marital Status	.366	.496	0.74	.461	-.606	1.338	
Job Creation	-.32	.221	-1.45	.148	-.752	.113	
Skills	.919	.637	1.44	.149	-.33	2.167	
Education	-.326	.844	-0.39	.699	-1.981	1.328	
Professionals	-1.333	.277	-4.82	.003	-.791	1.876	***
Technicians	2.162	.598	3.62	.004	.99	3.335	***
Craft workers	1.333	.244	5.47	.009	.855	1.811	***
Machine Operators	.679	.512	1.33	.185	-.324	1.683	
Mean dependent var		2.091	SD dependent var			1.743	
Pseudo r-squared		0.050	Bayesian crit. (BIC)			120.865	
Chi-square		5.330	Prob > chi2			0.502	
Akaike crit. (AIC)		114.319					
*** $p < .01$, ** $p < .05$, * $p < .1$							

Table A10: Bootstrap results

Linear regression		Number of obs = 1,665				
		Replications = 1,000				
		Wald chi2(3) = 5856.55				
		Prob > chi2 = 0.0000				
		R-squared = 0.3299				
		Adj R-squared = 0.3297				
		Root MSE = 0.9746				
Variable	Observed Coef.	Bootstrap St. Err.	Normal-based			
			z	P>z	[95%Conf.	Interval]
Age	-.0114	.0312	-0.40	.686	-.076	.05
Sex	3.822	1.237	2.83	.005	1.118	6.127
Residence	-.364	.735	-0.45	.655	-1.745	1.097
Marital Status	1.032	.546	1.93	.053	-.015	2.058
Jobs growth Index	-.564	.232	-2.57	.01	-.958	-.13
Skills	2.096	.73	2.78	.005	.605	3.506
Education	-.55	.843	-0.72	.471	-2.309	1.068
professionals	-2.760	.23	-11.24	.006	-1.949	2.772
technicians	3.567	.432	8.25	.009	2.931	4.756
Craft workers	2.415	.279	11.19	.001	2.055	2.927
Machine Operator	1.519	.339	4.33	.004	.87	2.313
_cons	-.0151	3.401	-0.70	.484	-6.386	3.025