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Article *in* Journal of Somali Studies · August 2022

DOI: 10.31920/2056-5682/2022/v9n2a2

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Volume 9, (Number 2), August, 2022
Pp 39-57

Modelling the Determinants of Unemployment Exit Duration among Graduates in a Fragile State: A Case of Somalia

DOI: https://doi.org/10.31920/2056-5682/2022/v9n2a2

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Abstract

The scale of the severity of graduate unemployment in a fragile state like Somalia prompts the need for modelling factors related to the unemployment exit duration. Hence, this study aimed to model the determinants of graduate unemployment exit duration. More specifically, it determined the factors that have effects on the probability of escaping from the unemployment status. Data collected from students who graduated from SIMAD University in Somalia were analysed, using the duration model. Particularly, this paper utilised product-limit estimator and Cox proportional hazards model to model the prognostic factors influencing the probability of leaving the unemployment status. Gender, CGPA, part-time job experience, type of degree, and age were found to have significant

effects on the probability of escaping from unemployment. Male graduates were 1.47 times more likely to increase their chances of employability than their female counterparts while graduates with part-time job experience were 2.81 more likely to escape from unemployment than graduates without part-time job experience. Similarly, graduates with a higher CGPA were 1.54 times more likely to get employment than those with a low CGPA.

Keywords: *Duration model, Graduate unemployment exit duration, Somalia, Youth unemployment.*

Introduction

Youth unemployment is evolving social phenomena globally. It is rising worldwide due to the low growth and economic recessions. According to the International Labour Organisation, global youth unemployment increased gradually from 11.5% to 13.6% between 2018 and 2020 (ILO 2020). Youth unemployment has continued until the term "generation jobless" has been introduced to denote youth unemployment (Vogel 2015). Youth unemployment is a worldwide concern which retards economic development and should be tackled to accomplish communal integration and reduce the income inequality gap. Youth unemployment remains a major policy challenge for governments and international organisations worldwide in the 21st century. The lack of decent employment among young people results in substantial socio-economic problems. Such problems include increase in crime rates and violence, high dependency ratio, low self-esteem, drug addiction and mental health problems in the community (Kabaklarli, Hazel, and Buluş 2011, Nazir et al. 2009).

According to Fund for Peace (2020), Somalia has persistently ranked among the top three most fragile nations for 13 years. The situation remains the same where it is ranked second in 2020. Its fragility has been worsened by the recent events such as the COVID-19 pandemic, locust invasion, famine, war in Ukraine and prolonged conflicts. A fragile state can be defined as a state of weak security institutions and weak governance which are contributing factors to low economic growth. The civil war began in 1991 after the collapse of the central government. As a result of two decades of insecurity, week government, lack of public good and services, the country has been negatively affected by both natural and man-made calamities. Consequently, Somalia's key development indicators are among the lowest in the world. For instance, the human development index of the country stands at 0.285 out of 1.0, which shows how the country

poorly performs in terms of education, income and health. Furthermore, Somalia's Gender Inequality Index was 0.776 out of 1 (UNDP 2014), whereas the incidence of poverty rate stands at 69% (World Bank 2019).

According to the UNDP (2012), the youth unemployment rate is about 67% which is one of the highest rates in the world. The unemployment rate is even higher among youth and women, which stood at 74%. However, the unemployment rate of the youth aged between 15 and 24 is 37.4%. The female youth unemployment rate is 40.8%, which is higher than that of the males which stands at 35.2% (Somali National Bureau of Statistics 2019). Fresh graduates encounter a huge challenge to secure a job as thousands of young graduates from the local universities and other institutions across the country are offloaded into the labour market every year and the labour market is unable to absorb them. These cohorts of graduates from local universities continue to increase yearly due to the increased number of universities operating in the country, especially in Mogadishu, the capital city of Somalia. According to the Iftin Foundation (2019), 65% of the graduates are males while 35% are females. Of these students, 77.63% graduated from local universities in the Benadir region. The unemployment rate was highest for university graduates (62.9%). This high unemployment rate among university graduates is linked to the inadequate decent jobs and less employable labour market skills (Somali National Bureau of Statistics 2019). In a fragile state like Somalia, the consequences of high and persistent graduate unemployment can be drastic. It may even lead some youths to join armed groups, while others try to migrate from the country.

Although international organisations such as the International Labour Organisation have launched and implemented employment programmes to tackle youth joblessness, these interventions have not yet produced a visible outcome because they are just a drop in the ocean. Graduate unemployment has a significant negative impact on a country's economic growth and the well-being of the society. Nonetheless, there is no empirical studies that have been conducted to model the graduates' unemployment exit duration in a fragile state like Somalia which hosted decades of armed conflicts and instability. The average time it takes for university graduates to get employment is yet to be known. After university graduation, some graduates will find jobs in a short period while others may spend sufficient time to get integrated into the labour market. To accurately design policies to tackle the problem of graduate unemployment, it is not only essential to know the graduate unemployment rate but it is also more important to understand how the probability of exiting unemployment status varies from

graduates' characteristics. Therefore, the objective of this study is to investigate the key determinants of unemployment exit duration among graduates using the duration model.

Literature Review

Much attention has been given to the rising graduate unemployment in many countries including the developed countries. However, it is a more pressing issue for developing countries to attain sustained economic growth through the expansion of the educated workforce. According to (Nazir et al. 2009, Stokey 1995), higher education is an essential element in the achievement of economic development. For instance, skilled labour is expected to engage in research and development which provides the basis for sustainable development. There is extensive empirical research on examining the determinants of graduate unemployment in different countries. These determinants can be broadly divided into socio-demographic factors, university factors and employment preparedness behaviour. Gender, age, marital status, and schooling, which constitute socio-demographic variables, are found to be a significant determinants of graduates' employment outcome (Bradley 1992, Cox 1997, Lázaro, Moltó, and Sánchez 2000, Narendranathan and Stewart 1993). Other studies in Ethiopia (Woya, 2019) and in Tunisia (Gassab and Jamoussi 2011) also found that there is a statistically significant difference between male and female graduates when it comes to the graduates' employability. The likelihood of employment among higher age groups tends to be higher and may lead to a better wage level. Nevertheless, as they age, the probability of getting a job gradually decreases (Nam 2006). The study by (Joyce and Neumark 2001) reported that the likelihood of securing employment is better among children whose parents' education level and income level are higher. According to human capital theory, productivity gained from education, job training and job experience accumulate human capital and lead to a better labour market outcome (Burt 1997, Wise 1975). Additionally, Jones and Jackson (1990)Jones and Jackson (1990)Jones and Jackson (1990) conclude that young people's job experience during university has a positive effect on their wages after graduation. Some studies (Lim and Bakar 2004, Morshidi et al. 2004, Kong and Jiang 2011, Lim and Lee 2019) conclude that the type of degree and academic achievement (CGPA) are significant determinants of graduates' employment outcome. The importance of the type of degree obtained as a

significant determinant is also emphasised by (Smith, McKnight, and Naylor 2000) while the study by (Baldry 2016) in South Africa found that the type of degree does not contribute significantly to the graduates' employability. The cumulative grade point average (CGPA) attained is also a vital factor. According to (Smith, McKnight, and Naylor 2000), the UK graduates with higher academic attainment (CGPA score) are more likely to have better labour market outcomes.

Among the employment preparedness variables that have been found to be significant are job experience and certificate acquisition (Mau and Kopischke 2001, Smith, McKnight, and Naylor 2000). These factors are known to have a positive influence on graduates' employability (Dabalen, Oni, and Adekola 2001, Machin, Cheung, and Parmar 2006). Although graduate unemployment is extremely high, there is scanty literature in the published works in Somalia. Gelle, Abshir, and Ali-Salad (2021) investigated the causal factors of graduate unemployment, its socio-economic consequences and possible solutions in Somalia. The scholars employed logistic regression model where the dependent variable was binary. However, this model is not appropriate if the dependent variable is time until an event of interest occurs, that is, the time until a graduate finds his or her first job. Other studies examined unemployment in general or youth unemployment in Somalia, but these studies are not tailored to address graduate unemployment (Dalmar, Ali, and Ali 2017, Yusuf, Muturi, and Samantar 2019). Therefore, the current literature indicates that there are huge empirical studies which attempt to identify the major determinants of graduates' unemployment exit duration in different nations. Nevertheless, modelling the effects of these crucial determinants on the graduates' unemployment exit duration is yet to be studied in the context of a fragile state like Somalia which is now emerging from decades of armed conflicts and chaos. Based on the above-described gap in the literature, this study examines the key determinants of graduates' unemployment exit duration. Specifically, this study attempts to answer the following research questions: On average, how long does it take for a graduate to transit into the labour market? Which factors affect graduates' unemployment exit duration?

Methodology

1. Data

This study implemented a survey research design, using a quantitative approach with the primary data being collected through a structured

questionnaire as the instrument. A cross-sectional study with simple random sampling as sampling design was employed. This means that a sampling frame was required to use simple random sampling. The participants of the study were the students of SIMAD University, one of the best private universities in Somalia, who graduated on September 6, 2018. According to the Admission and Record Office at SIMAD University, a total of 558 undergraduate students graduated on September 6, 2018. However, those graduates who completed their studies in February semester 2018 and graduated on September 6, 2018 were 490 and this constituted the sampling frame in this study. To distribute the copies of the questionnaire, their contact phone numbers and e-mails were obtained from the Admission and Record Office. Through their contacts, online copies of the questionnaire were sent to 400 graduates who completed their studies in February semester 2018 and graduated on September 6, 2018. This online questionnaire was piloted on 10 graduates to ensure the clarity and the logical sequence of the questions. As a consequence of this pilot study, the questions were modified accordingly. Initially, 322 graduates filled and returned the copies of the questionnaire successfully. However, after screening the data, only 286 remained, which constituted the final sample. The data collected were analysed using R programing language, version 4.0.4.

2. Study Variables

The dependent variable is unemployment exit duration. The time it took a university graduate to secure his/her first job after convocation is termed unemployment exit duration. To find this period, the first month on which graduates were employed was subtracted from their graduation month (September, 2018). Any graduate who was not employed after 20 months (the end of the study period) from his/her graduation (September, 2018), his/her unemployment exit period was rightly censored. The covariates composed of qualitative and quantitative variables. Gender, marital status, father's education level and age are demographic characteristics of the university graduates while part-time job experience, whether graduates undertook training to get marketable skills, the number of training attended and the certificates obtained, cumulative grade point average (CGPA), and type of degree attained measure how the graduates are prepared for the competitive labour marked ahead.

3. Kaplan-Meier and Cox Proportional Hazards Model

This study employed the survival analysis approach. This approach was chosen as it utilises a censored data where the outcome variable (dependent variable) of interest is time as the case in this study, often known as a failure time. According to Machin et al. (2006), survival analysis statistically investigates the time until an event of interest occurs, that is, the time until a graduate finds his or her first job which starts from September 2018 (graduation month) to April 2020 which marks the end of this study. This statistical method analyses the period until graduates get their first employment and examines the determinants of such a period. Kaplan-Meier – also termed product limit and developed by Kaplan and Meier (1985) – and Cox proportional hazards model were employed for exploratory data analysis and modelling purposes respectively, which accounted for censored data. This procedure is used to estimate and verify the probability of survival of an individual at each point in time. It computes the likelihood of university graduates moving from an unemployment status to an employment status after graduation over a period of time in the presence of censoring. At the end of the study period, some university graduates may remain unemployed where the length of time until their employment cannot be observed. These cases were treated as censored data.

Let T denote a non-negative random variable representing the lifetimes of some subjects (graduates in this case) in the population. The survival function which provides the likelihood that a subject survives beyond time t, can be defined as:

$$\boldsymbol{s(t) = P(T > t)} \qquad \textbf{(1)}$$

The cumulative distribution function is $\boldsymbol{F(t) = P(T \leq t)}$, giving the probability that a subject survives less than or equal to *t*, and the probability density function is derivative of $\boldsymbol{F(t)}$. Hence, the hazard function, which is very important in a survival analysis, is defined as follows:

$$\boldsymbol{h(t) = \frac{f(t)}{s(t)}} \qquad \textbf{(2)}$$

where *h(t)* is the hazard of function or rate of failure that the event (employment) happens during a very small interval of time, provided that subjects were stilled at risk just before time *t*.

Let *n* be the total number of graduates whose survival times, failure or not failure, are available. Reorganise the *m* survival times in ascending order so that $\boldsymbol{t_{(1)} \leq t_{(2)} \leq \cdots \leq t_{(n)}}$. Then the Kepler-Meier can be defined as:

$$\hat{\boldsymbol{s}}(\boldsymbol{t}) = \prod_{\boldsymbol{t_{(r)} \leq t}} \frac{\boldsymbol{m - r}}{\boldsymbol{m - r + 1}} \qquad (\mathbf{3})$$

where *r* runs through those positive integers for which $\boldsymbol{t_{(r)} \leq t}$ and $\boldsymbol{t_{(r)}}$ is failure time. The values of $\boldsymbol{r}$ are succesive integers $\mathbf{1, 2, \ldots, m}$ if all the cases are uncensored or failure times; if there are censored cases, they are not (Lee and Wang 2003). In addition to product-limit, this study used the Cox proportional hazards model (Schoenfeld 1983) to investigate the effect of the covariates on the probability of escaping from unemployment. This model is also known as Cox semi-parametric hazards model which has fewer assumptions than typical parametric methods (Breslow 1975). Particularly, it does not make any assumptions about the shape of the baseline hazard function compared to parametric models (Cox 1997). This model can be defined as follows:

$$\boldsymbol{h_i(t, x) = h_0(t) e^{\beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_k X_{ik}}} \qquad (\mathbf{4})$$

where $\boldsymbol{h_i(t, x)}$ is the hazard function for individual $\boldsymbol{i}$ which is a function of *t* and *x*, $\boldsymbol{x = (x_{i1} + x_{i2} + \cdots x_{ik})}$ are the vectors of covariates, $\boldsymbol{h_0(t)}$ is the baseline hazard function when all covariance values are zero. This refers to the instantaneous hazard rate given to a case by default if there is no impact of covariates. $\boldsymbol{\beta_k}$ denotes the coefficients of covariates. A linear form of Cox proportional hazards model may be written as:

$$\boldsymbol{log h(t, x) = \alpha + \beta_1 x_{i1} + \cdots + \beta_k x_{ik}} \qquad (\mathbf{5})$$

where $\boldsymbol{\alpha = log\ h_0(t)}$. From Equation (4), we can observe that

$$\frac{\boldsymbol{h_i(t, x)}}{\boldsymbol{h_0(t)}} = \boldsymbol{e^{\beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_k X_{ik}}} \qquad (\mathbf{6})$$

Equation (6) highlights that Cox proportional hazards model leaves the baseline hazard unspecified, an important property of this model (Fox and Monette 2002).

Results and Discussion

1. Descriptive statistics

Table 1 depicts the respondents' characteristics. With respect to gender and marital status, it can be seen that the majority of the graduates are male (72%) and single (81.8%). Relating to part-time job experience and training participation, it is found that 48.6% of the graduates did part-time jobs during their study period and 87.4% attended training. In terms of employment status and fathers' education, 60.5% of the graduates were employed and the majority of the graduates had fathers with no formal education.

In light of the continuous variables, it can be observed that, on average, the graduates attained a cumulative grade point average of 3.11(SD=0.40). The average age of the graduates was around 24.5(SD=1.96) while the average number of training graduates undertook during their study period was 5.1(SD=3.63).

Table 1: Respondents' characteristics

Variable	Frequency	%
Gender		
Male	206	72
Female	80	28
Marital status		
Single	233	81.5
Married	53	18.5
Employment status		
Employed	173	60.5
Self-employed	45	15.7
Unemployed	68	23.8
Part-time job experience		
Yes	139	48.6
No	147	51.4
Attending training		
Yes	250	
87.4		
No	36	12.6
Father's education		
No formal education	108	
37.6		
Primary & secondary	101	35.3
Tertiary	77	
26.9		
Type of degree[1]		
BCS	29	10.1
BIT	43	15
BACC	37	12.9

BBF	22	7.7
BBA	34	11.9
BECO	38	13.3
BSP	25	8.7
Other degrees	58	20.3

Continuous Variable	Mean	SD
CGPA	3.11	0.40
Unemployment exit duration	6.08	6.64
Number of training	5.09	3.6
Age	24.47	1.96

1. BCS= Computer Science, BIT=B. Information Technology, BACC= B. Accounting, BBF= B. Banking & Finance, BBA=B. Business Administration, BECO= B. Economics, BSP= B. Statistics, Other degrees= (B. Telecommunication Engineering, B. Law, B. Procurement & logistics, B. Public Administration, B. Education)

2. Product-limit estimate of the unemployment exit duration

As depicted in Table 2, the graduates who managed to find a job before or at graduation was 25% (72 out of 286). It took 50% of the all graduates approximately four months to find employment, whereas 84.6% of the graduates had a job after one year of their convocation ceremonies.

Table 2: Product-limit estimates for unemployment exit duration

Month	Number of events	Estimate	standard error	lower 95% CI	Upper 95% CI
0	72	0.748	0.0257	0.6996	0.8
1	26	0.657	0.0281	0.6046	0.715
2	29	0.556	0.0294	0.5012	0.617
3	16	0.5	0.0296	0.4453	0.561
4	4	0.486	0.0296	0.4314	0.548
5	12	0.444	0.0294	0.39	0.506
6	29	0.343	0.0281	0.2918	0.402
7	20	0.273	0.0263	0.2257	0.33
8	4	0.259	0.0259	0.2127	0.315
9	3	0.248	0.0255	0.2029	0.304
10	2	0.241	0.0253	0.1964	0.296
11	2	0.234	0.025	0.19	0.289
12	23	0.154	0.0213	0.1172	0.202

13	1	0.15	0.0211	0.1141	0.198
14	1	0.147	0.0209	0.1111	0.194
15	1	0.143	0.0207	0.108	0.19
16	2	0.136	0.0203	0.1019	0.183
17	1	0.133	0.0201	0.0988	0.179
18	5	0.115	0.0189	0.0837	0.159

In Table 3, the median time it took the university graduates to exit from unemployment was approximately three months. This implies that the time it took 50% of the university graduates to get employed was approximately three months, while the average time it took the graduates to find employment was about six months. However, this estimate (average) is not reliable since it is affected by outliers (Ali and Midi 2020). In survival analysis, the data are rightly skewed, and it is not appropriate to use average since it will provide an inflated estimate.

Table 3: Estimated mean and median of the university graduates' unemployment exit duration using product-limit estimator

Average				Median		
Estimate	Std Error	95% CI		Estimate	Std Error	95% CI
6.084	.392	5.316	6.852	3.000	.793	1.446 4.55

Figure 1 shows that the percentage of those who exited unemployment decreased rapidly after convocation and continued to decline gradually over time. Specifically, the more the unemployment span persists, the likelihood that the graduates' escape from unemployment will fall slowly over time.

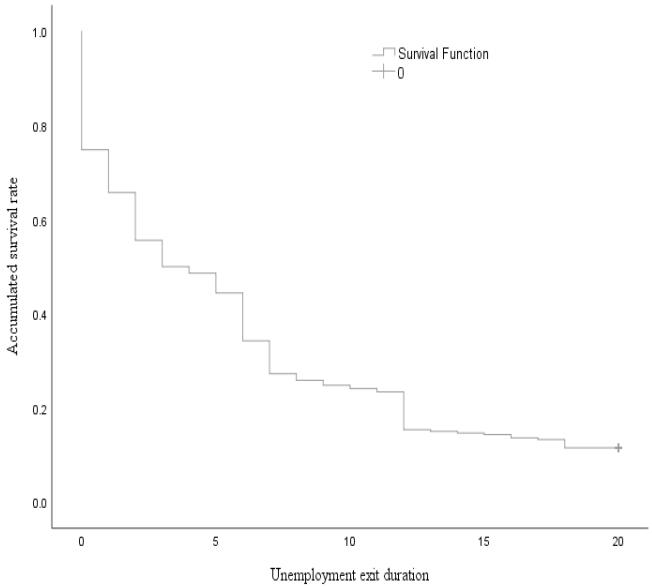

Fig. 1: Survival function for the graduates' unemployment exit duration

3. Factors affecting graduates' unemployment exit duration

Cox proportional hazards model was employed to determine the factors which may speed up the likelihood that graduates will escape from unemployment after their graduation from the university. The results of this model are presented in Table 4. According to Table 4, it is observed that CGPA and the type of degree had significantly influenced university graduates' unemployment exit duration. These findings support the previous studies (Lim and Bakar 2004, Morshidi et al. 2004, Smith, McKnight, and Naylor 2000). Specifically, graduates with a higher CGPA were almost 1.55 times more likely to get employment than those with a low CGPA, while statistics graduates (BSP), business graduates (BBA) and economics (BECO) graduates were 3.17, 1.57 and 1.55 times more likely to exit from unemployment than graduates with other degrees.

Regarding job experience, graduates who had part-time job experience during their study period were 1.56 more likely to escape from unemployment compared to their counterparts and this finding agrees with the study of (Smith, McKnight, and Naylor 2000).

Similarly, gender and age of the graduates were found to be significant covariates to the probability of exiting unemployment. These findings are also consistent with some previous works (Bradley 1992, Edin 1989, Lázaro, Moltó, and Sánchez 2000, Narendranathan and Stewart 1993, Lim and Lee 2019). Male graduates were 1.47 times more likely to exit from unemployment than those female graduates. This implies that men are preferred to women when it comes to employment opportunities because recruiters could believe that men are more productive than women. The ages of the graduates negatively affected the probability of escaping from unemployment, that is, as graduates' ages increase, the probability of exiting from unemployment will fall.

However, the demographic characteristics such as marital status, father's education level, training, and number of training were not found to have statistically significant effects on the probability of escaping from unemployment.

Table 4: Estimation of Cox proportional hazards model

Covariate	β	SE	$Exp(\beta)$	Z	P-value
Gender	0.382	0.177	1.465	2.154	0.0312
Marital status	-0.087	0.198	0.917	-0.438	0.661
Father's Education	-0.286	0.176	0.751	-1.624	0.104
No. of training	0.022	0.022	1.023	1.028	0.304
CGPA	0.435	0.193	1.545	2.253	0.024
Part-time job Experience	0.447	0.159	1.563	2.808	0.005
Training	-0.141	0.223	0.869	-0.632	0.527
Age	-0.065	0.024	0.936	-2.707	0.007
Type of degrees[1]					
BCS	0.131	0.275	1.140	0.477	0.633
BIT	0.074	0.269	1.076	0.274	0.784
BACC	0.254	0.307	1.265	0.990	0.322
BBF	0.235	0.307	1.265	0.765	0.444
BBA	0.448	0.273	1.566	1.641	0.100
BECO	0.439	0.259	1.551	1.696	0.089
BSP	1.168	0.312	3.151	3.677	0.000

1. Other degrees are used as reference category.

Conclusion and Policy Implications

This study modelled the time it takes university graduates to exit unemployment after graduation and the determinants of such an exit. It identified the prognostic factors that affect the unemployment exit duration of those who celebrated their graduation in September 2018 to echo the existing graduates' labour market and to deduce policy options to tackle the problem of youth unemployment in the country. The study employed Kaplan-Meier to estimate the probability of escaping unemployment. This probability is the highest immediately after convocation but fell gradually as the unemployment span persists as depicted in Figure 1.

To model the determinant of unemployment exit duration of the graduates, this study used Cox proportional hazards model. Based on these results, CGPA, type of degree, job-experience, gender and age were found to have significant effects on the probability of escaping from unemployment. Graduates with a higher CGPA were 1.54 times more likely to get employment than those with a low CGPA while graduates with part-time job experience were 1.56 more likely to escape from unemployment than graduates without part-time job experience. Similarly, male graduates were 1.47 times more likely to exit from unemployment than those who are female graduates. Type of degrees and age of the graduates were significant determinants of graduates' labour market outcome.

The aforementioned findings are subject to some limitations. Firstly, the findings are from a sample of SIMAD University graduates. Future research should include graduates from other public and private universities. Secondly, some prospective predictors such as the English language proficiency and the number of applications submitted are not included in the current study due to the lack of data. Therefore, future studies should consider these covariates. Although the current study uses a sample of graduates from SIMAD University, it is hoped that this paper will create further debate in modelling the graduates' employment exit duration in Somalia.

Based on these results that gender, type of degree, job experience, CGPA and age are significant covariates of graduates' probability of exiting unemployment, the following policy implications can be derived to tackle the graduates' joblessness in Somalia:

Firstly, the government and its stakeholders should recognise female graduates with a low CGPA as a target or vulnerable group for their employability programmes since they have less probability of transitioning to the labour market relative to their counterparts. This susceptibility is due to the fact that female graduates don't have equal employment opportunities both in public and private sectors. Thus, the government should implement policies that create equal job opportunities for female graduates so that their transition to the labour market is encouraged. Moreover, the universities should provide constant counselling, guidance and support to poorly performing students in their early semesters to improve their academic performance.

Secondly, part-time job experience is found to have a significant effect on graduates' likelihood of exiting unemployment. Hence, to promote graduates' employability, it is suggested that internship programmes as a

requirement to the university students should be introduced to the curricula of the universities so that students will be better prepared for the competitive labour market ahead. To implement this policy, there should be a strong partnership between universities and industries in the country.

Thirdly, the type of degree obtained by a graduate is also a major determinant on the graduate's chances of exiting unemployment. This indicates that there is a mismatch between degree programmes produced and labour market needs. To re-install this disequilibrium, it is advised that adjustments should be made so that the labour market demand and supply will be balanced. Therefore, the Ministry of Education of Somalia should consider a demand-planning policy for university enrollment, such as lowering the student intake for some degree programmes and increasing the student intake for other degree programmes. This means that the admission of the university programmes should be based on the labour market needs.

Lastly, to identify the graduates with low probability of employment or vulnerable groups, it is recommended that statistical profiling should be employed by the Ministry of Labour and Social Affairs. This susceptible group will be the target for future programmes whose aim is to assist graduates with low employability.

Availability of data

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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