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Article

Higher Education Enrolment, Graduation, and Employment Trends in Ethiopia: An Empirical Analysis

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Abstract: The purpose of this study was to investigate trends in undergraduate enrolment, graduation, and employment in Ethiopian. It looked at data from the past 20 years of enrollment and graduation, as well as the 15 years of unemployment trends. For enrollment, we used the ARIMA(0,1,0) model, for graduation, the Holt-Winter model, and for unemployment, the Simple model. Results showed that enrollment rates increased dramatically, but graduation rates remained constant. Besides, enrollment is expected to continue rising, while graduation rates are expected to fall. On the other hand, between 1999 and 2018, the overall unemployment trends declined. Yet, between 2009 and 2018 the unemployement trends stayed stable. According to the findings, for the next ten years, higher education enrollment and graduation, will continue. Neverthless, it is shown the diminishing demand for jobs in the labor-market. As part of improving the existing realities of higher education, the study suggests reconsidering job-driven policy formulation, strengthening higher education-labor market alignment, contolled higher education expansion, and sustaining the development qualification systems.

Keywords: higher education; sustainability; enrollment; graduation; unemployment

1. Introduction

In today's world, it is recognized that investing in human capital is the key to achieve development and education plays a crucial role in providing the required human capital for [9, 2]. According to UNESCO, higher education has reached a thriving status in Sub-Saharan Africa between 2000 and 2010, with enrolments more than doubling, rising from 2.3 million to 5.2 million [59]. However, the Sub-Saharan enrolment rate remains less than 7%, whixh is far from the global rate of 29%. (UIS, 2012). Given the rapid expansion of higher education in the region, enhancing graduates' employability has become a top priority [35].

Creating jobs for the growing number of graduates is, thus, a major challenge for Sub-Saharan African countries, which is becoming a primary concern in the labor market [12]. Even though these countries invest heavily in education, they are still challenged by the rising of graduate unemployment [4, 12]. Thus, development cannot be ensured simply by producing a large number of graduates; it must also be ensured by paving the way to employment. This is crucial to ensuring a considerable match between higher education systems on the supply side and graduates on the demand side of the labor market.

Ethiopia's economy, as one of the Sub-Saharan African countries, is expected to grow by 8.5 percent by the end of 2019. [26]. Based on this figure, the International Monetary Fund (IMF) predicts that the country will have the fastest growing economy in Sub-

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Saharan Africa, followed by Rwanda with 7.8 percent growth and Senegal with 6.7 percent growth. Unlike the previous two decades, it appears that its large infrastructure investments are bearing fruit, and the provision of public services such as education has increased dramatically [26]. The changing faces of the country's education sector are also manifestations of its promising economic growth. From the supply side of higher education, the undergraduate participation rate was 0.7 percent in 1996 and 12% in 2018 [36, 51]. This shows that higher education in the country has increased in surplus, resulting in a large number of graduates in a variety of fields.

Despite this, the country faces significant challenges in terms of maintaining economic growth, which necessitates the creation of jobs for graduates. Other difficulties encountered include a lack of competitiveness, which limits the development of manufacturing, the creation of jobs, and the increase in exports [62]. There are also possible elements that influence the employability outcomes of higher education graduates in a recent study [22]. According to this study, factors such as demographic characteristics, curriculum, institutional characteristics, graduate characteristics, and economic and labor market conditions have a significant impact on graduates' employability.

As a result, the country's higher education and employability status are not functioning well, and the education–job mismatch is both vertical and horizontal, affecting more than a third of graduates [56]. From this, it is reasonable to conclude that there is a need to reconsider the efficiency of the country's higher education system in terms of enrollment, graduation, and employability. This study takes the initiative to examine Ethiopian higher education enrollments, graduation rates, and employment trends and predicts the future fate of the system.

2. Literature Review

2.1. The Development of Higher Education: Global Imperatives

Higher education, it is argued, is necessary for world countries to succeed in a global economy where knowledge has become a critical competitive advantage. In recent years, the development of higher education systems has been marked by an increase in the number of students and university graduates. One of the developing characteristics of higher education institutions is the implementation of quality assurance policies, strategies, and procedures, as well as the adaptation of university curricula to the demands of global labor market dynamics [20]. Globalization, as a crucial reality of the twenty-first century, necessitated a critical evaluation of higher education's function and mission amid the profound, changing necessities of a global society [67].

Graduates are accustomed to rapid access, any time, any place in today's dynamic global educational economy [27]. As a result, higher education institutions are promoting themselves as entrepreneurial models in the national and international market [31]. Thus, in order to be globally competitive, every country, major or little, is attempting to restructure higher education in order to make it more of a service to the country [5, 6, 10].

The contribution of universities to economic development in the knowledge era has been attributed to three domains [29]: i) developing and accumulating human capital; (ii) generating, disseminating, and applying knowledge; and (iii) innovating and inventing new information and technology [58]. As a result, much recent research has concluded that the primary goal of higher education is to prepare students for job[57]. Programs focusing on the role that higher education institutions should play in graduate employment can be viewed from two perspectives [25].

To begin, determine what is happening in terms of graduates entering the labor force: large-scale data collection that can be analyzed in terms of gender, ethnicity, subject discipline studied, degree categorization, salary obtained, institution providing degree, and so on [25]. The second factor is to be indexed by the concept of employability. Given that higher education institutions do not control the labor market (and no other agency can in a market-based economy and free society), they cannot guarantee employability outcomes. What they can do, it is said, is take steps to increase the possibility that their

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graduates will find adequate and stable job. Furthermore, governments can properly expect higher education institutions to do so [25].

2.2. Alignment of Higher Education and the Labor Market

The higher education-labor market alignment refers to a system that coordinates a variety of initiatives and strategies. Theses initiatives and strategies include workforce and economic development, career pathways, work-based learning, vocational education, labor markets, higher education institutions, graduate employment outcomes, student career choice and development, and more [30, 18]. The goal of aligning the demand side of the labor market with the supply side of higher education is to ensure that higher education institutions produce the appropriate number of graduates with the necessary skills for the job market in a way that supports students' career goals while also being consistent with institutional mission and economic conditions [18]. Job vacancy alignment and skill alignment are two intertwined but conceptually distinct goals of higher education-labor market alignment.

The first goal, referred to as job vacancy alignment, entails matching the number of graduates from specific schools to the quantifiable demand for workers with these credentials. It's important to get the numbers right when it comes to job vacancy alignment. It aims to address the question of whether the quantity of graduates and job opportunities are equal [19, 61, 15]. The second goal, which we call skills alignment, entails aligning higher education's skills, abilities, and credentials with those in highest demand in the labor market. The degree to which the skills and qualifications acquired in a program fit the demands and preferences of employers is referred to as skills alignment. It aims to address the following question: do graduates' skills match the skills required for relevant jobs? Several reports and campaigns describe labor market alignment in these terms, asking schools to ensure that graduates have the basic workplace skills and/or technical capabilities that employers demand, either instead of or in addition to ensuring that the appropriate number of graduates are available [17, 24, 55]. According to [13], skills alignment is multifaceted, just as job vacancy alignment; the skills companies seek may reflect core work needs, while others may indicate preferences that fluctuate depending on labor market conditions or the preferences of certain employers.

2.3. The Development of Higher Education: Ethiopian Context

It was stated that higher education in Ethiopia dates back to the the 4th-century common era.. However, higher education in its modern form may be traced back to the founding of Addis Ababa University College in 1950 [63]. The country had only two state higher education institutions and no private higher education providers between the 1950s and the last decade of the twentieth century [64]. However, expansion activities that began in the last decade of the twentieth century brought the total number of government led institutions to eight by 2002. [11]. This trend has persisted throughout the last two decades (even since the introduction of the Education and Training Policy in 1994), and one could say that the distinctive features of contemporary Ethiopian higher education are strong government-led expansion and rapid change [3].

The goals of higher education in Ethiopia can be summed up as preparing knowledgeable, skilled, and emotionally mature graduates through demand-based programs, resulting in the country becoming internationally competent, technologically equipped, and economically self-sufficient (Higher Education Proclamation, 2019). With these objectives in mind, a large number of students were admitted to undergraduate programs in 2017/18. The regular program had 825,003 students enrolled. Since then, undergraduate enrollment in regular programs has increased significantly. In Ethiopia, the undergraduate program had the highest number of enrolment rates. Engineering and technology fields accounted for 32% of all undergraduate programs [51]. On the other hand, the number of undergraduate program graduates has been increasing. In 2017/18, for example,

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141,700 people graduated [51]. However, there has been no evidence-based investigation into the employment status of graduates.

As the number of graduates increases, the market capacity to absorb graduates is likely to decrease, particularly in countries like Ethiopia, where there is little demand for the skills fostered by some academic programs [53, 22]. In Ethiopia, increased access to higher education may have contributed to an increase in the number of unemployed. As a result, with the annual graduation rate of both private and public universities hovering around 79 percent, graduate unemployment is likely to rise [52]. This may be determined by the interaction of various factors such as the individual (the graduate), universities, employers, and government rules and regulations [22, 54]. Other authors have noted that the attitudes of employers have a significant impact on the rate of graduate employment [8, 13]. As a result, the rise in graduate employability in Ethiopia could be ascribed to the rapid development of higher education as well as a lack of curriculum aimed to improve students' entrepreneurial skills. To that aim, trend analysis and forecasting the future of the country's higher education institutions and its match with the labour market is critical for early identification of potential problems.

3. Research methods

This research took a purely quantitative approach. Its major analysis is based on secondary data provided by government agencies and professional organisations on higher education enrolment, graduation, and employment rates [51]. The enrolment and graduation rates of government universities were described using a summary of education annual abstracts from the Ministry of Education between 2004 and 2018. On the other hand, the research depended on panel data on unemployment rates from 1999 to 2018. 2020 (Trading Economics). The data from the unemployment survey was gathered to see how the country's socioeconomic situations affect university graduates' employment prospects in relation to higher education progress. Thus, using analytical models such as the Autoregressive integrated moving analysis ARIMA (0, 1, 0) model, which means random walk to forecast the enrolment rate. Holt Winter model and the Simple model were used to forecast for graduation and unemployment. This study used a longitudinal survey to depict Ethiopian graduate unemployment, trends, and forecast unemployment rates.

Table 1. Summary Statistics of Higher Education in Ethiopia.

Year	Enrolment		Graduation	
	№.	Annual Change in %	№.	Annual Change in %
2004	98,404		7600	
2005	104501	6	11535	52
2006	173,901	66	24458	112
2007	203,399	17	29845	22
2008	214,199	5	39,304	32
2009	254192	19	55770	42
2010	265050	4	50672	-9
2011	290005	9	58953	16
2012	316,432	9	64,469	9
2013	412752	30	69137	7
2014	396,725	-4	79231	15
2015	368,314	-7	65,897	-17
2016	379,389	3	73,689	12
2017	392,788	4	89,754	22
2018	388,186	-1	62,199	-31

Source: [36-51]

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The enrolment rates of regular undergraduate students fluctuate from one academic year to the next, as seen in Table 1. In 2004, 98,404 regular undergraduate students enrolled in government universities, and in 2018, 388,186 students were admitted. Furthermore, as shown in the above table, the graduation rates of undergraduate regular students varied significantly over time. For example, 7,006 regular undergraduate students graduated in 2004, while 62,199 regular undergraduate students graduated in 2018.

Table 2. Summary Statistics of Ethiopia Unemployment Rate (1999-2018).

Year	Unemployment (%)
1999	26. 90
2000	26.40
2004	22.90
2005	20.60
2008	20.40
2010	18.90
2011	18.00
2012	17.50
2014	17.4
2015	16.8
2016	16.9
2018	19.1

Source: {23]

Ethiopia's unemployment rate increased to 19.10 percent in 2018 from 16.90 percent the previous year. Table 2 shows that from 1999 to 2018, Ethiopia's unemployment rate averaged 19.54 percent, with a high of 26.90 percent in 1999 and a low of 16.80 percent in 2015.

4. Results: Trend analyses

Secondary data were analyzed in this part to indicate the trend in Ethiopian higher education enrollment, graduation, and employment.

4.1. Trends: Enrolment and Graduation

Figure 1 depicts the enrollment and graduation rates of undergraduate students in Ethiopian government universities over the last 15 years.

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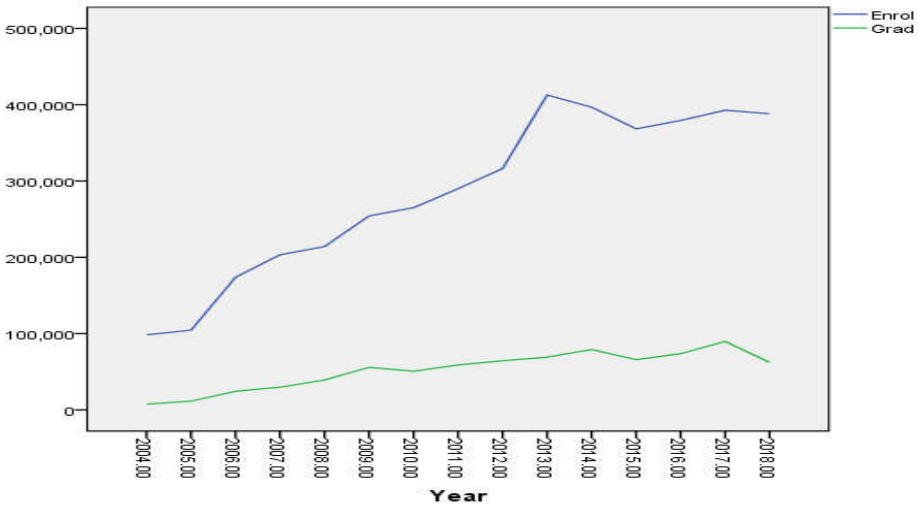

Figure 1. Higher Education Enrolment and Graduation (2004 to 2018).

In Ethiopian government universities, both enrolment and graduation rates of regular undergraduate students have increased, as shown in Figure 1. Enrollment and graduation rates, on the other hand, were not proportional. Enrollment was soaring, and graduation rates were gradually increasing. Surprisingly, the enrolment rates in 2007, 2013, and 2016 differed significantly. These shifts could be attributed to the emergence of second, third, and fourth generation universities.

4.2. Forecasting: Enrolment and Graduation

Figure 2 presents the forecast on higher education undergraduate enrolment graduation rates based on trends of the past 15 years.

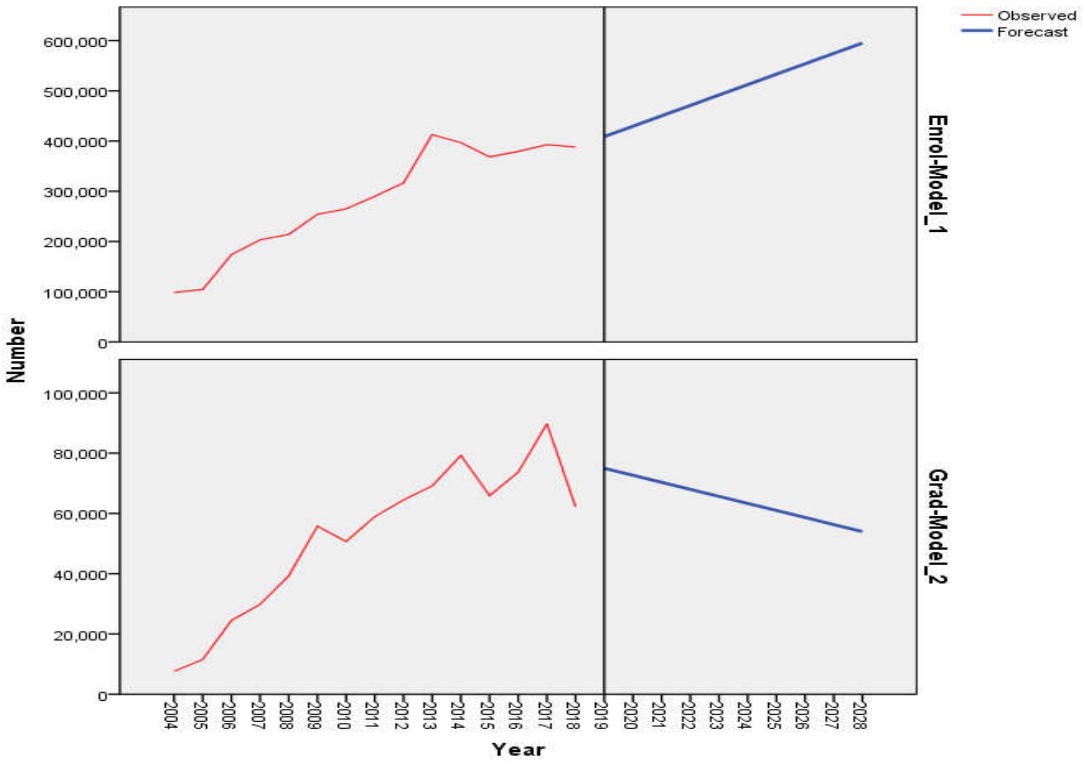

Figure 2. Forecasts on Higher Education Enrolment and Graduation (2019-2028).

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The projection shows that the enrolment rate of undergraduate students will continue to climb over the next ten years, as illustrated in Figure 2 and Table 3. The reasons for the increased enrollment of undergraduate students could be linked to population growth and institutional intake capacity. Graduation rates for undergraduates, on the other hand, are predicted to decline within the same time span. Because of government and institutional responses to quality education, undergraduate graduation rates may be dropping [52, 51]. Table 3, which is a summary of estimates on undergraduate enrolment and graduation, also supports the above-mentioned result.

Table 3. Summary of a forecast of Ethiopian Enrolment and Graduation (2019-2025).

Model		2019	2020	2021	2022	2023	2024	2025
Enrol-Model	Forecast	408884.71	429583.43	450282.14	470980.86	491679.57	512378.29	533077.00
	UCL	478620.50	528204.72	571068.07	610452.43	647613.53	683195.38	717580.55
	LCL	339148.93	330962.13	329496.22	331509.28	335745.61	341561.19	348573.45
Grad-Model	Forecast	74985.54	72651.20	70316.87	67982.53	65648.20	63313.86	60979.53
	UCL	95253.27	95655.40	98523.46	103608.89	110473.08	118765.74	128250.31
	LCL	54717.81	49647.01	42110.28	32356.18	20823.32	7861.99	-6291.25

4.3. Employment Trends

Figure 3 displayed undergraduate employment trends of the past 20 years.

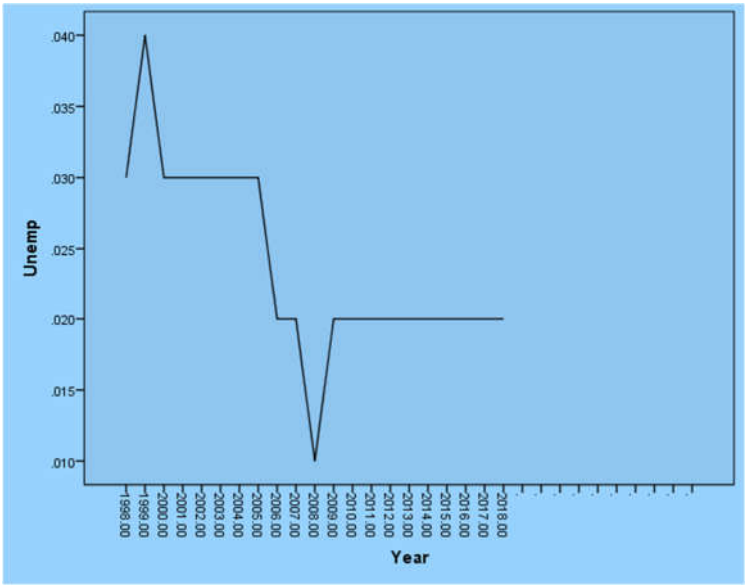

Figure 3. Unemployment Trends (1999-2018).

In Ethiopian government universities, both enrolment and graduation rates of regular undergraduate students have been increasing, as shown in Figure 1. Enrollment and graduation rates, on the other hand, were not proportional. Enrollment was rapidly increasing, but graduation rates were increasing steadily. Surprisingly, there were considerable fluctuations in enrolment rates in 2007, 2013, and 2016. One of the reasons for these shifts could be the emergence of second, third, and fourth generation institutions.

4.4. Forecasting Employment

The time series forecasting of unemployment in Ethiopia is depicted in figure 4.

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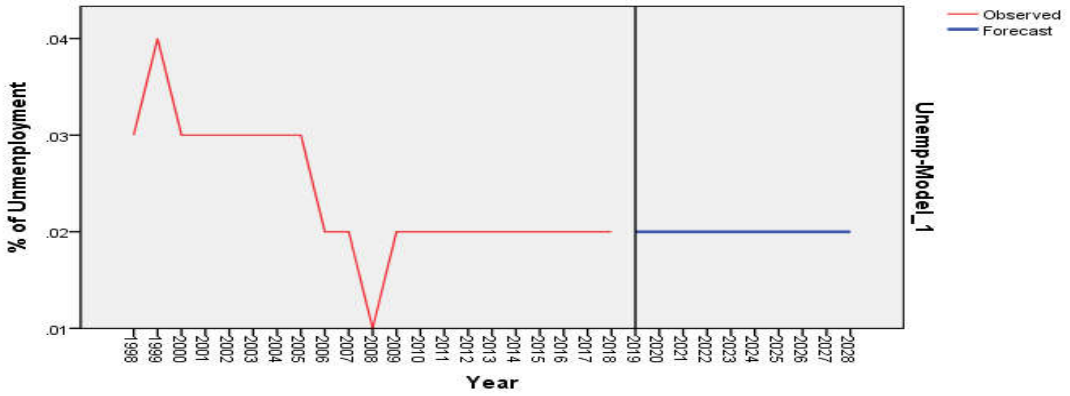

Figure 4. Time Series of Unemployment (1998-2028).

Figure 4 shows a time series of graduate unemployment rates, which shows that the rates will remain stable for the next 10 years (2019-2028). Table 4 also backs up the findings in the previous figure (Figure 4 and Table 4). Consistent economic growth could be one of the causes of high rates. The spread of the coronavirus, as well as the current political instability and economic climate, are thought to be influential factors in the rising rate of graduate unemployment in the coming decade.

Table 4. Time Series Forecasting of Unemployment in Ten years in Ethiopia.

Model	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Forecast	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
UCL	.03	.03	.03	.03	.03	.04	.04	.04	.04	.04
LCL	.01	.01	.01	.01	.01	.00	.00	.00	.00	.00

5. Discussions

Forecasting future events, such as economic conditions, educational system efficiency, and labor market dynamics, is critical for governments to take proactive measures. Higher education development in Ethiopia has continued in response to numerous economic and political changes in the country. One of these changes is assumed to be the growing features of population growth. The higher the enrolment rate, the larger the population. [60, 65] verified this by stating that the country's growing population demanded the expansion of universities as well as the enrollment rate. Another factor for the increase in higher education enrollment could be the vast expansion of higher education institutions across the country in the form of second and third generation universities (Abdela & Pillay, 2014).

The changing faces of higher education in Ethiopia have also been regarded as significant outcomes of major sector reforms such as: introducing cost-sharing in higher education; changing the system for financing higher education; devolution of power in managing higher education institutions; establishing a Council of Universities; establishing critical regulatory bodies; and changing the government [60]. According to the findings, the enrolment rate will follow the same path. It was also evident that the principal causes of the declining graduation rate are associated with the government's paradigm change from equitable to quality education [52, MoE, 2018).

For a variety of reasons, graduate employability has been steadily increasing over the previous decade (2009-2018). The Ethio-Eritrean war, for example, may have contributed to the rise in the unemployment rate. Employment outcomes of the graduates has also been improved in 2005, which could be attributable to the government's post-election measures in terms of political stability. This was confirmed by [32] that political stability is also acknowledged with helping to lessen the unemployment rate in 2009. In 2008 and 2009, moreover, Ethiopia's low-cost labor market and proximity to Europe drew

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remittances and private investment from nations such as China, India, Turkey, Sweden, and the United Kingdom. This has also confirmed by a study that the economy's growth, particularly in the textile and leather industries, implying that it has a considerable favorable impact on employment outcomes [66].

One of the problems addressed by this study is the mismatch between higher education graduation and enrollment. This mismatch between graduation and employment, according to the forecast, will continue in the same way it has in the past. For this result, the spread of coronoavirus and the current political instability are also assumed to be the influencing factors for the mismatch between the graduation and employment rates. This is also in line with the findings of studies [1, 7, 22], which found that the coronavirus disease is limiting residents' employment opportunities, meaning that in the next years, higher education graduates would be expected to share such a global burden. The idea that an unstable political environment can harm graduates' employment prospects has been confirmed by scholars, who claim that a high rate of youth unemployment, coupled with socioeconomic inequalities and corruption, makes countries more vulnerable to political instability in some parts of the country [28, 7].

6. Conclusions

ARIMA, Holt winter, and simple models were used to depict patterns in higher education enrollment, graduation, and employment. For a given range, the ARIMA forecasting model may not always have the requisite accuracy. The uncertainty in the parameter estimation is not represented in the forecast ranges. Despite these limitations, scientific evidence reveals that ARIMA methodology is competitive in terms of accuracy [34 33, 63] and so continues to be thoroughly investigated in order to give justification for each case's assumptions. The horizon of the Holt-Winters method predictions should not, however, exceed the seasonal cycle of the series, as predictions with a longer horizon have lower accuracy. A comparison of natural computing-based models with particle swarming approaches for optimization is suggested as a future research topic [22, 16] given the limits of this work. More research, however, is needed to bridge the gap of such methodological limitations and possible areas that are beyond the scope of this study.

Finally, identifying the causes of misalignment between higher education and labor market is critical for further reforms in terms of quality, equity, and efficiency. As a result, the study found that the interplay between higher education graduation and employment rate is heading in the other direction to each other, which has important implications for Ethiopia's higher education development prospects. It was also indicated that the interplay between enrolment, graduation, and employment rates is the key to effective higher education systems. As a result, substantial improvements in the country's higher education institutions are required to monitor and manage this interplay. Efforts at the policy level to promote the alignment of higher education labour market are critical in this regard. This entails reconsidering strategic directions in order to develop job-driven mechanisms and put further proactive economic measures in place to sustain the interplay between higher education and the labour market.

Supplementary Materials: The following supporting information can be downloaded at: https://www.macrotrends.net/countries/ETH/ethiopia/unemployment-rate'>.

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Data Availability Statement: A set of data is available from the principal investigator of this project, and it will be shared whenever requested.

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Conflicts of Interest: There are no conflicts of interest.

References

1. Abate, T. W. "The Effect of Covid-19 on Unemployment and Price Changes in Ethiopia: Evidence from Woldia Town "Does The Downward Sloping Philips Curve Hold True at Micro Level"." *Research Journal of Finance and Accounting*, 2021. doi:10.7176/rjfa/12-15-01.
2. Adeleye, Bosede N., Ismail Bengana, Abdelaziz Boukhelkhal, Mohammad M. Shafiq, and Hauwah K. Abdulkareem. "Does Human Capital Tilt the Population-Economic Growth Dynamics? Evidence from Middle East and North African Countries." Social Indicators Research, 2022. doi:10.1007/s11205-021-02867-5.
3. Akalu, Girmaw A. "Higher education 'massification' and challenges to the professoriate: do academics' conceptions of quality matter?" Quality in Higher Education 22, no. 3 (2016), 260-276. doi:10.1080/13538322.2016.1266230.
4. Al'Abr, Khalaf. "The Impact of Globalization on Education Policy of Developing Countries: Oman as an Example." Literacy Information and Computer Education Journal 2, no. 4 (2011), 491-502. doi:10.20533/licej.2040.2589.2011.0068.
5. Altbach, Philip G. "India's Higher Education Challenges." The International Imperative in Higher Education, 2013, 163-166. doi:10.1007/978-94-6209-338-6_35
6. Anderson, Tim. "Seeking Internationalization: The State of Canadian Higher Education." Canadian Journal of Higher Education 45, no. 4 (2015), 166-187. doi:10.47678/cjhe.v45i4.184690.
7. Azeng, T. F. and Yogo, T. U. Youth Unemployment and Political Instability in Selected Developing Countries, Working Paper Series No. 171. Tunis: African Development Bank. 2013. https://gsdrc.org/document-library/youth-unemployment-and-political-instability-in-selected-developing-countries/
8. Bailly, Franck. "The role of employers' beliefs in the evaluation of educational output." The Journal of Socio-Economics 37, no. 3 (2008), 959-968. doi:10.1016/j.socec.2006.12.083.
9. Bareke, Misganu L., Birhanu H. Agezew, Negash H. Dedho, Mulugeta F. Lebeta, Mesfin M. Demissie, Berhanu M. Yimer, and Adane H. Herut. "Determinants of Human Capital Development in Ethiopia: Implications to Education Policy." Education Research International 2021 (2021), 1-10. doi:10.1155/2021/6619674.
10. Barrett, Beverly. "The Dual Roles of Higher Education Institutions in the Knowledge Economy." Globalization and Change in Higher Education, 2017, 57-73. doi:10.1007/978-3-319-52368-2_4.
11. Bishaw, Alemayehu, and Solomon Melesse. "Historical Analysis of the Challenges and Opportunities of Higher Education in Ethiopia." Higher Education for the Future 4, no. 1 (2017), 31-43. doi:10.1177/2347631116681212.
12. British Council. Can higher education solve Africa's job crisis? Understanding graduate employability in Sub-Saharan Africa. British Council 2014, 16.
13. Cai, Yuzhuo. "Graduate employability: a conceptual framework for understanding employers' perceptions." Higher Education 65, no. 4 (2012), 457-469. doi:10.1007/s10734-012-9556-x.
14. Cappelli, Peter, and JR Keller. "Talent Management: Conceptual Approaches and Practical Challenges." Annual Review of Organizational Psychology and Organizational Behavior 1, no. 1 (2014), 305-331. doi:10.1146/annurev-orgpsych-031413-091314.
15. Carnevale, A., Smith, N. & Strohl, J. Recovery 2020: Job Growth and Education Requirements Through 2020, Washington DC: Center on Education and the Workforce. (2013).
16. Castán-Lascorz, M., Jiménez-Herrera, P., Troncoso, A., & Asencio-Cortés, G. A new hybrid method for predicting univariate and multivariate time series based on pattern forecasting. Information Sciences. (2021). https://doi.org/10.1016/j.ins.2021.12.001

 doi:10.20944/preprints202206.0093.v1

17. Cleary, J., & Fichtner, A. The Emerging Skill Needs of a Rapidly Changing, InnovationDriven Economy. New Brunswick, NJ: John J. Heldrich Center for Workforce Development. (2007).
18. Cleary, J., & Noy, M. V. A framework for higher education labor market alignment: Lessons and future directions in the development of jobs-U-Driven strategies. Working paper. (2014). https://files.eric.ed.gov/fulltext/ED565469.pdf
19. Cooper, D., Hersh, A., & O'Leary, A. The Competition That Really Matters: Comparing US, Chinese, and Indian Investments in the Next-Generation Workforce. Washington DC: Center for American Progress. (2012).
20. Corominas, E., Saurina, C. & Villar, E. The Match between University Education and Graduate Labour Market Outcomes (Education-Job Match): An analysis of three graduate cohorts in Catalonia. Barcelona: University of Girona. (2010).
21. Demissie, M. M., Herut, A. H., Yimer, B. M., Bareke, M. L., Agezew, B. H., Dedho, N. H., & Lebeta, M. F. Graduates' unemployment and associated factors in Ethiopia: Analysis of higher education graduates' perspectives. Education Research International, 2021, 1-9. https://doi.org/10.1155/2021/4638264
22. dos Santos Coelho, L., Klein, C. E., Luvizotto, L. G. J., & Mariani, V. C. Firefly approach optimized wavenets applied to multivariable Identification of a thermal process. In Eurocon 2013 (pp. 2066-2071). IEEE. https://doi.org/10.1109/EUROCON.2013.6625265
23. Ethiopia unemployment rate 1991-2020. Retrieved from Ethiopia Unemployment Rate 1991-2020. www.macrotrends.net. Retrieved 2020-10-18.
24. Hart Research Associates. It Takes More Than a Major: Employer Priorities for College Learning and Student Success. Association of American Colleges and Universities. Retrieved from http://www.aacu.org/leap/documents/2013_EmployerSurvey.pdf
25. Holmes, P., Fay, R., Andrews, J., & Attia, M. Researching multilingually: New theoretical and methodological directions. International Journal of Applied Linguistics, (2013). 23(3), 285-299. https://doi.org/10.1111/ijal.12038
26. International Monetary Fund (IMF). Report: Ethiopia is Africa's fastest-growing economy for 2019. Retrieved March 2, 2020, from https://www.ethioembassy.org.uk/ethiopia-is-africas-fastest-growing-economy-for-2019/
27. Jones, P., & Skinner, H. E-learning globalization: the impact of e-learning–what difference has it made? Education+ Training, (2014). 56(2-3). https://doi.org/10.1108/ET-11-2013-0128
28. Kassa, A. F. Unemployment in Urban Ethiopia: Determinants and Impact on household welfare. Ethiopian Journal of Economics, (2012). 21(2), 127-157. https://www.ajol.info/index.php/eje/article/view/91524
29. Korka, M.. Graduate labour market mismatches: New features of an older matter. Economics and Finance Research | IDEAS/RePEc. (2010, February 2) https://ideas.repec.org/a/aic/revebs/y2010i5korkam.html
30. Kozumplik, R., Nyborg, A., Garcia, D., Cantu, L. & Larsen, C. Career Pathways Toolkit: Six Key Elements for Success, Oakland, CA: Social Policy Research Associates. (2011).
31. Lane, K. E., Lemoine, P. A., Tinney, T. M., & Richardson, M. D. Modify and adapt: Global higher education in a changing economy. In M. Khosrow-Pour (Ed.), Economics: Concepts, methodologies, tools, and applications (2014a). (pp. 1650-1663). Hershey, PA: IGI.
32. Lyons, T. The Ethiopia–Eritrea conflict and the search for peace in the Horn of Africa. Review of African Political Economy, (2009). 36(120), 167-180. https://doi.org/10.1080/03056240903068053
33. Makridakis, S., & Hibon, M. The M3-Competition: results, conclusions and implications. International journal of forecasting, (2000). 16(4), 451-476. https://doi.org/10.1016/S0169-2070(00)00057-1
34. Makridakis, S., Andersen, A., Carbone, R., Fildes, R., Hibon, M., Lewandowski, R., ... & Winkler, R. The accuracy of extrapolation (time series) methods: Results of a forecasting competition. Journal of forecasting, (1982). 1(2), 111-153. https://doi.org/10.1002/for.3980010202

35. Mateja, M., & Palvin, S. (Eds.). EMPLOYABILITY OF GRADUATES AND HIGHER EDUCATION MANAGEMENT ... Retrieved March 2, 2020, from (2012). http://www.dehems-project.eu/static/uploaded/files/files/deliverables/final_report/DEHEMS_SHORT_SUMMARY.pdf
36. Ministry of Education. Education Statistics Annual Abstract 1996/97, Addis Ababa: Education Management Information Systems, Ministry of Education. 1997
37. Ministry of Education. Education Statistics Annual Abstract 2003/04, Addis Ababa: Education Management Information Systems, Ministry of Education, 2004
38. Ministry of Education. Education Statistics Annual Abstract 2004/05, Addis Ababa: Education Management Information Systems, Ministry of Education, 2005
39. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2006
40. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2007
41. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2008
42. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2009
43. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2010
44. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2011
45. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2012
46. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2013
47. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2014
48. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2015a
49. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2016
50. Ministry of Education. Education Statistics Annual Abstract 2005/06, Addis Ababa: Education Management Information Systems, Ministry of Education, 2017
51. Ministry of Education. Education Statistics Annual Abstract 2017/18, Addis Ababa: Education Management Information Systems, Ministry of Education, 2018
52. Ministry of Education. Education Sector Development Programme V (ESDP V) 2008 - 2012 E.C. 2015/16 - 2019/20 G.C. Addis Ababa, Ethiopia, 2015b
53. Mulu, N. Quality of Pre-university Preparation, English language proficiency and university entrance examination of students enrolling in Higher Education Insitutions. Quality of Higher Education (2009).
54. Oluwajodu, F., Blaauw, D., Greyling, L., & Kleynhans, E. P. J. Graduate unemployment in South Africa: Perspectives from the banking sector. SA Journal of Human Resource Management, (2015). 13(1). doi:10.4102/sajhrm.v13i1.656
55. Splitt, F. G. The challenge to change: On realizing the new paradigm for engineering education. Journal of Engineering Education, (2003). 92(2), 181-187. https://doi.org/10.1002/j.2168-9830.2003.tb00756.x

56. Tamiru Jote Exploring Employment Status and Education–Job Match among Engineering Graduates in Ethiopia: Policy Implications. (Unpublished). Jimma University, (2017).
57. Tran, T. T. Graduate employability: Critical perspectives. Reforming Vietnamese Higher Education, (2019). 93-111. https://doi.org/10.1007/978-981-13-8918-4_6
58. UNESCO. Graduate Employability in Asia. APYouthNet. (2012b). https://apskills.ilo.org/ap-youthnet/network/asia-pacific-youth-employment-network-apyouthnet
59. UNESCO-IESALC. Understanding access to higher education in the last two decades – UNESCO-IESALC. UNESCO-IESALC – UNESCO IESALC. (2021, November 2). https://www.iesalc.unesco.org/en/2020/12/23/understanding-access-to-higher-education-in-the-last-two-decades/
60. Varghese, N. V. Reforms and changes in governance of higher education in Africa. Paris: IIEP-UNESCO. (2016).
61. Wilson, B. How Many More Skilled Workers Do We Need? Washington DC: National Skills Coalition. (2014).
62. World Bank. Promoting economic growth and shared prosperity: Improving livelihoods, building resilience and creating a better future for ethiopians. https://www.worldbank.org/en/results/2019/10/29/promoting-economic-growth-and-shared-prosperity (2019, October 29).
63. Yallew, A. Higher education in Ethiopia: Recent developments and challenges. (2020). https://doi.org/10.14293/111.000/000009.v1
64. Yirdaw, A. Quality of education in private higher institutions in Ethiopia: The role of governance. SAGE Open, (2016). 6 (1), 1-12.
65. Yizengaw, T. Policy Development in Higher Education in Ethiopia and the Role of Donors and Development Partners 1. Nuffic Conference 'A Changing Landscape', The Hague, (2004). 23–24.
66. Zewdu, G. A. "The impact of migration and remittances on home communities in Ethiopia". PhD Dissertation University of Adelaide, School of Social Science. Adelaide Research & Scholarship. (2014). https://digital.library.adelaide.edu.au/dspace/handle/2440/106785
67. Zhu, C. Organisational culture and technology-enhanced innovation in higher education. Technology, Pedagogy and Education, (2015). 24(1), 65-79. https://doi.org/10.1080/1475939X.2013.822414