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**Tracing Labor Market Outcomes
of Technical and Vocational Training
Graduates in Saudi Arabia:
A study on graduates
from the Technical and Vocational
Training Corporation (TVTC)**

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and Mohamed Ihsan Ajwad



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Tracing Labor Market Outcomes of Technical and Vocational Training Graduates in Saudi Arabia: A study on graduates from the Technical and Vocational Training Corporation (TVTC)

Nayib Rivera, Mehtabul Azam and Mohamed Ihsan Ajwad¹

Abstract

This paper exploits a rich dataset from various administrative sources to study short- and medium-term labor market outcomes of vocational education and training graduates in Saudi Arabia. It examines five cohorts of graduates from institutes operated by the Technical and Vocational Training Corporation who are formally employed in the private sector. The outcome measures for the study are based on monthly earnings data from the private sector social insurance records covering up to five years after graduation for the first cohort. The analysis finds positive returns to technical and vocational education are sustained over time. However, program orientation and economic conditions at the time of graduation appears to impact wages. Furthermore, vocational education and training in Saudi Arabia is associated with higher job mobility after graduation from the program. Students' mobility premium is enhanced by completion of the program, suggesting improved skills signaling and utilization contributing to higher returns to vocational education and training. The analysis identifies several challenges and opportunities to further improve outcomes of graduates, such as reducing the gender gap in labor market outcomes of female graduates and reducing the high incidence of vertical mismatch among graduates' field-of-study selection and the occupations group in which they are employed.

JEL Codes: E24, I26, J13, J16, J21, J24, J62

Keywords: human capital, vocational education, skills, training, labor markets, skills mismatch

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Abbreviations

Active Labor Market Programs	ALMP
Arab Standard Classification of Occupations	ASOC
Consumer Price Index	CPI
Female Labor Force Participation	FLFP
General Authority for Statistics	GASTAT
Gross Domestic Product	GDP
Gulf Cooperation Council Countries	GCC
High Income Countries	HIC
Human Capability Development Program	HCDP
Human Capital Index	HCI
Human Resources Development Fund	HRDF
International Standard Classification of Education	ISCED
International Standard Classification of Occupations	ISCO
On-the-job training	OTJ
Labor Force Participation	LFP
Long Term Unemployed	LTU
Ministry of Human Resources and Social Development	MHRSD
National Transformation Program	NTP
Not in Education, Employment, or Training.	NEET
Organization for Economic Cooperation and Development	OECD
Program for International Student Assessment	PISA
Program for the International Assessment of Adult Competencies	PIAAC
Progress in International Reading Literacy Study	PIRLS
Small and Medium-Sized Enterprises	SME
Technical and Vocational Education and Training	TVET
Technical and Vocational Training Corporation	TVTC
Total Factor Productivity	TFP
Trends in Mathematics and Science Study	TIMSS

Abbreviations

United Nations Educational, Scientific and Cultural Organization	UNESCO
Value Added Tax	VAT
Vision Realization Program	VRP
Saudi Arabia Three Labor Markets Survey	3LMS
World Development Indicators	WDI

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Executive Summary

Saudi Arabia's Vision 2030 sets an ambitious reform agenda seeking to increase economic diversification and improve living standards for its citizens. One of the main priorities of the Vision 2030 is to enable the private sector to become a driver of job creation and enhance its contribution to the Saudi economy. A key challenge to increasing productivity and developing the full potential of the private sector is the stock of modern workforce skills in Saudi Arabia. The Vision 2030 acknowledges the role of skills development policies in achieving its long-term economic diversification goals. Various initiatives seek to expand the TVET system and make smart investments in human capital.

Saudi Arabia has made progress toward upgrading the skills of the workforce in recent decades. But employment in the private sector remains dominated by low skilled foreign workers. There are various challenges for employment of Saudis in the private sector. First, Saudi Arabia has traditionally experienced low levels of participation among nationals. Second, there is persistently high unemployment, underlined by various challenges keeping Saudis away from work, including high reservation wages, preference for public sector jobs and skills deficits. Skills deficits drive large employability gaps among the unemployed, thwarting efforts of labor market inclusion for vulnerable groups such as youth, women. Skills outcomes in Saudi Arabia are partially the product of low quality and limited labor market relevance of the education system throughout the skills development lifecycle.

The TVET sector in Saudi Arabia is emerging but remains very limited in scope. The under-provision of TVET remains significant despite recent efforts to increase capacity to enroll more students, including women. Saudi Arabia's Vision 2030 acknowledges the limited provision of training and seeks to expand the TVET system through more investments in human capital. Recent reforms aimed at expanding capacity in the TVET sector, improving curriculums, and developing more learning pathways by giving students more flexibility in transitioning between general and vocational education. But the system continues to reflect gaps in quantity, quality and relevance of training and education.

This paper studies the outcomes of TVTC students joining the private sector in Saudi Arabia. It seeks to expand the limited knowledge base of skills development in Saudi Arabia to inform human capital decisions and policies that will increase the effectiveness of the TVET system and prepare for the future. The first part provides a background of challenges in the Saudi labor market and the TVET sector. The second part focuses on the role of the TVET system in improving labor market and social protection outcomes, ensuring access to opportunity for more individuals, driving better outcomes and contributing to more inclusive growth in Saudi Arabia.

Overall, TVET programs seem to yield relatively positive labor market outcomes for graduates in the short and medium term. TVTC graduates earn higher wages on average after graduation compared with before graduation. Most graduates find work in the private sector. This is an encouraging finding highlighting the importance of training to advance key national priorities. This is particularly remarkable in light of traditional preferences among Saudis for public sector employment. Moreover, participation in TVET appears to increase students' likelihood of labor mobility, as well as enhancing the mobility premiums of graduates during job transitions.

However, there is a degree of heterogeneity in TVET outcomes in the private sector - both in terms of employment and earnings. First, there are various sources of heterogeneity in outcomes among graduates, including gender-related, across student cohorts, and variance in outcomes across fields of study. While Saudi Arabia is making progress towards expanding access to TVET for women, a significant gap in employment outcomes continues to exist between male and female graduates. Second, technical and trades programs provide higher private sector returns on average than other specialization fields. Finally, while post-graduation returns appear to hold over the five-year time period observed, economic conditions at the time of graduation seem to be one of the determinants of differences in labor market outcomes among graduation cohorts. Addressing heterogeneity in outcomes is important to continue building on the rapid progress made towards a TVET system that provides a reliable path to productive employment and inclusive growth.

This paper intersects two important areas for Saudi Arabia's national priorities: maximizing productivity by building the skills of the Saudi workforce and enabling the private sector as an engine of job creation and economic growth. The Vision 2030 contains a range of strategic objectives that are directly impacted by provision of high quality and relevant TVET. Among the objectives of the Vision 2030 and the National Transformation plan are initiatives to increase development of job-relevant technical skills through TVET, building a life-long learning journey, aligning educational outputs to market-relevant vocational training to meet labor market needs, and improving the readiness of youth to enter the labor market. Conversely, developing the private sector as a vehicle for economic growth and job creation requires enhancing employers' ability to recruit talented Saudis with the skills needed for firms to grow and become more productive.

Given the importance of skills outcomes of Saudis and private sector employment for the Vision 2030, generating knowledge in these areas is critical to monitor the reforms progress. Expanding the knowledge base of outcomes of TVET graduates adds significant value for evidence-based policymaking by informing policies to increase the effectiveness of the TVET system, make progress towards achieving Vision 2030 goals, and preparing Saudi students for the future. Efforts to overcome scarcity of labor market information can help reduce systemic frictions in the labor market. Generating and disseminating analysis of skills and labor market outcomes helps inform better decisions not only for policymakers, but also enables optimal human capital and career decisions for students and parents and beyond.

Data, Methods and Limitations

The Technical and Vocational Training Corporation (TVTC) is the government agency responsible for the provision of TVET in the Kingdom of Saudi Arabia. In partnership with the TVTC and the Ministry of Human Resources and Social Development (MHRSD), the World Bank team assembled a unique employee-employer matched dataset that serves as the main data source for the analysis covered in this report.

The dataset covers five cohorts of TVTC graduates in Saudi Arabia containing details from the full student record during the academic years between 2014-15 to 2018-19. The data captures TVTC general student and program characteristics, including student's date of birth, graduation year, institute, specialization and academic performance in the TVTC programs. The TVTC student record includes all students who graduated from the Secondary Industrial Institutes (ISCED Level 3) and the Technical Colleges (ISCED Level 4) between 2015 and 2019, covering 133,552 students.

This report combines additional data sources to track labor market outcomes of students after graduating from the TVTC system. The outcome data is from the private sector payroll data was obtained from Saudi Arabia's General Organization for Social Insurance (GOSI). To produce the dataset, TVTC's administrative records of graduates were matched to the full GOSI database which contains payroll employment information of all employees in the private sector in Saudi Arabia over time. The GOSI record provides a range of additional demographic variables such as age group, nationality and education level as well as employment data, including service start date, occupation and monthly wages. Furthermore, the *Nitaqat* data provides information about the firms employing each graduate, including the economic activity, firm size, number of Saudi and foreign workers employed, among others.

The resulting employee-employer panel dataset captures labor market dynamics reflecting private sector trajectory of graduates, providing up to 80 data points for a given student over the five-year observation period. While the vast majority of TVTC graduates are represented in the TVTC-GOSI matched dataset used for this study, it does not cover the full graduate population. For example, individuals working in the public sector, military sector or informal sector are not included in this study. Instead, the main reference group covered in the analysis is TVTC graduates who appear in the GOSI record. That is, graduates who are formally employed in the private sector.

Most TVTC graduates are from the private sector or find work in the private sector. Roughly 56 percent of graduates appear in the private sector payroll database after graduation. Around 42 percent of all graduates appear in the private sector before graduation and remained in the private sector after graduation, while 14 percent are first time private sector entrants (Table 1). And 12 percent of graduates appear in the private sector before graduation but not after. This may indicate transitions into public sector employment, self-employment, unemployment, or inactivity following graduation. About 32 percent of graduates are not found in the database.¹

Private sector payroll employment						
GOSI status (% of graduates)	2015	2016	2017	2018	2019	Total
Not found	31.35	30.34	29.94	33.59	34.79	32.2%
Pre- and post-graduation	43.36	45.64	45.14	42.01	37.25	42.34%
Only post-graduation	19.6	15.42	14.44	11.09	8.37	13.51%
Pre but not post-graduation	5.69	8.6	10.48	13.3	19.59	11.95%
Total	100	100	100	100	100	100%

Source: GOSI/TVTC. Note: Groups included are mutually exclusive and add up to the total number of graduates

The high share of students found in the payroll dataset may also reflect distortions originating from widespread “ghost employment” in the private sector. There is an extent to which localization policies and *Nitaqat*-induced ghost employment distorts data reporting in Saudi Arabia. A significant proportion of TVTC graduates are reported on private payroll during the 24-month period when they are enrolled in TVTC institutions, and majority of them have reported receiving the minimum salary of SAR 3000. It is possible that those individuals are on the private payrolls just to meet firms’ Saudization quota.² Since the estimates are based on pre- and post-graduation, the post-TVTC increase in wages is likely to be underestimated. However, comparative returns to different TVTC specializations should hold.

The nature of the dataset allows for analysis that traditional tracer studies are unable to capture, but it also has shortcomings. Traditional tracer studies – that is, surveys of former participant or graduates of programs – benefit from a representative picture of the labor market outcomes of the entire graduate population. However, administrative data, such as the data used in this study, enables a timely, more accurate measure of wages and employment outcomes of TVET graduates without relying on survey respondent’s recall of events.

Due to data availability constraints, the report is unable to measure the *causal* impact of TVTC programs.³ Ideally, to measure impact of a program, a control group composed of randomly assigned individuals for TVTC participation and non-TVTC participants is necessary to compare with the outcomes of individuals’ who have been randomized into the program. Future research isolating the causal effect of participation in TVTC compared to control groups of non-participants can add additional evidence to further inform and improve skills development policies.

Box 1: Harnessing administrative data for graduate tracer studies.

Graduate tracer studies are widely used instruments to understand the relevance of education to the current labor market needs. Tracer studies generally take the form of retrospective evaluations that collect data from graduates along several dimensions to measure graduates' outcomes after joining the world of work. Tracer studies generate useful information to help institutions and policymakers design course offers and develop market-relevant content to improve the employability of graduates. While tracer studies are traditionally carried out through surveys of graduates, the use of administrative data sources to trace outcomes of graduates has increased in recent years.⁴

Administrative data can provide a reliable and cost-effective source of information for tracer studies, labor market research and evidence-based policymaking in general. One advantage of using administrative data is lower time and cost of collecting data compared to surveys. Administrative data may also provide more data points for more complex longitudinal analysis, as opposed to a snapshot of graduate outcomes at a specific time. Such detailed analysis is particularly useful to answer questions about students' school-to-work transition and overall trajectory in the labor market. Administrative data may be more reliable than self-reported data in many instances. This is especially true with survey information regarding earnings or length of employment, which may lack accuracy or lead to response biases.⁵

Administrative data can be a powerful tool for analysis, especially when there is a high degree of integration and interoperability across databases. Integration of data sources goes well beyond labor market programs or payroll data; it can include social protection interventions, social services, categorical programs like child allowances and/or pensions, cash transfers, unemployment insurance, among others. Interoperability of administrative data enables information-sharing among actors - even without common information systems. This is especially useful in developing countries lacking resources to establish a robust and integrated data infrastructure. Multiple administrative databases can be combined to provide a real time picture of the labor market, as long as all sources use the same unique individual identification number - such as a social security number or a national ID. In that sense, data can be linked and anonymized to be responsibly shared across institutions, safeguarding individual privacy, and ensuring its appropriate use for research purposes.

There are some tradeoffs between administrative data and more traditional surveys of graduates. For example, administrative data often lacks the representativeness of survey data to make general statements about the population studied. For example, payroll or tax data may fail to capture some important segments of the graduate population, such as those working in the informal sector, which is a large source of employment in developing countries. In many countries, unemployed individuals are not recorded in tax or payroll data, thus limiting the analysis to fewer segments of the labor force. In light of these trade-offs, the practice of integrating survey and administrative data through supplementary questionnaires is increasingly common. Applied research using administrative data sources is context specific and can require adapting the scope based on data availability. In conclusion, administrative data sources are a good resource to build modern labor market monitoring capacity to enable evidence-based policymaking.

Motivation

Global and regional trends are reshaping the labor market at a rapid pace. Globalization, digital technologies, shifts in migration and work organization are making workplaces more virtual, more interconnected, and more technology-and knowledge-intensive. In Saudi Arabia and the Gulf Cooperation Council (GCC) region, falling demand for fossil fuels is forcing governments to rethink a social contract largely supported by natural resource wealth and an economic model characterized by heavy dependence on oil, human capital underutilization, and a generous welfare state that creates disincentives for nationals to join the labor market.

The new economy will require modern skills. Today's workers must be creative thinkers, work in diverse teams, solve problems, handle ambiguity, apply critical thinking and, importantly, continue learning throughout their lives. Building a strong mix of foundational skills is essential for workers to adapt to the challenges of a changing world of work. Many of these changes are not only permanent but will continue evolving and with growing complexity. Making smart investments in workforce skills development and retrofitting the adult training system is a must to meet the challenges of today and tomorrow's labor market.

The COVID-19 pandemic further accelerated some of these trends, potentially even transforming business and workplaces forever. Like other crises, the pandemic may lead to more inequality and labor market exclusion, especially among at-risk and vulnerable groups. Investing in a system that provides opportunities for job training, intermediation services and lifelong learning is now more important than ever to keep individuals attached to the labor market and mitigate the risk of social and economic exclusion.

Preparing for the new economy requires retrofitting adult training by building systems that are flexible, adaptable and which allow workers to continue learning new skills throughout their work lives. Rapid changes in the workplace will continue disrupting work, and workers need to be able to rapidly bridge skills gaps to effectively transition from one job to the other. More frequent job transitions will become the new normal. Workers with limited ability to adapt to these changes face higher risks of displacement, long term unemployment and poverty. When there are large gaps between the skills workers have and the skills required for new emerging occupations, workers will have more difficulties remaining employed and avoiding skills obsolescence. Developing a training system that provides a pathway to lifelong learning is essential to face the challenges of a changing labor market.

This paper studies the outcomes of TVET students joining the private sector in Saudi Arabia. It seeks to expand the limited knowledge base of skills development in Saudi Arabia to inform policies that will increase the effectiveness of the TVET system and prepare for the future. The first part provides a background of challenges in the Saudi labor market and the TVET sector. The second part focuses on the role of the TVET system in improving labor market and social protection outcomes, ensuring access to opportunity for more individuals, driving better outcomes and contributing to more inclusive growth in Saudi Arabia.

The findings of this study are relevant beyond the Saudi Arabia context and contribute to the global body of evidence on labor market outcomes of TVET graduates. In many ways, Saudi Arabia shares many of the traditional challenges labor markets around the world are facing. Features of the Saudi labor market are relevant beyond high income economies and provide insights for developing country contexts with high levels of unemployment and labor market exclusion among vulnerable groups, particularly women and youth.

The TVET system in Saudi Arabia faces some of the common challenges that developed and developing economies face, making its TVET experience highly relevant for practitioners and policymakers. While Saudi Arabia is a high-income country, its TVET sector is emerging and less mature than peers in the income group. Despite recent efforts to increase capacity of the system, TVET remains underprovided. The capacity constraints in turn result in unequal access to TVET for women and in most underserved regions. The limited availability of workplace training coupled with critical information gaps and tools to monitor changes in the labor market undermines the systems' ability to rapidly adapt and react to changing employer needs, contributing to misalignment between education and labor market needs.

Despite these challenges, Saudi Arabia provides insights for countries hastening reforms to rapidly adapt TVET systems to changing labor markets. The TVET sector has grown significantly in the past decade due to a combination of many factors, including aggressive institutional reforms, changes at the program level aimed at attracting more young Saudis to TVET, the introduction of private training providers, and a genuine drive for reform. The remarkable pace of Saudi Arabia's social and economic reform agenda offers insights and relevant international experience to many different country contexts.

Saudi Arabia offers an interesting case study of rapidly changing social norms and attitudes toward women in the workplace. These are increasingly reflected in the TVET sector. Many countries around the world face similar challenges integrating women in the TVET system.⁶ While Saudi Arabia still underperforms in terms of gender outcomes when compared to high income peers, there has been tremendous progress incorporating more women in the TVET system and in the labor market in general. Participation of women in the labor force has almost doubled in the span of five years. In the same period, the TVET system has enhanced its capacity to absorb more women and react to changes in the broader labor market.

The findings offer further evidence of TVET systems' role preparing for the future of work. Variation in outcomes of TVTC graduates across fields-of-study suggest Saudi Arabia experiences similar trends in changing demand for skills observed in other high-income countries. Given these patterns in a constantly and rapidly changing world of work, developing workers' skills to bridge job transitions is becoming increasingly important for labor dynamics and key for social and economic outcomes. In Saudi Arabia, TVET not only seems to facilitate job transitions in the private sector but enhances the combined skills and mobility premiums of graduates. This is an increasingly important role of TVET systems in the future, so learning from experiences is critical to build a future ready, adaptive TVET system capable of turning future challenges into opportunities, prosperity, and inclusive growth.

TVET and the Saudi Labor Market

Country context: skills of the Saudi workforce

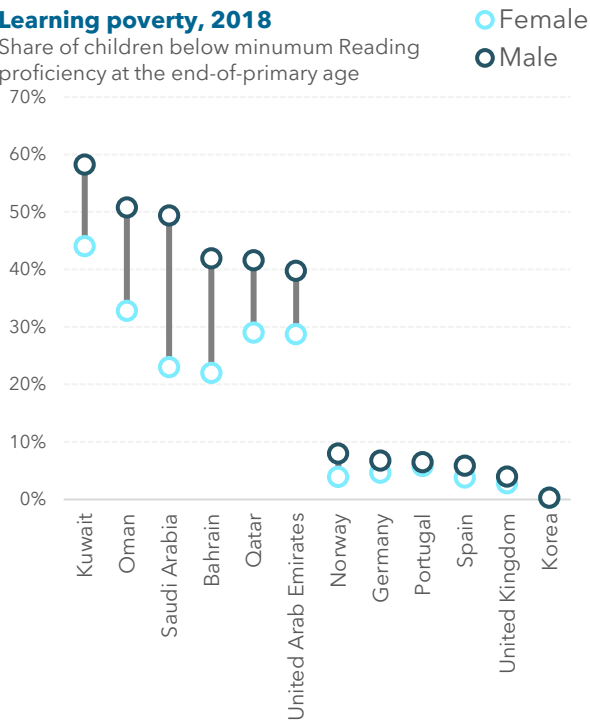
One of Saudi Arabia’s key Vision 2030 reform priorities is to enhance the private sector’s contribution to the Saudi economy and employment. The private sector remains ill equipped to create suitable job opportunities capable of meeting Saudis’ employment expectations. The Vision 2030 aims at increasing the private sector’s contribution to Gross Domestic Product (GDP) from 40 percent to 65 percent by 2030. The share of non-oil private sector contribution to GDP has been increasing over time, from roughly one third in 2010 to nearly half in 2020. The contribution of the private sector to overall employment in Saudi Arabia has been increasing over the last decade, as more Saudis take jobs in the private sector.

A key challenge to increase productivity and develop the potential of the private sector is the limited stock of modern workforce skills. Productivity growth has been stagnant and has contributed negatively to economic growth. The average educational attainment of Saudi workers is higher than in previous generations, but the low quality of the education system continues to produce poor learning outcomes. As of 2008, Saudi Arabia was spending 5.1 percent of GDP on education. This is higher than the regional average (4.4 percent) and higher than the average education spending among high income countries (4.5 percent). But as global evidence shows, the quality of learning in the classroom is critically important economic and long-run productivity growth.⁷

Figure 1

Learning poverty, 2018

Share of children below minimum Reading proficiency at the end-of-primary age

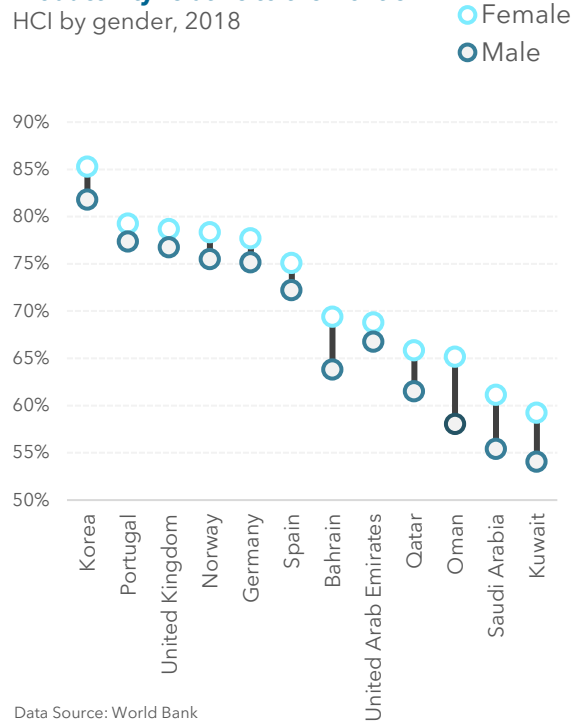


Data Source: World Bank World Development Indicators

Figure 2

Productivity relative to the frontier

HCI by gender, 2018

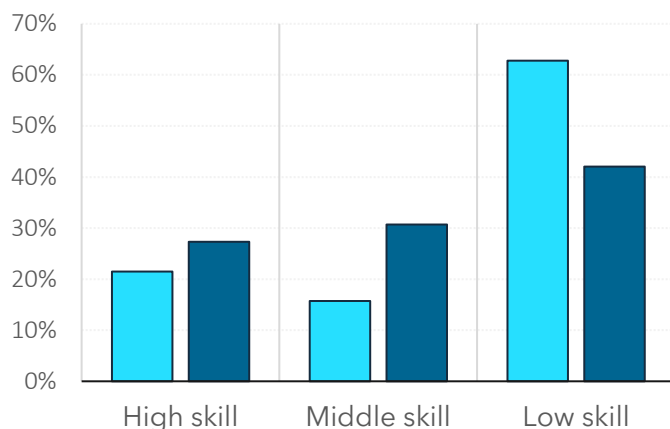


Data Source: World Bank HCI, World Development Indicators

Figure 3

Employment by occupation skills level

Share of workers by occupation skill level, 2000-2020



Source: GASTAT LFS

the education system in Saudi Arabia today is expected to reach only 58 percent of her production potential as an adult at the age of 18 (Figure 2).

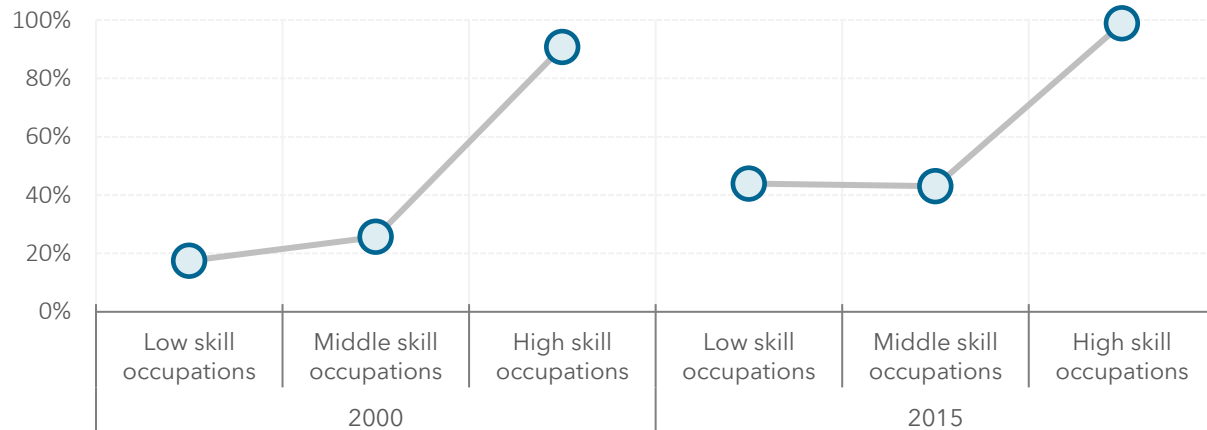
Saudi workers enter the labor market with large skills deficits due to low quality of education throughout the skills development lifecycle. Only 49 percent of male students and 23 percent of female students reach minimum reading proficiency at the end of primary age, one of the highest learning poverty rates among high income countries (Figure 1). Students in Saudi Arabia continue accruing a learning deficit throughout the general education cycle. According to PISA 2018, Reading, science and math proficiency at the age of 15 are well below that of high-income countries. As a result, human capital accumulation is very low. A child entering

Saudi Arabia has made progress toward upgrading the skills of the overall workforce in recent decades. In 2000, almost 12 percent of the employed workforce was illiterate. The share of illiterate workers in employment decreased to 1 percent in 2015. Only 36 percent of the employed population in 2000 had completed at least secondary education, but that increased to 59 percent in 2015 (Figure 4). Defining upskilling as the share of workers in low and medium skill occupation groups with secondary education or above,⁸ there have been notable upward shifts in the low and middle skills segments of the workforce.⁹ The share of workers in low and medium skill occupations with secondary education or higher increased significantly, by 26 pp and 17 pp, respectively between 2000 and 2015. The distribution of skills across main occupation categories shifted toward higher skills over the same period.

Figure 4

Occupational skills upgrading

Share of workers with secondary education or more by occupation level

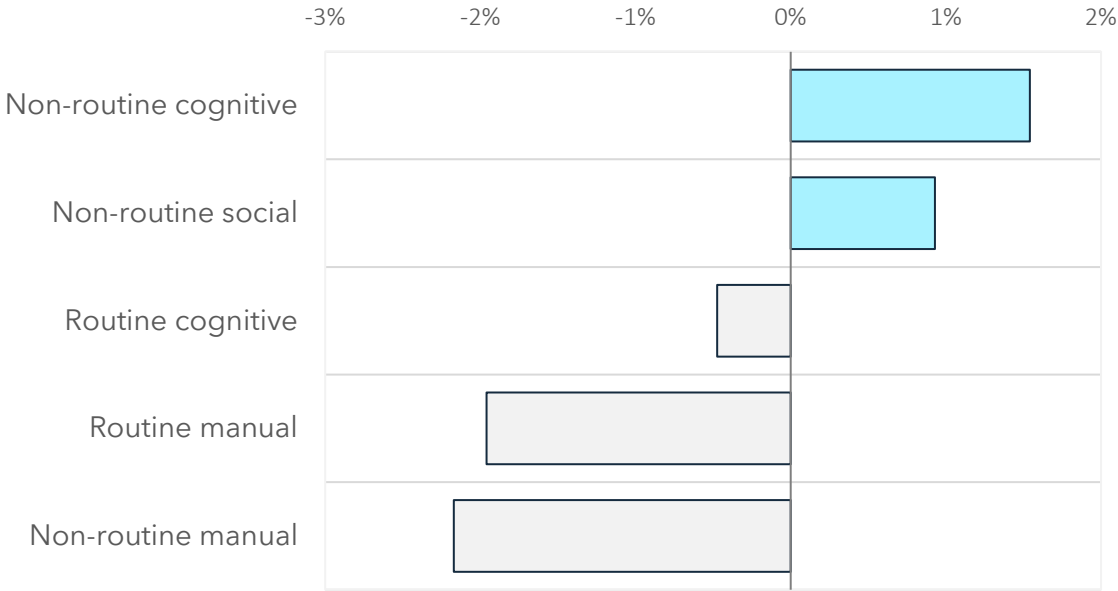


Source: GASTAT Labor Force Survey (LFS)

Some of the improvements in workforce skill levels are in line with increasing levels of more educated Saudis joining the labor market in recent years, driven by the so-called “localization” programs. Localization programs are part of a series of reforms Saudi Arabia has implemented and which aimed at creating more employment for Saudis in the private sector. The objective of localization policies is creating more employment for nationals in the private sector by reducing the wage differential between Saudi nationals and foreign workers. Localization measures seek to increase the cost of foreign labor vis-à-vis nationals by imposing levies and quotas on firms, occupations, and economic activities whose workforce is largely dominated by foreign workers. Increasing levels of Saudi employment in targeted economic activities such as retail, tourism, and services are in line with localization programs targeting those economic activities. ¹⁰

Despite increasing levels of Saudi employment, private sector employment remains dominated by low skilled foreign workers. Foreign workers represent 70 percent of private sector employment and over 75 percent of employment in labor intensive sectors. Employment of foreign workers in the private sector is more intensive in manual tasks -both routine and non-routine- than employment of Saudis, but employment in those tasks is decreasing (Figure 5). In fact, in recent years the trend is towards more non-routine cognitive and interpersonal activities (Figure 5), tasks in which Saudi workers have a slight edge (Figure 6). This is in line with global trends and evidence of employment shifts toward activities that require more non-routine cognitive and interpersonal skills intensity, which are surpassing manual and routine-cognitive task.

Figure 5
Change in task composition of private sector employment
Saudi Arabia, 2013-2020

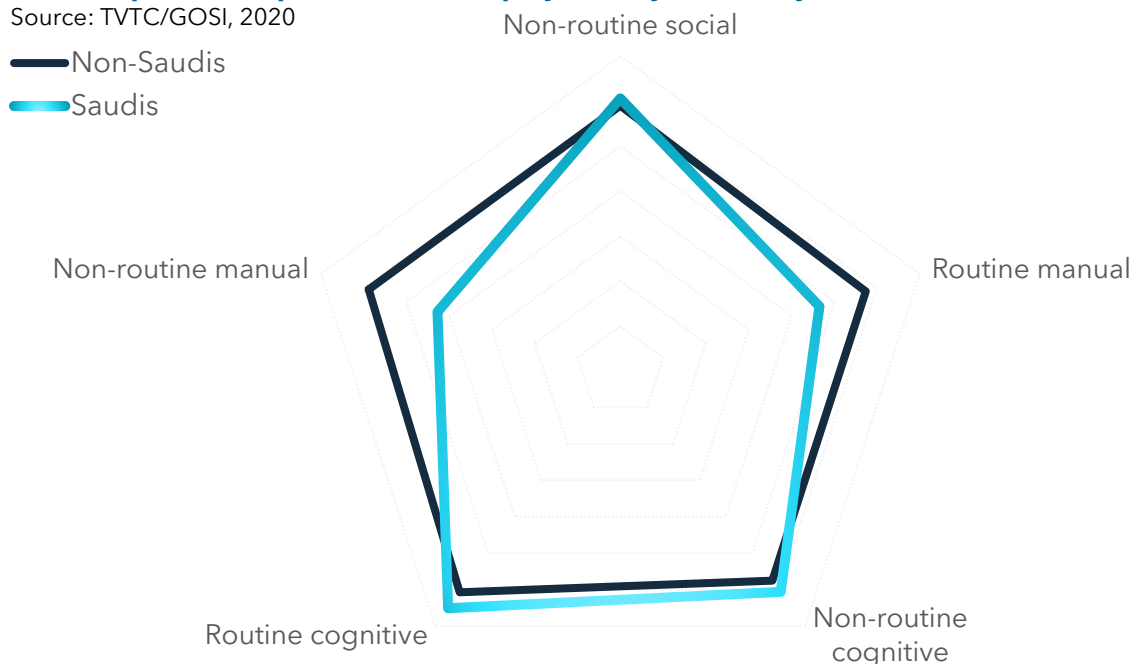


Source: GOSI
 Acemoglu and Autor (2011)

Figure 6

Task composition of private sector employment by nationality

Source: TVTC/GOSI, 2020



A key challenge for private sector employment is traditionally low levels of participation among nationals, particularly women. Labor force participation rates of Saudis have hovered around the 40 percent of the working age population but reached as low as 17 percent for women in 2016. According to estimates, nearly half of young Saudi women in 2015 were neither employed, nor participating in education or training.¹¹ However, in recent years, participation of women has increased tremendously. As of 2020, 31 percent of working age women had joined the labor force, reaching the Vision 2030 target way ahead of schedule.¹² On average, Saudi women outperform men in terms of skills outcomes, so increasing participation levels of women in employment has a positive effect on the overall skills of the workforce.

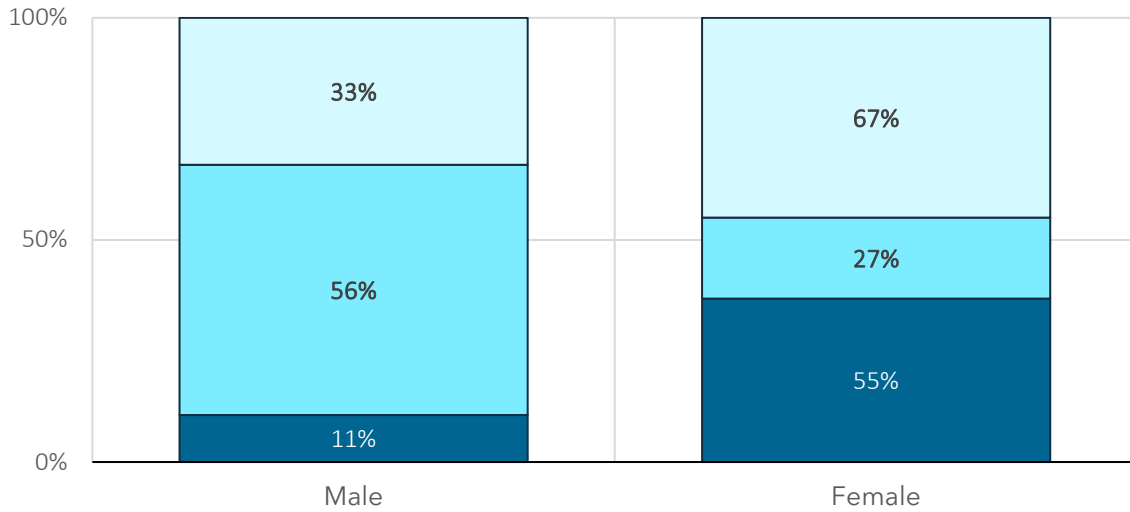
Deteriorating skills outcomes thwart efforts of labor market inclusion of the unemployed.

Limited employability is one of the main drivers of labor market exclusion in Saudi Arabia, especially among members of disadvantaged groups such as youth and women. Figure 8 illustrates the magnitude of the employability skills deficit for labor market outcomes of the unemployed: 92 percent of the unemployed lack previous work experience or have never participated in any type of professional on the on-the-job training (OTJ). Moreover, one-third of unemployed men and two thirds of unemployed women hold a bachelor's degree (Figure 7). In fact, Saudi Arabia has one of the highest unemployment rates among individuals with tertiary education in high income countries and one of the highest long term unemployment rates among High Income Countries (HICs).¹³ Addressing employability gaps among unemployed Saudis is critical to reduce unemployment.¹⁴

Figure 7

Distribution of unemployed by gender and education level

- Intermediate and below
- Secondary and post secondary diploma
- Bachelors and above



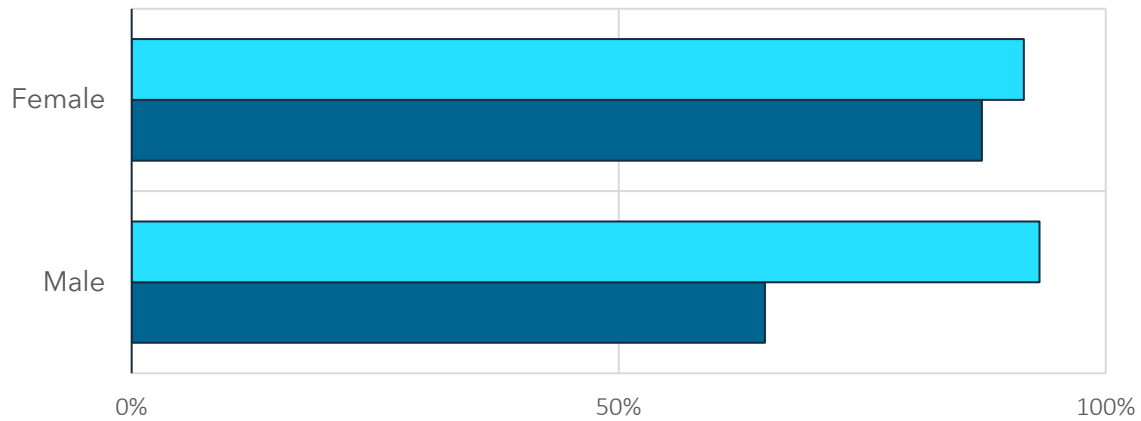
Data Source: GASTAT LFS

Figure 8

Distribution of unemployed by type of OTJ experience

Share of unemployed without:

- Professional on-the-job training
- Work experience



Source: GASTAT LFS

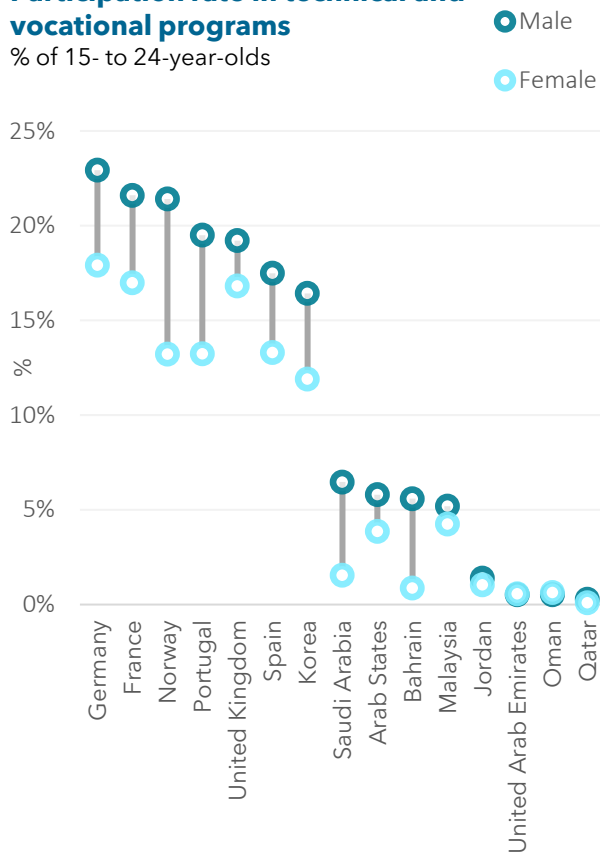
Sectoral Context: Saudi Arabia's emerging training sector

The training sector in Saudi Arabia is emerging but remains very limited in scope. Among youth ages 15 to 24, only 6 percent of men and less than 2 percent of women participate in TVET in Saudi Arabia. This is very low TVET participation compared to high income countries like Germany, France and Norway (Figure 9). But vocational education is not widely used in Saudi Arabia and the GCC region in general. Some of the lowest TVET participation rates in GCC countries are in the United Arab Emirates, Oman and Qatar, where TVET participation stands below 1 percent of men and women in the 15 to 24 age group. Participation in upper-secondary programs in Saudi Arabia and the GCC region is also quite low by international standards. TVET participation among youth in Saudi Arabia is very low (Figure 10). Only 1 percent of students enrolled in upper secondary education in Saudi Arabia are enrolled in vocational programs (Figure 10).

Figure 9

Participation rate in technical and vocational programs

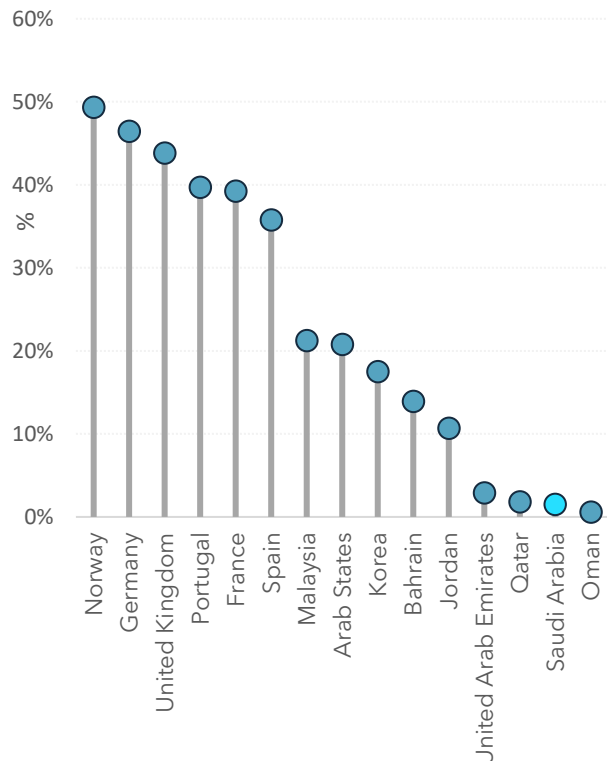
% of 15- to 24-year-olds



Data source: World Bank
World Development Indicators

Figure 10

Share of all students in upper secondary enrolled in TVET



Data source: World Bank
World Development Indicators

The TVET track in Saudi Arabia starts with the provision of secondary-level training programs. There are three levels of vocational education in Saudi Arabia. Initial vocational education and training typically starts at the upper-secondary level (ISCED 3) and provides a pathway to a job or to continue post-secondary TVET. In Saudi Arabia, this level of vocational education and training is delivered by TVTC Secondary Industrial Institutes. The secondary industrial program is quite small, with less than 3,000 graduates per year.

Post-secondary TVET is available for youth and adults in Saudi Arabia after graduating secondary education. Post-secondary pre-tertiary level (ISCED 4) TVET programs typically are designed to lead to placement in a particular occupation. In Saudi Arabia, this level of technical and vocational education and training is provided through TVTC Technical Colleges. In Saudi Arabia, this level of vocational education and training is delivered by TVTC Secondary Industrial Institutes. The secondary Industrial Institutes allow students to complete the first or second secondary grade of high school to obtain a diploma, mainly in construction and other industrial fields. The technical colleges also offer shorter programs for returning adults. In recent years, TVTC has also developed a bachelor's degree program (ISCED 6).

Recent reforms have given students more flexibility in transitioning between general and TVET pathways. One reason for low demand for technical education used to be that entering the vocational track, typically done in upper-secondary education at the age of 16, essentially foreclosed the option of attending university, which is the aspiration for most students.¹⁵ However, reforms in recent years have increased the level of flexibility for students to select educational pathways and transition from vocational education to higher education programs. In recent years, TVTC has engaged in a number of reforms and growth initiatives in line with the increased importance of TVET internationally and the more pronounced role TVET is expected to play as a high-quality education pathway in the Kingdom as articulated in Vision 2030. Some of these improvements were expanding capacity in TVTC colleges and opening new programs targeted at females. This likely contributed to the sharp increase in TVTC applicants over the past few years. In fact, enrolment in TVET increased significantly in the last few years - more than 30 percent in post-secondary colleges. However, while enrollment rates have increased, completion rates in the same years have declined. In 2017/2018 graduation rates in post-secondary diploma programs stood at 29 percent and in secondary institutes 35 percent. While graduation rates of bachelors' programs in the same colleges were 63 percent indicating that students within the TVET system still prefer bachelor's degrees to diploma degrees.¹⁶

Moreover, perceptions of vocational education in Saudi Arabia have improved, which may have potentially contributed to this expansion. Vocational training programs have faced negative societal perceptions in many high-income countries.¹⁷ This has also been the case in Saudi Arabia, where the predominant preference of nationals is to complete a higher education program and solidify their career prospects of a public sector job or a high paying, white collar profession in the private sector. The Vision 2030 reforms seek among other things to diversify education pathways and steer more high school graduates into vocational education fields and improve the perception of vocational education programs as a viable career path in Saudi Arabia. Aldossari (2020) finds that the Vision 2030 communication campaigns have helped improve the perceptions of TVET programs in Saudi Arabia.

There are gaps between supply and demand for TVET programs. In education, supply refers to the capacity of institutions and government programs to allocate resources to support and enable the education system to expand its capacity to deliver TVET - in both public colleges and increasingly through outsourcing to private training providers. On the demand side are patterns of enrollment, students and parents making educational choices that meet their career aspirations and building their human capital. In the context of a constantly changing labor market, the relevance and adaptability of the education and training system is an essential piece to correct imbalances between demand for TVET programs and supply of market responsive TVET that meets changing aspirations of students and changing employer demands for skills. Aligning supply and demand for more market responsive TVET provision requires building a learning experience that provides a true path to productive work, enabling students to acquire and apply the technical skills employers are looking for to grow their business. This benefits students, employers, and the economy.

Figure 11

Gaps in admissions in technical Technical Colleges for Men

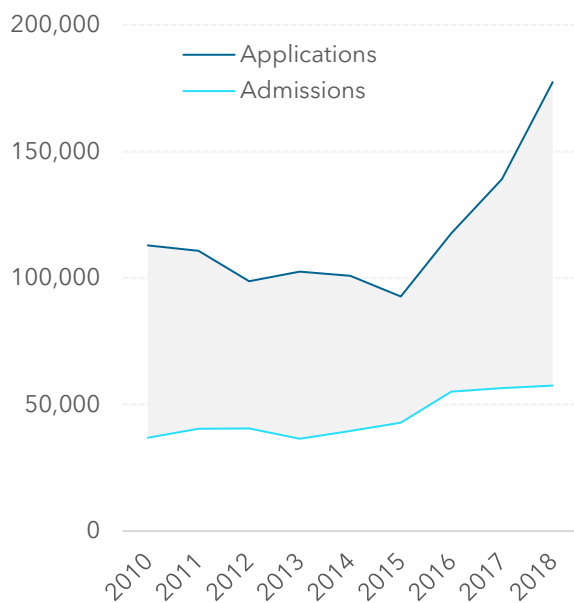
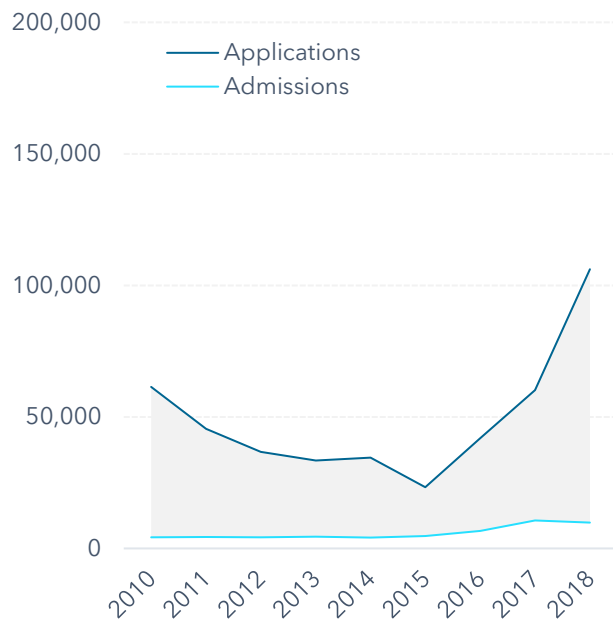


Figure 12

Gaps in admissions in technical Technical Colleges for Women



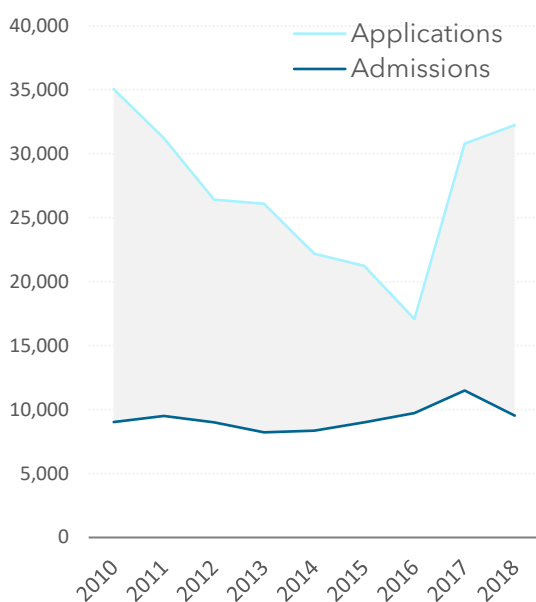
TVET education remains significantly underprovided, despite recent efforts to ramp up capacity. Enrollment in technical colleges for men tripled from 2014 to 2018. This increase in enrollments in TVTC is in line with to falling number of out-of-school adolescents and youth of secondary school age of both sexes in Saudi Arabia during the same period, which decreased by one third from 2016 to 2019 (from 96,743 in 2016 to 63,564 in 2019).¹⁸ However, the number of applicants also increased quite rapidly. As of 2018, 177,000 male students applied for admission to a TVTC programs but only 126,000 enrolled (Figure 11). The number of women applying for TVTC programs has increased dramatically over the past few years as well, from 23,000 female applicants in 2015 to over 100,000 female applicants in

2018 (Figure 12). Thus, even though the number of women enrolled in TVTC increased five-fold from 2015-2018, the roughly 20,000 female students enrolled in 2018 remained only a fifth of the number of applicants, according to TVTC records (Figure 12). There seem to be existing gaps in provision of training, particularly in computer, engineering support and equipment programs. Student demand for these fields skyrocketed after 2017, but the TVET system has not been able meet this demand (Figure 13).

Figure 13

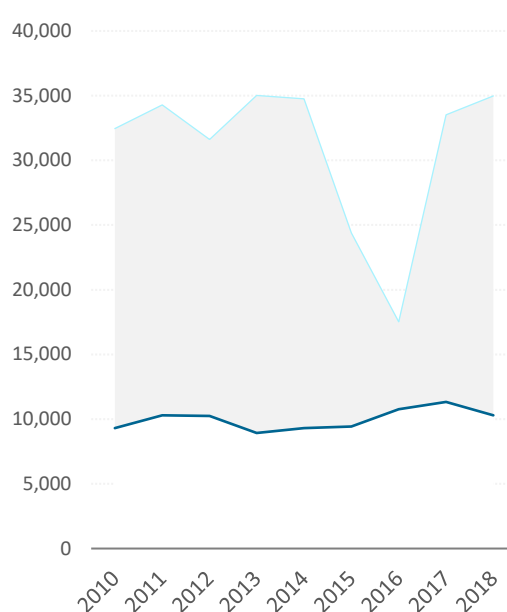
Gaps in computer-related and engineering support programs

Computer-related TVET-level fields



* Computer networks, software, control panel operations, multimedia, web development, computer technical support

Engineering support TVET-level fields



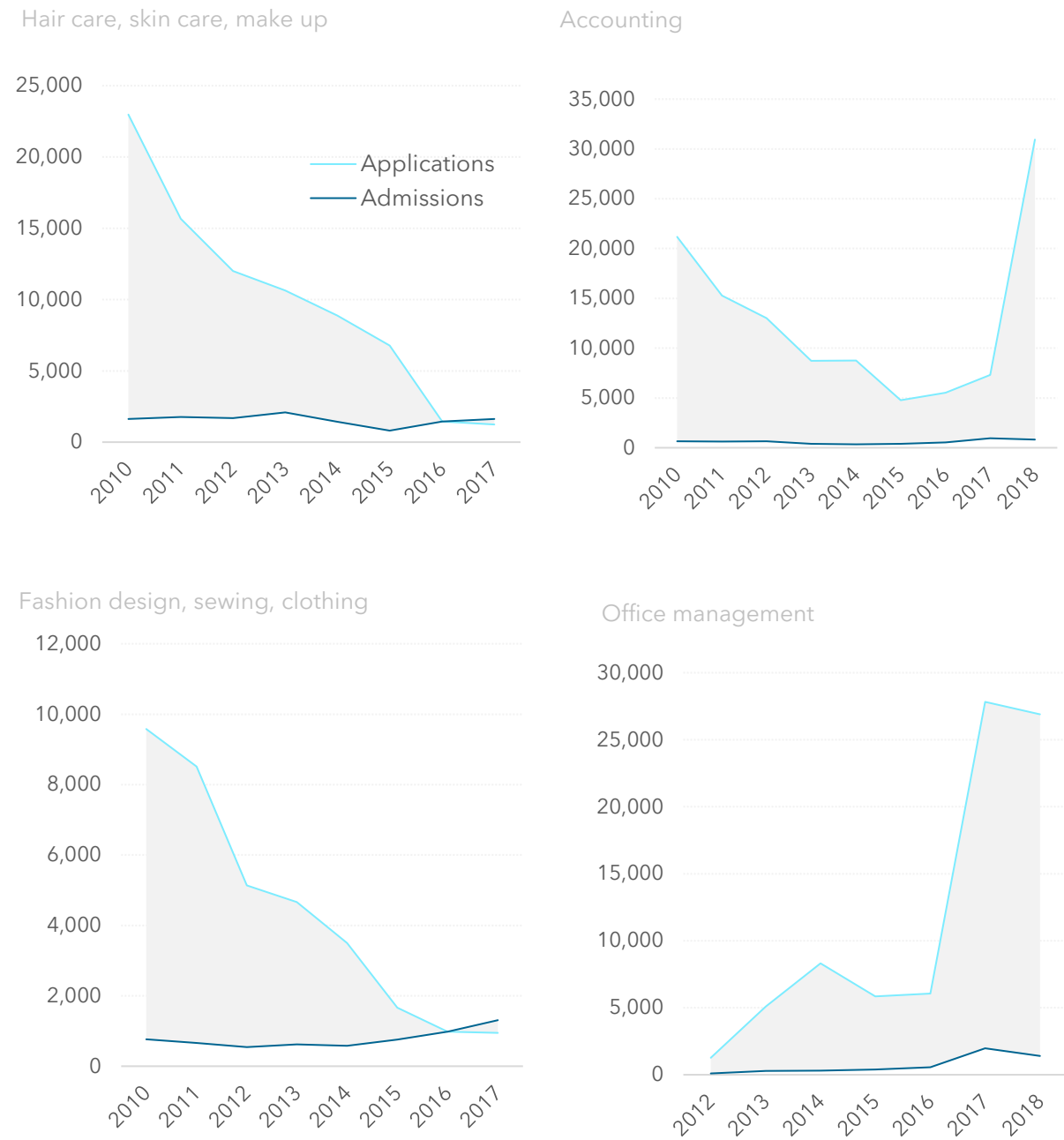
*Electric power and equipment trades, industrial electronics, automotive, hydraulic systems, mechanical maintenance, HVAC

Moreover, the apparent mismatch between changing occupational aspirations of female students in Saudi Arabia and the TVET system’s capacity to swiftly adapt, balancing changing social and labor market trends. For example, provision of TVET programs for women in Saudi Arabia has been narrowly focused on more traditionally “female” disciplines such as make up, cosmetology, clothing and fashion design fields. However, in Saudi Arabia, social norms and attitudes toward women in the workplace are rapidly changing, and with it are women’s human capital choices. As Figure 14 shows, demand for some of those fields among female prospective students in technical colleges is rapidly decreasing. Instead, student’s preferences seem to be shifting to other more fields, such as accounting and office administration fields (Figure 14).¹⁹ TVTC schools may reject many applicants due to their

interest in fields with perceived low demand in the labor market. But it is essential that such decisions are evidence-based, and data driven. Monitoring trends in the labor market is critical to generate the evidence base to make sound policy and curriculum decisions to maximize the human capital potential.²⁰

Figure 14

Gaps in programs for woman, technical colleges for women



Improving access to TVET is critical for Saudi Arabia's national priorities and to address the challenges of vulnerable working people in Saudi Arabia. Increasing access to training may facilitate labor market transitions for young Saudis and reduce the risk labor market exclusion. Around 16 percent of youth in Saudi Arabia are Not in Education, Employment, or Training (NEET). According to estimates, nearly half of young Saudi women in 2015 were neither employed, nor participating in education or training.²¹ While training can help address employability gaps and keep young people engaged, provision of training is very limited in Saudi Arabia compared to many high-income countries (Figure 15). Training measures and active labor market programs have a positive impact in terms of outcomes for vulnerable groups.

Evidence from meta-analyses of active labor market programs shows that training programs tend to have positive effects in the medium and longer term, increasing the probability of employment among unemployed participants. Programs providing job training particularly targeting hard-to-place unemployed jobseekers, providing them with on-demand technical, business, and life-skills training to raise their human capital and reduce skills mismatch have proven effective in improving the employability of unemployed workers in many European countries. While training programs for the unemployed can have unintended impacts - such as lock-in effects in the short term. For example, the evidence supports positive outcomes in the medium to long term.²²

Saudi Arabia's Vision 2030 acknowledges the limited provision of training and seeks to expand the vocational education and training system and investments in human capital. The Vision 2030 plan contains a series of strategic objectives that directly impact the provision of job-relevant technical skills through vocational education and training, including building a life-long learning journey, ensuring alignment of educational outputs with labor market needs, expanding vocational training to meet labor market needs, and improving the readiness of youth to enter the labor market. Similarly, building up the private sector as an engine for economic growth and job creation requires that employers can recruit talented Saudis with the skills firms need to grow and become more productive. Hence skills outcomes of Saudis in the private sector are highly relevant for Vision 2030 and Saudi Arabia's priorities.

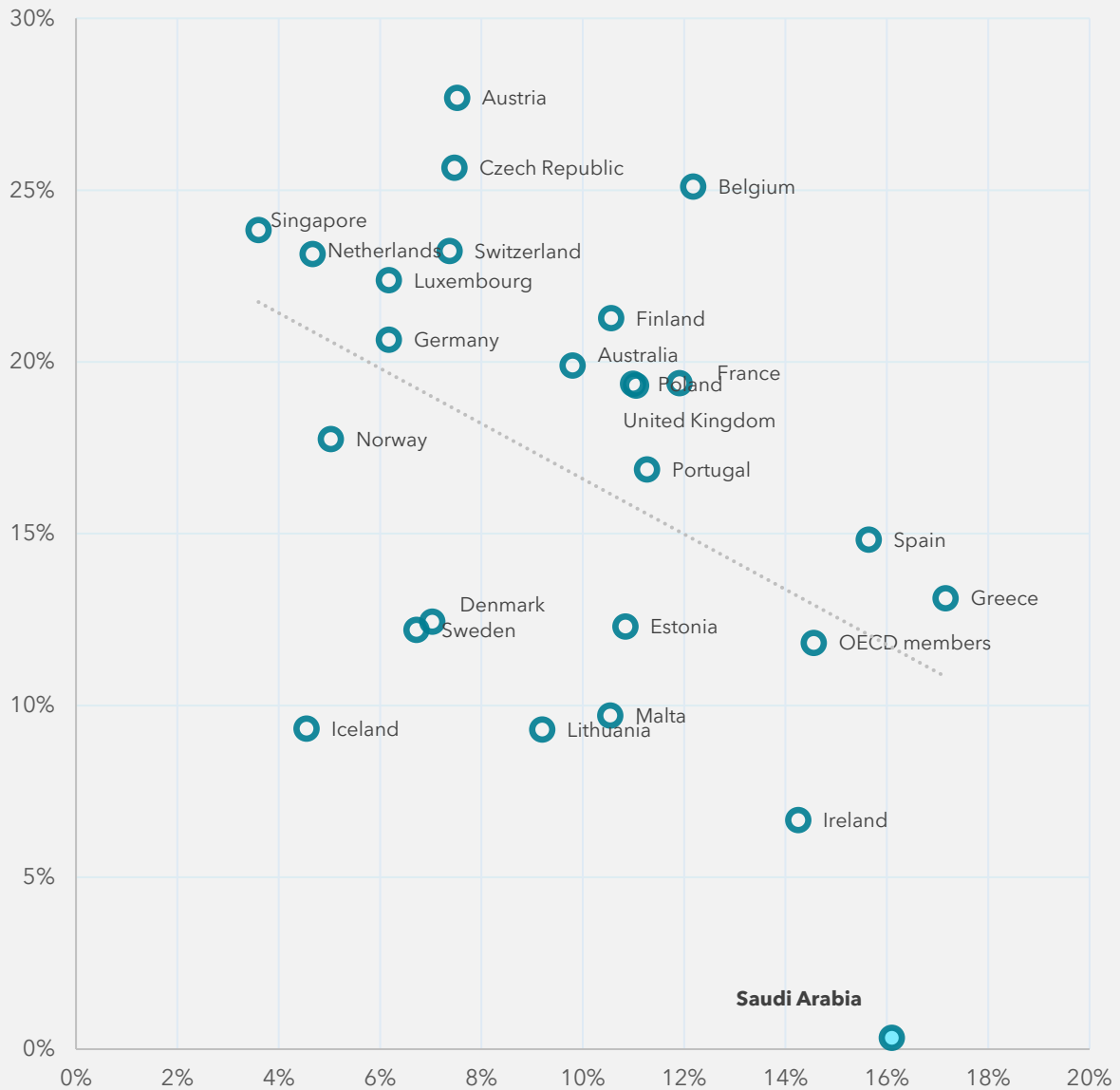
Developing the TVET system is an important objective for the Kingdom of Saudi Arabia. The Human Capability Development Program (HCDP) is the main Vision Realization Program (VRP) concerned with the development of human capital in the Kingdom. The program is a comprehensive work plan adopting recommendations and objectives from Vision 2030 related to workforce development and education. The HCDP is aimed at developing citizens that are able to compete globally by building basic and future values, knowledge and skills that enhance 21st century skills of Saudi citizens. The HCDP sets ambitious targets for the TVET. Among these are raising the enrollment rate in TVET institutes from 22.8 percent to 33 percent by 2025 and increasing the share of TVET graduates in total employment from 13.9 percent to 50 percent in 2025. The TVET sector can also play a key role in raising the share of localized high skilled jobs to 40 percent by 2025.

Figure 15

Youth TVET participation and labor market exclusion

TVET

Percentage of young people aged 15-24 years participating in technical or vocational education



NEET Rate

Share of youth not in education, employment or training, total (% of youth population)

Data source: World Bank, 2016

Private sector outcomes

Private sector employment

Most TVET trainees are from the private sector or find work in the private sector. Roughly 56 percent of graduates appear in the private sector payroll database after graduation. Around 42 percent of all graduates appear in the private sector before graduation and remained in the private sector after graduation, while 14 percent are first time private sector entrants (Table 1). And 12 percent of graduates appear in the private sector before graduation but not after. This may indicate transitions into public sector employment, self-employment, unemployment, or inactivity following graduation. About 32 percent of graduates are not found in the database. As the data is only available starting in 2013, they may have worked in the private sector before that year, or 2-4 years before entering the TVTC program. Most graduates are young workers, with an average of 24 years of age. The data may suffer from some selectivity issues. The more data points after graduation in GOSI, the more likely someone will appear postgraduation.²³

Table 1 Private sector payroll (GOSI) employment status of TVTC graduates

Private sector payroll employment	2015	2016	2017	2018	2019	Total
GOSI status (% of graduates)						
Not found	31.35	30.34	29.94	33.59	34.79	32.2%
Pre- and post-graduation	43.36	45.64	45.14	42.01	37.25	42.34%
Only post-graduation	19.6	15.42	14.44	11.09	8.37	13.51%
Pre but not post-graduation	5.69	8.6	10.48	13.3	19.59	11.95%
Total	100	100	100	100	100	100%

Source: GOSI/TVTC. Note: Groups included are mutually exclusive and add up to the total number of graduates

The high share of students found in the payroll dataset may also reflect distortions originating from widespread “ghost employment” in the private sector. There is an extent to which localization policies and Nitaqat-induced ghost employment distorts data reporting in Saudi Arabia. A significant proportion of TVTC graduates are reported on private payroll during the 24-month period when they are enrolled in TVTC institutions, and majority of them have reported receiving the minimum salary of SAR 3000. It is highly probable that they are on the private payrolls just to meet firms’ Saudization quota.²⁴ Since the estimates are based on pre- and post-graduation, the TVTC bump in wages is likely to be underestimated. However, comparative returns to different TVTC specializations should hold.

Large firms are responsible for the recruitment of almost half of TVTC graduates in the private sector (Figure 16). By contrast, firms with less than 50 employees accounted for only 24 percent of placements (micro firms with 5 employees or less had only 4 percent). The TVET sector has traditionally targeted large firms for placement of students in apprenticeships and post-graduation employment. One example is TVTC’s strategic partnership with Saudi

Aramco to provide relevant training for the energy sector. Under such partnerships, training institutes and firms jointly operate facilities and implement specialized industry-specific training largely designed by employers in the industry – the so-called Aramco model. Such models provide a framework to address sector-specific skills imbalances by aligning skills training with employers’ needs.

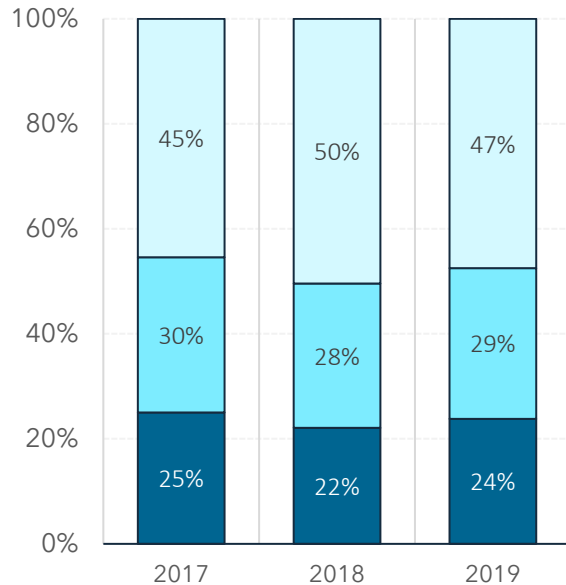
Small and Medium Enterprises (SMEs) combined hire the majority of new TVTC graduates employed in the private sector. SMEs are the main source of new job creation in developed economies, but they often lack the ability to find and recruit talent to grow their business as large corporations do. In Saudi Arabia, a large share of SMEs report difficulties finding qualified Saudi workers. Roughly one in five SMEs report difficulties finding skilled labor as the main obstacle for business growth (GASTAT SME Survey 2018). Labor and skills shortages can hold back growth among small firms unable to find workers. In Saudi Arabia, small firms tend to remain small over time. Increasing access to skilled labor can lead to more firm dynamism.

Figure 16

Distribution of TVET graduate recruitment by firm size

Small firms - 1 to 49 employees
 Medium - 50 to 499 employees
 Large - 500 and more employees

- Small
- Medium
- Large

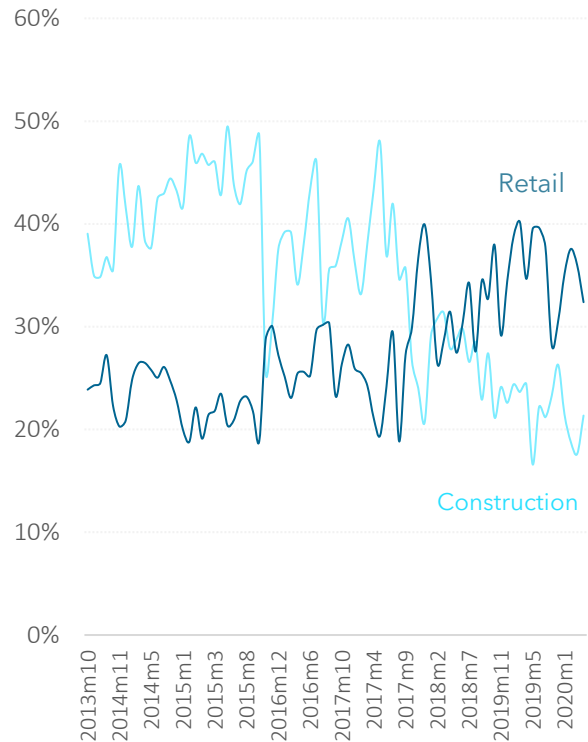


Source: TVTC, GOSI
 *Firm size categories in the GOSI record pre-2017 differ from recent years, thus are not comparable.

Figure 17

TVTC recruitment in construction and retail economic activities, 2013-2020

2013 to 2020, not seasonally adjusted



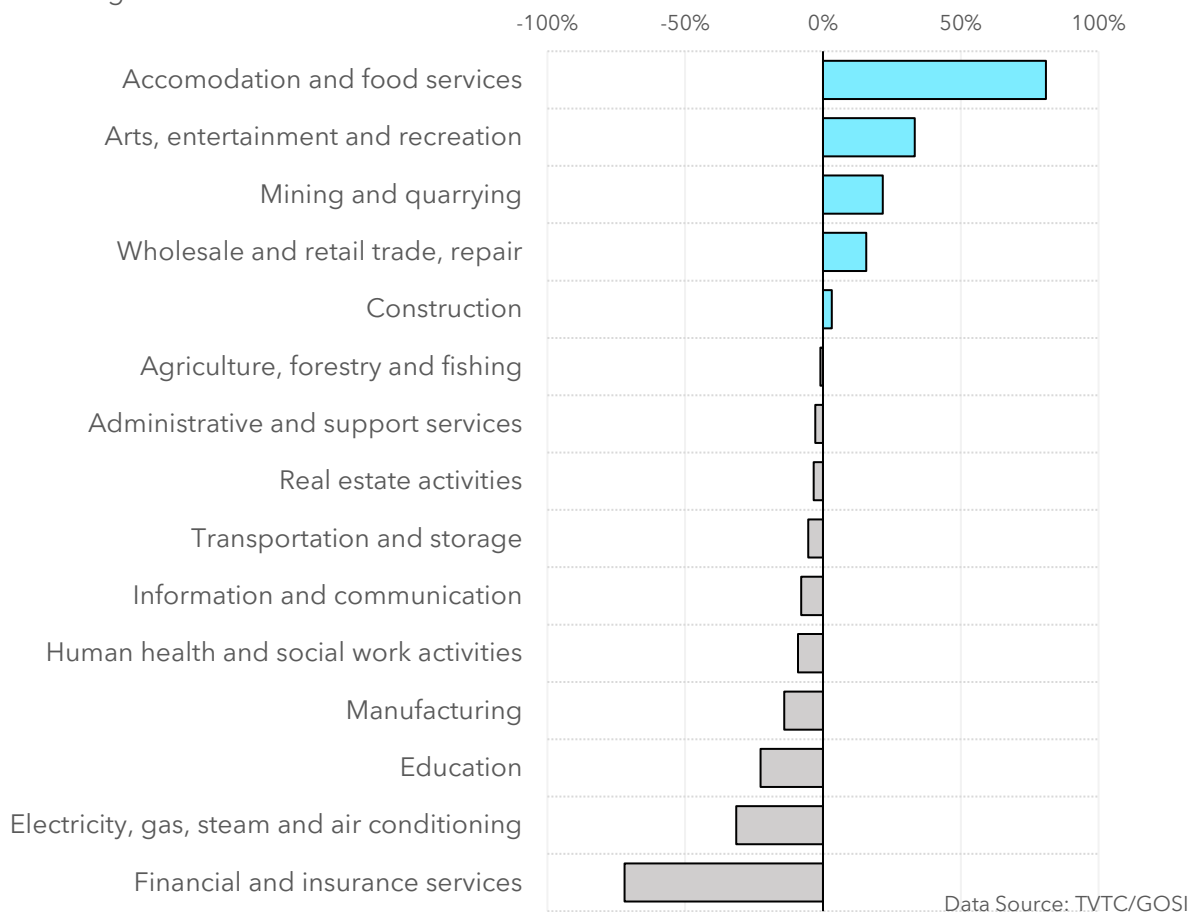
Data Source: TVTC, GOSI

There are some notable shifts in sectoral recruitment of TVTC graduates, but most employers remain concentrated in a handful of activities. More than 70 percent of private sector placements are concentrated in four sectors: construction, retail, administrative services and manufacturing. Sectoral recruitment of TVTC graduates seems to reflect similarities with broader patterns for Saudi employment in the private sector. For example, Saudi employment in the private sector is concentrated in the same four economic activities - retail 22 percent, construction 15 percent, manufacturing 10 percent and administrative support services 6 percent (GASTAT 2020). The construction sector, with about 34 percent of placements, was the top recruiter of TVTC talent until it was overtaken by the retail sector in mid-2018 (Figure 17). The retail sector is now the largest employer for TVTC graduates, overtaking the construction sector. There are shifts in sectoral recruitment reflecting overall Saudi employment trends and national priorities. The largest increase between 2015 and 2019 is the accommodation and food service activities, followed by entertainment, mining and quarrying, and retail (Figure 18).

Figure 18

Growth in TVTC recruitment by economic activities, 2015-2019

Saudi Arabia 2015 to 2019,
% change



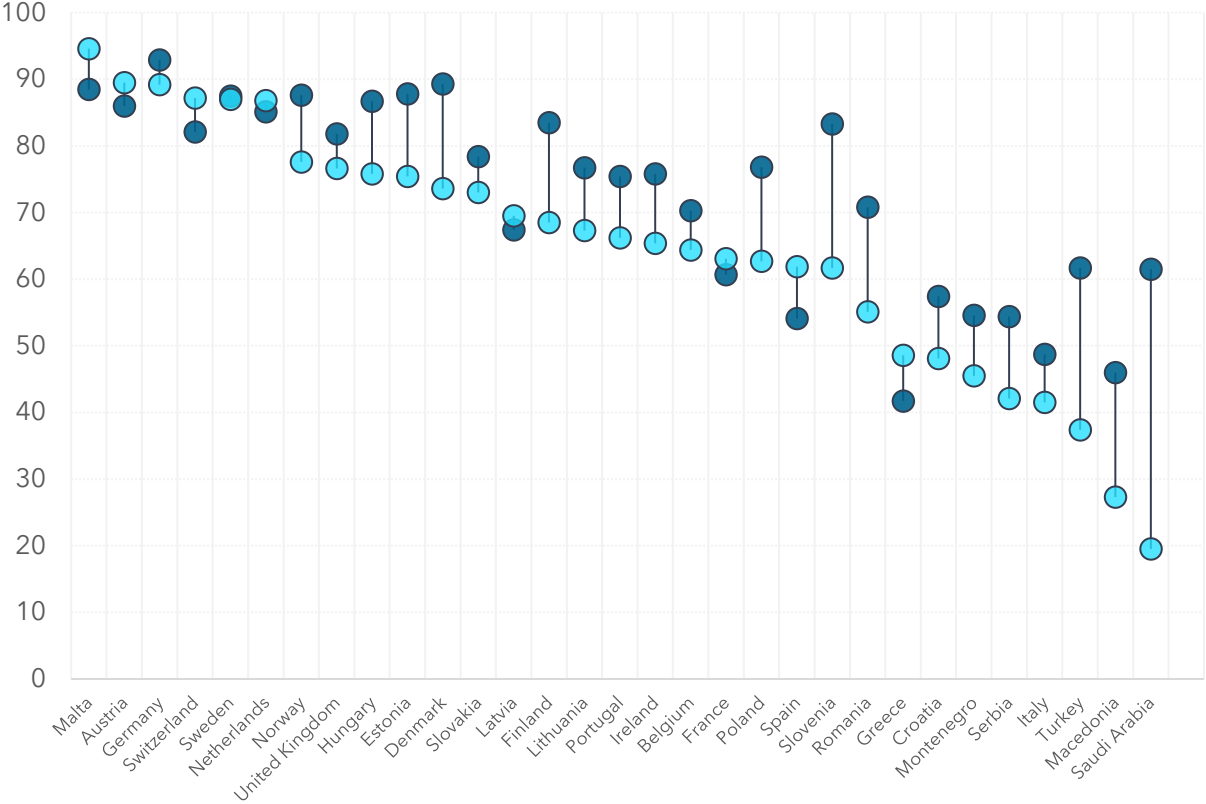
A wide gender gap in placement outcomes remains. Saudi Arabia is undergoing significant changes affecting the labor market. More women are joining the workforce and contributing productively in employment. The labor market is becoming more inclusive and increasingly creating more opportunities for women. In line with these trends, there have been improvements in both education and labor market outcomes for Saudi women attending TVTC institutes, but much more remains to be done. Men still account for about 95 percent of all private sector placements. Employment of female TVTC graduates is increasingly concentrated in service sector activities and occupations, reflecting similar employment trends for Saudi women in the labor market. There are increasingly more localization efforts seeking to create more employment opportunities for Saudi women in the private sector. The largest programs for women (29 percent of private sector placements for women is in services) have very low placement rates compared to the largest programs for men. But the possibility of informality cannot be ruled out. About 62 percent of male graduates find work within six months of graduation compared to 20 percent of female graduates - a 42 pp gender gap (Figure 19).

Figure 19

Employment rates of recent graduates by gender

(%) of post-secondary vocational education graduates
 Saudi Arabia* and comparator countries, 2018

● Men ● Women



Data Source: TVTC/GOSI/MHRSD, Eurostats
 *Data for Saudi Arabia only available for TVTC graduates in the public and private sector; it does not include the informal sector, military and armed forces sector

Vocational training programs are by definition associated with training students for a specific occupation or groups of occupations. As such, and to facilitate analysis across the numerous training programs offered by TVTC, specializations are classified into five vocational field categories: technical programs, trades and technology programs, clerical and office programs, sales and services programs, and industrial programs. ²⁵Vocational training program prepares individuals with a combination of theoretical knowledge and job-specific skills needed for a particular occupation. Mapping TVTC programs to occupations groups provides additional insight into the quality of job matching after graduation. Table 1 in the Methodology annex provides definitions and terminology for the occupational classifications used for the various TVTC fields of study to specific occupations. Table 2 - A2 Occupations and TVET field-of-study crosswalk - provides a description of the categorization methodology. Over half of graduates are concentrated in three occupation groups. About 20 percent of graduates go to clerical support occupations, 20 percent go to technicians and associate professional jobs, 16 percent go on to work as sales and service workers.

Vertical skills mismatch

Skills mismatch is a key source of labor market friction and further depress productivity. Skills mismatch or qualification mismatch occurs when workers qualifications - measured in terms of educational attainment - are either below or exceed the qualifications required for the job. A significant portions of individuals skills are acquired beyond formal education and on the job. In addition, education levels fail to capture learning outcomes or other measures of quality of education. Workers with the same education levels may have different skillsets, based on the competencies they have acquired and the specializations they have pursued. Nonetheless, on-the-job skills mismatch represented in terms of qualifications for a particular occupation is a widely used measure of skills mismatch, particularly in the context of limited internationally comparable data. Skill mismatches have a negatively affect economic growth, leading to increasing labor costs and slowing down the adoption of new technologies with efficiency gains potential, which inhibits productivity growth.

Vertical skills mismatch may be a factor preventing better labor market outcomes for TVET graduates. Vertical skills mismatches - that is, a disconnect between fields of study and occupation groups students go into - can have a negative impact on graduates' employment outcomes. Too many graduates enter occupations that do not maximize the technical skills acquired during participation in TVTC programs. For example, as Figure 20 shows, only 21 percent of graduates from technical program categories end up joining the corresponding occupation group of technician and associate professional jobs in the private sector. The vertical mismatch for trades related programs is even higher. Only 8 percent of graduates from trades programs join employment in jobs corresponding to the occupation group for which they trained, in this case crafts and related trades workers (Figure 21). For example, the Auto Mechanics Program imparts technical skills associated with occupations in the metal, machinery, and related trades workers occupations. Yet, very few students go into this occupation category. Instead, a larger number of students end up working clerical and sales occupations. These mismatches can be costly for graduates.

Figure 20

Flows from technical programs to occupation groups

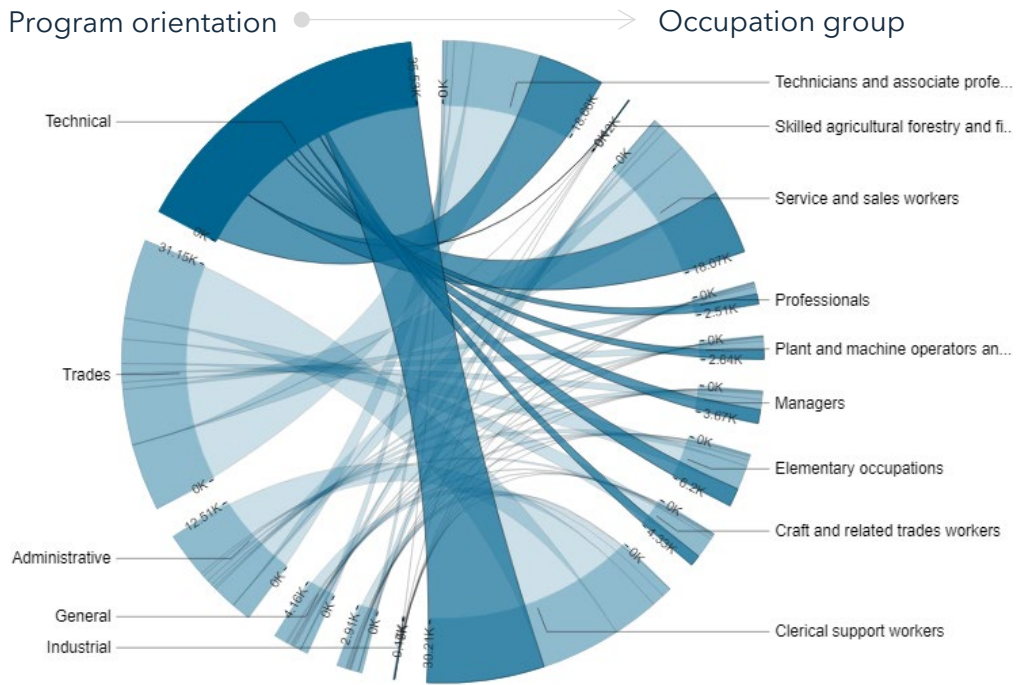
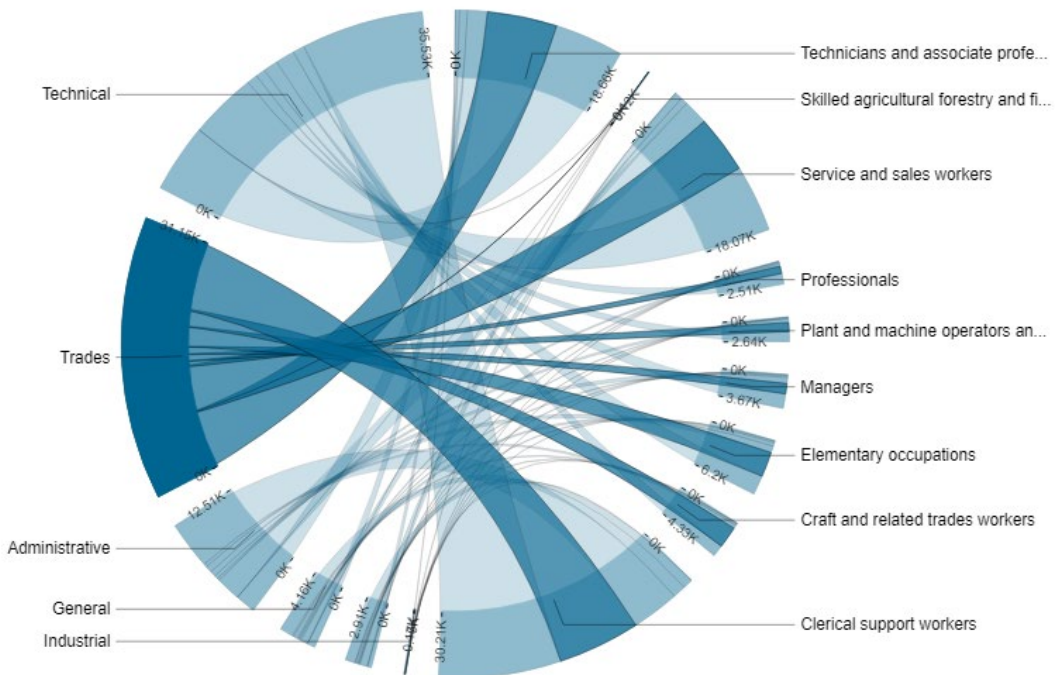


Figure 21

Flow from trade related programs to occupations



Returns to education and training

Returns to education are important measures of the quality of learning with many implications for policymakers and education providers – from spending decisions, to prioritization of specializations and program design considerations. Returns to education refer to the earnings of graduates after participation in educational programs. Measuring returns to education and disseminating information can help students and parents make informed career and human capital decisions, including how much they should invest in education. It helps students answer the million-dollar question: how much they will earn if they invest money and time in a TVTC program. In the United States, for example, vocational education is associated with higher earnings of young workers. Using data from the United States National Longitudinal Survey of Youth between 1998 to 2015, Kreisman and Strange (2019) find that each year of advanced TVET education yields a 2 percent return in earnings of students early in their careers. A recent evaluation of the United States’ Jobs Corp Program – an intensive one-year training program for young underprivileged students – finds that participation in the program is associated with a return of 12 percent per year, but returns are not sustained over time.

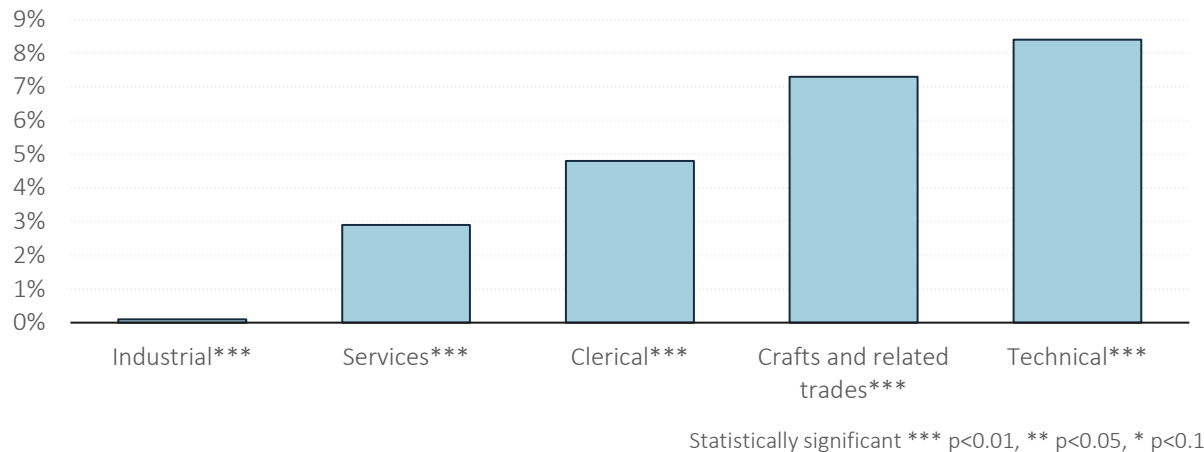
Figure 22

Returns to TVET by program orientation

Post-training vs pre-training

By program orientation

OLS regression



TVTC graduates in Saudi Arabia earn returns of 7.3 percent on average after graduation compared to before graduation.²⁶ Technical programs and trades and technology programs provide the highest returns to TVET in the private sector. Comparing the wages of students who work in the private sector before and after graduating from a TVTC program shows that in all programs, students make more after completion of a program regardless of specialization. Returns to technical programs are 8 percent higher compared to the pre-TVET baseline. Graduates of trade and technology programs experience an average 7 percent return increase in private sector earnings after completing the program (Figure 22). General programs – including English and Computer programs – also lead to a 7 percent return.

There is significant variation in returns to training depending on the type of specialization. The programs in the top quintile of returns to education range from 30 percent returns to construction programs to 5 percent return to hydraulic and pneumatic systems (Table 2 and Table 3). A large proportion of TVTC graduates are reported on private payroll during the 24-month period while still enrolled in TVTC institutions, and a majority report earning the minimum salary of SAR 3000. Since these estimates are based on pre-and post-graduation, the increase in wages is likely to be underestimated. Comparative returns to different TVTC specializations should hold.²⁷

Table 2 TVET program specializations in the top return quintile

Specializations in the top returns quintile	Returns
Construction	29.7%
Computer networks support	28.8%
Electric power and machines	26.1%
Public administration	24.1%
Binding	11.7%
Photography	10.5%
Automatic printing	8.9%
Medical supplies	7.8%
Production machines operation	6.4%
Welding	6.3%
Auto body denting and painting	6.1%
General carpentry	5.9%
Engines and vehicles	4.9%
Hydraulic and pneumatic systems	4.8%

Table 3 Average entry nominal wages by occupation subgroup

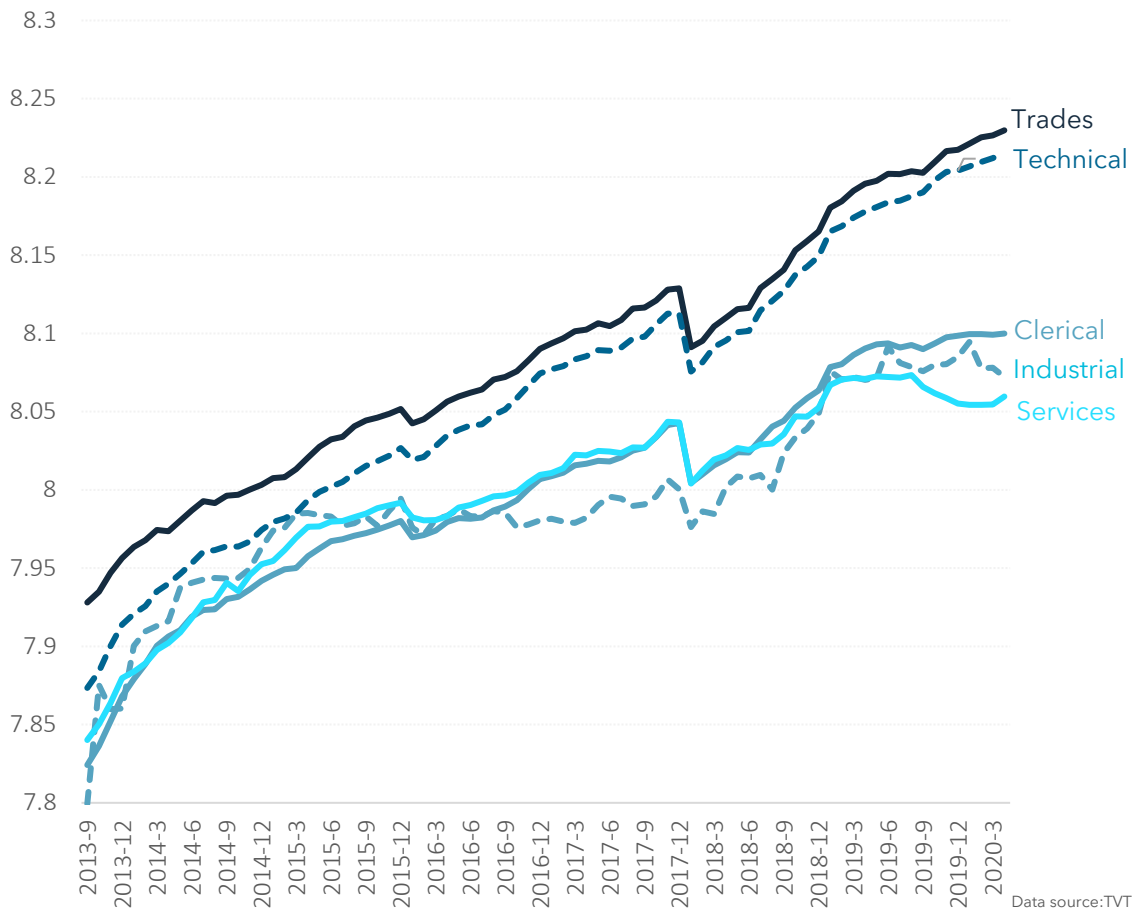
Table 3: Occupation Subgroup <i>Top 15 highest nominal wages in 2019</i>	Average entry nominal wages (in SAR)
Science and engineering professionals	5,791.06
Production and specialized services managers	5,295.56
Information and communications technology professionals	5,266.68
Stationary plant and machine operators	5,197.59
Information and communications technicians	4,946.97
Science and engineering associate professionals	4,875.94
Electrical and electronic trades workers	4,753.45
Food processing, wood, garment and other craft workers	4,628.98
Street and related sales and service workers	4,564.79
Legal social and cultural professionals	4,525.50
Metal machinery and related trades workers	4,365.08

Real wages of graduates of all main program categories in the TVTC class of 2015 have consistently increased over time (Figure 23). Wages of students participating in trades and technical programs have continued to increase steadily for a period of five years after graduation. Wage growth of graduates from clerical and service-related programs appear to have stagnated in the past three years. Trends for clerical and administrative occupations seem consistent with experiences from other high income countries falling demand for highly routine cognitive work associated with occupations such as keyboard and filing clerks, for example. Low returns to sales and services programs may be due to the overrepresentation of women in this program category. Saudi women are increasingly joining low-wage service occupations (Alaref et al 2021) and are more prone to significant wage penalties for qualification mismatch (Rivera et al, forthcoming).²⁸ Real wages declined across specialization groups in the first quarter of 2018 following the introduction of the value added tax in January 2018, which reduced inflation-adjusted wages of workers via an increase in consumer prices compared to the previous year.

Figure 23

Real wage growth over time for 2015 trainee cohort

Log(real wages)

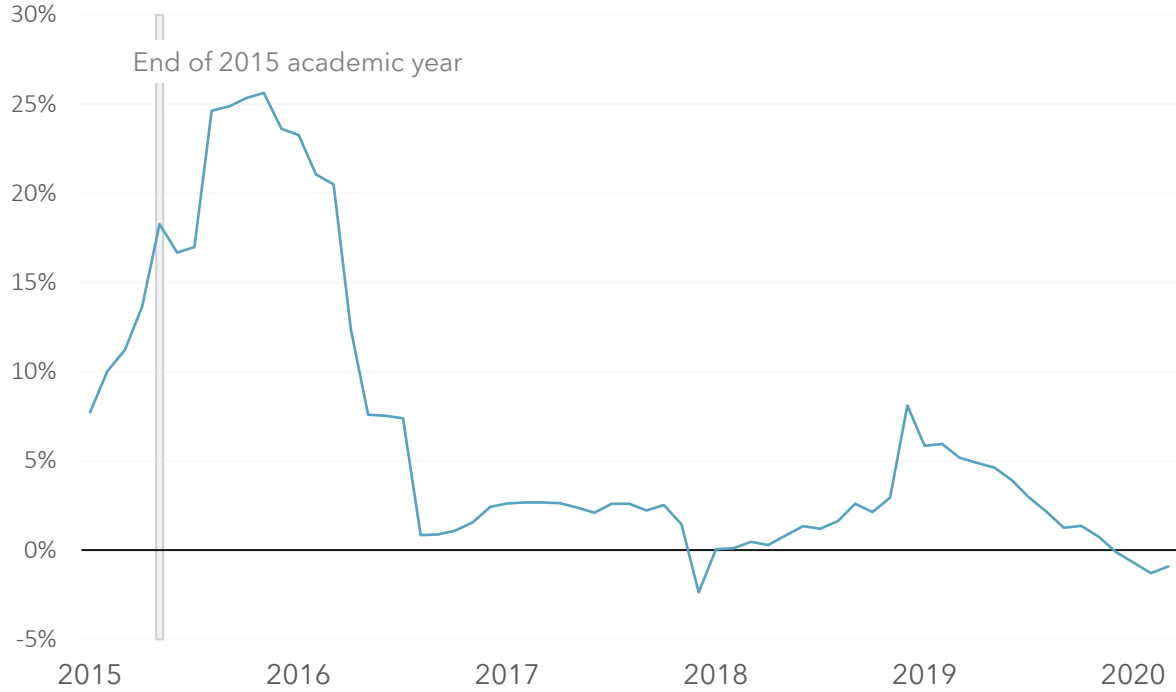


Data source: TVTC/GOSI
Adjusted for inflation. Data source: CPI: GASTAT

Positive earning outcomes for TVTC 2015 graduates seem to be sustained over time. Graduates completing the program in 2015 experienced a sharp increase in wages compared to the previous year, suggesting sustained benefits of participation in TVTC programs. Since a significant share of graduates have recorded wages before joining the training program, it is possible to compare wages before and after graduating of the program. Some students graduate in previous trimesters or find placements in wage employment before the end of the academic year.²⁹ Average year-to-year wage growth reached 26 percent for the 2015 cohort months after completion of the program (Figure 24). However, following the post-graduation bump in earning, wage growth seems to decelerate in 2016 and 2017.

Figure 24

Year-over-year change in private sector real average monthly wages
2015 graduates cohort, percentage change



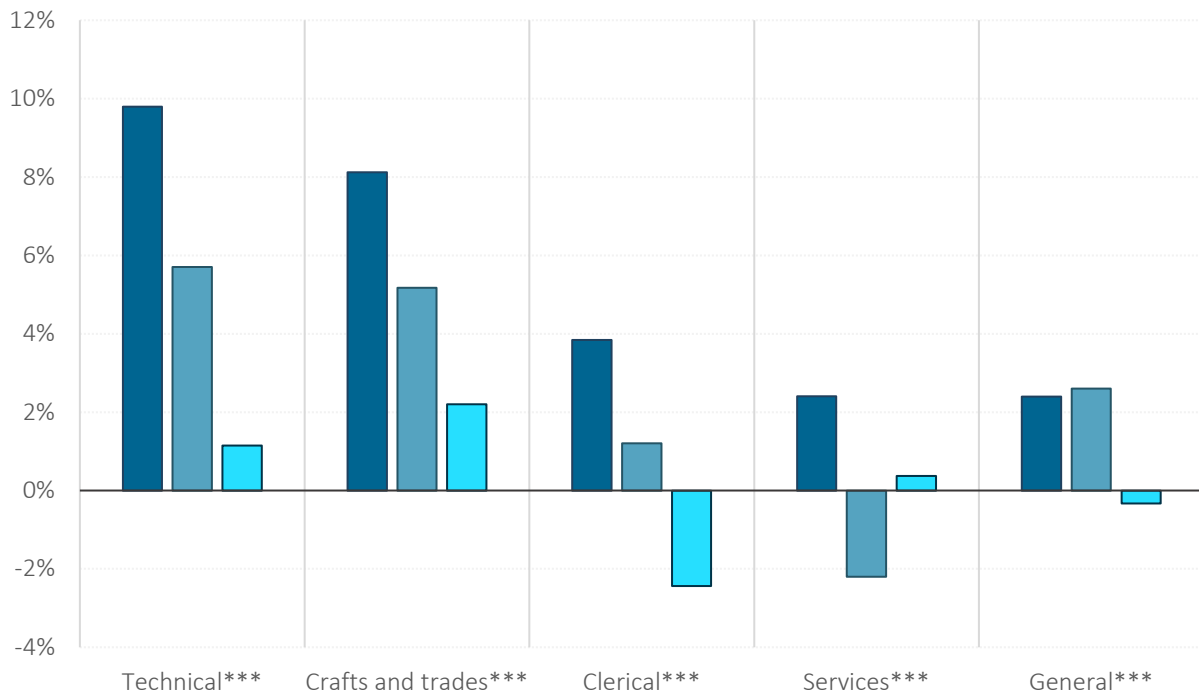
Data source: TVTC, GOSI

In fact, subsequent cohorts of graduates completing the TVTC program during the 2016-2017 recession experienced lower returns on average when compared to the previous cohort entering the labor market under healthier economic conditions (Figure 24). In fact, in the five-year observation period for the 2015 cohort, average year-over-year wage growth entered negative territory only twice: during and after the economic shock of 2017 and during the COVID-19 shock in 2020. The Saudi economy suffered an economic downturn beginning in 2016 and extending into 2017. This was due to a combination of factors including high volatility in the price of oil, sluggish growth in the non-oil sector and the imposition of austerity measures. In 2017, the Saudi economy shrank for the first time since

the Great Recession. This is likely contributing to observed patterns in wages of graduates entering the labor market during this period. Students graduating in 2016 and 2017 experienced returns of 6 percent and 1 percent, respectively, compared to the about 10 percent of those graduating in 2015 (Figure 24). This trend is observed across program categories, with individuals in clerical, services and general programs even experiencing negative returns in 2016 and 2017.

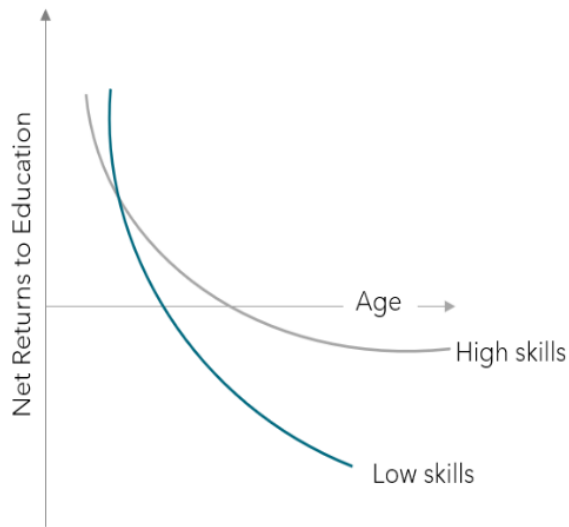
Figure 24

Returns to training by graduation cohort and program orientation ■ 2015 ■ 2016 ■ 2017
Two years after graduation, 2015, 2016 and 2017 cohorts



Statistically significant *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Returns estimates based on two-year before TVET and two-years after TVET after TVET to ensure uniform comparison across graduation cohorts.

International evidence suggests that low returns as a result of graduating during a recession are unlikely to be transitory. In fact, individuals who graduate and enter the labor market during recessionary shocks tend to face persistent long term negative effects on wages. In the United States, for example, a one percentage point increase in the unemployment rate at the time of graduation is associated with an initial 6 percent wage loss, with negative wage effects shown to persist for up to 15 years (Kahn 2010). In Canada, research shows that the cost of recessions on earnings of recent college graduates tends to be more substantial for disadvantaged individuals. The recession widened the inequality gap among graduates, with disadvantaged groups suffering an initial wage loss of 9 percent and lasting effects over ten years (Oreopoulos et al. 2012).



International evidence shows returns to training tend to wane over time. Several studies in high income countries find that initial returns to training programs can be initially substantial, but may weaken over time, particularly for low-skilled workers. There are often self-selection issues at play when it comes to outcomes of TVET graduates. Low performing individuals are tracked or self-select into vocational education in the first place, thus the diminishing returns to education may reflect some of the foundational skills deficit individuals have carried over their careers. For low skilled workers, returns tend to diminish at a faster pace than for high skilled

workers, as illustrated in the modified Heckman curve below. Returns to technical or job-specific skills acquired during adulthood tend to decrease faster than returns to cognitive skills formation during childhood (Cunha and Heckman, 2008).

For example, Lavrijsen and Nicaise (2014), using data on men from the Organization for Economic Cooperation and Development (OECD) Programme for the International Assessment of Adult Competencies (PIAAC), find positive returns to vocational education at the start of the career across the OECD countries included in the study. TVET students gain important on-the-job experience that provides an earnings advantage over general education students, who in turn tend to perform better on cognitive assessments as a result of more years of schooling in general subjects. However, the earnings advantage associated with vocational education students over general education students disappears 12 years after completing secondary education. Moreover, observed returns to general skills increase continuously over the career.

Finally, fast changes in the labor market are making job-specific skills learned through TVET increasingly more vulnerable to obsolescence than general cognitive skills. Declining returns to TVET over time are often the result of changing demands for certain technical skills, as introduction of new technology and constant changes in the labor market led to depreciation of skills acquired through training. Evidence from high income countries shows that TVET students are more likely to engage in the type of routine cognitive and routine non-cognitive work that is at higher risk of digitization or automation.

The “future of work” raises important questions for the TVET system in Saudi Arabia. On the one hand, job-specific and technical skills will become obsolete faster, leading to negative social outcomes and worker displacement. On the other hand, the TVET system is absolutely essential to reincorporate these individuals to the labor market by re-training displaced workers left behind by rapid technology adoption and structural change. Preparing for the new economy requires retrofitting the adult training system, building systems that are flexible, adaptable and allow workers to continue learning new skills throughout their work

lives. Of particular importance is developing a training system that provides a pathway to lifelong learning. This is essential to face the challenges of a changing labor market. Ensuring workers have access to opportunities to learn, develop and acquire new skills to improve their employability is key not only for the skills development system but for the future of social protection.

Job transitions and mobility

In a constantly changing world of work, developing workers' skills to bridge job transitions is becoming increasingly important for labor dynamics and key for social and economic outcomes. Job transitions are important for workers and employers. Worker reallocation is important to improve workers' wages and employment outcomes via more bargaining power. Businesses also benefit from workers fluctuations can lead to gains in efficiency and productivity stemming from better allocation of skills and work. Labor mobility allows both workers and firms to "shop around" and find better matches.

Job turnover is an important element of labor mobility with implications for workers' wages and productivity. But high job turnover can discourage employers from further investments in training. The high likelihood that a given worker will leave the firm reduces employers' incentives to invest in that worker's training early in the employment relationship.³⁰ However, once the worker gains job-specific skills important for the firm, such skills increase his productive wage potential above potential gains from switching firms, thus reducing the probability of turnover. Thus, the probability of separation from the firm decreases as workers gain more tenure within the firm, making employer investments in training more likely. Nonetheless, labor mobility is an important mechanism for young workers, especially to acquire - and, importantly, signal - skills to improve their bargaining power for better wages.

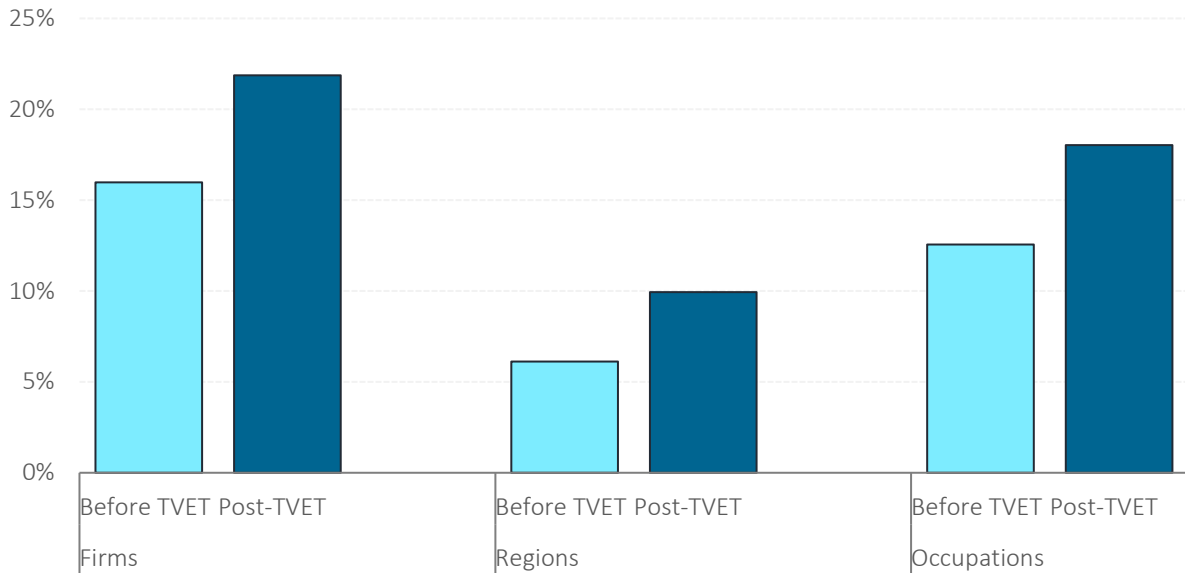
In Saudi Arabia, TVET increases students' ability to change jobs and the skills and mobility premiums of graduates. Comparing outcomes of students with previous work experience provides insightful evidence about the likelihood of students transitioning across occupations, firms and regions. On average, 18 percent of graduates in Saudi Arabia transition across occupation within a year after completing a public TVET program, compared with 13 percent occupational mobility within a year pre-TVET (Figure 25).³¹ This is in line with mobility rates of TVET graduates in the OECD, where 17 percent of graduates change occupations within a year (OECD 2016). Graduates of TVET in Saudi Arabia are also 6 pp more likely to shift from firm to firm and 4 pp more likely to change regions after completing a TVET program.

Completing a TVTC program seems to influence mobility decision of graduates across specialization groups. Individuals undergo more job transitions on average in the 20 months after completing a TVTC program than in the 20 months before. Mobility after TVET varies across occupation groups, but graduates across specializations have more transitions across firms and regions than before participating in TVET (Figure 26). Post-TVET mobility across firms is higher among students who completed a technical or trades program. These programs also see the largest increases from pre-and post TVET in terms of firm-to-firm mobility. To a lesser extent, this trend also holds for regional labor mobility decisions - which tends to be somewhat uncommon in Saudi Arabia.

Figure 25

Share of TVET students switching jobs, firms and regions

Pre-post TVET, percentage of individuals changing:

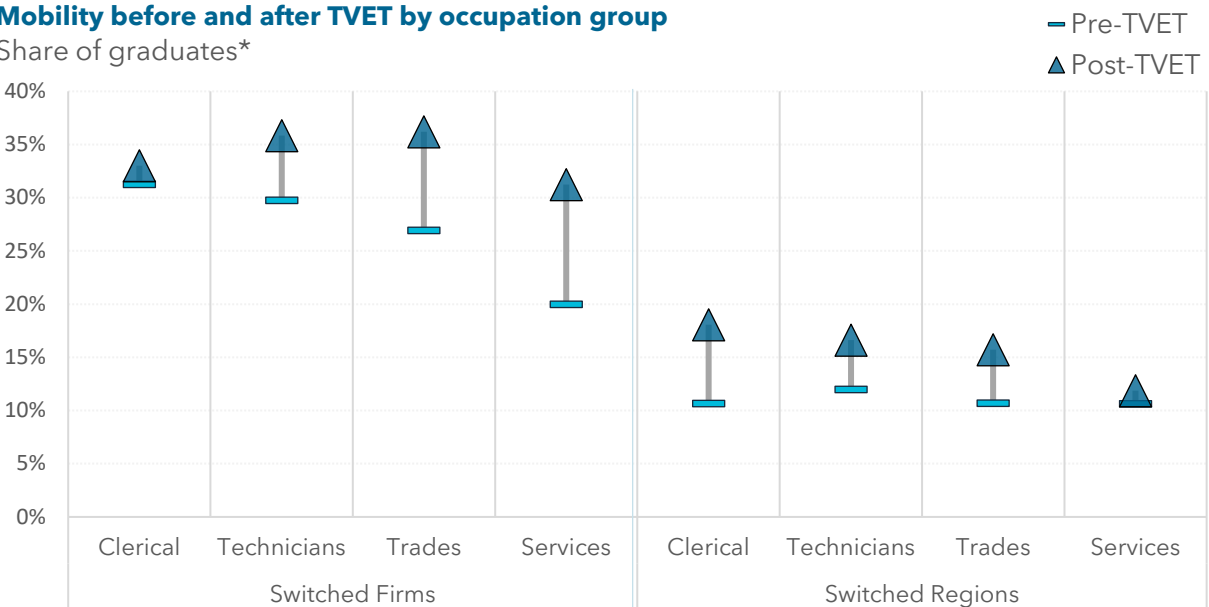


*Mobility is defined as transitioning between firms and regions within the observed period. Compares individuals for a period of 20 months before the entry in the TVET program vs 20 month after graduation from TVET are compared. Only two cohorts with bala

Figure 26

Mobility before and after TVET by occupation group

Share of graduates*



*Mobility is defined as transitioning between firms and regions within the observed period. Compares individuals for a period of 20 months before the entry in the TVET program vs 20 month after graduation from TVET are compared. Only two cohorts with bala

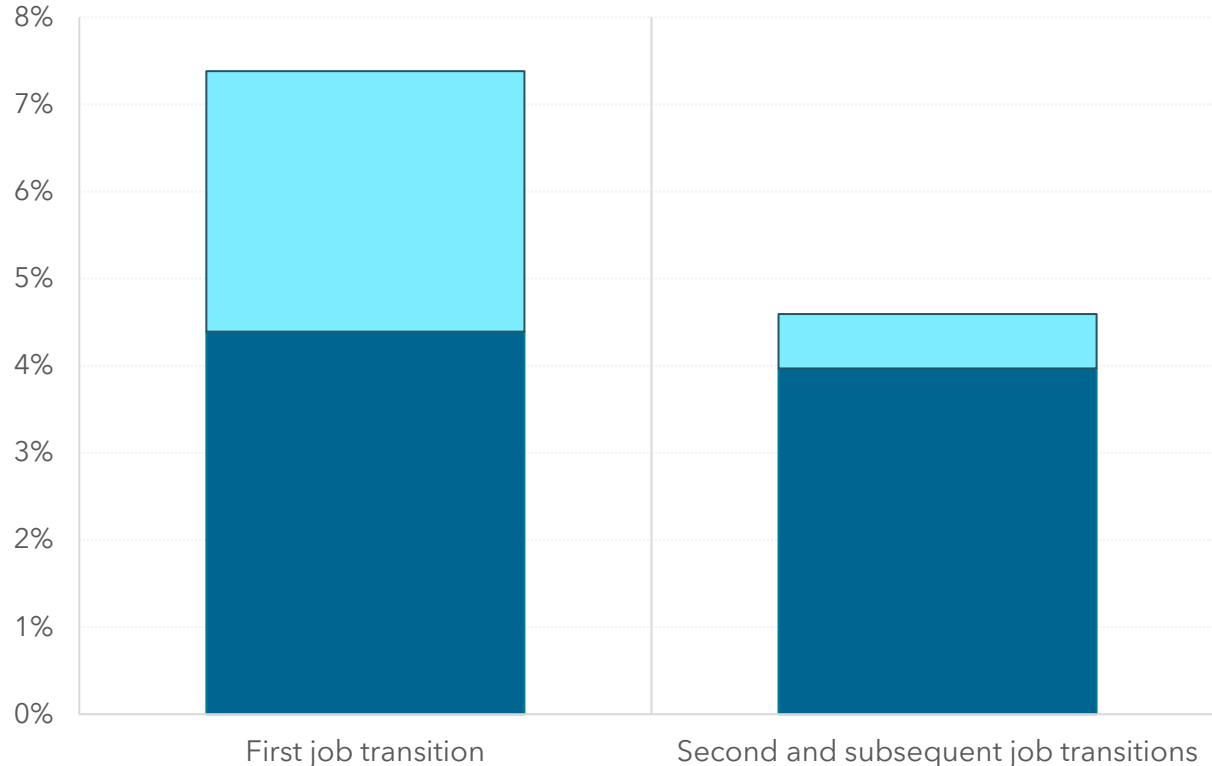
Finally, completing a TVTC program also increases students' combination of skills and mobility premium. Trainees get a larger salary bump in the first job change (a 4.4 percent "job mobility premium") than in subsequent job changes, (Figure 27). However, there is an additional 3 percent "skill premium" if those job transitions take place after the individual completes a TVTC program. Subsequent job changes yield an additional 4 percent mobility premium. The cumulative job training skills and mobility premiums can add up to 12 percent higher wages after two or more job transitions. But returns to education are affected by high levels of skills mismatches. Students graduating from programs with relatively high labor market return end up working in occupations that are unrelated to their training. These skills mismatches are costly not only for the graduates and workers but also in the aggregate impact on productivity and economic growth.

Figure 27

Training and mobility premiums

Wage effects of switching firms
Wage mobility premium (%)
before and after TVET

■ Pre-TVET mobility premium
 ■ Post-TVET mobility premium



Data Source: TVTC, GOSI

Results are statistically significant *** p<0.01

* Wage mobility premium refers to the resulting wage gains from the process of moving across jobs when all other factors are controlled for.

Conclusion

Developing the TVET sector in Saudi Arabia is important to achieving the goals of the Vision 2030 and preparing for the future. Increasing the productivity of the private sector and fully maximizing the potential of the workforce requires upgrading workers' skills. Given the clear job-specific skills deficit among key vulnerable groups, the TVET sector has a particularly important role to play in reforming the labor market, driving better outcomes, improving living standards for citizens, and contributing to more inclusive growth in Saudi Arabia.

TVET is a critical intervention to address one of the main social protection and jobs challenges in the country, namely high unemployment. Skills deficits of the unemployed and other vulnerable populations thwart efforts to create a more inclusive labor market. On-the-job training is an effective intervention to improve the employability of youth, women and the highly educated unemployed. Private sector employment would benefit from increasing the supply of high-quality workers, as it is constrained by traditionally low levels of participation among nationals, particularly women.

A wide gender gap in placement outcomes remains. While the course offering for female students expanded beyond the traditional services activities - for example, hair care and make up, fashion design - the private sector placement outcomes of women remain significantly low compared to men and compared to the placement outcomes of women in other high-income countries. Improving the quantity, quality, and relevance of vocational education programs for female students is a key priority with significant potential to enhance outcomes for women.

TVTC students in Saudi Arabia perform relatively well in the private sector. The fact that most graduates find work in the private sector is an encouraging sign that the TVET sector can play a central role in achieving some of the most important objectives of the Vision 2030. Participation in TVTC programs is associated with higher wages and better job transitions. TVTC graduates earn 7.3 percent on average more after graduation compared to before graduation. Technical programs and trades and technology programs provide the highest returns to TVTC graduates in the private sector. Returns are sustained over the observed time period. Real wages of TVTC graduates of the TVTC class of 2014 have consistently increased over time, suggesting sustained returns over the observed five-year period.

Finally, TVET programs appear to smooth job transitions of students and enable them to earn higher wages. TVET increases students' likelihood of labor mobility and increases the skills and mobility premiums of graduates. Completing a job training program also increases students' combination of skills and mobility premium. This is becoming an increasingly important role of TVET systems in preparing students for a constantly changing nature of work through an adaptive TVET system. Moreover, this suggests participation in TVTC programs may help students signal skills to employers. Further improving the quality of matching can lead to higher wages for graduates, increase productivity at the firm level and achieve a more efficient and productive allocation of skills and workers in the labor market.

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Methodology Annex

Table 1 - A1 ISCO-08 occupational definitions and terminology

Job types	Corresponding ISCO-08 one-digit occupation group and definition
Technicians	<p>Technicians and associate professionals perform tasks that usually include undertaking and carrying out technical work connected with research and application of concepts and operational methods. Supervision of other workers may be included. Competent performance in most occupations in this major group requires skills at the third ISCO skill level.</p> <p>Occupations in sub-major groups:</p> <ul style="list-style-type: none"> • Science and Engineering Associate Professionals • Health Associate Professionals • Business and Administration Associate Professionals • Legal, Social, Cultural and Related Associate Professionals
Trades	<p>Craft and related trade workers apply specific technical and practical knowledge and skills to construct and maintain buildings; form metal; erect metal structures; set machine tools or make, fit, maintain and repair machinery, equipment or tools, etc. The work is carried out by hand and by hand-powered and other tools which are used to reduce the amount of physical efforts and time required for specific tasks, as well as to improve the quality of the products. The tasks call for an understanding of all stages of the production process, the materials and tools used, and the nature and purpose of the final product.</p> <p>Occupations in sub-major groups:</p> <ul style="list-style-type: none"> • Building and Related Trades Workers (excluding Electricians) • Metal, Machinery and Related Trades Workers • Electrical and Electronics Trades Workers
Clerical	<p>Clerical support workers record, organize, store, compute and retrieve information, and perform a number of clerical duties in connection with money-handling operations, travel arrangements, requests for information, and appointments.</p> <p><i>Occupations in sub-major groups:</i></p> <ul style="list-style-type: none"> • General and Keyboard Clerks • Customer Service Clerks • Numerical and Material Recording Clerks
Services	<p>Sales and service workers provide personal and protective services related to travel, housekeeping, catering, personal care, protection against fire and unlawful acts; or demonstrate and sell goods in wholesale or retail shops and similar establishments, as well as at stalls and on markets.</p> <p><i>Occupations in sub-major groups:</i></p> <ul style="list-style-type: none"> • Personal Service Workers • Sales Workers • Personal Care Workers • Protective Service Workers
Industrial	<p>Plant and machine operators and assemblers operate and monitor industrial and agricultural machinery and equipment on the spot or by remote control; drive and operate trains, motor vehicles and mobile machinery and equipment; requires understanding of industrial and agricultural machinery and equipment, as well as an ability to cope with machine-paced operations and to adapt to technological innovations.</p> <p>Occupations in sub-major groups:</p> <ul style="list-style-type: none"> • Stationary Plant and Machine Operators • Drivers and Mobile Plant Operators

Box A1: Occupations and TVET field-of-study crosswalk

The objective of the occupational classification exercise is to link technical and vocational education courses to occupations using the International Standard Classification of Occupations (ISCO-8). The exercise consists of conducting searches for TVTC specializations using the Occupational Information Network (O*NET) database of occupations and matching courses to the United States Bureau of Labor Statistics' SOC 2010 Code.

O*NET is a widely used resource for labor research for its rich and granular taxonomy of occupations and skills. O*NET provides useful occupational information to enhance the technical depth of the tracer study analysis such as educational requirements, work activities and content of occupations, intensity of non-routine cognitive and manual skills, and long-term occupation growth projections from the United States. In other words, O*NET sheds light into the normative skills composition of occupations - and respective training courses - for a better use of the "specialization" variable, which otherwise remains a black box.³² An additional crosswalk is used to convert SOC 2010 codes to ISCO-8 to facilitate international benchmarking and aggregation to one-digit code to facilitate the matching quality analysis.

The classification exercise entails certain degree of subjectivity, but the availability of detailed descriptions minimizes the risk of mismatching courses and occupations. For example, an O*NET search for "food safety" returns a large number of related occupations with similar titles such as, Food Science Technicians and Food Scientists and Technologists. A review of the occupational description and educational requirement (shown below) suggests the former is the most likely match to the TVTC specialization course.

Table 2 - A2 Occupations and TVET field-of-study crosswalk

O*NET/ SOC 2010	19-4011.02 - Food Science Technicians	19-1012.00 - Food Scientists and Technologists
Job description	Perform standardized qualitative and quantitative tests to determine physical or chemical properties of food or beverage products.	Use chemistry, microbiology, engineering, and other sciences to study the principles underlying the processing and deterioration of foods; analyze food content to determine levels of vitamins, fat, sugar, and protein; discover new food sources; research ways to make processed foods safe, palatable, and healthful; and apply food science knowledge to determine best ways to process, package, preserve, store, and distribute food.
Education level required	Training in vocational schools	Mostly four-year bachelor's degree

Table 3 - Selected trades and technical TVET programs mapping to occupation groups

TVTC Specialization Technical college programs	TVET program category One-digit ISCO name	O*NET/SOC Code	ISCO-8 four- digit code	
Air conditioning	Trades - TVTC programs <i>Crafts and related trades</i>	49-9021.01	7127	
Auto body denting and painting		49-3021.00	7231	
Auto mechanics		49-3023.00	7231	
Automatic printing		<i>Trades related fields include learning skills that are often skilled manual tasks and the use of technologies and tools to reduce the number of physical efforts and time required for specific tasks.</i>	51-5112.00	7322
Automotive electronics			49-3023.00	7231
Binding			51-5113.00	7323
Electric power			49-9051.00	7413
Electric power and machines			49-2092.00	7412
Electrical machines equipment			49-2093.00	7412
Engines and vehicles			49-3023.02	7231
Food production			51-3092.00	7513
Forming and installation of aluminum uPVC			51-4072.00	7211
General carpentry			47-2031.01	7115
Industrial electricity		49-2094.00	7412	
Industrial electronics		49-2094.00	7412	
Offset printing		51-5111.00	7321	
Poultry production		51-3022.00	7511	
Production machines operation		51-4081.00	7223	
Sewing and clothes production		51-6052.00	7531	
Sheet metal		47-2211.00	7213	
Welding	51-4121.06	7212		
Accounting	Technical - TVTC programs <i>Technicians and associate professionals</i>	43-3031.00	3313	
Architectural construction		17-3011.01	3118	
Architectural drawing		17-3011.01	3118	
Chemical laboratories		19-4031.00	3111	
Civil construction		<i>Technician fields involve tasks that require broader</i>	17-3022.00	3112
Civil surveillance			17-3022.00	3112
Computer networks/support		<i>knowledge application, such as "carrying out technical work connected with research and application of concepts and operational methods."</i>	15-1142.00	3514
Computer software			15-1134.00	3514
Computer technical support			15-1151.00	3512
Design and layout			17-3011.01	3118
Electronics			17-3029.04	3115
Food safety			19-1012.00	3142
Mechanical production			17-3029.07	3115
Medical device technology		51-9082.00	3214	
Multimedia and web technologies		15-1134.00	3514	
Network systems management		15-1142.00	3514	
Structural electricity		17-3012.02	3118	
English	General - TVTC programs <i>No occupation groups</i>	N/A	N/A	
Computer				

Technical Notes

¹ Because data is only available starting in 2013, it is entirely possible some students might have worked in the private sector before that year, about or 2-4 years before entering the TVTC program. The data may suffer from some selectivity issues. The more data points after graduation in GOSI, the more likely someone will appear postgraduation. Some students appear in multiple year graduation cohorts. This may mean that students proceeded to further education levels or new training programs after completion of a previous degree.

² It is possible for TVTC students to appear in the GOSI record as Saudi ghost employees. Under this scenario, a student would receive the minimum salary that could be registered with GOSI to meet their firms' Saudization quota could also enter stipend offering TVTC programs. It is also possible that some students return to ghost employment after graduation.

³ Ideally, to measure impact of a TVET program, a control group composed of randomly assigned individuals for TVET participation and non-TVET participants is necessary to compare with the outcomes of individuals' who have been randomized into the program, i.e., isolating the treatment effect of participation in TVET.

⁴ World Bank (2019).

⁵ The pandemic underscored the importance of alternative sources of high-quality and timely data in developing effective measures. The COVID-19 pandemic underscored the usefulness of administrative data to gather real-time insights when other traditional data collection sources are unavailable. At a time when conducting face-to-face surveys became difficult due to lockdowns, social distancing, stay-at-home orders, in containment measures and restrictions, the importance of alternative sources of high-quality and timely labor market data became clear for policymakers.

⁶ For example, in developing countries, TVET systems are widely perceived as a viable education choice for male students. Programs tend to offer limited career choices for girls and in countries where girls have access to TVET, they are often tracked into programs that conform to gender roles and reinforce common stereotypes.

⁷ Hanushek and Woessmann (2012).

⁸ Occupation groups are used to classify employed individuals as members of low, medium, and high skills occupation categories.

⁹ It is unclear the extent to which this observed outcome is caused by actual skills upgrading of Saudis or whether it reflects a composition effect of the substitution from lower-skilled foreigners towards higher-skilled Saudis.

¹⁰ The Nitaqat policy sets targets for Saudis as a share of employment in firms and industries. The cost to employ foreign workers was increased significantly; an increase in work permit fees and visa renewal fees, among others, has resulted in a significant loss of non-Saudi workers leaving a substantial professional employment gap in the private sector.

¹¹ Chartouni et al. (2019).

¹² Ajwad et. al (forthcoming).

¹³ It is unclear the extent to which long term unemployment is attributed predominantly to skills deficit as in other high income countries, as there are gaps in the data preventing more analysis on the long

term unemployed. It must be acknowledged, however, that there are other distortions that may be contributing to long term unemployment, such as queuing for public sector jobs or high reservation wages among Saudi nationals.

¹⁴ Card, Kluve and Weber 2010.

¹⁵ The elimination of the summer trimester for certain programs and introduction of stipends for TVET education may have also contributed to the increase in enrollment in recent years.

¹⁶ ETEC Report (2019).

¹⁷ Daley et al (2008); Atkins and Flint (2015).

¹⁸ UNESCO (2019).

¹⁹ It is worth noting that in the context of education, demand refers to students for some fields, unlike in labor economics where demand refers to employers trying to find an individual with a particular skill or field of education.

²⁰ In that context, it is unknown what the labor market demand certain skills is in Saudi Arabia as detailed data from employers' skills needs are not regularly collected. However, there are trends toward increasing employment in personal services occupations. In the United States, for example, makeup artist is the third highest paying non-college field with median salaries of over 100,000, according to the Bureau of Labor Statistics. Collecting accurate and actionable data from employers detailing skills can help tailor education and training programs to meet demand for skills in the labor market.

²¹ Chartouni et al (2019).

²² Card, Kluve and Weber (2010).

²³ Moreover, some students appear in multiple year graduation cohorts. This may mean that students proceeded to further education levels or new training programs after completion of a previous degree.

²⁴ It is possible for TVTC students to appear in the GOSI record as Saudi ghost employees. Under this scenario, a student would receive the minimum salary that could be registered with GOSI to meet their firms' Saudization quota could also enter stipend offering TVTC programs. It is also possible that some students return to ghost employment after graduation.

²⁵ TVTC offers 67 specialization programs that were categorized into the five TVET field categories based on the International Occupational Classifications Standards 08. Programs that are too broad and for which mapping to a specific occupation is not possible - such as English, computer, Haj, Microsoft Office, among others - are included in the general program category.

²⁶ Returns are estimated based on pre- and post-analysis based on interactions of specializations with post indicator.

²⁷ While some technical colleges seem to produce better outcomes in terms of average returns of graduates, the current dataset does not provide the necessary information to control for other important factors that have an impact on performance, such as local labor market conditions. There are also institute level differences in terms of critical inputs that increase the likelihood of better outcomes, such as budget, technical equipment, and differences in trained staff. This is also not covered in the current data.

²⁸ Alaref *et al* (forthcoming).

²⁹ There are data limitations preventing estimates of the exact duration of the school to work transition. The dataset contains only the year in which students graduated. TVTC programs are offered on a trimester basis, so many students may be graduating months before the end of the school year. This is reflected in rising wages in the months prior to graduation.

³⁰ For example, about 4 percent of young workers in the United States switch jobs in a given month. A young worker in her 20s in the United States has roughly a 75 percent probability of changing jobs within two years.

³¹ For purposes of the occupational mobility analysis, occupations are defined at the 2-digit ISCO level. This means that all occupation changes that happen within a two-digit occupation are not recoded as changes of occupations. For example, a worker who moves across firms while maintaining the same occupation code in the GOSI payroll database is not included in the occupation category, but the firm mobility category. Individuals who stay within the same firm but have recorded changes in occupation - whether a lateral move or a promotion - such circumstances are captured by occupation changes.

³² Importantly, unpacking the skills composition of employment can provide useful information to understand changes in the labor market. The O*NET database allows us to test this hypothesis based by allowing for the construction of task contents measures -non-routine cognitive analytical, non-routine cognitive interpersonal, routine cognitive, routine manual, and non-routine manual physical - using an adaptation of the Acemoglu and Autor (2011) methodology (Acemoglu and Autor, 2011; Hardy, Keister, and Lewandowski, 2018).

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ABSTRACT

This paper exploits a rich dataset from various administrative sources to study short- and medium-term labor market outcomes of vocational education and training graduates in Saudi Arabia. It examines five cohorts of graduates from institutes operated by the Technical and Vocational Training Corporation who are formally employed in the private sector. The outcome measures for the study are based on monthly earnings data from the private sector social insurance records covering up to five years after graduation for the first cohort. The analysis finds positive returns to technical and vocational education are sustained over time. However, program orientation and economic conditions at the time of graduation appears to impact wages. Furthermore, vocational education and training in Saudi Arabia is associated with higher job mobility after graduation from the program. Students' mobility premium is enhanced by completion of the program, suggesting improved skills signaling and utilization contributing to higher returns to vocational education and training. The analysis identifies several challenges and opportunities to further improve outcomes of graduates, such as reducing the gender gap in labor market outcomes of female graduates and reducing the high incidence of vertical mismatch among graduates' field-of-study selection and the occupations group in which they are employed.

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