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Evaluation of the Georgia II Industry-Led Skills and Workforce Development Project

Final Report

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Acknowledgements

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Mathematica strives to improve public well-being by bringing the highest standards of quality, objectivity, and excellence to bear on the provision of information collection and analysis to our clients. The findings in this report solely reflect Mathematica's interpretation of available information. Mathematica staff involved in analyzing the information and authoring this report did not report any conflicts of interest. The evaluation was funded exclusively by MCC.

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Acronyms

CBA	Cost benefit analysis
ENQA	European Association for Quality Assurance in Higher Education
EQAR	European Quality Assurance Register for Higher Education
EQAVET	European Quality Assurance Reference Framework for Vocational Education and Training
ERR	Economic rate of return
EU	European Union
GAU	Georgia Aviation University
GEL	Georgian Lari (currency of Georgia)
GIPA	Georgian Institute of Public Affairs
GMGA	Georgian Mountain Guide Association
GORBI	Georgian Opinion Research Business International
GTU	Georgian Technical University
ISWD	Industry-Led Skills and Workforce Development
IT	Information technology
MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
MES	Ministry of Education and Science
NCEQE	National Center for Educational Quality Enhancement
PICG	Program Improvement Competitive Grants
QA	Quality assurance
QAF	Quality assurance framework
SSO	Sector skills organization
STEM	Science, technology, engineering, and math
STPP	Strengthening TVET Provider Practice
TVET	Technical and vocational education and training
USAID	United States Agency for International Development

Executive Summary

A. Overview of the Georgia Compact and interventions evaluated

Recognizing that economic growth in Georgia is being significantly hindered by skills shortages and education gaps in the workforce, the Government of Georgia and the Millennium Challenge Corporation (MCC) carried out the $138.6 million Georgia II Compact to improve the quality of education in science, technology, engineering, and math (STEM), and thereby develop a more skilled Georgian labor force. The five-year compact, which entered into force in July 2014 and concluded in July 2019, included three projects that focus on general education, workforce development, and higher education. This report presents final evaluation results for the compact's workforce development project.

The Industry-Led Skills and Workforce Development (ISWD) project, with a total investment of about $15.7 million, was designed to increase the availability of STEM technicians to meet industry demand by investing in technical and vocational education and training (TVET). The project comprises two activities and four components: the $11.7 million Program Improvement Competitive Grants activity had a single component (Component 1 below), and the $3.9 million Strengthening Sector Policy and Provider Practice activity had three components (Components 2–4 below). The four project components were as follows:

- **Component 1: Program Improvement Competitive Grants (PICG)** funded Georgian TVET providers on a competitive basis to establish new or improved training courses that reflected industry demand for skills. These courses were in areas such as information technology, agriculture and veterinary services, aquaculture, engineering, maritime operations, tourism, railways, and aviation—most of which are STEM areas.
- **Component 2: Strengthening TVET Provider Practice (STPP)** provided small grants on a competitive basis to identify, document, and disseminate innovative best practices in the TVET sector. The grants were awarded to TVET providers and other institutions actively involved in TVET.
- **Component 3: Strengthening TVET Sector Policy** provided technical assistance to the Ministry of Education and Science (MES) related to TVET sector policy. These efforts were conducted in coordination with other TVET-related technical assistance provided contemporaneously to the MES by other donors, including the European Union delegation and United Nations Development Program.
- **Component 4: Annual TVET Conference** sought to create a forum for dialogue and information sharing among TVET stakeholders, and the dissemination of best practices.

B. Evaluation type, questions, and methodology

MCC contracted with Mathematica to evaluate the implementation and potential effects of the ISWD project. The evaluation of the ISWD project was designed to address eight key questions. The full set of evaluation questions is as follows, with the questions that this final evaluation report focuses on italicized (the remaining evaluation questions were addressed in the interim evaluation report [Borkum et al. 2019]):

1. How did the implemented PICG-supported courses compare with the original grant proposals, and what were the reasons for any deviations?
2. Did trainees enroll in PICG-supported courses and graduate from them at targeted levels?

   a. To what extent did women or members of socially disadvantaged groups (defined by language, region of origin, or other socio-demographic characteristics) enroll and graduate?
   b. Did these patterns differ across training sectors and grantees?

3. *What were the labor market outcomes (employment and wages) for graduates from PICG-supported courses?*
   a. *How did the outcomes of these graduates compare to those of graduates from other, non-supported courses?*
   b. *Did these results differ by gender or other socio-demographic measures?*
   c. *Did the results differ across training sectors and grantees?*
4. *What were employer perceptions of the graduates from the PICG-supported courses, and how did the availability of these graduates affect their hiring and training plans?*
   a. *Do employer perceptions of graduates from PICG-supported courses differ according to gender or socio-demographic categories?*
5. *Will PICG-supported courses be sustained after the compact?*
   a. *What are the main challenges to sustaining these courses, and how can they be overcome?*
   b. *How has the level of engagement between employers and grantees changed after the compact?*
6. What are TVET providers' perceptions of the best practices the project has identified and disseminated, to what extent have they adopted them, and what are the main barriers to doing so?
   a. How were best practices identified and disseminated in practice?
   b. How has the adoption of best practices affected TVET providers, including the grantees and other providers?
   c. *Is adopting best practices sustainable, and is the extent of adoption likely to increase in the future?*
7. To what extent have the MES and its agencies adopted the policy reforms supported by the project (for example, those related to industry engagement, marketing of TVET, and quality improvement), and what have been the main challenges in doing so?
   a. How has the adoption of these reforms affected or expected to affect the TVET sector, and in what time frame?
   b. *Are the policy reforms supported by the project sustainable, and how are these policies expected to evolve?*
   c. *Is there any evidence of a broader shift toward higher-level, industry-driven courses in the Georgian TVET sector? If so, what was the role of the project, and if not, why not?*
8. How and to what extent has the annual TVET conference influenced providers, employers, the MES, and other TVET sector stakeholders?
   a. Who attended and financed the conference, and what were its main areas of focus?
   b. *Is the conference likely to be sustained in the future?*

To answer these questions, we conducted a mixed-methods performance evaluation, which includes two studies: (1) a quantitative outcomes study of the PICG component; and (2) a qualitative study assessing all project components. The outcomes study measured the labor market outcomes of trainees in PICG-supported courses about one year after their courses ended, and used several analytical approaches to

benchmark those outcomes in the absence of a well-defined counterfactual. Specifically, it comprised an ex-post thematic analysis (national benchmarking) and two pre-post analyses (course level and trainee level). The qualitative study was an ex-post thematic analysis that explored implementation of all the project components, the potential mechanisms driving the results observed in the PICG outcomes study, and the likelihood of sustainability across all ISWD components more than two years after the compact ended.

This evaluation's interim evaluation report (Borkum et al. 2019) found that the project had been implemented in a manner that closely aligned with the project's original theory of change, meeting most of the project's implementation and output targets (evaluation questions 1 and 2). For example, 1,935 trainees had enrolled in MCC-supported courses by the end of the compact in July 2019 (exceeding the compact's target of 1,500 enrollees by about 30 percent), and the courses attracted almost $6 million of private industry co-investment in TVET provision (more than tripling the compact's target of $1.8 million).

In this report, we present the final results of the performance evaluation using data collected up to two and a half years after the end of the compact. These data include: (1) a quantitative follow-up tracer survey of 992 trainees enrolled in TVET courses supported by the PICG component project, conducted between mid-2019 and late-2021 (with these follow-up surveys taking place about one year after trainees were due to finish their course); (2) qualitative data collected in late 2021 and early 2022 from PICG grantees, STPP grantees, employers of TVET graduates, and stakeholders involved in implementation or in the TVET sector more broadly (including MES officials, former ISWD project implementers, and international donors); and (3) administrative data on the number of enrollees and graduates in PICG-supported courses from when the courses were established through the end of 2021.

C. Implementation summary

This evaluation's interim evaluation report (Borkum et al. 2019) found that the project had been implemented in a manner that closely aligned with the project's original theory of change, meeting most of the project's implementation and output targets (evaluation questions 1 and 2). The status of project implementation at the end of the compact was as follows:

- **Component 1, Program Improvement Competitive Grants (PICG):** The 10 institutions selected to receive grants established 23 new diploma courses, improved 15 existing diploma courses, and established 13 new short certificate courses. Most of the diploma courses were at TVET levels IV and V, the two highest levels on a five-level scale, and were between 6 and 24 months in duration. The compact established two output targets for this component, both of which were exceeded: 1,935 trainees had enrolled in MCC-supported courses by the end of the compact in July 2019 (exceeding the compact's target of 1,500 enrollees by about 30 percent), and the courses attracted almost $6 million of private industry co-investment in TVET provision (more than tripling the compact's target of $1.8 million) (Georgia II Star Report).
- **Component 2, Strengthening TVET Provider Practice (STPP):** This component awarded 27 grants in total: 7 grants totaling about $69,000 were awarded in the first round in April 2016, an additional 10 grants totaling about $172,000 were awarded in the second round in April 2017, and a final 10 grants totaling about $177,000 were awarded in the third and final round in June 2018.
- **Component 3, Strengthening TVET Sector Policy**: To reflect the priorities of the MES, efforts under this component were consolidated into three main areas: (1) promoting increased business

engagement in TVET; (2) improving and promoting the quality and attractiveness of TVET; and (3) supporting the enhancement of learning and qualifications opportunities for adults. These efforts were conducted in coordination with other TVET-related technical assistance provided contemporaneously to the MES by other donors.

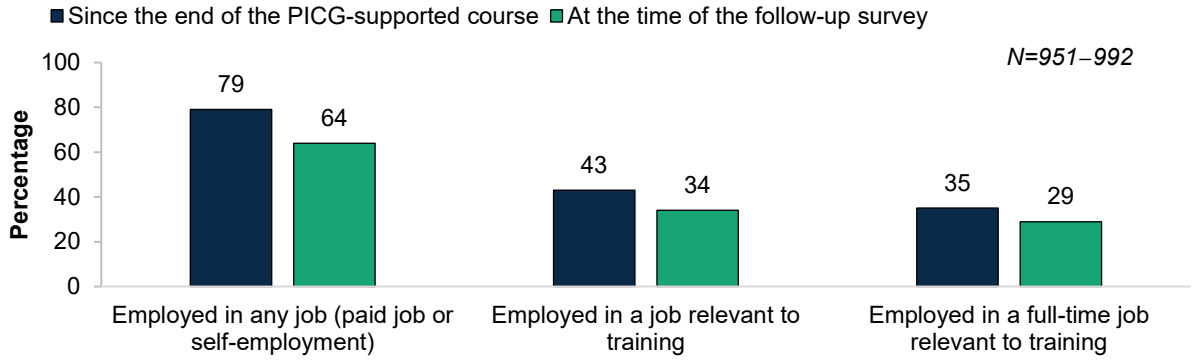
- **Component 4, Annual TVET Conference:** This component included three conferences, which took place in the Georgian capital, Tbilisi, in July 2016, October 2017, and November 2018. The conferences were complemented by other public relations and outreach events to promote the project's objectives and Georgian TVET more generally throughout Georgia, such as awards ceremonies for project grants and a multimedia communications strategy to publicize the project.

D. Findings: PICG component

RQ3. What were the labor market outcomes (employment and wages) for graduates from PICG-supported courses?

More than three-quarters of trainees in PICG-supported courses found employment within a year of the course ending; however, only one-third found a full-time job that was relevant to their course. Most trainees (79 percent) were employed at some point in the year after the end of their PICG-supported course (Figure ES.1). However, only about one-third of trainees (35 percent) obtained a full-time job that was related to their PICG-supported training course. At follow-up, about one year after the end of the course, 64 percent were still employed, and 29 percent were employed in a full-time job relevant to training. The rate of course-relevant job placements at follow-up varied substantially by course provider, from around two-thirds of the trainees (aviation and railway) to under 20 percent (information technology and aquaculture). Almost three-quarters of trainees who had been employed since the end of training found a job within the first month, and about one-half returned immediately to a job that they held before training.

Figure ES.1. Employment rates of trainees in PICG-supported courses



Source: Follow-up tracer survey.

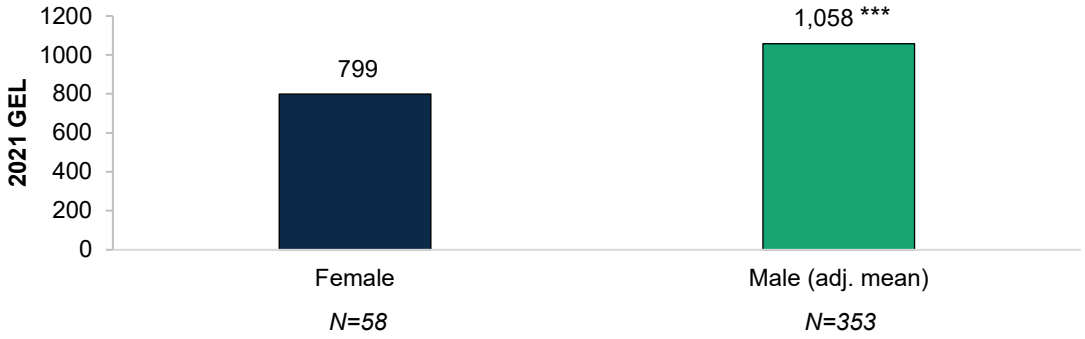
The limited rate of course-relevant employment reflects both supply and demand constraints. Among the trainees who did not obtain a course-relevant job, about one-half never searched for one due to a lack of interest or availability for work, or perceptions wages would be too low. A lack of available job opportunities might have also been a constraint for some trainees, especially those with limited relevant work experience: trainees who had more than two years of prior work experience obtained full-

time, course-relevant jobs at about double the rate of those with less experience. This suggests that employers in course-relevant fields may have had substantially less demand for PICG course graduates who did not also have meaningful prior work experience.

Trainees employed in full-time jobs relevant to training earned only about 8 percent more than those employed in other types of jobs. This suggests that the earnings benefits of finding a job placement that is relevant to the PICG course are modest, which is one reason why some trainees might prefer or be willing to accept other types of jobs. Consistent with this, dropout rates from PICG-supported courses were high, and trainees who dropped out had very similar employment and earnings outcomes to those who completed these courses. This suggests that dropping out was a rational choice by some trainees, who found jobs that they preferred equally or more relative to the jobs they anticipated receiving had they completed training.

The PICG-supported courses reflected prevailing patterns of gender-based inequality in the labor market. Trainees in PICG-supported courses were disproportionately male. Only 15 percent of all trainees in PICG-supported courses were female, probably reflecting cultural gender norms associated with many of the occupations that PICG-supported courses focused on. Comparing male trainees to female trainees in the same courses, employment rates were similar by gender but employed male trainees earned about 32 percent more than employed female trainees (Figure ES.2).

Figure ES.2. Average monthly earnings for trainees in PICG-supported courses who were employed at the follow-up survey date, by gender



Source: Follow-up tracer survey.

Note: Earnings are self-reported and defined as after-tax wages from paid employment or typical monthly profits from self-employment.

*** Significantly different from zero at the 0.01 level, two-tailed test.

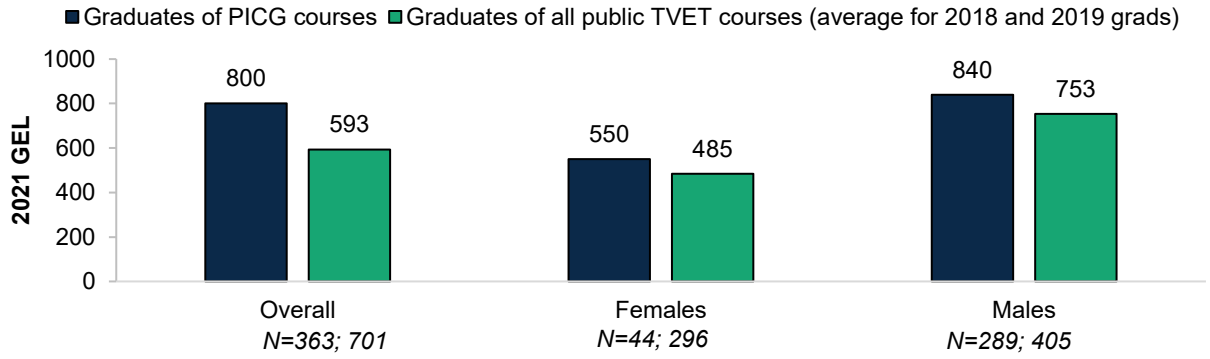
The evaluation's benchmarking analyses suggest that PICG courses likely improved the employment rates of trainees. The evaluation did not include a rigorous impact analysis with a well-defined counterfactual for the outcomes of trainees in PICG-supported courses. However, compared to a national benchmark of all TVET courses in Georgia, graduates of PICG-supported courses maintained similar rates of employment before the pandemic but higher rates of employment during the pandemic, suggesting that the pandemic's effect on graduates' ability to find new jobs was a greater constraint for all graduates nationally than for PICG graduates. Specifically, for graduates surveyed during the pandemic (one year after graduation, on average), those in PICG-supported courses were 15 percentage points more likely to be in paid employment and 12 percentage points more likely to be in course-relevant paid employment than a nationally representative sample of TVET graduates. In part, this could be because

many PICG courses focused on sectors and roles that tended to have more stable employment during the pandemic. Although these findings are positive, they suggest that, absent the unexpected shock of the pandemic, the effects on employment envisaged in the project logic might not have occurred.

Results from the study's three descriptive benchmarking exercises consistently suggest that the courses were likely to have improved trainees' earnings. Among trainees from PICG-supported course who were employed one year after the end of the course, there was substantial variation in monthly earnings across grantees, with a range from 786 GEL ($253) to 1,711 GEL ($550). (These currency conversions use the average daily exchange rate of 3.11 GEL to $1 during the period of the follow-up survey for trainees in PICG-supported courses.) The highest average monthly earnings were for trainees in the tourism and aviation sectors, and the lowest for those in the IT and rail sectors. Relative to the national benchmark, PICG graduates in paid employment earned monthly wages that were 12 to 13 percent higher for male and female graduates, respectively (Figure ES.3). Further, for nine existing courses enhanced by PICG grants, trainees during the compact appear to have monthly earnings (defined as after-tax wages for those in paid employment or profits in a typical month for those in self-employment) that were 16 percent higher than those of earlier cohorts. Finally, trainees who were employed before enrolling in a PICG-supported course increased their monthly earnings (defined in the same way) by 10 percent after the end of the course, and trainees who returned to the same job experienced a 21 percent earnings boost.

We do not have strong evidence about *why* these earnings improvements occurred. The project intended to boost earnings by funding new or improved courses in fields of high market demand. However, most trainees from PICG-supported courses did not find employment in a training-relevant field, and earnings were only slightly higher for those in training-relevant jobs relative to other jobs. While it is possible that the PICG-supported courses played a role in improving the earnings of trainees who did not obtain a training-relevant job (for example, by providing a credential that helped trainees negotiate for higher wages in an unrelated field), it is also possible that these trainees would have obtained their positions even in the absence of the PICG support. (The vast majority of jobs in all these benchmarking analyses were full time jobs, so increased time worked is not driving the differences in earnings.)

Figure ES.3. National benchmarking findings for graduates' median monthly wages one year after graduation, among graduates in paid employment



Source: Follow-up tracer survey and MES tracer survey reports (MES 2019 and MES 2020).

Note: Wages are self-reported. We were unable to assess the statistical significance of differences in wages because the individual-level data for the benchmarking sample (all public TVET courses) were not available.

Data from the evaluation suggests that the project is likely to have produced a strongly positive economic rate of return (ERR). MCC's closeout cost-benefit analysis (CBA) model estimated that the project produced an ERR of 20.9 percent over a 20-year time horizon, with benefits driven by higher employment rates and wages for PICG graduates relative to if the courses had not been established. Through the end of 2021, total post-compact enrollment in PICG-supported courses fell short of what was projected in the CBA; enrollment for many grantees was dampened by the COVID-19 pandemic, which required providers to enroll only one cohort rather than two cohorts per year in 2020 and 2021. On the other hand, employment rates in the evaluation's tracer survey are similar to or higher than those assumed in the CBA model (although details vary depending on the specific survey-based measure of employment we use) and wages for PICG graduates also appear to be higher than assumed in the CBA model. The tracer survey data also validate the CBA model's assumed wage premium for the large, improved Tetnuldi IT support specialist level III course that is an important driver of the ERR; evidence for other courses is mixed and only available for a few courses because of sample size limitations. Overall, updating the CBA model to reflect data from the evaluation is likely to have offsetting positive and negative effects on the ERR, and it remains likely that the model will still produce in an ERR that is strongly positive and well above MCC's hurdle rate of 10 percent beyond which MCC considers an investment to be worthwhile.

RQ4. What were employer perceptions of the graduates from the PICG-supported courses, and how did the availability of these graduates affect their hiring and training plans?

Employers were satisfied with the skills of graduates from PICG-supported courses, but the courses have only directly affected hiring practices at a few employers and have generally not affected employers' training practices. The PICG-supported courses have affected the hiring practices of some employers through internships, dual employment and training programs, and direct relationships with providers for hiring trainees. However, these formal structures are limited to a few, larger employers in specific economic sectors (such as railways and the energy sector). Linkages between these courses and changes in employers' hiring practices are weaker in sectors with smaller firms (information technology) or where self-employment is more common (agriculture, tourism). Internships in particular are associated with a greater likelihood of employment, but the number of internship offers from employers appears to have fallen short of trainee demand. PICG-supported courses also do not appear to have affected employers' internal training needs. Employers reported that all new hires typically need further on-the-job training and more practical experience, regardless of whether they graduated from a PICG-supported course.

RQ5. Will PICG-supported courses be sustained after the compact?

Grantees continued to offer all of the PICG-supported courses two years after the end of the compact. When the compact ended, it was not clear if the grantees could successfully navigate the challenge of sustaining course enrollment and maintaining teaching facilities and teaching staff in the absence of outside grant support. In practice, nearly all of these courses demonstrated a strong pattern of sustainability in the post-compact period, with the providers showing sustained enrollment patterns. State voucher funding fully covers tuition at most PICG-courses, strongly supporting continued operations. Nearly half of the grantees also expanded into newly launched course-offerings that are related to the PICG-supported courses. Among the small number of courses facing sustainability challenges, difficulties included paying for high-quality teaching staff and maintaining international affiliations in the absence of grant funding, attracting trainees to the handful of courses where the full cost of tuition was not covered

by government vouchers, and experiencing unforeseen shifts in the demand for trainees in certain professions (such as a possible decline in demand for trainees in occupational health and safety, due to limited enforcement of the relevant regulations). Several grantees are also recording graduation rates below 50 percent, which could threaten course sustainability over time.

E. Findings: STPP, technical assistance, and annual conference components

RQ6c. Is adopting best practices sustainable, and is the extent of adoption likely to increase in the future?

STPP grants supported some best practices that grantees sustained in the years after the compact, but there is limited evidence of widespread adoption. As described in the interim evaluation report, during the compact it appeared that most of the practices supported with STPP grants had the potential for wider adoption if these practices attracted adequate outside attention and support. However, after the compact there was limited evidence of broad-scale adoption of supported practices. In several cases, the STPP grants did support development of a new course or a new set of relationships between a grantee and other organizations that continued after the compact—an encouraging result given the small size of these investments. For example, Vocational College Icarus reported lasting internal changes resulting from its STPP grant, noting that it has continued to build on conference activities and employer relationships undertaken during the compact to deepen and institutionalize several related practices during the post-compact period. However, several STPP grantees consistently cited the absence of additional funding as a limiting factor. In several cases (such as efforts to develop online learning modules that require sustained updates and maintenance) initial efforts were abandoned after the compact due to a lack of resources. More widespread adoption of new practices by other providers might have also been hindered by challenges such as outside providers' lack of awareness, inadequate financial resources, and limited capacity.

RQ7b. Are the policy reforms supported by the project sustainable, and how are these policies expected to evolve?

Some of the project's technical assistance efforts may have contributed to important policy reforms after the compact that have the potential to further strengthen the TVET sector in the future. Strong existing relationships between implementing staff, ministry staff, and other donors active in the TVET sector helped ensure that technical assistance to the MES and related agencies remained flexible, responsive to MES needs, and policy-relevant during the compact. Two areas of technical assistance progressed particularly strongly after the compact. First, the government's new Skills Agency established after the compact is supporting deeper public-private partnerships in the TVET sector in ways that build on the reform efforts supported by the ISWD project, including establishing sector skills organizations (autonomous sector-specific umbrella bodies that seek to engage a wide variety of employers in TVET governance, which were an area of focus for the technical assistance efforts during the compact). Second, the quality assurance framework (QAF) for TVET providers and courses that the compact helped develop has been directly codified by legislation, and the government's authorization procedures for TVET providers and courses durably reflect these reforms (although provider-level changes in quality assurance practices have been slower to change). Progress in other areas of technical assistance that the ISWD project supported (such as teacher professional development and adult learning) has been slower, although these topics remain priorities as part of Georgia's current TVET strategy.

RQ7c. Is there any evidence of a broader shift toward higher-level, industry-driven courses in the Georgian TVET sector? If so, what was the role of the project, and if not, why not?

A broader shift towards higher-level, industry-driven TVET diploma courses has not yet occurred. The PICG courses provided a strong example of how TVET course offerings in Georgia might be reoriented towards higher-level diploma courses that are aligned with labor market demand. However, stakeholders agreed that a broader shift in this direction had not yet occurred because it was challenging for providers to identify market demand and develop new diploma courses beyond the PICG-supported courses. Instead, the most visible change in TVET offerings since the end of the compact has been a broad-based increase in the number of short certificate courses, which focus largely on upskilling or reskilling existing workers whose skills fall short of employers' needs. Some stakeholders reported that the closer engagement of the private sector with TVET providers under the new Skills Agency may help to facilitate a shift towards more industry-driven diploma courses in the future.

RQ8b. Is the annual TVET conference likely to be sustained in the future?

The annual conference activities continued after the compact in the form of an annual TVET awards ceremony. The three annual TVET conferences held during the compact were well attended and well received by stakeholders. Attendees at these conferences included industry groups in certain sectors, TVET providers, government, and donors, among others. Following the compact these activities have continued in the form of an annual TVET awards ceremony. Two rounds of the ceremony have been conducted in the two years after the compact with close government involvement and public and private financial support. Stakeholders expect the event to continue in future years, and report that these continued events have the potential to contribute to improving perceptions of TVET in Georgia in a sustained fashion.

F. Policy implications

Overall, the evaluation's findings suggest that the ISWD project met its objective of increasing the availability of STEM technicians to meet industry demand after the compact by sustaining compact-supported course offerings and TVET reforms. The findings have several important implications for the design and implementation of the future TVET programs and policies, both in Georgia and in other settings.

MCC's TVET investments are more likely to be sustainable if they account for expected post-compact funding levels and are carried out in the context of broader government reform efforts and commitments. The ISWD project would not have succeeded in its objectives in the absence of post-compact support from the Georgian government and other donor agencies. Financial commitments to sustain the PICG courses via government tuition vouchers were critical to the survival of these courses after the compact. Similarly, it proved critical to closely align the technical assistance provided during the compact to the priorities of the government and other donors, leading to successes in building on these reforms in the post-compact period under the government's newly created Skills Agency. While the formation of the Skills Agency is not solely or directly attributable to the ISWD project, there is a striking degree of continuity between the Skills Agency's areas of focus and ISWD project's theory of change, particularly with respect to employer involvement in the TVET sector through public-private partnerships.

TVET providers need to strengthen systems for identifying and enrolling trainees who are ready to pursue careers in their chosen fields. The existing literature on TVET effectiveness focuses heavily on constraints related to employer demand for trainees—but creating a supply of graduating trainees interested in pursuing a relevant career is also critical to the success of these programs. A substantial portion of the trainees in PICG-support courses chose not to look for a job in their field, showing that there is room for improvement in this area. Pathways for improving the trainee pipeline might include: (1) encouraging providers to more fully screen and support trainees; (2) providing career guidance during secondary school to support students in making more informed choices about vocational education; and (3) establishing a well-functioning labor market information system, so that trainees would have more realistic expectations about job opportunities and wages.

There is a need for TVET providers to engage with a broader range of employers, rather than just a few large providers in specific sectors. A few of the PICG courses benefited from very strong relationships with large employers, but these relationships proved more difficult to create in sectors where employment tends to be scattered across smaller firms. Developing broader private-sector links with smaller firms could have helped to provide better pathways to employment—especially for trainees who came out of the course with no experience. Pursuing links with a broader and more representative range of employers would also help these courses to adapt more quickly to changes in employer demand for particular professions and skills. This is an explicit area of focus under Georgia's new Skills Agency, which is establishing sector skills organizations with the objective of involving a broader range of employers in TVET governance.

Closing gender-based gaps in vocational training and the labor market will require more concerted effort. While the ISWD project intended to create equitable training opportunities for both men and women, in practice the program largely replicated existing gender-based disparities in the Georgian labor market. Enrollment in PICG-supported courses was 85 percent male, and there was also a large post-graduation earnings gap between male and female trainees, with median earnings for females about one-third lower than males. A key lesson from the ISWD project is that achieving more equitable outcomes requires sustained support for identifying the extent to which course offerings are likely to appeal to different groups, and targeting concerted effort and support to addressing the issue where concerning disparities exist. For example, providers could be supported to develop appropriate communication and marketing programs to encourage women who are interested in certain fields to apply and enroll. Wage-inequities in the labor market may be more difficult to address through TVET training programs themselves. That said, if the issue is identified in advance as a major area of concern, future programs might consider asking employers to commit to the objective of strengthening the pipeline of female employees and paying these employees equitably. Addressing structural disparities in the labor market requires attention, time, effort, and resources that are equal to the scale of the problem.

There is strong evidence that investing in well-designed and sustainable TVET programs can improve trainees' labor market outcomes and produce a positive economic return, but these effects are likely to depend on the labor market context. The evaluation's benchmarking analyses suggest that compact-supported courses may have improved trainee employment rates and earnings meaningfully (boosting earnings by 10 to 21 percent, depending on the analysis). Overall, the evidence from this evaluation is also broadly consistent with the overarching conclusion from MCC's CBA for the project: these investments are likely to have produced a positive ERR above MCC's hurdle rate (10 percent). The findings also suggest that the Georgian labor market context played an important role in mediating the effects of the project. The unexpected labor market shock of the pandemic appears to have played a role

in generating positive effects on trainee employment, possibly because the PICG-supported courses were in fields in which employment was more resilient to the pandemic. Further, many trainees found jobs in fields that were not relevant to their course, reflecting a labor market context in which some TVET-related jobs offer low pay, and with fewer relevant positions for trainees without substantial work experience. This raises questions about whether certain PICG-supported courses were well-aligned with market demand for skills—a key assumption in the project's theory of change—despite the strong ERR. Overall, establishing new TVET programs and policy reforms is difficult work, and there is no guarantee that new or enhanced course offerings will establish a sustainable business model, identify trainees appropriately, involve employers adequately, and succeed in matching graduates to well-paid positions in their fields. The evidence from Georgia suggests that TVET does have the potential to position trainees to improve their employment and earnings outcomes, despite the very real and substantial challenge of ensuring that courses remain responsive to broader contextual changes in the labor market.

I. Introduction

Recognizing that economic growth in Georgia is being significantly hindered by skills shortages and education gaps in the workforce, the Government of Georgia and the Millennium Challenge Corporation (MCC) carried out the $138.6 million Georgia II Compact to improve the quality of education in science, technology, engineering, and math (STEM), and thereby develop a more skilled Georgian labor force.[1] This work builds on other efforts by the Government of Georgia, including a 2013 Vocational Education and Training Development Strategy, all of which share the goal of making effective vocational training programs more available and responsive to the labor market's skills needs (Ministry of Education and Science [MES] 2013). The five-year compact, which entered into force in July 2014 and concluded in July 2019, included three projects that focus on general education, workforce development, and higher education. This report presents final evaluation results for the compact's workforce development project.

The Industry-Led Skills and Workforce Development (ISWD) project, with a total investment of about $15.7 million, was designed to increase the number of Georgians with technical skills that are relevant to the local economy by investing in technical and vocational education and training (TVET). MCC contracted with Mathematica to evaluate the implementation and potential effects of the ISWD project. The evaluation involves a mixed-methods approach that draws on both qualitative and quantitative data to explore how the project was implemented, its effects on TVET trainees, and whether project-supported activities have been sustained after the end of the compact.

In this report, we present the final results of the evaluation using data collected between mid-2018 and mid-2021, including follow-up information from trainees, TVET providers, and employers up to two and a half years after the end of the compact. These data include a quantitative survey of trainees enrolled in TVET courses supported by the project; qualitative data collected from project participants and stakeholders involved in implementation or in the TVET sector more broadly; and project documents and administrative data related to project implementation. To provide context, we next describe the ISWD project's activities and logic model, and briefly review the existing literature on the impacts of vocational training programs in other developing countries. We then summarize the objectives of the final report.

A. Overview of the ISWD project

The objective of the ISWD project was to increase the availability of STEM technicians to meet industry demand. The Millennium Challenge Account-Georgia (MCA-Georgia) managed implementation of the project, and oversaw subcontracted work carried out by an implementation consortium led by PEM GmbH (PEM), a global development consulting firm. The project comprises two activities and four components: the $11.7 million Program Improvement Competitive Grants activity had a single component (Component 1 below), and the $3.9 million Strengthening Sector Policy and Provider Practice activity had three components (Components 2–4 below). The four project components were as follows:

- **Component 1: Program Improvement Competitive Grants (PICG)** funded Georgian TVET providers on a competitive basis to establish new or improved training courses that reflect industry demand for skills. The 10 institutions selected to receive grants, which are a mix of public and private TVET providers established 23 new diploma courses and sought to improve 15 existing diploma courses, as well as establish 13 new certificate courses (certificate courses are generally shorter than diploma courses, and require a less involved government authorization process). These courses were

[1] All project costs reported here are based on final compact disbursement figures from MCC.

in areas such as information technology, agriculture and veterinary services, aquaculture, engineering, maritime operations, tourism, railways, and aviation—most of which are STEM areas—and were developed in close coordination with international institutions and/or large Georgian employers. Seven of the PICG providers offered their PICG-supported courses in the capital, Tbilisi, and the other three offered them in Batumi (Batumi State Maritime Academy), Poti (Vocational College Phazisi), and throughout Georgia (Vocational College Tetnuldi, which offered the courses through its own college and another 12 affiliated providers.) Most of the courses were at TVET levels IV and V, the two highest levels on a five-level scale, and were between 6 and 24 months in duration. During the compact, trainees could use state vouchers to fully or partly cover tuition costs at the public providers but had to pay their own tuition costs at private providers. The compact established two output targets for this component, both of which were exceeded: 1,935 trainees had enrolled in MCC-supported courses by the end of the compact in July 2019 (exceeding the compact's target of 1,500 enrollees by about 30 percent), and the courses attracted almost $6 million of private industry co-investment in TVET provision (more than tripling the compact's target of $1.8 million) (Georgia II Star Report). As described in the interim evaluation report (Borkum et al. 2019), these implementation successes were driven by a rigorous selection process that identified high-quality grant proposals from TVET providers, strong grant management systems, and close working relationships between grantee, PEM, and MCA-Georgia staff that effectively identified and addressed implementation issues as they arose (such as supporting grantees to navigate the course authorization process). However, at the end of the compact, the extent to which grantees would sustain these courses over time was unclear.

- **Component 2: Strengthening TVET Provider Practice (STPP)** provided small grants on a competitive basis to identify, document, and disseminate innovative best practices in the TVET sector. The grants were awarded on a competitive basis to TVET providers and other institutions actively involved in TVET, including educational establishments, public or private companies, and professional and nongovernmental organizations located throughout Georgia. This component awarded 27 grants in total: 7 grants totaling about $69,000 were awarded in the first round in April 2016, an additional 10 grants totaling about $172,000 were awarded in the second round in April 2017, and a final 10 grants totaling about $177,000 were awarded in the third and final round in June 2018. The individual grant sizes ranged in size from $9,350 to $24,311. As described in the interim evaluation report (Borkum et al. 2019), in many cases the STPP grants supported dissemination of best practices during the compact in ways that could be replicated by other TVET providers and institutions, particularly when practices were directly aligned with the reform efforts of the MES. The interim report also found that longer-term, broad-scale adoption of these practices could also be limited by providers' resource and capacity constraints.
- **Component 3: Strengthening TVET Sector Policy** provided technical assistance to the MES related to TVET sector policy. To reflect the priorities of the MES, efforts under this component were consolidated into three main areas: (1) promoting increased business engagement in TVET; (2) improving and promoting the quality and attractiveness of TVET; and (3) supporting the enhancement of learning and qualifications opportunities for adults. These efforts were conducted in coordination with other TVET-related technical assistance provided contemporaneously to the MES by other donors, including the European Union delegation and United Nations Development Program. Qualitative analyses from the interim evaluation report revealed that this component succeeded in delivering timely and policy-relevant support to the MES for a wide range of initiatives during the compact. These activities were bolstered by strong existing relationships between implementing staff, ministry staff, and other donors active in the TVET sector, which helped ensure that technical

assistance remained flexible, timely, and responsive to MES needs. The interim report also found that many of the policy reforms supported by the component were long-term efforts, meaning that changes in leadership and priorities at the MES, as well as limited resources and capacity after the end of the compact, could pose challenges to the sustainability of reform efforts.

- **Component 4: Annual TVET Conference** sought to create a forum for dialogue and information sharing among TVET stakeholders, and the dissemination of best practices. It included three conferences, which took place in the Georgian capital, Tbilisi, in July 2016, October 2017, and November 2018. The conferences were complemented by other public relations and outreach events to promote the project's objectives and Georgian TVET more generally throughout Georgia, such as awards ceremonies for project grants and a multimedia communications strategy to publicize the project. As described in the interim evaluation report, these conferences were well attended and well received by TVET providers, donors, and industry participants who attended. Overall, these stakeholders believed that the conferences did have at least some potential to contribute to improving perceptions of TVET in Georgia. Although funding had not been secured to continue similar events at the conclusion of the compact, the MES indicated that it intended to provide support for additional TVET conferences as part of its post-compact activity plan.

The design and implementation of the ISWD project reflects MCC's learning from its early TVET investments in countries like Namibia, El Salvador, and Mongolia. Although these investments typically achieved their implementation targets, their results in terms of labor market outcomes fell short of expectations. Key features of MCC's modified approach that were adopted ahead of the Georgia II Compact were to focus on identifying that demonstrable, specific skills gaps are a constraint on domestic employment and economic growth, and targeting TVET assistance to economic sectors where trainees can acquire skills that are strongly demanded by employers and where graduates have the potential to improve their earnings (Ricou and Moore 2020).

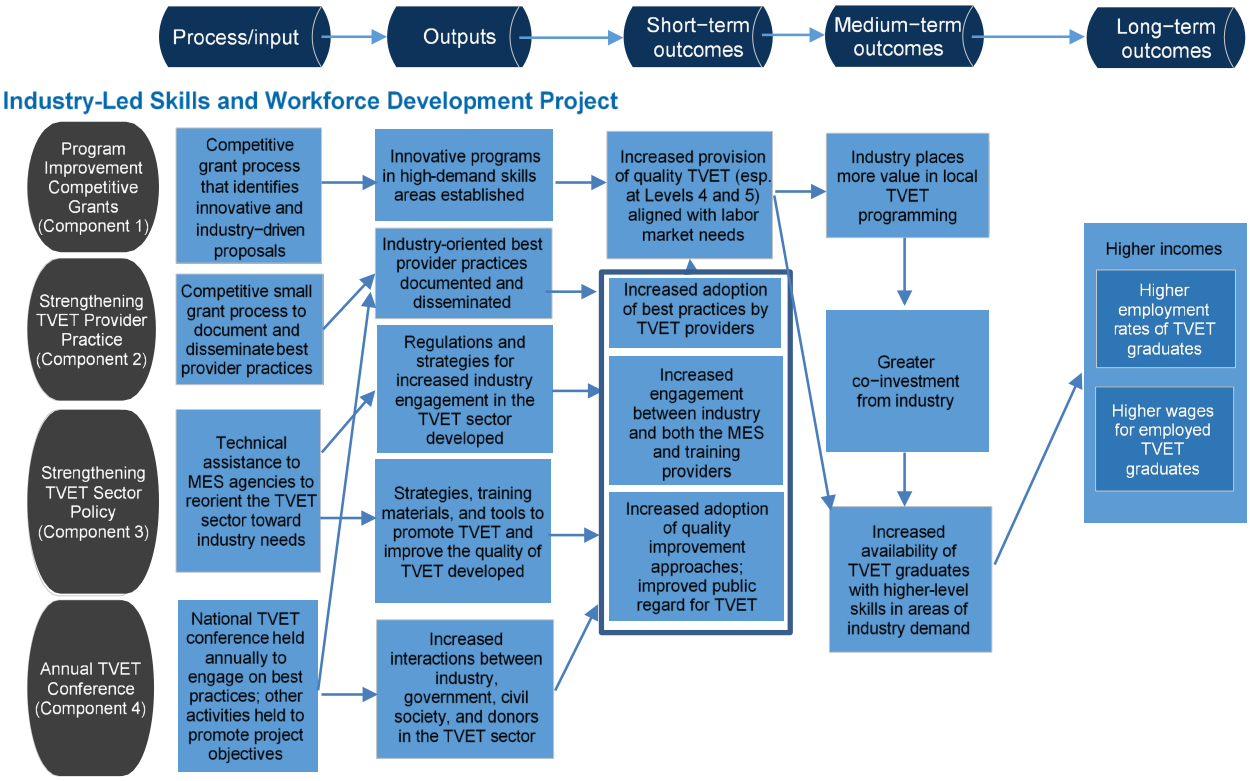
Figure I.1 shows the ISWD project's logic model, a modified version of a model originally developed by MCA-Georgia and MCC.[2] The logic model indicates that, in the short term, the PICG component (Component 1) was expected to lead to an increase in the availability of industry demand-driven TVET courses (the PICG-supported courses). These courses—as well as Georgian TVET courses more generally—were also expected to benefit from improved quality and closer alignment with industry needs through the adoption of best practices disseminated by the STPP component (Component 2), as well as the implementation of policy changes supported by the technical assistance component (Component 3). By encouraging interaction between stakeholders, the annual conference component (Component 4) was expected to support the other components—for example, by facilitating dissemination of best practices (identified through the STPP component) and greater industry engagement in TVET (promoted by the technical assistance component).

In the medium term (when compact-supported courses started producing graduates), the combination of project activities was expected to increase the number of TVET course graduates with higher-level skills in areas of industry demand, especially in STEM fields. This was expected to result in greater industry satisfaction with local TVET programs, which would lead to greater industry co-investment in the sector. In turn, this increased investment should feed back into an even larger increase in the availability of graduates with industry-demanded skills.

[2] As part of the evaluation planning process, we suggested updating the original logic model to more clearly highlight the key pathways through which the project activities are expected to influence the ultimate outcomes that the evaluation will examine—Figure I.1 reflects updates following from those discussions.

Finally, in the long term (when multiple cohorts of course graduates enter the labor market over time), the logic model implies that the close alignment of graduates' skills with market needs would lead to higher average incomes through higher employment rates (which reflects greater demand for their skills), and higher wages for those employed (which reflects their higher productivity). Ultimately, these outcomes were expected to contribute to increased economic growth and reduced poverty in Georgia (the Georgia II Compact's overarching goal, not shown in the logic model).

Figure I.1. The ISWD logic model



MES = Ministry of Education and Science; TVET = technical and vocational education and training.

B. Cost-benefit analyses and projected economic rates of return

MCC's cost-benefit analyses (CBAs) for this project focus on the new or improved TVET courses funded under Component 1, which accounted for most of the ISWD project's disbursed funding ($11.7 million of $15.7 million) and had the most clearly defined benefits. When the compact began, MCC's CBA model compared the expected costs and benefits of this component and estimated an economic rate of return (ERR) of 14 percent (the 95 percent confidence interval was 6 to 22 percent) over a 20-year time horizon. The costs in the CBA model included the total PICG investment amount from both MCC and the private sector, as well as tuition costs. The main projected benefits were an increase in the earnings of PICG trainees, driven by (1) a higher expected employment rate and (2) higher expected wages for those employed.[3] The initial CBA model assumed that the courses would benefit a total of 25,000 people

[3] Throughout this report we use the term "wages" when discussing the CBA, consistent with the terminology therein. However, strictly speaking, our analysis of the CBA examines earnings, which comprise after-tax wages for those in paid employment and typical monthly profits for those in self-employment.

(including trainees and members of their households), with the employment rates of these trainees rising by 9 percent, and the wages of these trainees rising by 911 GEL per annum, or 23.8 percent, over a counterfactual wage of 3,828 GEL per annum in 2010 currency (Georgia II Monitoring and Evaluation Plan, as published by MCA-Georgia in 2016).

This ex-ante version of the CBA model was developed before the PICGs were awarded, when little was known about the number of compact-supported courses, the topic areas the courses would cover, or the number of trainees the courses would accept. After closure of the compact, MCC updated the CBA model, which led to an increase in the projected ERR from 14.0 percent to 20.9 percent. The primary changes to the model related to the projected number of trainees, their employment rates, and their earnings. These changes were informed by data on the enrollment patterns in PICG courses during the compact, together with descriptive results from the interim evaluation report, which included early, survey-based findings on the prior and expected employment patterns and salaries of PICG course graduates. The updated model increased the estimated number of project beneficiaries from 25,000 to 81,769, and used finer-grained, course-level assumptions about the projected change in trainees' employment rates and earnings. Specifically, the updated model decreased the expected change in employment from 9 percent to an average of 6 percent (with course-level employment increases ranging from 2 percent to 10 percent), and decreased the average expected change in earnings from 23.8 percent to 17 percent (with course-level earnings increases ranging from 3 percent to 35 percent, or between 587 to 2,491 GEL per annum for 2020 wages estimated in 2013 currency). The large projected increase in the number of project beneficiaries more than offset the reductions in projected employment and earnings increases, leading the projected ERR to rise to 20.9 percent over 20 years.

This final evaluation report provides an opportunity to cross-check MCC's CBAs against the empirical results of this study's tracer survey of PICG course graduates. The tracer survey measured trainees' employment rates and earnings one year after graduating from these courses, and used several approaches to benchmark these outcomes against the employment rates and earnings patterns of graduates from other, existing TVET courses in Georgia. Results of this re-analysis of the CBA model's assumptions can be found in Chapter III.

C. Literature review

In this section, we review the literature on the labor market impacts of vocational training programs in low- and middle-income countries. The program logic and CBA for the ISWD project anticipated that the project will eventually result in better labor market outcomes for Georgian TVET graduates—specifically, higher employment rates and wages. Outside of Georgia, a number of high-quality impact studies have examined the relationship between vocational training programs and these outcomes. These studies provide useful context and could help to indicate whether the ISWD program logic represents a plausible hypothesis about how the project activities could affect the ultimate outcomes of interest.

McKenzie (2017) reviewed 12 such impact studies that used an experimental design, which provides the highest standard of evidence (Table A.1 in Appendix A).[4] Only 3 of the 9 studies that measured

[4] The literature also includes several relevant quasi-experimental impact evaluations. However, a review by Tripney et al. (2013) found that the quality of these studies is highly variable, making it difficult to interpret the similarly variable findings on labor market impacts. In addition, other studies have found that evaluations of the same training program using different quasi-experimental methodologies can yield very different results (Ibarrarán and Rosas Shady 2009; Delajara et al. 2006). Therefore, we focus our review on the higher-quality experimental studies summarized in Table A.1 in Appendix A, which have largely superseded these older quasi-experimental studies.

employment as an outcome found a statistically significant impact, and the mean impact was only 2.3 percentage points.[5] However, there is some evidence of larger impacts on formal employment, with a mean impact across studies of 3.6 percentage points—suggesting that training might shift workers from the informal to the formal sector. Only 2 of 9 studies that examined earnings as an outcome found a statistically significant impact, although most estimates were positive, with a mean increase of 17 percent and a median increase of 11 percent. McKenzie (2017) concluded that most studies find only modest impacts of vocational training on employment and earnings, although those impacts are positive in some cases. He also suggested that few of these programs are likely to pass a simple cost-benefit test given the high cost of training and uncertainty about the sustainability of labor market impacts over time.

Several more recent rigorous impact evaluations of vocational training programs found similarly mixed impacts:

- Mathematica's impact evaluation of scholarships funded by MCC for vocational training in Namibia (Borkum et al. 2017) randomly assigned the offer of vocational training scholarships to applicants. The trainee scholarships were provided by issuing competitive grants to training providers and were designed to fund training in high-priority skill areas. Although the evaluation found that receiving a scholarship offer had large impacts on the probability of enrolling in and completing vocational training, especially among women, there was no evidence of positive impacts on employment and wages. A complementary qualitative study (Velyvis et al. 2017) suggested that the process that TVET providers used to assess market demand for skills was not fully developed when the grants were made, which could partially explain the project's limited labor market impacts.
- Alzúa et al. (2019) conducted a randomized controlled trial of short, inexpensive vocational training programs for disadvantaged youth in Mongolia, which offered up to 45 days of training and included a substantial internship component. The authors found that the offer of training led to an increase in the self-employment rate (3.5 percentage points higher for the treatment group than the control group) and higher monthly earnings (more than 20 percent higher for the treatment group than the control group) after 12 months, although it did not increase overall employment. However, most of these benefits accrued to trainees who were wealthier, older, and better educated. Also, take-up of training was low, possibly because the program placed part of the burden of finding internships on trainees.
- Chakravarty et al. (2019) recently used a regression discontinuity design to conduct an impact evaluation of the Nepal Employment Fund, a large training and job placement program for disadvantaged youth in Nepal. The program gives trainees one to three months of technical training, six months of paid on-the-job training, and life skills training for female trainees. The study found positive impacts of the offer of training on the rate of non-farm employment (10 percentage points) and average monthly earnings for those engaged in income-generating activities (almost double) one year after the end of training These impacts were largely driven by women who started their own businesses inside their homes. However, there were no impacts on male employment, nor on the rate of wage employment for women; as a result, there was no overall impact on the employment rate, measured by whether individuals self-reported any income-generating activities in the previous month

Overall, the literature suggests that, although the effects of many vocational training programs in developing countries are modest, these programs can be successful in specific contexts. The success of any given program likely depends on factors such as social, economic, and labor market conditions;

[5] McKenzie's review focused on the impacts of the offer of training; the impacts on those who actually received training were 20 to 40 percent larger, depending on the take-up rate of the offer of training in a particular study.

existing skill levels of targeted groups; and training program characteristics. To the best of our knowledge, no large-scale, rigorous evaluations of vocational training programs in Georgia or other countries in the Caucasus region have taken place, so the likely ranges of effects in the Georgian context are unclear.

In addition, there are some important differences between many of the training programs studied in the literature and the PICG-supported courses. First, the PICG-supported courses are substantially longer in duration and involve training at higher technical levels. Second, PICG-supported courses have a much stronger market-related focus and a higher degree of industry involvement than most of the training programs studied in the literature. Specifically, employers were closely involved in developing the PICG-supported courses—for example, through co-funding arrangements (including monetary and in-kind contributions) and by advising providers on curriculum development—which could lead to stronger market alignment of these courses relative to other programs. Third, the ISWD project was explicitly designed to integrate market-relevant training with complementary activities and broader sector reforms aimed at improving the quality and market relevance of vocational training, and this was not the case for most other training programs. The expected changes in the TVET sector resulting from these complementary activities—for example, adoption of best practices by TVET providers, increased employer engagement, and improved public perceptions of TVET—could support broader improvements in outcomes for graduates of Georgian TVET programs. It is possible that these features of the ISWD project could make it more successful than typical vocational training programs.

D. Objectives of the final report

This final evaluation report has two main objectives. First, it provides endline results on the evaluation's key evaluation questions, including findings related to the observed labor market outcomes of trainees in MCC-supported courses (the full list of evaluation questions is presented in Chapter II). Building on results from the 2019 interim evaluation report (Borkum et al. 2019), these findings represent a comprehensive assessment of the long-term effects of supported TVET courses and provide new empirical data to inform MCC's CBA for the ISWD project as a whole. Second, this report draws on qualitative and quantitative data to assess the sustainability of each of the project's four components up to two and a half years after the compact ended, and examine whether it is likely that these components will be continued.

The remainder of this report is structured as follows. In Chapter II, we list the evaluation questions we seek to address, present the evaluation design, and describe the endline data and analysis approach. The following chapters present our findings related to the PICG component (Chapter III) and the other project components (Chapter IV). We conclude in Chapter V with a discussion of how our findings answer the evaluation's original evaluation questions and the implications of the findings for TVET practitioners in Georgia and in other country settings.

II. Evaluation design and endline analysis approach

In this chapter, we review the design for the evaluation of the ISWD project and describe the analyses performed for this final report. We begin by listing the key evaluation questions and explaining how we used the evaluation to answer them. We then describe the data analyzed in the report—which include quantitative and qualitative data, as well as administrative data—and our analysis approach, including the approach to assessing the assumptions in MCC's closeout CBA model.

A. Evaluation questions

The evaluation of the ISWD project was designed to address eight key questions (and related sub-questions). These questions cover the implementation of the activities, their effects on project participants and the TVET sector more broadly, and their sustainability. Because the PICG component (Component 1) is the project's largest component, five of the eight questions focus on that component. The remaining three key evaluation questions focus on the other project components, with one question per component—STPP (Component 2), technical assistance for policy reform (Component 3), and the annual conference (Component 4)

The interim evaluation report (Borkum et al. 2019) addressed evaluation questions related to the project's implementation (evaluation questions 1 and 2, and the implementation-related items under evaluation questions 6–8). This final evaluation report will answer evaluation questions related to the labor market outcomes of trainees (evaluation question 3), employer perceptions of trainees (evaluation question 4), and the sustainability of all of the project components after the end of the compact (evaluation question 5, together with the sustainability-related items under evaluation questions 6–8). The full set of evaluation questions is as follows, with the questions that this final evaluation report focuses on italicized:

1. How did the implemented PICG-supported courses compare with the original grant proposals, and what were the reasons for any deviations?
2. Did trainees enroll in PICG-supported courses and graduate from them at targeted levels?
    a. To what extent did women or members of socially disadvantaged groups (defined by language, region of origin, or other socio-demographic characteristics) enroll and graduate?
    b. Did these patterns differ across training sectors and grantees?
3. *What were the labor market outcomes (employment and wages) for graduates from PICG-supported courses?*
    a. *How did the outcomes of these graduates compare to those of graduates from other, non-supported courses?*
    b. *Did these results differ by gender or other socio-demographic measures?*
    c. *Did the results differ across training sectors and grantees?*
4. *What were employer perceptions of the graduates from the PICG-supported courses, and how did the availability of these graduates affect their hiring and training plans?*
    a. *Do employer perceptions of graduates from PICG-supported courses differ according to gender or socio-demographic categories?*
5. *Will PICG-supported courses be sustained after the compact?*
    a. *What are the main challenges to sustaining these courses, and how can they be overcome?*

   b. *How has the level of engagement between employers and grantees changed after the compact?*

6. What are TVET providers' perceptions of the best practices the project has identified and disseminated, to what extent have they adopted them, and what are the main barriers to doing so?
   a. How were best practices identified and disseminated in practice?
   b. How has the adoption of best practices affected TVET providers, including the grantees and other providers?
   c. *Is adopting best practices sustainable, and is the extent of adoption likely to increase in the future?*
7. To what extent have the MES and its agencies adopted the policy reforms supported by the project (for example, those related to industry engagement, marketing of TVET, and quality improvement), and what have been the main challenges in doing so?
   a. How has the adoption of these reforms affected or expected to affect the TVET sector, and in what time frame?
   b. *Are the policy reforms supported by the project sustainable, and how are these policies expected to evolve?*
   c. *Is there any evidence of a broader shift toward higher-level, industry-driven courses in the Georgian TVET sector? If so, what was the role of the project, and if not, why not?*
8. How and to what extent has the annual TVET conference influenced providers, employers, the MES, and other TVET sector stakeholders?
   a. Who attended and financed the conference, and what were its main areas of focus?
   b. *Is the conference likely to be sustained in the future?*

To answer these questions, we conducted a mixed-methods performance evaluation, which includes two studies: (1) a quantitative outcomes study of the PICG component and (2) a qualitative study assessing all project components. To evaluate the possible effects of the PICG component, the outcomes study measured the labor market outcomes of trainees in PICG-supported courses about one year after their courses ended, and used several approaches (described below) to benchmark those outcomes. Specifically, it comprised an ex-post thematic analysis (national benchmarking) and two pre-post analyses (course level and trainee level). The qualitative study was an ex-post thematic analysis that explored implementation of all the project components, the potential mechanisms driving the results observed in the PICG outcomes study, and the likelihood of sustainability across all ISWD components more than two years after the compact ended.

B. Evaluation design

This section describes the analytical approach used for the two components of the evaluation—the outcomes study and qualitative study—in more detail. A complete description of the evaluation design is also available in our evaluation design report (Borkum et al. 2018).

1. Outcomes study

The outcomes study for the PICG component describes the labor market outcomes of trainees who enrolled in PICG-supported courses—in particular, employment rates and wages (evaluation question 3). We measured these using data from a trainee tracer survey that followed them into the labor market about

one year after they graduated, which fell between summer 2019 (around the end of the compact) and fall 2021 (about two years later). We also used a combination of study-collected survey data and MES survey data to contextualize these outcomes, through three complementary benchmarking approaches:

- **A national benchmarking approach,** which compares the outcomes of trainees in all 41 PICG-supported courses included in the evaluation sample (measured through the tracer survey) to those of a representative sample of trainees enrolled contemporaneously in the broader set of all public TVET courses in Georgia (measured using secondary tracer survey data collected annually by the MES).[6] The evaluation sample comprises all 38 new or improved diploma courses, plus 3 certificate courses that were initially expected to be accredited as diploma courses; it excludes an additional 10 certificate courses that were also created through PICG support.
- **A course-level pre-post design,** which focuses on the PICG-supported courses that the project worked to improve (instead of introducing new courses in those subjects) and compares the outcomes of trainees in these courses with those of an earlier cohort taking the same courses before they were improved. This approach covers trainees in 9 of the 41 PICG-supported courses included in the evaluation sample. These 9 courses were selected for the pre-post analysis because (1) they were among the 15 PICG-supported courses that existed in some form before the grants were awarded, and (2) it was possible to collect data from a cohort of trainees who attended the courses before they were improved (forming a "pre-intervention" comparison group).
- **A trainee-level pre-post design**, which compares the earnings of trainees in all 41 PICG-supported courses in the evaluation sample about one year after the end of their training to their earnings at baseline (soon after the start of training), among trainees who had positive earnings in both periods. This approach is possible because slightly more than half the sample of trainees in the PICG-supported courses were employed both before and after completing their training and reported their associated earnings in both periods.

Importantly, none of these analyses provides a well-defined counterfactual for the labor market outcomes of the trainees who attended PICG-supported courses. In the case of the national benchmarking analysis, the lack of a well-defined counterfactual stems primarily from differences in economic sector and level between the national benchmarking and PICG-supported courses, as well as differences in demographic characteristics of the trainees enrolled in them. (We discuss these differences in further detail in Chapter III.) In the case of the course-level pre-post analysis, there is an important difference in timing of graduation because of the COVID-19 pandemic, which might have adversely affected labor market conditions. Specifically, we measured outcomes for the pre-improvement courses in our sample well before the pandemic, but those outcomes were measured during the pandemic for the improved courses. And in the case of the trainee-level pre-post design, we are only examining the trend in trainees' earnings growth and do not have a comparison group to indicate how much of that earnings growth would have occurred in the absence of PICG-supported courses. Further, the sample included in this design might not be representative of the broader group of trainees in PICG-supported courses.

Because none of the analyses represents a rigorous empirical framework for estimating the impacts of PICG-support courses, we do not focus on any individual analysis or set of results as "primary," but ultimately seek to triangulate across them. More broadly, we recommend interpreting the overarching

[6] As we note in Chapter III, we estimate that about 12 percent of the MES tracer survey sample comprises graduates of the 41 PICG-supported courses, but were unable to remove these from the MES data because we could not access the microdata.

pattern of findings across all three analyses with caution, acknowledging they might not reflect the true impacts of these courses.

2. Qualitative study

The qualitative study drew primarily on interviews with key stakeholders, complemented by information on course enrollment and graduation from administrative data. This report focuses on findings from qualitative data collected in late 2021 and early 2022, more than two years after the end of the compact. The qualitative study covers the following main areas:

- **Employer perceptions about the quality of PICG trainees and the potential benefits of PICG-supported courses** (evaluation questions 3 and 4). Through interviews with employers who hired graduates of PICG-supported courses, we examined employer perspectives on the skills of the trainees they hired, the quality of the PICG-supported courses, and the implications of these new courses for their hiring and training practices.
- **The sustainability of PICG-supported courses after the compact** (evaluation question 5). We sought to understand how the PICG grantees maintained and/or adapted their courses over time after the end of the compact. Specifically, we assessed the sustainability of demand for the courses, financial and staffing considerations related to sustaining the courses after the PICG grants ended, the impacts of the COVID-19 pandemic, and potential factors likely to affect sustainability of the PICG-supported courses in the future.
- **Sustainability of STPP grants and adoption of best practices** (evaluation question 6). We interviewed grantees who received best-practice grants during the compact, and examined the extent to which these practices continued to be used internally after the compact and whether other organizations in the TVET sector adopted the practices more widely.
- **National changes in TVET policy related to technical assistance provided during the compact** (evaluation question 7). We sought to understand the post-compact progress made in each of the policy areas supported by Component 3 and assessed whether and how the technical assistance provided during the compact contributed to new policy initiatives in the Georgian TVET sector after the compact ended.
- **Sustainability of the compact's annual TVET conference** (evaluation question 8). We examined whether the activities related to the annual conference continued after the compact and the likelihood that these activities will continue in the future.

C. Data collection and analysis approach

This section describes the data we collected for analysis in this report, which included quantitative survey data, qualitative data, and administrative data.

1. Quantitative survey data

The quantitative survey data analyzed in this report are drawn from a tracer survey of trainees who were enrolled in PICG-supported courses and pre-improvement courses, as well as secondary data from MES-funded tracer surveys of Georgian TVET graduates (which we use for national benchmarking).

Targeted sample and response rates for the evaluation's tracer survey

Mathematica contracted with Georgian Opinion Research Business International (GORBI) to collect follow-up data from as many trainees as possible who had enrolled during the compact in the 41 PICG-supported courses included in the evaluation sample and had completed a baseline survey. (The baseline survey was conducted in class or over the phone while trainees were still enrolled in training; the timing of the baseline survey relative to the start of the course varied but, on average, was between four and five months after the start of training.) The follow-up sample included up to three cohorts in each course, depending on the course dates (except for the Spektri water sewage systems exploitation technician course, which had no enrollees in the cohorts we had intended to include in the evaluation). We were unable to cover all the cohorts that enrolled during the compact for two reasons: (1) in two courses (the Georgian Mountain Guide Association [GMGA] level V trekking guide course and the Spektri level IV welding course), trainees in the first cohort had graduated before the baseline survey was conducted (meaning we could not collect adequate contact information to track these students and conduct a follow-up survey); and (2) we did not include cohorts that enrolled during the final six months of the compact because they would have been due for follow-up too late to be included in the originally-planned final report (the final report was ultimately delayed because of the pandemic, but it was too late to include these cohorts).

In total, the follow-up survey collected data from at least one cohort in 40 of the 41 PICG-supported courses included in the evaluation sample (as noted above, the exception was the Spektri water sewage systems exploitation technician course). More specifically, the final sample comprised the first cohort of trainees in 38 of the 41 PICG-supported courses included in the evaluation sample, the second cohort in 26 PICG-supported courses, and the third cohort in 6 PICG-supported courses (Table B.1 in Appendix B). We also focused on the final cohort of trainees in 11 pre-improvement courses, which are linked to 9 PICG-supported courses (Table B.2 in Appendix B).[7] (These links are not one-to-one, because in some cases the new PICG-supported course drew on aspects of more than one existing course.)

Overall, according to administrative data collected by GORBI, there were 1,451 enrollees in the 40 PICG-supported courses included in the evaluation, including 760 in the first cohort, 420 in the second cohort, and 271 in the third cohort. Of these 1,451 enrollees, 1,148 completed a baseline survey and 992 completed the follow-up survey, resulting in a follow-up response rate of 68 percent overall (or 86 percent relative to the sample that completed a baseline survey) (Table II.1).

In the 11 pre-improvement courses, a total of 179 enrollees in the final cohort of these courses completed a baseline survey and 156 completed the follow-up survey, a response rate of 87 percent relative to the sample that completed a baseline survey. We are unable to calculate an overall response rate for the pre-improvement courses because we do not have information on the total number of enrollees.

Timing of the evaluation's tracer survey

GORBI collected the follow-up data from July 2018 to November 2021; all of the follow-up surveys were completed by phone using software for computer-assisted telephone interviewing.

[7] Table B.2 in Appendix B excludes several pre-improvement courses linked to the PICG-supported courses established by Community College Spektri. We attempted to schedule data collection for the final pre-grant cohort of trainees in these courses in June 2017 but were unable to do so before the trainees graduated. The number of trainees in these courses was relatively small compared to the overall number of trainees across all pre-improvement courses.

PICG trainees. For PICG trainees, GORBI conducted the follow-up survey about 12 months after each course ended, which was between July 2019 and October 2021. This 12-month follow-up period is typical for evaluations of TVET programs, according to the literature discussed in Chapter I (the typical period is 12 to 18 months, although some studies do have a longer follow-up), and balances the desire for longer-term outcomes with the lower response rate that would result from a longer follow-up. We expected this 12-month period to be sufficient for trainees to seek work after the end of training, complete probationary periods in new jobs, and determine whether they were a good initial fit for the jobs they found (and search for an alternative job if not). About one-third of the PICG trainee sample was surveyed before the pandemic began in earnest, at the start of March 2020.

Table II.1. Sample sizes and response rates for the follow-up trainee survey

	First cohort	Second cohort	Third cohort	Total
PICG-supported courses				
Number of courses	38	26	6	40
Number of enrollees at start of course	760	420	271	1,451
Number of completed baseline surveys	606	306	236	1,148
Number of completed follow-up surveys	527	259	206	992
Follow-up survey response rate (overall)	69%	62%	76%	68%
Follow-up survey response rate (relative to baseline sample)	87%	85%	87%	86%
Pre-improvement courses				
Number of courses	–	–	–	11[a]
Number of enrollees at start of course	–	–	–	NA
Number of completed baseline surveys[b]	–	–	–	179
Number of completed follow-up surveys	–	–	–	156
Follow-up survey response rate (overall)[c]	–	–	–	NA
Follow-up survey response rate (relative to baseline sample)	–	–	–	87%

Source: Information on the number of enrollees in PICG-supported courses is from administrative data GORBI collected from providers.

[a] These 11 pre-improvement courses became 9 improved PICG-supported courses.

[b] All trainees were from the final pre-improvement cohort in each course.

[c] For the pre-improvement courses, we are unable to calculate an overall response rate because we do not have information on the total number of enrollees.

NA = not available.

Pre-improvement trainees. GORBI surveyed trainees from pre-improvement courses in July and August 2018. Although ideally this would also have been 12 months after the end of these courses, there was some ambiguity about the precise course end-dates across the cohorts in the pre-improvement sample, and so the timing of the survey relative to graduation is unclear. In Chapter III, we describe how we account for this in the analysis by focusing on employment within one month of graduation.

Supplemental surveys for PICG trainees. In October and November 2021, GORBI conducted two short supplements to the follow-up tracer survey for PICG trainees. These supplements were conducted with 538 PICG trainees who already participated in the follow-up survey. One of the supplements was for

trainees who were employed in course-relevant jobs (111 trainees), with the goal of obtaining information about their employers to help us identify the sample for qualitative interviews. (The data obtained were used purely for this purpose and not in any of the analyses discussed in this report.) The second supplement was for trainees who had not been employed in a course-relevant job since graduation (427 trainees), with the goal of understanding why they did not find such a job.

Contents of the follow-up survey

The follow-up tracer survey had several sections (Table II.2). (The full follow-up tracer survey instrument and its supplements are in Appendix G.) It collected detailed information about trainees' training experience, as well as labor market outcomes such as employment and wages. The supplemental survey for trainees who were employed in course-relevant jobs contained questions about employer name, location, size, and name and contact of the hiring manager who hired the respondent. The supplemental survey for trainees who had not been employed in a course-relevant job since graduation contained questions on why they thought they were not able to find a relevant job, what steps (if any) they took to find such a job, and whether they reached the job interview stage.

Table II.2. Contents of the follow-up trainee tracer survey

Domain	Survey contents
Training receipt	Completion of training; perceptions of training quality; course content and pedagogical approaches (use of laboratories, practical component, teaching practices, and so on); receipt of and duration of internships; career guidance received; job placement assistance received; enrollment in further training after graduation
Employment	Paid employment; productive engagement (employed or engaged in further training); self-employment; hours per week worked; time to find a job; relevance of training to job; effects of training on existing job (if employed at time of training); availability for work and job-seeking activities (for those not working)
Earnings	Monthly wages from employment (or profits from self-employment in a typical month)
Supplemental surveys	For those employed in a course-relevant job at follow-up: employer name, location, size, and name and contact of the hiring manager who hired the respondent For those not employed in a course-relevant job since graduation: whether searched for, identified, applied for, or interviewed for such a job; perceived reasons for not finding such a job

National benchmarking data from MES-funded tracer surveys

To benchmark the labor market outcomes of PICG trainees measured in our follow-up tracer survey against those of TVET graduates nationally, we used data from two MES-funded tracer surveys. These tracer surveys, which were conducted at the end of 2019 (for trainees who graduated in 2018) and the end of 2020 (for trainees who graduated in 2019) were intended to be representative of graduates from all TVET diploma courses in Georgia.[8] The final samples for these surveys comprised a total of 704 graduates from 2018 (response rate unknown) and 1,201 graduates from 2019 (response rate 56 percent).

[8] Another round was conducted in late 2021, for trainees who graduated in 2020. Although data from this survey round would be relevant because some of our PICG sample also graduated in 2020, information from this latest survey round was not available at the time of this report.

Although the timing of graduation differed across the courses in these survey samples, the average time between graduation and the survey was about 12 months—the same as for our follow-up tracer survey for PICG trainees.

The national benchmarking analysis relied on information about labor market outcomes from the MES tracer survey study reports (MES 2019 and MES 2020), as well as several additional descriptive analyses that the MES conducted on our behalf using the tracer survey microdata (for example, reporting wage by gender). We were unable to obtain access to the microdata to conduct our own analysis, which had two main implications: (1) the benchmarking sample likely includes some trainees in PICG courses, which we were unable to remove,[9] and (2) we were unable to adjust for differences between the PICG and MES samples in terms of demographic characteristics and course level, which might have made the samples more comparable.

Quantitative analysis approach

Analysis of PICG tracer survey data. Our analysis of the tracer survey data from trainees in PICG-supported courses is largely descriptive in nature. In particular, most of the analyses presented in this report rely on straightforward calculations of the mean or distribution of key variables and, where relevant, explore variation across providers, trainee cohorts (relative to the pandemic), and trainee gender. Table II.3 shows the key outcomes that we examine. Because the number of trainees in the follow-up sample varied substantially across providers, we also conducted a sensitivity test where we reweighted the data so that all providers contributed equally to the estimates; as we mention in Chapter III, this adjustment did not change the pattern of overall findings.

Table II.3. Key outcomes for the follow-up tracer survey analysis

Domain	Key outcomes
Employment	• Employed since the end of the course (any paid job, any course-relevant job, any full-time course-relevant job) • Employed at the follow-up survey (any paid job, course-relevant job, full-time course-relevant job) • Time to find first job after the end of training, among those who found a job • Job characteristics, among those employed at the follow-up survey: wage employment (versus self-employment), formality (business registered for tax purposes), relevance of job to training, full-time status (versus part-time), job satisfaction • Employment status at the follow-up survey: employed, unemployed (searching for work), or out of the labor force (not searching for work)
Earnings	Monthly after-tax earnings (wages, or profit from self-employment in a typical month).

To compare outcomes by trainee cohorts (in particular, comparing results for cohorts seeking employment before and during the pandemic) or compare outcomes by trainee gender, our analyses adjust for other potentially confounding factors using the following regression model:

$$Y_{ij} = \alpha + \beta Z_{ij} + \gamma X_{ij} + \delta_j + \varepsilon_{ij} \quad (1)$$

[9] Based on total enrollment numbers, we estimate that about 12 percent of the benchmarking sample would have comprised PICG-supported courses if it were truly representative of all TVET courses in Georgia.

where Y_{ij} is the outcome of trainee *i* enrolled at provider *j*; Z_{ij} is a binary indicator for either post-pandemic cohort or gender (depending on the analysis being conducted); X_{ij} is a set of trainee characteristics (gender [only for the cohort analysis], age, education, and baseline employment status), δ_j is a set of binary indicators (fixed effects), one for each provider; and ε_{ijt} is a random error term. The estimated value of the coefficient β represents the difference in outcomes by trainee cohort or gender after controlling for differences in the distribution of these subsamples across providers, as well as differences in other demographic characteristics.

National benchmarking analysis. The study's national benchmarking analysis is also largely descriptive in nature, comparing the labor market outcomes of graduates in PICG-supported courses to the aggregated labor market outcomes of a representative sample of graduates from all TVET courses in Georgia, as reported by the MES. We also conducted some of these comparisons separately by graduate cohort (relative to the pandemic) and trainee gender, where possible, but in the absence of microdata from the MES-funded surveys it was not possible to perform this benchmarking analysis using adjustments for potentially confounding trainee characteristics.

Course-level pre-post design. For the course-level pre-post design, we compared the outcomes of trainees in improved PICG-supported courses to those of trainees who enrolled in earlier versions of the same courses (before they were improved). To make this comparison, we used the following regression model:

$$Y_{ijt} = \pi + \psi POST_t + \kappa X_{ijt} + \lambda_j + \omega_{ijt} \quad (2)$$

where Y_{ijt} is the outcome of trainee *i* enrolled in course *j* at time *t* (where *t* is before or after the improvements); $POST_t$ is a binary indicator for the trainee being enrolled after the PICG-supported improvements; X_{ijt} is a set of trainee characteristics (gender, age, and education), λ_j is a set of binary indicators (fixed effects), one for each PICG-supported course and the pre-improvement course(s) it is linked to;[10] and ω_{ijt} is a random error term. The estimated value of the coefficient ψ represents the regression-adjusted difference in outcomes between the average trainee in PICG-supported courses and the average trainee in corresponding pre-improvement courses.

Trainee-level pre-post design. For the trainee-level pre-post design, we used our trainee tracer survey data to calculate the difference in baseline and follow-up wages for those who reported both, after adjusting wages for inflation. This analysis does not require a regression model to control for trainee characteristics because the analysis does not involve a separate treatment and comparison group: it is simply describing the within-trainee trend in earnings at two points in time.

2. Qualitative data

This final report draws on two sources of qualitative data: (1) interviews with project grantees and employers and (2) interviews with high-level stakeholders. Below, we describe the qualitative data we collected and how we analyzed them.

[10] For example, the PICG-supported Tetnuldi computer network and systems technician course is linked to two pre-improvement courses; the analysis includes a binary variable that is equal to 1 for all these courses and 0 otherwise.

Qualitative data collection

GORBI conducted the interviews with project grantees and employers from December 2021 to February 2022. The project grantees included both PICG and STPP grantees, and the employers included both those who hired graduates from PICG-supported courses, and a broader set of employers in sectors for which TVET graduates are relevant. (Table II.4 summarizes the various types of respondents, the criteria used to select them, and the key topics that were covered.) Mathematica developed detailed protocols for the qualitative data collection and participated in training interviewers and piloting the protocols. GORBI recorded all interviews and prepared transcripts in English.

Mathematica staff conducted the interviews with high-level stakeholders. These interviews, which took place in December 2021 and January 2022, included organizations that were involved in project implementation or in the TVET sector more broadly. (Table II.4 lists the interviewees and summarizes the key topics covered in the interviews.) Mathematica prepared detailed notes from these interviews and used these in the analysis.

Qualitative analysis approach

Our analysis drew on the interviews described above to identify similarities and differences in perspectives across respondents. For the interviews we conducted with high-level stakeholders, we drew on our interview notes to develop a set of initial themes related to the evaluation questions soon after the data were collected. For the interviews GORBI conducted, we analyzed the translated transcripts in NVivo, using a coding scheme that was mapped to the protocols and evaluation questions. We used the coded transcripts to triangulate responses across different respondent types. This approach enabled us to refine the themes developed from the high-level stakeholder interviews and develop new themes.

Table II.4. Interviews conducted for the final report

Respondent	Sample size	Sampling approach	Key topics
Interviews conducted by GORBI			
PICG grantees	10 interviews	All 10 TVET providers who received PICG grants	• Changes to PICG-supported courses since the end of the compact • Level and patterns of demand for training in PICG-supported courses since the end of the compact • Sustainability of PICG-supported courses and barriers to continued sustainability
STPP grantees	8 interviews	8 STPP grantees (4 of the 7 first-round grantees, 4 of the 10 second-round grantees, and none of the 10 third-round grantees) interviewed for the interim report, selected as those whose practices have the best potential for wider adoption (based on discussions with PEM)	• Perceptions of best practices, extent of adoption, and effects of adoption
Employers	24 interviews	15 employers of PICG graduates (1–3 per grantee across 8 of the 10 grantees), selected from the most common employers using data from the follow-up trainee tracer survey[a] 9 employers in sectors for which TVET graduates are relevant, selected as a convenience sample from the list of employers that attended the annual TVET conferences during the compact	• Awareness of PICG-supported courses and perceptions of these courses • Current hiring, training, and wage-setting practices, how these have changed over time, and reasons for these changes • Key challenges faced in hiring employees with the right skills, how these have changed over time, and reasons for these changes • Satisfaction with skills of graduates from PICG-supported courses and graduates from other courses, including key skills gaps • Extent and nature of engagement with TVET providers, and future plans • Extent and nature of engagement with the MES, and future plans
Interviews conducted by Mathematica			
Former project implementation staff	2 interviews	Former MCA-Georgia and PEM project leads	• Sustainability of PICG-supported courses since the end of the compact • Status of other project components since the end of the compact
NCEQE staff	1 interview	Deputy director	• Changes related to quality assurance since the end of the compact • Changes to the course development and authorization process since the end of the compact
Georgia Skills Agency	1 interview	Director (until recently Deputy minister at the MES responsible for TVET)	• Establishment of the new Skills Agency, its functions, and how it was affected by the ISWD project • Status of policy reforms supported by the project since the end of the compact and policy priorities of the new Skills Agency
Interviews conducted by Mathematica (cont.)			
Other donors in the TVET sector	4 interviews	European Union delegation; United Nations Development Program (UNDP); United States Agency for International Development (USAID, 2 interviews)	• Status of policy reforms supported by the project and other changes in the TVET sector since the end of the compact • Nature and scope of current investments in the TVET sector and how these were affected by the ISWD project
Georgian Association of Private Colleges	1 interview	Co-founder	• Extent and nature of engagement between the Association, government TVET bodies, and employers • Key policy reforms affecting the Association since the end of the compact.

Table II.4 (*continued*)

[a] We originally intended to interview two employers per PICG grantee. However, we were unable to secure employer interviews for GMGA or the Agricultural University, due to relatively high rates of self-employment among graduates and employer nonresponse. For the other grantees, we interviewed a convenience sample of one to three employers, with the number of interviews varying depending on the number we could identify and successfully contact using the tracer survey data, and employers' willingness to participate.

GORBI = Georgian Opinion Research Business International; ISWD = Industry-Led Skills and Workforce Development; MES = Ministry of Education and Science; NCEQE = National Center for Educational Quality Enhancement; PICG = Program Improvement Competitive Grants; STPP = Strengthening TVET Provider Practice; TVET = technical vocational education and training.

3. Administrative data

To complement the quantitative and qualitative data, the analysis draws on administrative data on the number of enrollees and graduates in PICG-supported courses during and after the compact to help assess course sustainability, graduation rates, and how actual enrollment and graduation compared to what was assumed in MCC's CBA model. These data were collected regularly from PICG grantees by MCA-Georgia during the compact and by the Millennium Foundation (the post-compact successor agency to MCA-Georgia) after the end of the compact. The data comprise course-level numbers of enrollees, continuing trainees, and graduates for each semester's intake from fall 2016 through fall 2021, recorded as of the end of 2021.[11]

D. Analysis approach to assessing assumptions in the closeout CBA model

We used administrative data on the number of enrollees and graduates in PICG courses, together with data from our tracer survey, to assess the key assumptions in MCC's closeout CBA model in several ways:

- **Number of enrollees and graduates.** We compared the CBA model's assumptions about the number of enrollees and graduates by the end of 2021 to administrative data, focusing on the 41 PICG-supported courses included in the evaluation. Because the direct beneficiaries in the CBA model are graduates, comparing the number of graduates through 2021 provides the most direct evidence about whether the CBA model's assumptions about the number of beneficiaries are accurate. However, relatively few of the cohorts expected to be enrolled over the time horizon of the CBA model were due to graduate by the end of 2021. Therefore, we also assessed the extent to which the pattern of enrollment though 2021 supports the CBA model's enrollment projections for future years.
- **Post-training employment rates.** We used tracer survey data to compare course-level employment rates of PICG trainees to the rates assumed in the CBA model. We conducted this analysis using two survey measures of employment: (1) any paid employment in the 12 months since the end of the course; and (2) employment at the follow-up survey date. We present both measures because it is unclear which is more appropriate for this analysis. On the one hand, the first, less conservative measure might be appropriate because finding a job (even if it was subsequently lost within the first 12 months) might be a signal of employability over the long time horizon in the CBA model. In addition, for two-thirds of the evaluation sample employment outcomes were observed during the pandemic when employment may have been unstable due to a temporary shock that is not representative of the labor market over the long run. On the other hand, the second measure might be a better signal of sustained employment, which is appropriate because the CBA model assumes a constant stream of income for those employed. We conduct this analysis only for courses for which

[11] TVET courses in Georgia typically have a fall and spring intake each year. However, because of the pandemic, there was only a single (fall) intake in both 2020 and 2021.

we have a survey sample size of at least 10 for employment rates, to avoid relying on very imprecise survey estimates; this enables us to cover 29 of the 41 PICG courses included in the evaluation.[12]

- **Post-training wages.** We used tracer survey data to compare course-level earnings of employed PICG trainees to the assumptions in the CBA model (all adjusted to 2013 GEL, the base year in the CBA model).[13] Like we did for employment, we conducted these comparisons only for courses for which we have a survey sample size of at least 10 for wages; this covers 15 of the 41 courses included in the evaluation.
- **The wage premium.** The wage premium—the difference between actual and counterfactual wages for those employed—is key to the economic benefits estimated in the CBA model. We therefore compared the assumed course-level wage premium in the CBA model to two estimates based on the survey data (again, in 2013 GEL). (Our comparisons focus on the absolute difference in wages in GEL rather than the percent difference, because the absolute difference directly affects the economic benefits in the model.) First, we used the course-level pre-post design to compare the difference in wages for the improved and pre-improvement versions of existing courses. This is directly equivalent to the counterfactual for these courses in the CBA model and is appropriate despite the pandemic because we show in Chapter III that there is little evidence that the pandemic affected wages for TVET graduates. Because of sample size limitations we could only conduct this analysis for one of the nine improved courses, the Tetnuldi IT support specialist level III course. However, because this course contributes the largest number of graduates out of all courses in the CBA model, these estimates are still valuable. Second, we used the trainee-level pre-post design to estimate the course-level average change in wages for those employed at baseline and follow-up. This is directly relevant to the CBA counterfactual of those who would not have enrolled in further training.[14] Considering sample size limitations for some courses, this analysis covers 11 of the 41 courses included in the evaluation. [15]

[12] We did not attempt to validate counterfactual employment rates in the CBA model because we had no good information to do so. The national benchmarking estimates we discussed earlier are not suitable for this purpose because they (1) do not represent the conceptual counterfactual in the CBA model (because they involve courses at different levels and in different fields than PICG courses), (2) are not at the course level, and (3) were affected by the pandemic. The course-level pre-post estimates of employment rates are not suitable either because they are also likely to have been strongly affected by the pandemic.

[13] Wages in the CBA model grow over time; we used 2020 wages for our analysis, because 2020 was the modal year in which the follow-up survey was conducted.

[14] This counterfactual is not precise because it is possible that baseline earnings would have increased over time absent further training. However, this increase is likely small given that trainings typically lasted between a few months and two years.

[15] We did not use the national benchmarking estimates to validate the wage premium in the CBA model because they do not represent the conceptual counterfactual in the model and are not available at the course level.

III. Findings: PICG component

This chapter presents findings related to the employment and earnings outcomes of PICG trainees. After summarizing the characteristics of the PICG trainees and presenting descriptive data on their employment and earnings outcomes, we benchmark these outcomes using three analytical approaches: (1) national benchmarking against other TVET courses in Georgia; (2) comparing outcomes for courses improved through PICG support to pre-improvement versions of those courses; and (3) comparing pre- and post-training wages for those employed before and after PICG training (Section A). We also discuss the sustainability of PICG courses since the end of the compact, drawing on administrative enrollment data and relevant qualitative data (Section B). Finally, we use our findings on employment outcomes and course sustainability to examine whether the assumed parameters in MCC's CBA model, which is driven by the PICG component, are reasonable (Section C).

A. Descriptive and benchmarking findings

In this section we describe the characteristics and labor market outcomes of trainees in PICG-supported courses, and seek to benchmark their labor market outcomes. Our analysis sample is based on trainees who were administered a baseline survey while they were still enrolled in the PICG-supported training. About 23 percent of respondents in the follow-up analysis sample reported that they had not ultimately completed the training. However, our findings are very similar if we restrict the analysis to those who completed training (for example, employment rates are almost identical). Therefore, unless stated otherwise, our analyses in this chapter use the full sample of follow-up respondents in PICG-supported courses, including those who did not complete the training. (We address the issue of course completion rates in greater detail in Section B.)

1. Characteristics of PICG trainees

To provide context for the descriptive findings on the employment and earnings of PICG trainees, we first briefly describe the profile of the trainees in our follow-up sample. Since many trainee characteristics—gender, age, education, and baseline employment status—vary across providers and cohorts, we also use these characteristics as regression controls in subsequent analyses in this chapter.

PICG trainees were disproportionally male. Only 15 percent of all trainees in our follow-up PICG sample were female (Table III.1). Across the PICG grantees, the proportion of females ranged from zero (Spektri and Georgia Aviation University [GAU]) to about one-third (Agricultural University and the Georgian Institute of Public Affairs [GIPA]) (Figure C.1 in Appendix C). The proportion of female trainees was generally lower for the providers that offered courses in the sectors of aviation, electrical systems, railways, maritime vocations, and engineering. It was higher (although still far from equal to the proportion of males) in courses related to tourism, information technology, aquaculture, occupational health and safety, and agriculture and veterinary services. These disparities likely reflect cultural norms and stereotypes associated with many of the occupations that the PICG-supported courses focused on.

Almost half of PICG trainees had completed some education or training beyond secondary school (grade 12), and many had substantial work experience. Most trainees did not enroll in PICG-supported courses directly after secondary school, while still in their teens. Specifically, only about 3 in 10 trainees in our follow-up analysis sample were younger than age 20 when they enrolled in the PICG-supported course, whereas about 4 in 10 were in their 20s and about 3 in 10 were in their 30s (the average age was 27). Consistent with this, about 45 percent of trainees had pursued education beyond grade 12

and almost three-quarters had gained work experience before enrolling in the training (six years of work experience, on average). About one-half (53 percent) of trainees maintained some form of employment while enrolled in their PICG-supported course (most of which was paid employment rather than self-employment).[16]

Table III.1. Characteristics of PICG trainees in the follow-up analysis sample

	Mean	Sample size
Male	85%	992
Age at enrollment in PICG course		
Younger than 20	28%	991
20–24 years	27%	991
25–29 years	16%	991
30–34 years	10%	991
35 years or older	19%	991
Mean (years)	27	991
Education		
Less than grade 12	21%	992
Grade 12	34%	992
Beyond general education	45%	992
Employment status at baseline		
Employed in a paid job	41%	987
Self-employed	12%	987
Not employed	47%	987
Work experience		
None	26%	965
Less than a year	8%	965
1 to <2 years	7%	965
2 to <5 years	18%	965
5 to <10 years	18%	965
10 years or more	24%	965
Mean (years)	6	965

Source: Baseline tracer survey.

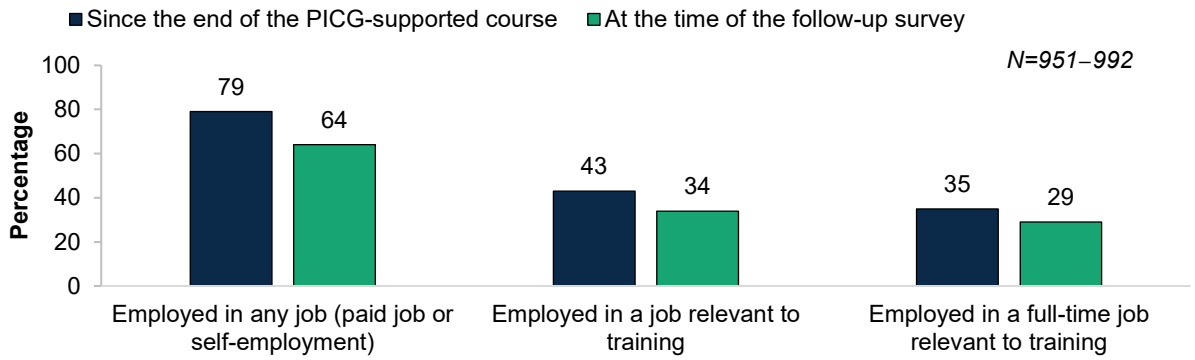
2. Descriptive findings on employment

Seventy-nine percent of trainees were employed at some point since the end of the PICG-supported course, and 64 percent were still employed at the follow-up survey date (Figure III.1). The gap in employment rates since graduation and at follow-up is consistent with reports from employer interviews that TVET graduates—including those from PICG-supported courses—typically must complete multiple steps before securing a permanent position. In particular, it is common for graduates to complete

[16] This data point is shown in the "employment status at baseline" section of Table III.1; as mentioned earlier, the baseline was conducted while trainees were enrolled in training.

internships and/or probationary periods of one to six months, which can lead to permanent positions if they perform well and are interested in staying in such a position. The need for these steps—with potential for the employer or the graduate to discontinue the arrangement at any time—suggests that not all graduates who were hired after the end of their course would secure a permanent position within 12 months.

Figure III.1. Employment rates of trainees in PICG-supported courses



Source: Follow-up tracer survey.

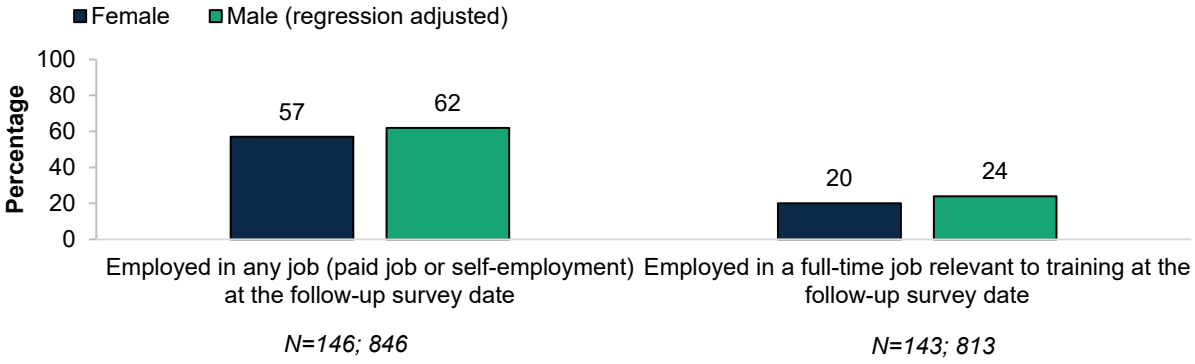
However, only about 35 percent of trainees reported having been employed in a full-time job related to their PICG-supported training course since the end of the course (Figure III.1). A further 8 percent reported having been employed in a part-time job relevant to their course at some point in the first year after graduation. By using information that respondents provided about their job title and role, we were able to confirm that respondents' self-reports about job relevance were largely accurate and examine the types of positions they held. A large fraction of respondents held jobs that were in a different field than the focus of their training and many of these positions appeared to require few of the technical skills taught in the PICG-supported courses. For example, several trainees across grantees found employment in the retail sector (e.g., as cashiers), the hospitality sector (e.g., as waiters), security sector (e.g., as security guards), or education sector (e.g., as teachers)—although positions in these sectors do not directly use skills that were the focus of PICG-supported courses. We also asked survey respondents who were employed at follow-up but did not return to a job they already held before training (that is, those in new jobs, about one-third of the total sample) whether they thought that they would have obtained their job without having attended the PICG training. About two-thirds of these respondents said that was the case, consistent with the large fraction holding jobs in fields unrelated to training.

Employment rates at the follow-up survey date were similar by gender. As mentioned earlier, only 15 percent of PICG trainees in our follow-up sample are female, but there is substantial variation in the proportion of females across grantees. It is also likely that the relatively small portion of female trainees are strongly self-selected in terms of their characteristics. Therefore, we used a regression framework to compare employment for males and females accounting for these factors, effectively conducting this comparison within TVET provider while controlling for observed baseline differences in trainees' age, education, and baseline employment status.[17] Regression-adjusted employment rates were slightly higher

[17] Female trainees were slightly likely be in the 25–34 year age range at enrollment than male trainees (by 11 percentage points), similarly likely be employed at baseline, and more likely to be educated beyond general education (by 14 percentage points).

for men than for women at follow-up—both overall and for employment in a full-time course-relevant job—but the differences were 5 percentage points or less and not statistically significant (Figure III.2).

Figure III.2. Employment rates of trainees in PICG-supported courses, by gender.



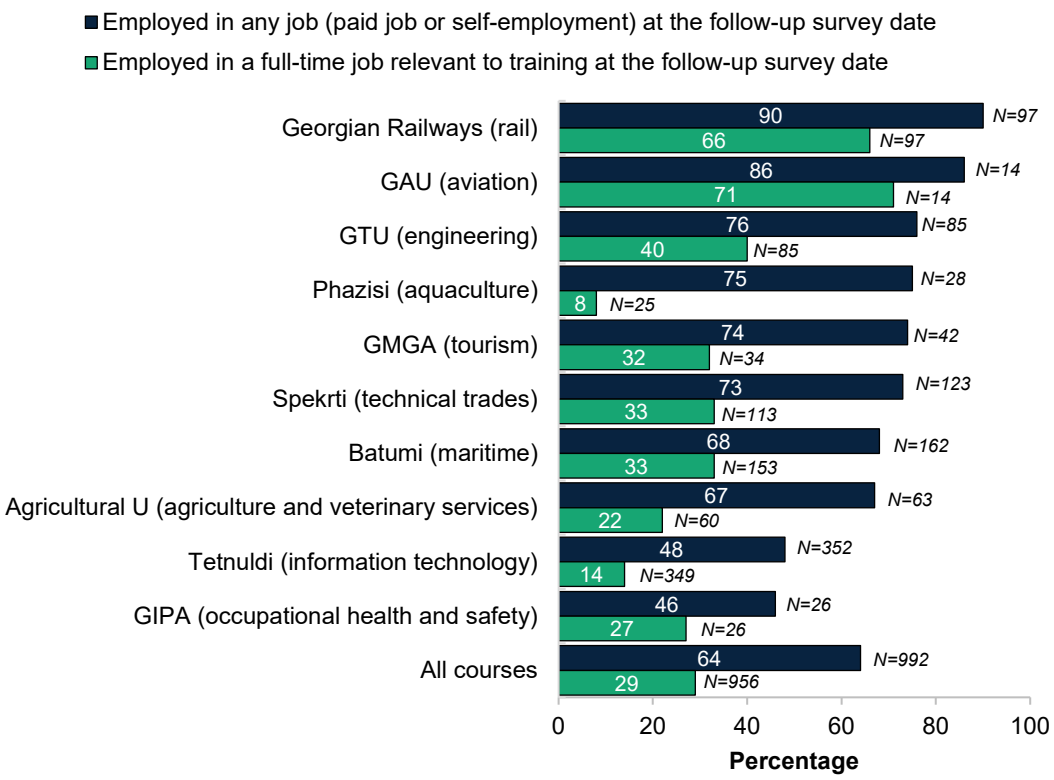
Source: Follow-up tracer survey.

Note: The differences in employment are not statistically significant at the 10 percent level.

There was substantial variation in employment rates across grantees (Figure III. 3). Across the 10 grantees, the employment rate at the follow-up survey date varied from 46 to 90 percent. Rates of employment in a full-time job relevant to training also varied substantially across grantees—who targeted different economic sectors—from 8 to 71 percent. Georgian Railways (which prepared graduates for positions in the rail sector) and the Georgian Aviation University (aviation) had the highest rates of both overall and course-relevant employment, while the gap between overall and course-relevant employment was largest (in percentage terms) for Phazisi (aquaculture), Tetnuldi (information technology), and the Agricultural University (agriculture).[18]

[18] Because there is also substantial variation in the number of trainees across the various grantees—with Tetnuldi (information technology) alone comprising more than one-third of the sample—we also explored how average employment rates changed after reweighting the data so that each grantee counted equally. These estimates, which can be interpreted as the employment rates for the average grantee, were higher than for the unweighted sample, but the differences were modest. For example, the overall employment rate at follow-up was 70 percent and the full-time course-relevant employment rate was 35 percent, both a modest 6 percentage points higher than the unweighted estimates. This suggests that data from a small number of providers with relatively large sample sizes did not drive the findings.

Figure III.3. Employment rates of trainees in PICG-supported courses, by grantee



Source: Follow-up tracer survey.

Almost three-quarters of trainees who had been employed since the end of training found a job within the first month, and about one-half returned immediately to a job that they held before training (Figure III.4). These findings are consistent with the fact that many trainees in the PICG-supported courses had substantial work experience before enrolling. About 6 in 10 trainees had at least two years of work experience before enrolling in the PICG-supported training, and about 4 in 10 trainees had at least five years of experience (Table III.1). Only 13 percent of employed respondents took more than three months to find their first job after training. The large fraction of trainees who return to a job that they held before training is a feature of the Georgian TVET system,[19] and reflects employers' use of TVET providers to upskill their existing employees and provide them with formal credentials to supplement their practical experience. This training of existing employees is often career enhancing, although promotion is not automatic after completing training.[20] A prominent example is the PICG grant to Georgian Railways, the national railway company, to establish a new training provider. In the trainee

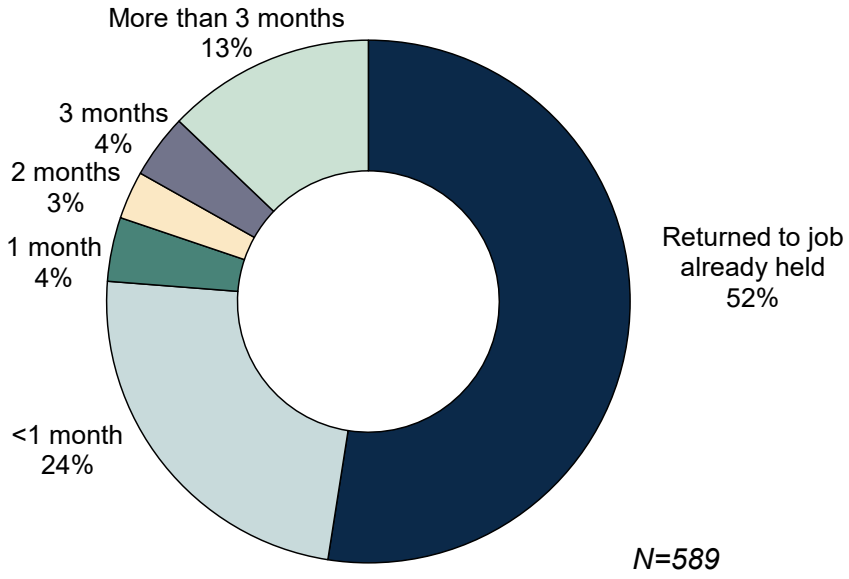
> ***"The Railway College is still young, but it has already proven successful in the sense that several existing employees have been promoted and raised their qualifications after participating in training."***
>
> ***—Employer (rail sector)***

[19] In the MES tracer surveys of 2018 and 2019 TVET graduates that we used for national benchmarking—which cover a representative sample of graduates from all TVET courses in Georgia—43 and 56 percent of employed graduates, respectively, returned to an existing job.

[20] Among PICG trainees who returned to an existing job, only 30 percent reported that their job responsibilities had increased and only 17 percent reported that they had received a new job title (not shown).

survey, about 7 in 10 Georgian Railways trainees who were employed at follow-up reported having returned to their existing job at the company. The company views this upskilling effort as very successful and intends to continue leveraging the PICG-supported courses for this purpose in the future. Another example is the grant to the Georgian Mountain Guide Association to establish a new training provider in the tourism sector. Again, about 7 in 10 trainees who were employed at follow-up reported having returned to an existing job—except at this provider self-employment was common. This suggests that some trainees were taking advantage of the program to improve their skills and gain a formal qualification before returning to tourism-related self-employment.

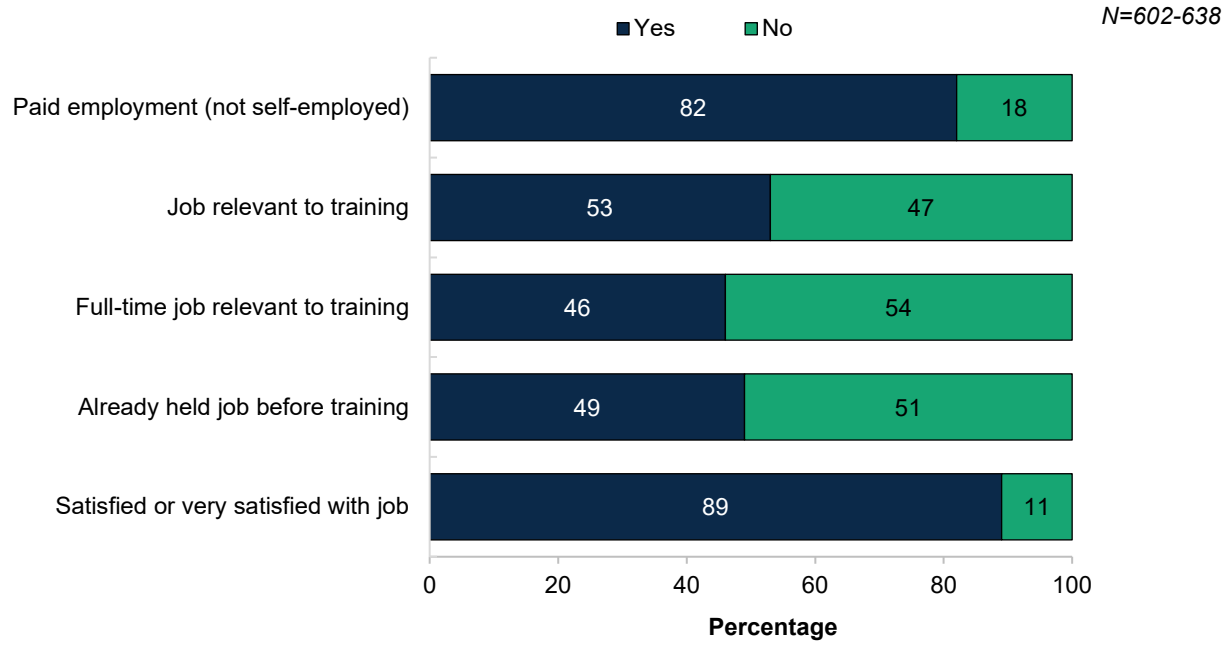
Figure III.4. Time to find the first job after training, among trainees in PICG-supported courses those who were employed since the end of training



Source: Follow-up tracer survey.

Most employed trainees were in formal sector wage employment; job satisfaction was high despite limited job relevance to training. Figure III.5 shows the characteristics of the main jobs held by respondents who were employed at the time of the follow-up survey. About 8 in 10 jobs were paid positions at a firm (as opposed to self-employment). As suggested above, about one-half of these respondents were in the jobs they held before the training. Although fewer than half of the positions respondents held at the time of the follow-up survey were full-time jobs relevant to their training, about 9 in 10 employed respondents reported that they were satisfied or very satisfied with their job.

Figure III.5. Characteristics of employment, among trainees in PICG-supported courses who were employed at follow-up



Source: Follow-up tracer survey.

Among the trainees who were not employed at follow-up, about one-half were actively looking for work and one-half had dropped out of the labor force. More specifically, 65 percent of respondents were employed,[21] 16 percent were unemployed, and 19 percent were out of the labor force according to the standard definition of unemployment that defines those not actively searching for work as out of the labor force.

About 13 percent of all trainees were enrolled in further training at the time of the follow-up survey.[22] Most of these were working at the same time and some were actively looking for work; engagement in further training accounts for only one-fifth of those who were out of the labor force. (We did not collect detailed information on other reasons for not searching for work.) Altogether, at the time of the follow-up survey 70 percent of trainees were "productively engaged," defined as being employed and/or engaged in further training.

3. Constraints to employment

Overall, the employment findings suggest that there were some important constraints preventing trainees in PICG-supported courses from securing employment—especially full-time employment that was relevant to their course. Below, we consider three main types of constraints, and assess the extent to which each might have applied. First, we consider possible constraints to labor supply in terms of the

[21] This is slightly different from the 64 percent employment rate described earlier, because the sample for this analysis is slightly different: it excludes a few respondents whose labor force status could not be determined because of survey item non-response.

[22] An additional 3 percent had already completed further training since the end of the PICG-supported course. Among those who were enrolled in or had already completed further training, a little more than half reported that their training was at a higher level than the PICG-supported course.

willingness of trainees to search for and take up relevant employment. Second, we consider possible constraints to labor demand, in terms of the availability of relevant jobs for trainees after the end of their PICG-supported courses. Third, we consider the economic shock of the pandemic, an external factor that might have affected labor demand for trainees from PICG-supported courses, especially given that two-thirds of the follow-up sample were surveyed during the pandemic. Disentangling these constraints is important because they have different policy implications, a point we return to in the concluding chapter.

Labor supply

Labor supply was a major constraint to course-relevant employment: more than half of the trainees who did not find a course-relevant job never searched for one (Figure III.6).[23] This pattern occurred despite strong support for career guidance by providers—69 percent of trainees reported having received this guidance, which commonly included receiving a list of course-relevant employers, job fairs, informational meetings with employers, and/or help with preparing job application materials. Several other pieces of evidence confirm that there were substantial labor supply constraints to trainees obtaining course-relevant employment. First, more than half of the follow-up survey respondents who had not found course-relevant employment since graduation cited supply-side reasons for this outcome, such as their lack of interest in the field (14 percent), their non-availability for work (25 percent), or their perception that jobs in the relevant field had low pay (18 percent) (Figure III.7). Second, we showed above that job satisfaction was very high despite limited relevance of employment to training, which is consistent with trainees choosing to pursue non-relevant employment based on their personal preferences.[24] Third, many employers whom we interviewed suggested that they continued to face a shortage of skilled labor despite the availability of trainees from the PICG-supported courses because the trainees were not interested in the available positions. Several of these employers noted particular challenges in filling positions in regions outside of Tbilisi, due to the higher salaries and perceived quality of life in the capital region. Fourth, in interviews with PICG grantees, some providers confirmed that a portion of their graduates are refusing available course-relevant jobs because of low salaries, limited benefits, and/or undesirable working conditions.

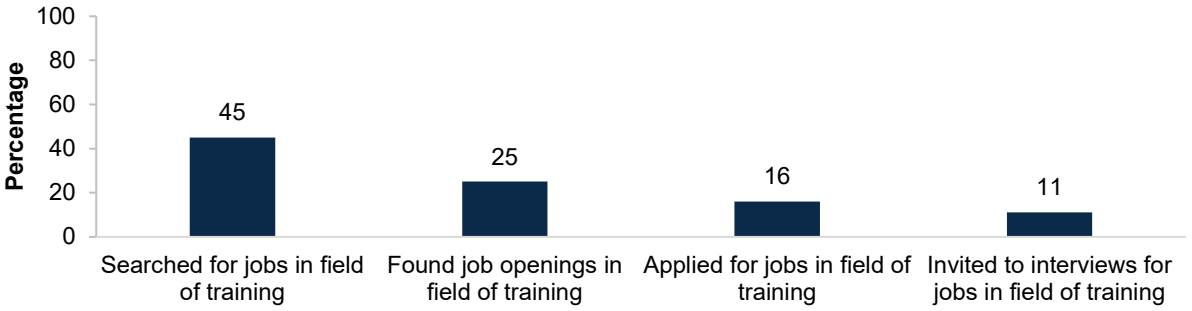
> ***"We have started to renew our fleet, but the population [of PICG graduates] didn't show much interest. The job wasn't attractive and now we're trying to make it more attractive in terms of working conditions and so on."***
>
> ***—Employer (maritime sector)***

[23] Restricting the sample to those who completed the training course, the percent of trainees who searched for a relevant job increases only slightly, from 45 percent to 49 percent. This pattern is therefore not driven by trainees who dropped out.

[24] Also consistent with this, although dropout rates from PICG-supported courses were high, trainees who dropped out had very similar employment and earnings outcomes to those who completed these courses. This suggests that dropping out was a rational choice by some trainees, who found jobs that they preferred equally or more relative to the jobs they anticipated receiving had they completed training.

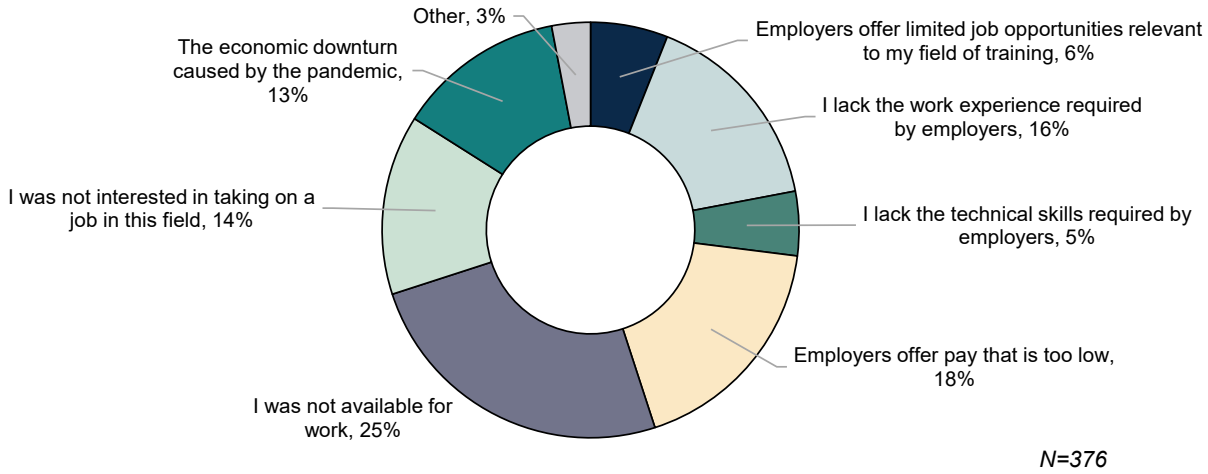
Figure III.6. Job search experience, among trainees in PICG-supported courses who were not employed in a course-relevant job since the end of the course

N=400-402



Source: Follow-up tracer survey.

Figure III.7. Main reason for not being employed in a course-relevant job, among trainees in PICG-supported courses who were not employed in such a job since the end of the course



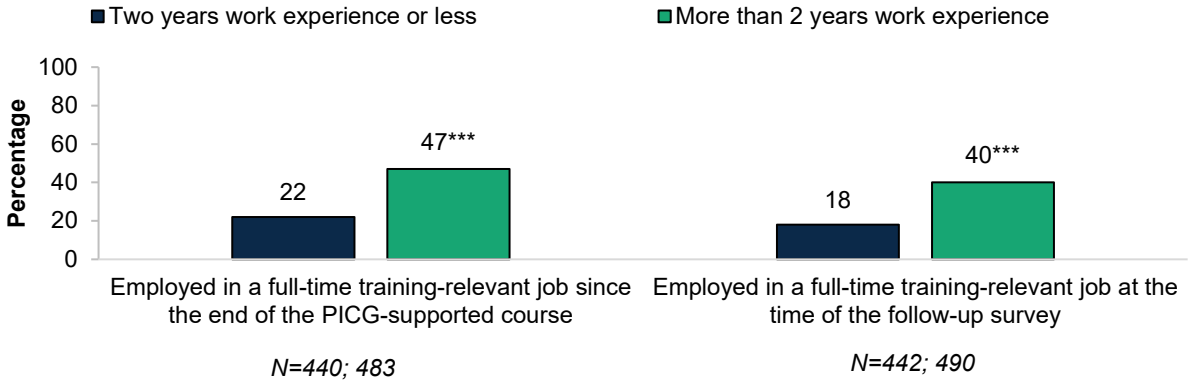
Source: Follow-up tracer survey.

Labor demand

A lack of available job opportunities might have also been a constraint for some trainees, especially those with limited relevant work experience. The decision not to search for a course-relevant job was not the only constraint to finding those jobs. Among those who searched for a relevant job, the subsequent steps of identifying a job opening, deciding to apply, and securing an interview proved to be important barriers as well. Forty-five percent of the trainees who were unable to secure a course-relevant position searched for such a job, but only 25 percent identified a relevant job opening and only 11 percent subsequently applied and were invited to a job interview (Figure III.6). There is also evidence that employer demand for PICG trainees was much higher when trainees had prior work experience: trainees who had more than two years of prior work experience obtained full-time, course-relevant jobs at about double the rate of those with less experience (Figure III.8). Consistent with this, although only 6 percent

of those who did not find course-relevant employment thought that a lack of job opportunities in the field was the main reason, 16 percent thought that their lack of work experience was the main reason (Figure III.7). This suggests that a lack of job opportunities in the field—that is, a labor demand constraint—might have been a more important constraint for those who had limited job experience before enrolling in PICG-supported courses. In other words, employers in course-relevant fields may have had substantially less demand for PICG course graduates who did not also have meaningful prior work experience.

Figure III.8. Employment of trainees in PICG-supported courses in a full-time job relevant to training by follow-up, by work experience



Source: Follow-up tracer survey.

*** Significantly different from zero at the 0.01 level, two-tailed test.

Employers in different sectors had different perceptions of the relevance of PICG courses and different levels of labor demand; only a few employers regularly recruited trainees directly from PICG grantees. To better understand the possible labor demand constraints to the employment of trainees from PICG-courses, we drew on interviews with employers to explore their reliance on PICG courses to meet their skills needs. Only a few of the employers we interviewed reported relying primarily on recruiting directly from PICG grantees rather than through a more traditional public recruitment process. These were mostly large employers who consistently need to replenish skilled labor, often annually. Examples include large energy companies hiring from the Georgian Technical University (GTU) and Spektri, and Georgian Railways, hiring from its own grantee. Strong linkages between PICG-supported courses and employers' desired skill sets—and the lack of alternate TVET providers for some specialty programs—also appear to drive hiring directly from grantees. For example, one employer in the occupational health and safety sector reported that the curriculum offered at GIPA (which is unique in Georgia) and the employer's day-to-day occupational safety work overlap almost completely. In contrast, most employers—including smaller employers with more modest annual labor market needs and/or employers with looser connections with PICG courses in terms of skills overlap (for example, those in the information technology sector)—continue to hire as they have in the past, with limited direct engagement with training providers. This suggests that differences in employment rates among grantees might be driven in part by the profiles of potential employers in those sectors and the strength of their recruitment

> ***"When labor quotas are being replenished, we are in an active relationship with the college and there is always communication about how much employment is available."***
>
> ***—Employer (rail sector)***

links with PICG grantees. Overall, however, most employers were not directly seeking out PICG trainees for open technical positions. This might have contributed to the perception among some trainees that job opportunities in their field were limited, especially those with limited work experience who might have been less familiar with relevant employers and opportunities.

A few employers have strengthened the pathway from training to permanent employment through internships and dual programs—giving some trainees from PICG-supported courses an inside track to employment. The linkages between this small number of employers and TVET providers appear stronger in recent years and are likely related to PICG investment. One large energy company we interviewed brings in trainees from PICG-supported courses at GTU for three-month internships while they are still studying, which is a relatively new practice for the company. Overall, about one-third of PICG trainees in our tracer survey sample report that they received an internship during or after their training; those who received one found full-time course-relevant jobs at double the rate of those who did not (not shown). This illustrates that internships are important for finding employment, but there are not enough internship opportunities for all trainees. (More than three-quarters of trainees reported at baseline that they expected an internship, but only one-third of trainees received one, suggesting that the supply of internships might have fallen short of the demand for them.) Another energy company has started teaching the practical component of a PICG-supported course at Spektri (a "dual program" that combines apprenticeships at a company with institutional training). In the dual program, company personnel train students in skills that are specific to the company's services and products—in some cases even producing an entire cohort of new employees through dual courses. Some of these direct training opportunities—and referrals from providers as discussed above—may place trainees from PICG-supported courses at some advantage in gaining exposure to employers. However, some employers noted that these trainees get no preferential treatment in the final hiring decision; they must compete for the job and prove their skills like everyone else. Further, given the small number of employers who reported these pathways, their overall effect on providing permanent job opportunities for PICG trainees might be limited.

> ***"Last year we implemented dual programs, which means that the practical part was provided by the company, while the theoretical part was provided by lecturers from the college. In the end, it turned out that the company had access to fifteen highly trained staff in line with this program. This is very welcome for us, and we would like to see the program continue in the future."***
>
> ***—Employer (energy sector)***

Trainees and employers were satisfied with the skills PICG courses provided. Trainees' satisfaction with course instructors, materials, tools and equipment, and physical infrastructure was very high. Between 85 and 90 percent of survey respondents rated these features of training as good or excellent, more than 90 percent rated the overall course quality as good or excellent, and 86 percent thought that the course provided skills that were attractive to employers (not shown). Consistent with these findings, only 5 percent of trainees who did not find course-relevant employment suggested that this was because they lacked the technical skills employers required (Figure III.7). In interviews, employers also expressed satisfaction with the performance of PICG graduates, noting their strong theoretical grounding in the technical work. A couple of employers also referenced a recent refresh for some PICG-supported courses, which introduce students to the latest technology. Graduates from some courses still lack practical experience with machinery, equipment and technology, and safety protocols, but that is to be expected and can be remedied through mentorship arrangements and in-house training. Additional training is also sometimes necessary because the job requirements at some employers are unique and very specific (for

example, operating specific machines or software that providers do not teach). Some employers expect to provide additional training to new employees—and even prefer doing so—so this does not reflect poorly on the PICG-supported courses.

Effects of the pandemic on labor demand

Employers reported that the pandemic complicated hiring efforts but did not lead them to let existing employees go. The pandemic was a major external shock that might have negatively affected employment in the Georgian economy, including that of trainees from PICG-supported courses. The employers we interviewed noted that the pandemic disrupted the traditional hiring cycle for new employees. Employers commonly reported difficulty conducting interviews in person (due to restrictions on or vaccination requirements for in-person meetings) or online (due to lack of a computer and an internet connection, and/or discomfort with the technology among older, more experienced candidates). Further, the number of responses to job postings decreased compared to the pre-pandemic period, and there were fewer employment forums. Employers who hired PICG graduates also noted that training providers moved teaching to an online format and, as a result, trainees were unable to complete internships on site. This diminished their typical internship-to-job pipeline of skilled labor. In contrast, existing employees in TVET-related sectors were generally retained in their positions at their current salaries during the pandemic. Some of these employers provide essential services (for example, in the water supply, telecommunications, and IT sectors) and moved to working remotely or in shifts. Government and donor stakeholders agreed that the pandemic worsened economic opportunities for TVET graduates overall, but also suggested that the effects varied by sector. For example, the tourism sector was especially adversely affected, but the IT sector might have even seen improved opportunities related to increased e-commerce and remote work.

Overall, the effect of the pandemic on the employment rates of PICG trainees was negative but modest. To quantitatively assess the effects of the pandemic on employment rates, we compared employment among PICG trainees who completed a follow-up survey before and after the start of March 2020, when the pandemic began in earnest. (Using this cutoff, about one-third of our sample is from pre-pandemic cohorts.) After adjusting for differences between pre-pandemic and pandemic cohorts in terms of provider and trainee characteristics (gender, age, education, and baseline employment status) using a regression framework, the pandemic cohorts were less likely to be employed at the follow-up survey, both in any job and in a full-time course-relevant job (Figure III.9). These differences are statistically significant but modest (6 or 7 percentage points), suggesting that the pandemic contributed to the observed employment rates but was not necessarily the driving factor.[25] This is consistent with the fact that only 13 percent of respondents who did not find course-relevant employment pointed to the economic downturn caused by the pandemic as the main reason.

[25] The qualitative evidence from employer interviews suggests that the pandemic might have affected new hires more than existing employees. Therefore, we also explored defining pre-pandemic and pandemic cohorts based on their graduation date rather than the follow-up survey date. Specifically, we compared employment for cohorts who would have graduated—and hence would have entered the labor market—before and after the start of March 2020, when the pandemic started. (About 80 percent of the sample is from pre-pandemic cohorts under this definition.) The differences in employment rates between pre-pandemic and pandemic cohorts under this definition were small and not statistically significant. Together with the relatively small size of the pandemic cohorts under this definition, this again suggests that the pandemic-related hiring challenges employers described did not drive the employment rates of our tracer survey sample.

Figure III.9. Employment rates of trainees in PICG-supported courses, by timing of follow-up relative to the pandemic

Source: Follow-up tracer survey.

** Significantly different from zero at the 0.05 level, two-tailed test.

4. Descriptive findings on earnings

The follow-up survey asked respondents about their after-tax monthly earnings (from paid jobs) or profits (from self-employment) at the follow-up survey date. Below, we provide the key descriptive findings related to earnings.

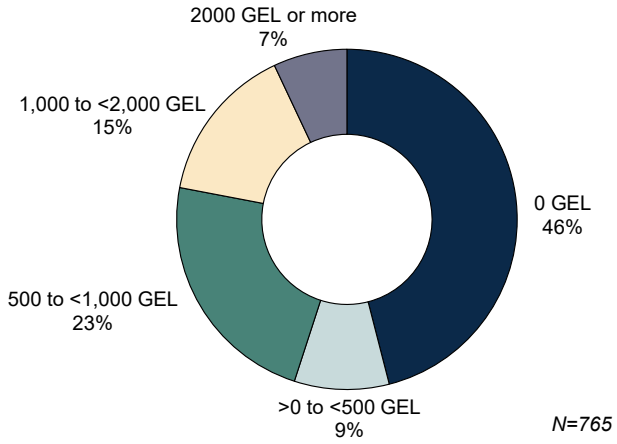
Average monthly earnings were 551 GEL ($177) including those who had zero earnings, and 1,031 GEL ($332) among those who were employed at the follow-up survey date.[26] Forty-six percent of respondents for whom earnings information was available had zero monthly earnings at the follow-up survey date, almost all of whom were not employed (Figure III.10).[27] Among those who were employed, there was substantial variation in monthly earnings across grantees, with a range from 786 GEL ($253) to 1,711 GEL ($550) (Figure III.11).[28] The highest average monthly earnings were for trainees in the tourism and aviation sectors, and the lowest for those in the IT and rail sectors. We also compared average monthly earnings for pre-pandemic and pandemic cohorts and found that they were almost identical after controlling for differences in providers and trainee characteristics across these cohorts (not shown). This is consistent with evidence from employer interviews that by and large the pandemic did not affect the wages that they offered for both existing and new employees. A handful of employers mentioned that they even increased salaries or provided bonuses to retain employees (for example, in the maritime sector).

[26] We adjusted all earnings to 2021 GEL using inflation data from worlddata.info. For currency conversions we used the average daily exchange rate of 3.11 GEL to $1 during the period of the follow-up survey for trainees in PICG-supported courses (June 6, 2019-October 21, 2021), based on data from the National Bank of Georgia (https://www.nbg.gov.ge/). To estimate mean earnings, we top-coded earnings at the 95th percentile of the distribution of non-zero earnings.

[27] In Figure III.1 we showed that 36 percent of respondents were not employed at the follow-up survey date, which is lower than the 46 percent in Figure III.10. This discrepancy is because the samples are slightly different—Figure III.1 includes all respondents for whom employment information was available, whereas Figure III.10 only includes respondents for whom earnings information was available. Because of item non-response to questions about earnings, some employed respondents are excluded from the earnings analysis.

[28] With the weighting adjustment described earlier so that all providers contribute equally, average monthly earnings are 687 GEL ($221) including those with zero earnings and 1,161 GEL ($373) among those who were employed at the follow-up survey. Both are modestly higher than the unweighted estimates, suggesting that a handful of grantees with relatively large sample sizes were driving down average monthly earnings.

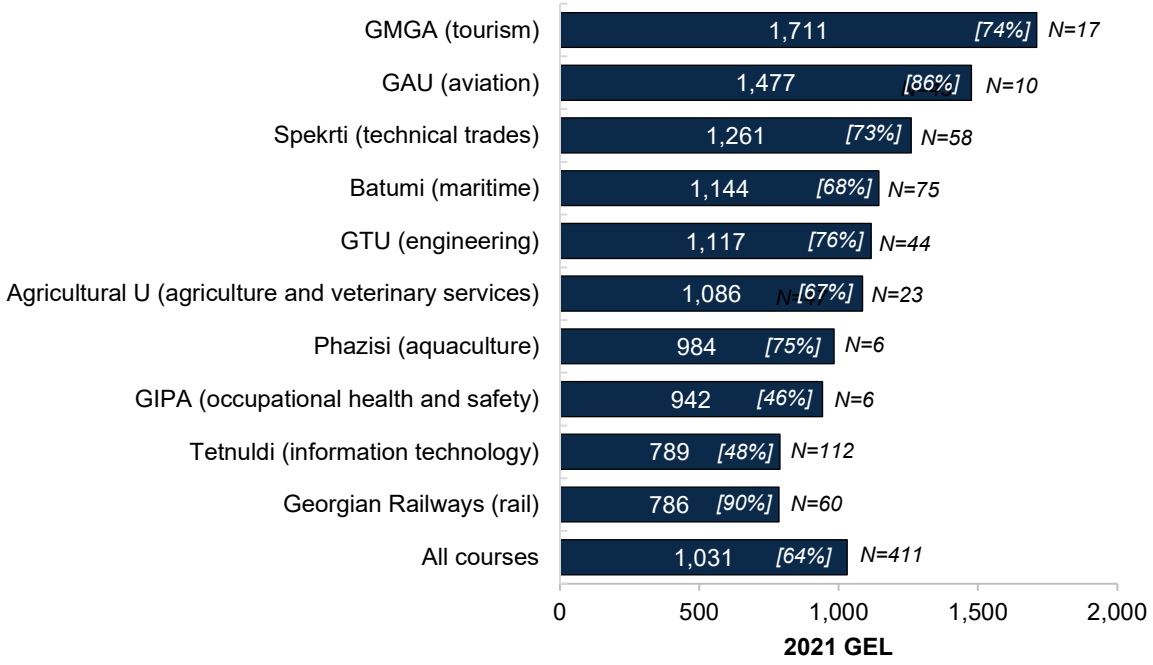
Figure III.10. Monthly earnings for trainees in PICG-supported courses at the follow-up survey date



Source: Follow-up tracer survey.

Note: Earnings are self-reported and defined as after-tax wages from paid employment or typical monthly profits from self-employment.

Figure III.11. Average monthly earnings for trainees in PICG-supported courses who were employed at the follow-up survey date, by grantee (employment rates in square brackets)

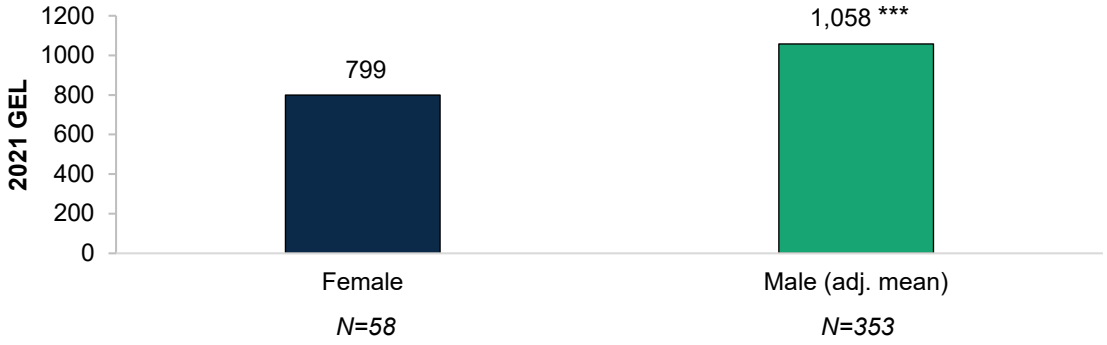


Source: Follow-up tracer survey.

Note: Earnings are self-reported and defined as after-tax wages from paid employment or typical monthly profits from self-employment. To calculate average earnings, we top-coded earnings at the 95th percentile of the distribution of non-zero earnings across all grantees. Employment rates in square brackets are from Figure III.2.

Among PICG trainees who were employed at the follow-up survey date, males earned about 32 percent more than females, on average (Figure III.12). As mentioned earlier, about 85 percent of PICG trainees in our follow-up sample are male, suggesting that there is a strong set of gender-based discrepancies related to the economic sectors that the PICG courses focus on. These factors are likely to vary greatly by grantee and economic sector, as evidenced by the variation in the proportion of females across grantees; further, the small portion of female trainees are likely to be strongly self-selected. Therefore, as in the gender analysis of employment, we used a regression framework to compare earnings for males and females within provider while controlling for trainees' age, education, and baseline employment status.[29] The large gap in earnings that we identified even after this regression adjustment suggests that there is a substantial unexplained gender gap in pay that may be related to gender inequality.

Figure III.12. Average monthly earnings for trainees in PICG-supported courses who were employed at the follow-up survey date, by gender



Source: Follow-up tracer survey.

Note: Earnings are self-reported and defined as after-tax wages from paid employment or typical monthly profits from self-employment.

*** Significantly different from zero at the 0.01 level, two-tailed test.

Trainees employed in full-time jobs relevant to training earned only slightly more than those employed in other types of jobs. The former earned 1,077 GEL ($346) on average, about 8 percent higher than the latter after accounting for differences in providers and trainee characteristics (not shown). This suggests that the earnings benefits of finding a job placement that is relevant to the PICG course are modest, which is one reason why some trainees might prefer or be willing to accept other types of jobs. (As shown earlier, 18 percent of survey respondents who were not employed in a course-relevant job since graduation cited low pay as the main reason for this.) It also might explain why job satisfaction is high even among those who are not employed in a course-relevant job.

5. National benchmarking of PICG courses against other TVET courses in Georgia

We used reported findings from MES-funded tracer surveys of a representative sample of graduates from TVET diploma courses in 2018 and 2019 to benchmark key outcomes measured in our PICG tracer

[29] Without these adjustments, gender-based differences in wages would be larger. For example, there were almost no female trainees in the sample for GAU and Spektri, the two providers with the highest average trainee earnings. More generally, this also suggests that it is challenging for female trainees to avail themselves of some of the most lucrative opportunities in the TVET sector.

survey.[30] These national benchmarking comparisons are subject to several caveats and should be interpreted with caution given the potential lack of comparability between the PICG and national benchmarking samples. In particular, the PICG courses were explicitly created to supply graduates to fill higher-skill, higher-demand positions relative to the types of positions targeted by pre-compact TVET courses. Therefore, the PICG-supported courses were typically at higher levels and in different sectors than previous offerings. For example, relative to 2019 graduates in the MES-funded study, graduates in our PICG survey sample were substantially more likely to have graduated from level IV or V courses (45 percent versus 30 percent), the two highest levels in the Georgian TVET system (Table III.2). In terms of sector, the PICG survey sample had a substantially larger percentage of graduates in the information technology sector (33 percent versus 9 percent) and a substantially smaller percentage in the food processing sector (less than 1 percent versus 12 percent) relative to 2019 graduates in the MES-funded study.[31]

There are also some important differences in the demographic characteristics of graduates in the PICG and benchmarking samples. Most notably, the PICG sample of graduates is about 85 percent male, whereas the benchmarking samples are split almost evenly between males and females (there are also differences, albeit less substantial, in age and education). The MES provided us with separate wage data for males and females, which enabled us to benchmark wages separately by gender (this is especially important due to the gender-based disparities in earnings discussed in our descriptive analysis, above.) However, we could not adjust for differences in characteristics more broadly because we were unable to obtain access to the microdata for the MES-funded surveys. Despite these caveats, the national benchmarking findings help place our employment and wages findings in the broader Georgian TVET context—especially given that the ISWD program logic explicitly sought to offer higher-level TVET courses in new economic sectors that previous TVET offerings in Georgia did not serve.

Table III.2. Characteristics of graduates in the PICG and benchmarking samples

	PICG graduate sample	All 2018 graduates	All 2019 graduates
Male	85%	53%	54%
Age at enrollment			
24 years or younger	53%	44%	42%
25–29 years	15%	15%	18%
30–34 years	11%	12%	13%
35 years or older	21%	28%	27%
Educational background			
Less than grade 12	21%	15%	13%
Grade 12	33%	39%	40%
Beyond general education	46%	47%	47%

[30] For PICG trainees, the sample sizes and estimates for this analysis differ from those reported earlier. Because the MES survey only includes graduates, for the benchmarking analysis we restricted the PICG sample to the 77 percent of respondents who reported completing the PICG-supported course.

[31] It is challenging to directly map all the PICG-supported courses to the sectors as defined in the MES-funded surveys, because many PICG-supported courses could arguably map to more than one sector. In the MES-funded survey of 2019 graduates, the most common sectors (together accounting for more than two-thirds of graduates) were food technology, design, energy and electrical engineering, information technology, tourism, transport, management, and construction. Overall, 39 percent of 2019 graduates were in sectors broadly related to engineering and 20 percent were in sectors broadly related to agricultural sciences.

Table III.2 (*continued*)

	PICG graduate sample	All 2018 graduates	All 2019 graduates
Level of TVET training			
Certificate	6%	0%	0
III	47%	NA	70%
IV	28%	NA	17%
V	18%	NA	13%

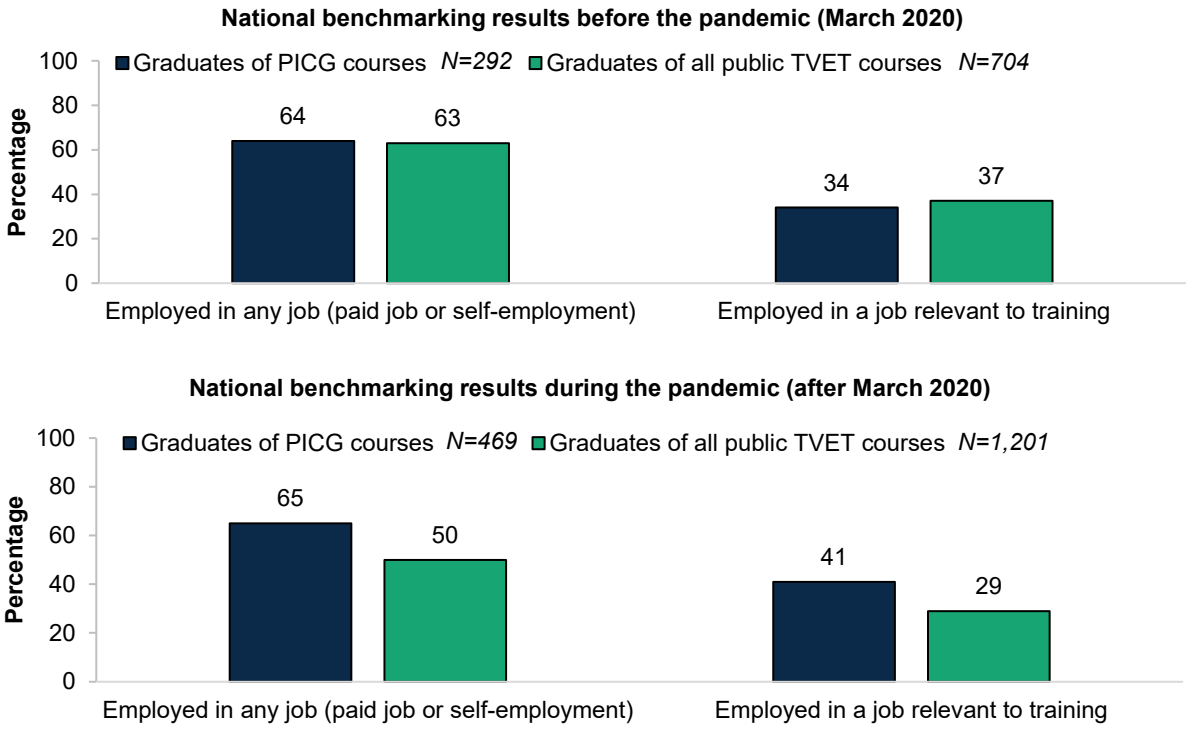
Source: Baseline tracer survey and MES tracer survey reports (MES 2019 and MES 2020).

NA = not available.

Employment rates for graduates from PICG-supported courses were similar to a national benchmark before the pandemic but substantially higher during the pandemic. Because of the potential influence of the pandemic on labor market outcomes, we separately benchmarked employment outcomes for pre-pandemic and pandemic cohorts of graduates from PICG-supported courses.[32] For the pre-pandemic cohorts, overall employment and employment in a course-relevant job were very similar for the PICG and national benchmarking samples (Figure III.13). Relative to the pre-pandemic cohorts, for the pandemic cohorts these employment outcomes were stable for the PICG sample but dropped substantially for the benchmarking sample. As a result, overall employment for pandemic cohorts was 15 percentage points higher (65 percent versus 50 percent) and employment in a course-relevant job was 12 percentage points higher (41 versus 29 percent) for the PICG sample relative to the benchmarking sample. This provides suggestive evidence that the employment of graduates from PICG-supported courses was more resilient against the pandemic than that of graduates from other courses. In part, this could be because many PICG courses focused on sectors and roles that tended to have more stable employment during the pandemic. Consistent with these findings, the percentage of employed graduates who returned to an existing job was stable in the pre-pandemic and pandemic cohorts for PICG graduates (43 and 46 percent, respectively), but much higher in the pandemic cohorts for the benchmarking sample (56 percent compared to 43 percent for the pre-pandemic cohort) (not shown). This suggests that the pandemic's effect on graduates' ability to find new jobs was a greater constraint for all graduates nationally than for PICG graduates.

[32] Specifically, we compared outcomes for PICG graduates who we surveyed before March 2020, the start of the pandemic, to those of 2018 graduates nationally, whom the MES surveyed in late 2019, also before the pandemic. And we compared outcomes for PICG graduates who we surveyed after the start of the pandemic to those of 2019 graduates nationally, whom the MES surveyed in late 2020, also during the pandemic.

Figure III.13. National benchmarking findings for employment



Source: Follow-up tracer survey and MES tracer survey reports (MES 2019 and MES 2020).

Note: We were unable to assess the statistical significance of differences in employment because the individual-level data for the benchmarking sample (all courses) were not available.

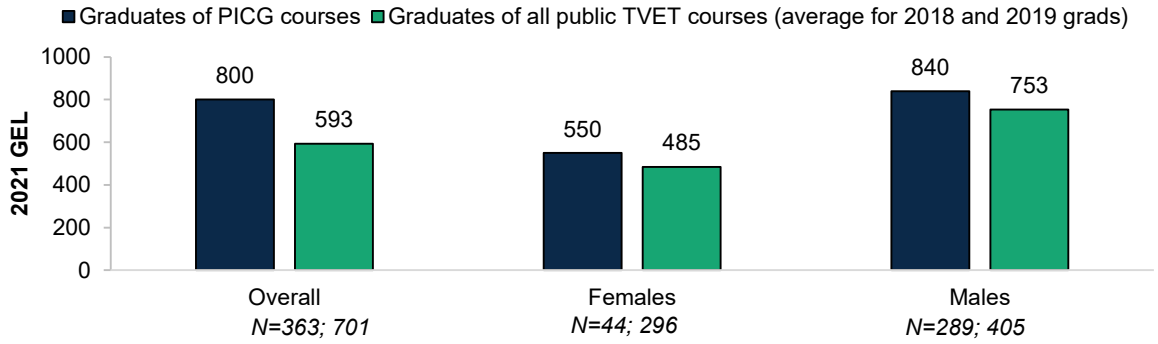
Median wages among those in paid employment were 12 to 13 percent higher for both female and male PICG graduates relative to a national benchmark. Because median wages were similar for the pre-pandemic and pandemic cohorts for both the PICG sample and benchmarking samples, we conducted a single analysis of wages for both cohorts combined.[33] Overall, median wages for the PICG sample were more than 30 percent higher than for the benchmarking sample (Figure III.14). However, this overall difference is misleading because females have much lower median wages than males in both samples, and the gender mix is very different for the PICG and benchmarking samples (it is more equitable for the latter). Comparing wages separately by gender suggests that the differences were still positive but smaller: wages were 13 percent higher for females and 12 percent higher for males in the PICG sample relative to the benchmarking sample.[34] These differences could reflect differences not only in the courses themselves (for example, level, sector, and quality) but also in graduate characteristics besides gender (such as education, experience, and location) that we were unable to control for, and should therefore be interpreted with caution. The gender gap in median wages was similar for both the PICG and

[33] The MES tracer surveys report wages for graduates in wage employment in categories of 100 GEL. We estimated the median wage for the 2018 and 2019 benchmarking samples as the midpoint of the median category for each sample and took the simple average across the two samples as our overall benchmark. We adjusted all wages in the PICG and benchmarking samples to 2021 GEL using data on inflation rates from worlddata.info.

[34] An addition caveat to this analysis is that it is unclear from the wording of the MES tracer survey questions whether respondents would have reported before-tax or after-tax wages, whereas the PICG survey specifically requested after-tax wages. If some MES tracer survey respondents reported before tax wages, these differences might be underestimated.

benchmarking samples—with median wages for females about one-third lower than males—suggesting that the PICG-supported courses did not substantively close the existing gender gap in wages among TVET graduates in Georgia.

Figure III.14. National benchmarking findings for median monthly wages, among those in paid employment



Source: Follow-up tracer survey and MES tracer survey reports (MES 2019 and MES 2020).

Note: Wages are self-reported. We were unable to assess the statistical significance of differences in wages because the individual-level data for the benchmarking sample (all courses) were not available.

6. Comparing courses improved with PICG support to earlier versions of those courses

We compared the outcomes of graduates from the improved and pre-improvement versions of the nine improved PICG courses—which covered the information technology sector (Tetnuldi), rail sector (formerly at GTU and now at Georgian Railways), and engineering sector (GTU)—using a regression framework to account for differences in graduates' gender, age, and education.[35] In contrast to the benchmarking analysis, this analysis held constant the types of courses in the pre-post analysis, which should improve comparability. However, the unexpected shock of the pandemic complicates our interpretation of the pre-post findings because it could have affected the outcomes of a substantial fraction of the improved course sample, whereas it did not affect the pre-improvement sample. In addition, because there was some ambiguity in the end dates of the pre-improvement versions of these courses (and hence in the months that had elapsed between graduation and the follow-up survey), for the pre-post analysis we only counted employment for graduates who reported that they were employed within one month of graduation.[36] This was intended to avoid comparing employment outcomes at follow-up for samples with different follow-up periods.

For courses that were enhanced by PICG grants, prior trainees had lower education levels than the trainees enrolling after PICG-supported enhancements. To provide context for the analysis below, we

[35] For this pre-post analysis we also restricted the sample to trainees who completed the training course. This is because, due to logistical constraints, the targeted sample for pre-improvement courses only comprised trainees who were in class towards the end of the course and were therefore likely to complete it. In contrast, the targeted sample for the PICG-supported course comprised all trainees who originally enrolled, some of whom eventually dropped out before completing the course. Restricting the analysis sample in the improved and pre-improvement courses to those who completed the course therefore improved the comparability of the two samples.

[36] More specifically, for this analysis we counted trainees who failed to find a job within one month as not being employed. Our post-improvement trainee surveys indicate that employment rates increase by about 25 percent when we expand the definition to include any employment within a full year after graduation.

compared the characteristics of trainees in the improved and pre-improvement versions of the courses (Table III.3). Compared to the prior version of these courses, the percentage of female trainees and the mean age of trainees were similar, but trainees in the improved courses tended to have a substantially higher level of education than those in pre-improvement courses. Specifically, in the improved courses trainees were much more likely to have undertaken some form of postsecondary education (37 percent versus 26 percent in pre-improvement courses) and much less likely to have less than a 12th grade education (34 percent versus 48 percent). In the analysis below, we use a regression framework to control for differences in gender, age, and education levels across trainees, to adjust for the difference in education and to improve statistical precision of the estimates.

Table III.3. Characteristics of the analysis sample for the course-level pre-post design

	Mean for PICG-supported courses	Mean for pre-improvement courses	Difference	*p*-value
Female	21%	23%	-2%	0.728
Mean age at enrollment (years)	24	23	1	0.180
Education[a]				
Less than grade 12	34%	48%	-14%**	0.012
Grade 12	30%	26%	4%	0.489
Beyond general education	37%	26%	11%*	0.059

Source: Baseline tracer survey.

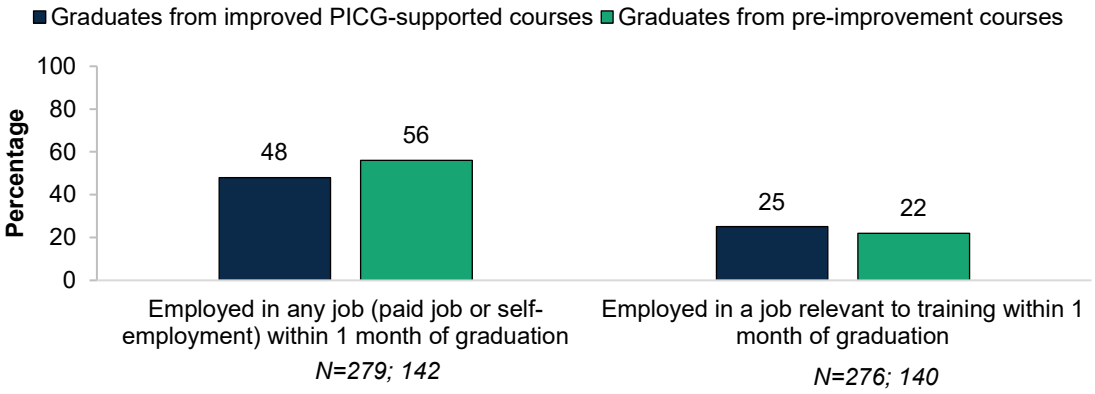
Note: N = 294–295 for improved PICG-supported courses; N = 146 for pre-improvement courses. Pre-improvement course means and differences regression-adjusted using fixed effects for each group of linked courses.

[a] Chi-squared *p*-value for the equivalence of distributions, estimated using a multinomial logit model, is 0.039.

*/** Significantly different from zero at the 0.05/0.10 level, two-tailed test.

There is suggestive evidence that graduates of improved PICG courses became more likely to be employed in a full-time job relevant to training. Relative to graduates from pre-improved versions of the courses, graduates from the improved courses were less likely to be employed overall (48 versus 56 percent) but more likely to be employed in a full-time job relevant to training (25 versus 22 percent) (Figure III.15). These modest differences in employment rates are not statistically significant. The higher overall employment rates in the pre-improvement versions of these courses could in part reflect the fact that employment outcomes for these earlier cohorts were observed before the pandemic. Given that overall employment rates were lower for improved versions of these courses (and the differential negative effect of the pandemic on them), it is especially notable that the improved courses placed trainees in course-relevant employment at a higher rate than the pre-improvement versions of the courses. This suggests that it is plausible that PICG support may have assisted graduates in finding employment in a relevant field. Consistent with this, we also reran the course-level pre-post analysis restricting the data to improved course observations that took place before the pandemic (this restricted the sample to a single level III information technology course at Tetnuldi). In the pre-pandemic sample at Tetnuldi, we found that course-relevant employment among graduates of the improved course was nearly double the pre-improvement benchmark (27 percent versus 16 percent).

Figure III.15. Employment rates for graduates of improved PICG-supported courses in the IT, rail, and engineering sectors



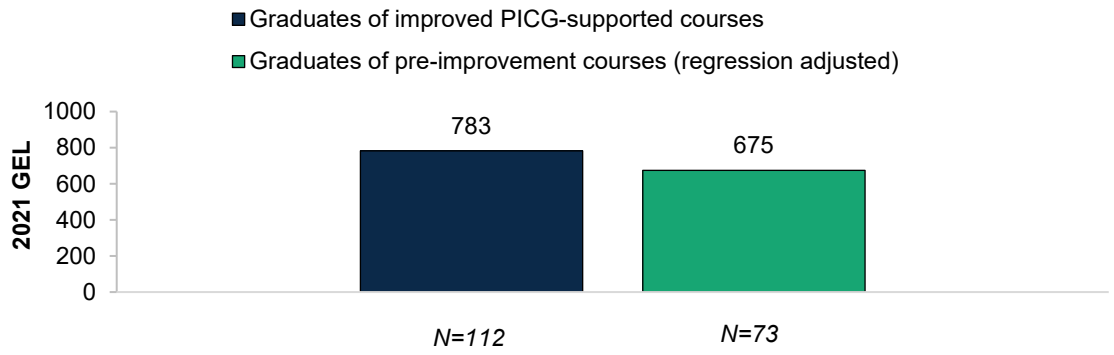
Source: Follow-up tracer survey.

Note: Differences in employment are not statistically significant at the 10 percent level.

At the follow-up survey date, the average earnings of graduates from the improved course were about 16 percent higher than those in the corresponding pre-improvement courses (Figure III.16).[37] However, this difference is not statistically significant because of relatively small sample sizes. Therefore, there is only suggestive evidence that the PICG-supported improvements were associated with higher earnings. The employers whom we interviewed noted that wage-setting is often standardized within companies, with all technical staff at a certain level earning the same wage. These employers reported that PICG graduates are typically paid the same as graduates of other schools—or even non-graduates—when they are first hired. In this sense, participation in PICG-supported training might not result immediately in preferential pay relative to other hires. Rather, its value is the ability to gain exposure to course-relevant employers through dual programs and internships, and better technical skills, which might eventually lead to improved job retention and promotion relative to other TVET graduates. The course-level pre-post analysis is also limited to three PICG providers that had existing courses that covered only a few economic sectors; the remaining seven PICG providers addressed difference economic sectors and established new courses that did not exist previously. New courses might have had a greater potential to boost the earnings of trainees by providing training in sectors where it had not been available before the compact.

[37] Figure III.16 applies to earnings at the follow-up survey date, our only measure of earnings. Because the timing of the follow-up relative to graduation is unclear for the pre-improvement course sample, we could potentially be comparing earnings at different points after graduation relative to the improved course sample. However, given that earnings are unlikely to change substantially over a period of a few months, this comparison is still meaningful.

Figure III.16. Average monthly earnings for graduates of improved PICG-supported courses in the IT, rail, and engineering sectors, among those employed at the follow-up survey date



Source: Follow-up tracer survey.

Note: Earnings are self-reported and defined as after-tax wages from paid employment or typical monthly profits from self-employment. To calculate average earnings, we top-coded earnings at the 95th percentile of the distribution of non-zero earnings. The difference in earnings is not statistically significant at the 10 percent level.

7. Comparing earnings of PICG trainees who were employed before and after PICG training

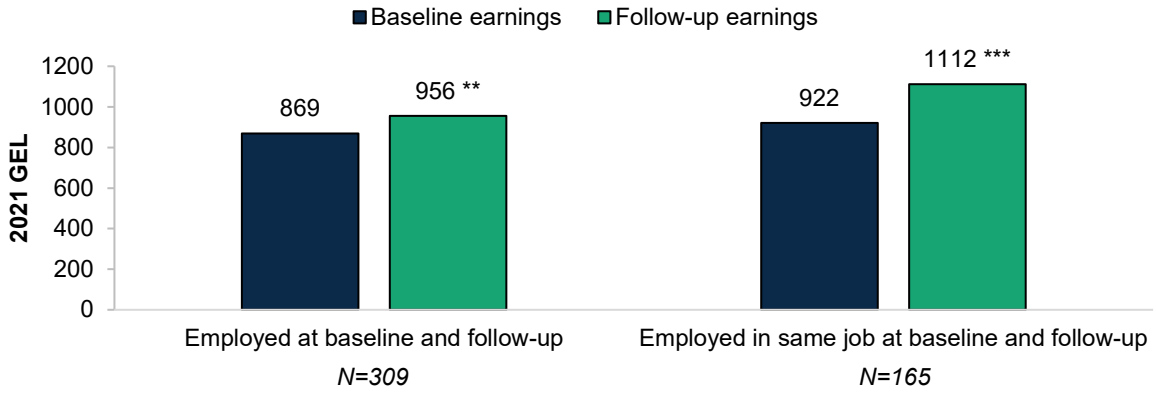
About half of PICG trainees who were employed at follow-up reported that they had started in their job before enrolling in the PICG-supported training. Most of these trainees reported earnings in the baseline survey and in the follow-up survey, which we used to estimate the average change in individual-level earnings.[38] An important strength of this approach is that, by comparing earnings for the same individuals at two points in time, it accounts for the confounding effects of any trainee characteristics that are fixed over time (including unobserved characteristics such as intrinsic motivation). However, it still does not account for confounding related to time-varying conditions, such as differences in labor market conditions in different years, and we cannot ascertain the extent to which the trend in trainee earnings would have differed in the absence of PICG courses; therefore, the estimates cannot be viewed as causal.

Among the trainees who were employed both immediately before training and at follow-up, monthly earnings increased by about 87 GEL ($28), on average (Figure III.17). This represents an increase of about 10 percent over the average pre-training earnings for this sample (869 GEL), which comprises about half of the full sample of those employed at follow-up. For the subset of these trainees who returned to the same job they held before training, earnings increased by a more substantial 190 GEL ($61), or about 21 percent over their average pre-training earnings.[39] This provides suggestive evidence that PICG training was associated with an increase in earnings among trainees, which is consistent with the evidence from the national benchmarking and course-level pre-post analyses.

[38] To calculate this average, we computed the change in earnings for each respondent who reported earnings at baseline and follow-up, and we top- and bottom-coded these changes at the 95th and 5th percentiles, respectively. We also adjusted all earnings to 2021 GEL using inflation data from worlddata.info.

[39] The median change in earnings was smaller than the average change in earnings, and similar whether or not it was restricted to those who returned to the same job (38 GEL [$12] and 55 GEL [$17], respectively).

Figure III.17. Average monthly earnings for trainees in PICG-supported courses who were employed at baseline and follow-up



Source: Baseline and follow-up tracer surveys.

Note: Earnings are self-reported and defined as after-tax wages from paid employment or typical monthly profits from self-employment. Baseline earnings are top coded at the 95th percentile. To estimate average follow-up earnings, we top- and bottom-coded the change in earnings at the 95th and 5th percentiles, respectively.

/* Significantly different from zero at the 0.05/0.10 level, two-tailed test.

8. Summary

Overall, we found that more than three-quarters of PICG trainees were employed at some point in the year after the end of their PICG-supported course; however, only about one third had obtained a full-time job that was related to their training course. These findings suggest that there remained a degree of misalignment between labor supply and demand in the PICG fields of training. On the labor supply side, about half of trainees who did not obtain a course-relevant job never searched for one due to a lack of interest or availability for work, or perceptions wages would be too low. On the labor demand side, a lack of available job opportunities and limited pathways from training to employment (such a internships) might have also been a constraint for some trainees, especially those with limited relevant work experience. Nevertheless, there is evidence that PICG courses led to higher employment rates relative to the status quo. Compared to a national benchmark of all TVET courses in Georgia, graduates of PICG-supported courses had similar rates of employment before the pandemic, but pandemic-affected cohorts were 15 percentage points more likely to be employed in any paid job and 12 percentage points more likely to be employed in a course-relevant job one year after training (Table III.4). Although these findings are positive, they suggest that the apparent employment benefits of these courses may not have occurred without the unexpected shock of the pandemic.

Results from the study's three descriptive benchmarking exercises also consistently suggest that the courses were likely to have improved trainees' earnings (Table III.4). Compared to a national benchmark of all TVET courses in Georgia, graduates of PICG-supported courses in paid employment earned wages that were 12 to 13 percent higher for male and female graduates, respectively. (However, there remained a substantial gender disparity in wages.) Similarly, for pre-existing courses enhanced by PICG support, trainees during the compact appear to have earnings that were 16 percent higher than earlier cohorts. Finally, trainees who were employed before enrolling in a PICG-supported course and one year after the end of training increased their real earnings by 10 percent, and trainees who returned to the same job

increased them by 21 percent. We do not have strong evidence about *why* these earnings improvements occurred. The project intended to boost earnings by funding new or improved courses in fields of high market demand. However, most trainees from PICG-supported courses did not find employment in a training-relevant field, and earnings were only slightly higher for those in training-relevant jobs relative to other jobs. While it is possible that the PICG-supported courses played a role in improving the earnings of trainees who did not obtain a training-relevant job (for example, by providing a credential that helped trainees negotiate for higher wages in an unrelated field), it is also possible that these trainees would have obtained their positions even in the absence of the PICG support.

Table III.4. Summary of descriptive benchmarking findings used for triangulation

	National benchmarking	Course-level pre-post	Trainee-level pre-post
Description	Compare outcomes of graduates in PICG-supported courses to those of a representative sample of graduates from all public TVET courses with similar timing	Compare outcomes of trainees in nine improved PICG-supported courses to trainees in pre-improvement versions of those courses	Compare follow-up earnings of trainees to baseline earnings, for those employed at both points in time
Comparison group	Yes	No	No
Regression	No	Yes (with controls for gender, age, education, and course)	No
Sample	Course graduates	Trainees, including non-graduates (pre- and post-improvement cohorts)	Trainees, including non-graduates, who were employed at baseline and follow-up
PICG courses included in analysis	All 40 courses included in the evaluation	9 courses that were improved	All 40 courses included in the evaluation
Definition: employment	Employed in a paid job	Employed in a paid job or self-employed	n.a.
Findings: employment	• **Pre-pandemic cohorts: little difference with benchmark** • **Pandemic-affected cohorts: 15 percentage points higher (any paid job) or 12 percent higher (course-relevant paid job) for PICG graduates relative to benchmark**	**Modest and statistically insignificant differences (interpretation is challenging because of the pandemic)**	**n.a.**
Definition: earnings	Monthly wages	Monthly earnings (after-tax wages or profits in a typical month)	Monthly earnings (after-tax wages or profits in a typical month)
Findings: earnings	**12 percent higher (males) or 13 percent higher (females) for PICG graduates relative to benchmark**	**16 percent higher for cohorts in improved courses relative to earlier cohorts, albeit not statistically significant**	• **10 percent higher at follow-up relative to baseline for the full sample, statistically significant** • **21 percent higher at follow-up for those who returned to the same job held at baseline, statistically significant**

Note: Findings for employment and earnings are in bold.

n.a. = not applicable.

B. Sustainability of PICG-supported courses

In this section we use interviews with PICG grantees and administrative data on enrollment and graduation rates to examine the sustainability of the PICG-supported courses more than two years after the end of the compact. We focus primarily on the 38 full diploma courses and 3 certificate courses (at the Agricultural University) included in our evaluation sample, but we also briefly address additional, related courses that grantees have established since the end of the compact.

All PICG-supported courses are continuing into 2022, supported by strong demand and vouchers tied to enrollment. Nine of 10 grantees confirmed that the courses funded by the PICG component are continuing as of January 2022, about two and a half years after the end of the compact. Most grantees said that the PICG-supported courses and the professions they are tied to are in high demand in Georgia, which has led to sustained demand from trainees. These courses are typically fully or partially subsidized by state voucher funding (that is, trainees who pass national exams receive voucher funding to attend professional schools); since 2020, trainees have been allowed to use state vouchers to pay for tuition at private TVET providers too. Coupled with sufficient demand from trainees, the voucher funding has typically been sufficient to make these courses financially viable. Three grantees (Batumi, Phazisi, and Tetnuldi) have even expanded their PICG-supported courses to other locations due to high demand. The only grantee that did not offer PICG-supported courses as of early 2022 is the Agricultural University, whose three certificate courses were originally intended to be established as full diploma courses but were never authorized as such. The University suspended these courses during the pandemic because it was unable to offer the core in-person practical component. However, it will reopen all three courses in fall 2022, and has seen a large number of applicants that exceeds the available number of slots.

The long-term sustainability of most PICG-supported courses appears strong, but a few grantees are facing challenges related to teacher resources, trainee demand, or course funding. To systematically assess the sustainability of the PICG-supported courses, we compiled information across four domains addressed in grantee interviews: (1) current course status, (2) trainee demand, (3) supply of qualified teachers, and (4) sufficiency of course funding (Table D.1 in Appendix D). We also used administrative data on enrollment at the grantee level to verify grantee reports on the status of each course (Figure III.18). In interpreting these enrollment data, it is important to recognize that TVET enrollment across Georgia was largely canceled for the spring 2020 and spring 2021 semesters because of the pandemic (in a typical year, most courses have both a spring and fall intake). Therefore, the fall 2021 enrollment levels might provide a better indication of the latest demand for these courses. The analysis for 6 of the 10 grantees (Batumi, Phazisi, GTU, Georgian Railways, Agricultural University, and GIPA) raised no major concerns about sustainability at this time. However, GIPA suggested that labor market demand for occupational health and safety professionals might not be sustained in the long run because their graduates are filling many of the available positions in the field and limited government enforcement of occupational health and safety standards means that companies might not invest in creating new positions. In that case, they will have to reconsider whether to continue to offer the course. Three of the 10 grantees (GMGA, Tetnuldi, and Spektri) raised concerns about the long-term supply of qualified teachers; although they have so far maintained staffing at the level needed to sustain strong enrollment in the PICG-supported courses, the lack of qualified teachers might become a constraint in the future. The remaining grantees, GAU, is facing sustainability challenges due to low demand for its aviation courses, particularly the high-cost level V helicopter pilot course. This course has a very large gap between tuition costs and state voucher funding, whereas most other courses are fully covered by voucher funding, and the few that are not have a smaller gap. Because trainees must largely self-fund tuition for this course,

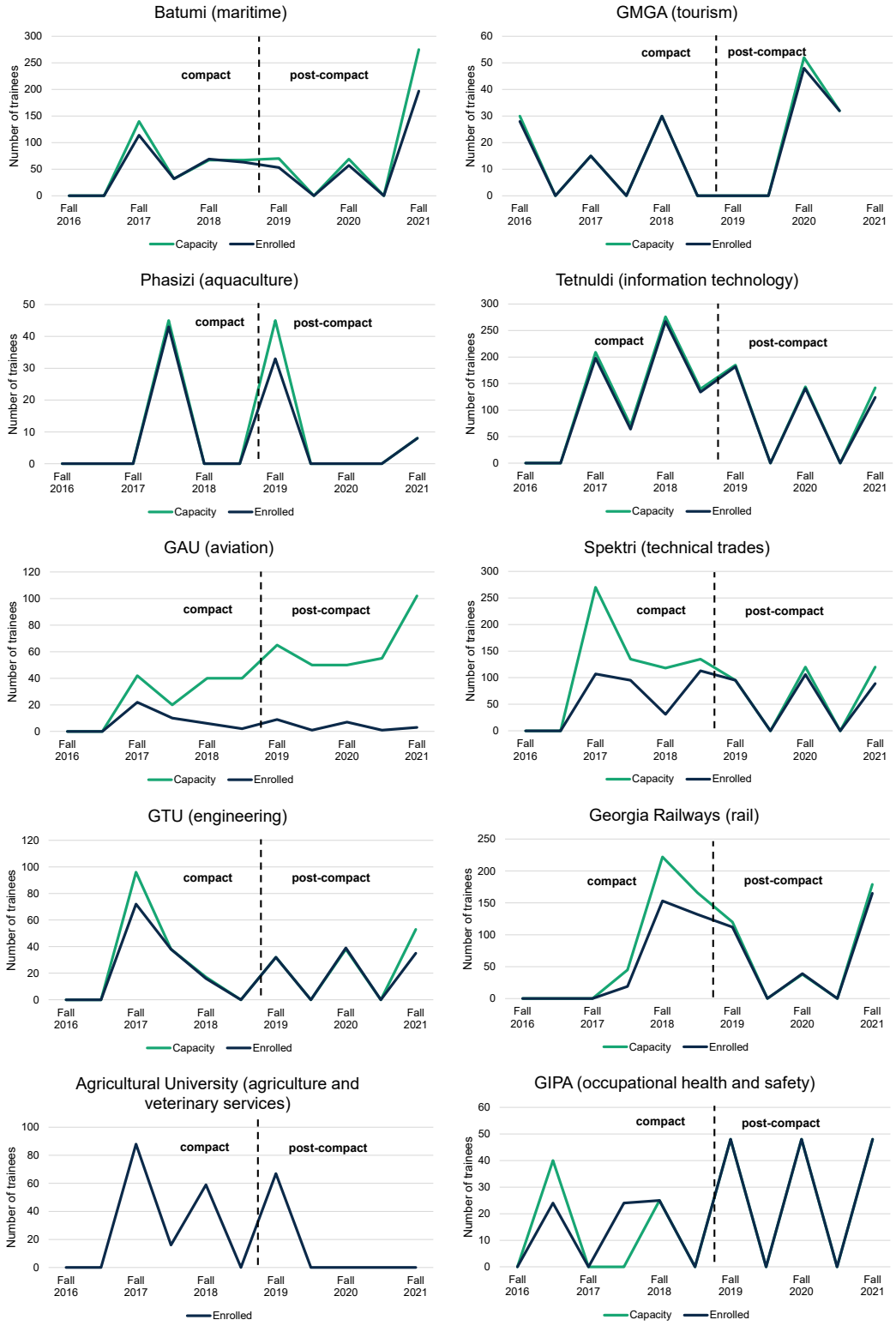
attracting enrollment is much more difficult. Nevertheless, GAU is continuing to offer all of its PICG-supported courses for the time being.

The cessation of PICG funding has negatively affected some grantees in terms of teacher resources and their ability to offer internationally recognized qualifications. A lack of funding was the main reason that three grantees (GMGA, Tetnuldi, and Spektri) were concerned about the long-term supply of qualified teachers. During the compact, grant funding helped them attract international experts (to train their local teachers) or highly qualified local teachers, but they can no longer afford this now that the grant funding has ended. Two grantees (Batumi and Spektri) also noted that the end of grant funding has meant that they can no longer offer their graduates an internationally recognized certificate to accompany their local certificate (because the international certifying organizations require fees for their services). This has not adversely affected demand for their courses to date but could limit some job opportunities for their graduates.

Many grantees continue to experience challenges with high trainee dropout rates. We used administrative data to estimate the graduation rate for all cohorts that enrolled since the PICG courses were established (focusing on the cohorts due for graduation by the end of 2021, when the administrative data were last updated). Across all grantees, 61 percent of enrollees in these cohorts graduated (Figure III.19).[40] Graduation rates across grantees vary substantially, ranging from 39 percent (Georgian Railways) to 78 percent (Batumi). Three grantees have graduation rates under 50 percent (Georgian Railways, GAU, and Spektri). Although our ability to compare graduation rates during and after the compact is limited because most post-compact cohorts are not yet due for graduation, the available data suggest that graduation rates remained similar in both periods. This implies that many PICG grantees continue to face high dropout rates, which could pose a challenge to course sustainability (for example, because provider revenues from these courses are lower than expected). (We do not have information about how these dropout rates compare to those at other providers in the Georgian TVET sector.)

[40] In our tracer survey of PICG graduates, the graduation rate is higher, at 77 percent. However, our tracer survey sample likely excluded many trainees who dropped out early, before we administered the baseline survey.

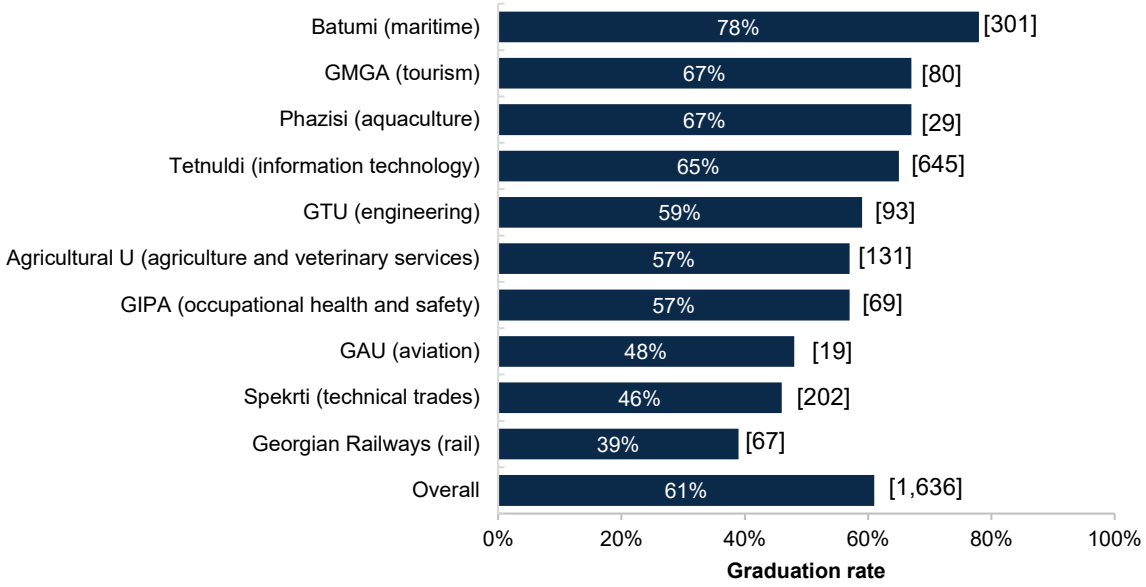
Figure III.18. Capacity of and enrollment in PICG-supported courses, by semester



Source: Administrative data MCA-Georgia and the Millennium Foundation collected from grantees.

Note: Axis labels for spring semesters are omitted for clarity.

Figure III.19. Graduation rates in PICG-supported courses, for cohorts graduating by the end of 2021



Source: Administrative data MCA-Georgia and the Millennium Foundation collected from grantees.

Note: Numbers in brackets represent total number of graduates.

Half of the grantees have used the PICG-supported courses as a platform to create related short certificate courses, which are in high demand. Since the end of the compact, 5 of the 10 grantees have created new certificate courses comprising certain learning modules from the PICG-funded courses (Batumi, Phazisi, GTU, GMGA, Georgian Railways), and others are planning to do so in the future (GAU, GIPA). This was in response to requests from private-sector partners as well as high demand from students. Altogether, the grantees have created nine new certificate courses since the end of the compact; Georgian Railways has also created four new diploma courses.[41] Although we cannot fully attribute these new courses to PICG support, grantees suggested that they were made possible because they had developed the required learning modules, materials, technical knowledge, and teacher resources as part of the PICG support. The increase in the number of short certificate courses, which focus largely on upskilling or reskilling existing workers, is part of a broader trend in the Georgian TVET sector noted by the high-level stakeholders we interviewed. As part of legislative reforms passed in 2019, providers are now able to create these courses—which typically entails pulling out modules from full diploma programs—and have them authorized by the National Center for Educational Quality Enhancement (NCEQE) so that graduates receive a state-approved certificate. These courses are attractive to trainees because they are short in duration, are covered by state voucher funding, can sometimes be completed remotely, and culminate in a formal qualification. They are also attractive to employers (who often fund their employees' participation) because they help address their skills needs while saving substantial internal training costs, and to providers because they serve as an additional revenue stream.

[41] These new diploma courses include two "integrated" courses, which can be taken by those with basic education as part of earning their general education degree at the same time (this arrangement was enabled by 2019 legislative reforms).

C. Assessing MCC's cost-benefit analysis

MCC's ex-ante CBA model for the PICG component of the project projected that the graduates of PICG-supported courses would be more likely to be employed and that those employed would earn higher wages, relative to what would have happened if they could only take existing courses. The model used assumptions about the number of PICG graduates over time, employment rates (an assumed 9 percentage point increase), and wages (an assumed increase of 911 GEL per annum, or 23.8 percent, over a counterfactual wage of 3,828 GEL per annum in 2010 currency). Comparing the estimated benefits under these assumptions to the PICG component's expected costs at the time, these assumptions yielded an ERR of 14 percent. In our evaluability assessment (Borkum et al. 2017), we noted that the assumed increases in employment and wages as a result of training in PICG courses were higher than typical estimates of the impacts of vocational training programs reported in the literature. However, it seemed possible that the PICG courses could align more with industry needs than other, more typical vocational training programs, which could potentially lead to higher impacts on employment and wages.

MCC's compact closeout CBA model for the PICG component is based on the same projected benefit streams as its ex-ante CBA model. However, whereas the ex-ante model projected these benefits at an aggregate level, the closeout model does so at the individual course level. Specifically, the model includes course-level assumptions about the number of PICG graduates over a 20-year time horizon, their post-training employment rates, and their annual post-training wages. It also includes course-level assumptions about the counterfactual employment rates and wages that these graduates would have experienced absent the PICG course.[42] The differences between post-training and counterfactual employment rates (which ranges across courses from 2 to 10 percent) and wages (the wage premium, which for 2020 wages ranges across courses from 587 to 2,491 GEL per annum in 2013 currency) for graduates in each cohort is then used to estimate the total economic benefits in the model. As mentioned in Chapter I, comparing these benefits to the PICG component's realized costs produced a closeout ERR of 20.9 percent, which is higher than the ex-ante ERR of 14 percent.

In this section, we assess the key assumptions in the closeout CBA model using administrative data on enrollment and graduation, and tracer survey data on employment and wages. Specifically, we assess course-level assumptions about (1) the number of enrollees and graduates; (2) post-training employment rates; (3) post-training wages; and (4) the wage premium. (As we describe in Chapter II, we do not assess the difference between post-training and counterfactual employment rates because we have no good information to do so.)

1. Findings

Through the end of 2021, total enrollment reached three-quarters of what was projected in the CBA and the total number of graduates reached two-thirds of what was projected; these shortfalls are largely due to the pandemic (Table E.1 in Appendix E). Specifically, the administrative data we analyzed suggested that there were 3,928 enrollees and 1,568 graduates from the PICG courses included in the evaluation by the end of 2021, whereas the closeout CBA projected 5,245 enrollees and 2,498 graduates. These shortfalls were driven primarily by three grantees that were anticipated to have relatively large enrollments: Tetnuldi, Spektri, and Georgian Railways. For these (and many other) grantees,

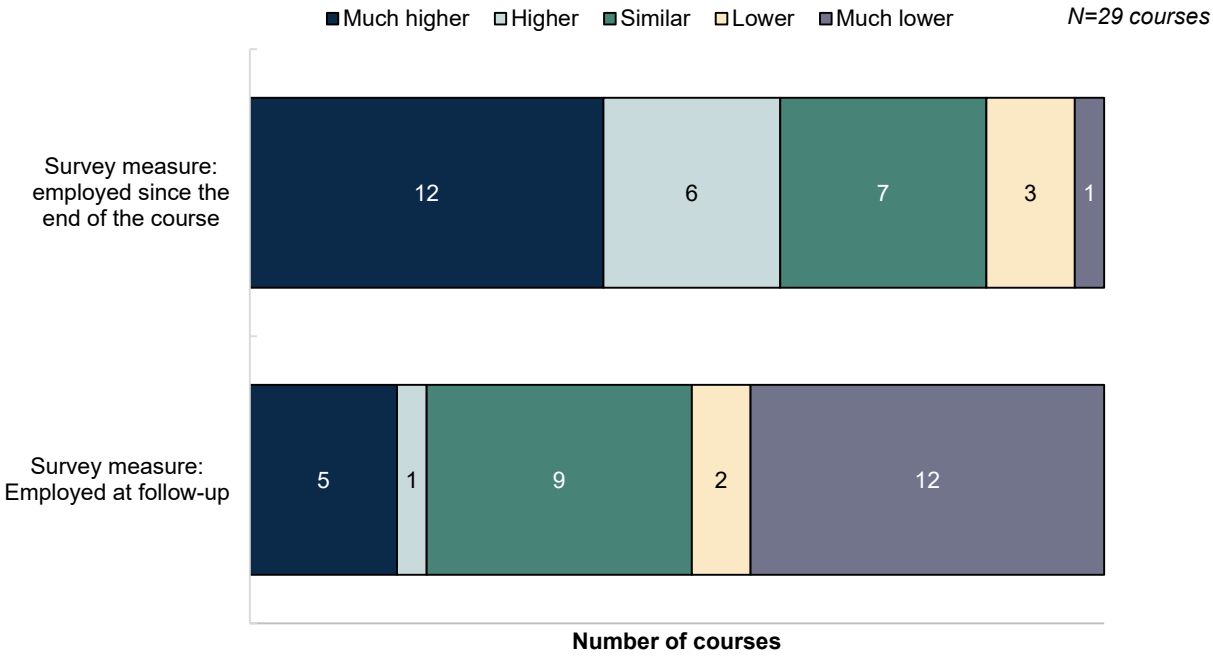
[42] The counterfactual for each course in the CBA model varies. For improved courses, it is that PICG graduates would have enrolled in the pre-improved versions of those courses. For new courses, it is that PICG graduates would have enrolled in other courses at similar levels in broadly similar fields (for younger graduates) and/or that PICG graduates would not have undertaken further training (for older graduates).

enrollments have recently been dampened by the pandemic, which led to a switch to one intake per year in 2020 and 2021. Looking beyond 2021, as described earlier, all the PICG-supported courses have been sustained after the end of the compact. Therefore, the CBA assumption that these courses will be sustained and continue to enroll trainees through 2036 seems reasonable at this time. However, the extent to which the CBA projections about enrollments beyond 2021 are accurate will depend in large part on the extent to which there is a post-pandemic recovery in enrollments. Further, because discounting in the CBA model places greater weight on the benefits for earlier cohorts, the shortfall in the number of enrollees and graduates through 2021 might still substantively reduce the estimated ERR even if such a recovery occurs.[43]

Post-training employment rates in the tracer survey are similar to or higher than those in the CBA model for almost 90 percent of courses using a less conservative survey measure of employment; this drops to about 50 percent using a more conservative measure. Using the survey measure of any paid employment between the end of the course and the follow-up survey, post-training employment rates were similar to the CBA model for 18 of the 29 courses and higher for 7 of these courses (Figure III.20 and Table E.2 in Appendix E). However, using the more conservative survey measure of paid employment at the follow-up survey date, employment rates were only similar to or higher than the CBA model for 15 of the 29 courses (for many courses they were substantially lower). Our assessment of the validity of the CBA model's assumptions therefore depends on which employment measure is viewed as most comparable to the employment rates ("insertion rates") in the CBA model. There is also substantial variation in the results of our assessment across grantees (Table E.2 in Appendix E). For example, for Phazisi, GAU, GTU, and Georgian Railways, the survey estimates across courses are similar to or higher than the CBA model's assumptions regardless of the survey measure used; for the other grantees, the results are more sensitive to the measure. Importantly, for two-thirds of our evaluation sample employment outcomes were measured in the midst of the pandemic which is likely to have depressed overall employment outcomes to some extent. It may be reasonable to expect that the long-term employment rates of these trainees may fall somewhere between the less conservative and more conservative measures presented here.

[43] The assumed dropout rates also affect how enrollments translate into graduates, who are the beneficiaries in the CBA model. We did not directly assess these dropout rates because they vary across courses and cohorts in the CBA model, whereas we estimated them at the grantee level for all cohorts that would have graduated by the end of 2021. However, if MCC plans to re-estimate the CBA, these grantee-level estimates of dropout rates (presented in Figure III.19) might be a useful reference.

Figure III.20. Post-training employment rates in tracer survey data compared to closeout CBA assumptions



Source: Follow-up tracer survey data and MCC's closeout CBA model.

Note: We define "much higher" as a positive difference of more than 10 percentage points, "higher" as a positive difference of 5 to 10 percentage points, "similar" as a difference of 5 percentage points or less, "lower" as a negative difference of 5 to 10 percentage points, and "much lower" as a negative difference of more than 10 percentage points.

Annual post-training wages of PICG trainees in the tracer survey were similar to or higher than the CBA model's assumptions for 12 of the 15 courses for which we could conduct this comparison (Table E.2 in Appendix E). For five of these courses, annual post-training wages in the survey were within 1,000 GEL ($322) of the CBA model's assumption, for another seven courses they were more than 1,000 GEL higher, and for the remaining three courses they were at least 1,000 GEL lower. Although this analysis only covers about one-third of the courses included in the evaluation because of sample size limitations at the course level, it suggests that on balance the CBA model's assumed wage levels for PICG graduates might be too conservative. Updating these wage levels to reflect data from the evaluation would increase the model's estimated ERR, holding constant the currently assumed counterfactual wages.

The survey data validate the CBA model's assumed wage premium for the large, improved Tetnuldi IT support specialist level III course; evidence for other courses is mixed. For the Tetnuldi IT support specialist level III course, the course-level pre-post design suggests that trainees who enrolled in the improved version of the course earned 1,920 GEL ($617) more per annum compared to those who enrolled in the pre-improvement version of the course. This is slightly higher than the annual wage premium of 1,557 GEL for this course that is assumed in the CBA model. As mentioned earlier, although this validation only applies to one course, this course is an important driver of the ERR estimate because it contributes the largest number of graduates out of all courses in the CBA model. For other courses, we relied on our trainee-level pre-post estimates for those employed at baseline and follow-up to assess the

wage premia assumed in the CBA model. Of the 11 courses for which we could conduct this comparison given the available sample sizes, the wage premium was similar in the tracer survey data for 3 courses (including the Tetnuldi IT support specialist level III course), higher for 3 courses, and lower for 5 courses (negative, in some cases).[44] Given these mixed results and the relatively small sample size of courses, we cannot draw strong broader conclusions about the validity of the assumed wage premia in the CBA model. On average, however, the assumptions in the CBA model about the assumed boost in trainee wages appears to be reasonable in light of the evaluation's findings.

2. Summary

In summary, based on the available evidence from the evaluation, the closeout CBA model appears to have overestimated the number of direct beneficiaries, underestimated the employment rate and average wage levels of trainees, and made reasonable assumptions about the wage boost experienced by trainees relative to a counterfactual where the PICG-supported courses did not exist. Updating the CBA to reflect data from the evaluation is likely to have offsetting positive and negative effects on the ERR, and still result in a strongly positive ERR. However, the exact magnitude of the updated ERR will require fully re-calculating the detailed CBA model.

[44] It is unclear why some trainees experienced negative changes in real wages from baseline to follow-up. It is possible that some trainees' nominal wages were stagnant over this period (and hence decreased in real terms), that some switched to new professions with initially lower wages (in the expectation of higher wages in the longer term), or that there is some reporting error.

IV. Findings: STPP, technical assistance, and annual conference components

In this chapter, we examine how the remaining components of the ISWD project—STPP, technical assistance, and annual conference—evolved more than two years after the end of the compact. The findings draw on interviews we conducted with STPP grantees, former implementation staff, government stakeholders, and international donors in the Georgian TVET sector.

A. STPP component

In this section, we assess the extent to which the practices STPP grantees developed were sustained after the end of the compact, using updated information from the eight grantees we interviewed as part of the interim evaluation report.[45] Because the information we gathered is limited to the grantees, an important caveat to this analysis is that the grantees could only comment on the extent to which they were directly involved in efforts to share the practice with partner organizations. In other words, we cannot rule out the possibility that adoption was broader than the grantees reported.

Five of the eight STPP grantees we interviewed reported that the practice they developed has been sustained to some extent, but only one was able to point to broader adoption. In keeping with the variation in the practices STPP grants supported, the ways in which these practices evolved after the end of the compact varied substantially (Table F.1 in Appendix F summarizes these developments):

- Four grantees have continued to internally use the practice developed through the grants, albeit to varying degrees. **Vocational College Icarus** reported some lasting internal change related to their STPP grant, noting that they were able to build on the tourism-employer conference held with grant support and organize a second conference after the grant period. They reported that these conferences have contributed to a long-term increase in their engagement with employers, and that they expect to continue using the electronic resources portal and labor market research practices supported through the grant as well. The **Georgian Patriarchate Community College of Decorative Gardening** continues to engage with the schoolteachers they trained to implement a decorative gardening course under the grant; for example, the teachers arrange site visits to the college for their students and refer interested students for vocational training after graduation. **Kutaisi Public School #33** has used their own resources to sustain the computer course created under the grant, as part of their strong commitment to achieve excellence in IT-related education. However, the other courses created under the grant (sewing, furniture production, and mushroom cultivation) were only sustained for two or three years after the grant before being paused due to the pandemic, and the grantee reported that the courses are unlikely to resume due a lack of funding. **Akaki Tsereteli State University** also sustained their short courses in solar energy and green building as part of their continuing education program, although they reported that thus far demand for the courses has been more limited than they had hoped.

[45] These comprised 4 of the 7 first-round grantees and 4 of the 10 second-round grantees, selected as those whose practices had the best potential for wider adoption (based on discussions with PEM). One of the grantees, Akaki Tsereteli State University, received an additional grant in the third and final round. (We did not include other grantees from the third round because grants had not been awarded at the time of interim data collection.)

- One grantee, **Mindworks Ltd.,** might have seen broader adoption of their "flipped classroom" practice among private schools,[46] spurred by an entrepreneurial teacher who is using the materials to provide consulting services about the practice at these schools. Adoption of the practice by the two original partner colleges was initially limited due to lack of teacher motivation to implement it. However, the potential for adoption by these colleges might have improved during the pandemic, as the practice was highly relevant for remote instruction (although the grantee does not know the extent to which the college's teachers ultimately adopted it).
- The remaining three grantees did not report that their practices had been sustained actively. Two grantees developed practices that involved delivering IT-related content (**GTU**'s web-based course on basic IT for TVET trainees and **EasySoft Ltd**.'s course for industrial laboratory teaching software); the grantees reported that the materials they developed have now become outdated due to technological advances, and there is no funding to update them. In our interim report, we suggested that GTU's web-based course had especially strong potential for broad adoption because a basic IT module is compulsory for all TVET programs, but it appears that other providers are not using it given the outdated content and absence of electronic management systems for e-courses at most providers. The final grantee, **Business Academy of Georgia**, is no longer partnering with the original participating colleges and has not partnered with any new colleges to implement their assessment tools for two business-related TVET modules. Although in the interim study we had also identified strong potential for broad adoption of these tools because the two business-related TVET modules are compulsory for all TVET programs, this does not appear to have occurred in practice. However, these tools remain available online for potential use in the future.

B. Technical assistance component

The technical assistance component of the ISWD project provided a range of support in the broad areas of business engagement in TVET (public-private partnership and sector skills councils), quality and attractiveness of TVET (branding and marketing, career guidance, the quality assurance framework [QAF], teacher professional development, and TVET financing), and learning and qualification opportunities for adults. Given limited time and resources, the project mostly focused on developing contributory materials, conducting pilots, and holding small-scale trainings to initiate or advance policy reforms. In general, these policy reforms were long-term efforts, and it was expected that a great deal of post-compact work would be necessary before they could be fully implemented. In this section, we describe the extent to which policy reforms directly supported during the compact have been continued, as well as other major post-compact policy changes that may have been influenced by ISWD activities or might affect their sustainability.

[46] In traditional pedagogical approaches, basic levels of learning such as remembering and understanding occur in class through direct instruction, and students work on activities that involve higher levels of learning outside of class. In the flipped classroom model, students complete the basic levels of learning before class, typically through instructional videos. During class, students can then engage in higher levels of learning through group tasks and discussions with peers and teachers.

Stakeholders perceive that the ISWD project contributed to the government's establishment of a national Skills Agency, specifically in the areas of public-private partnerships and sector skills organizations. The national Skills Agency, an equal collaboration between the government of Georgia and the Georgian Chamber of Commerce and Industry, is the new legal entity governing the TVET sector in Georgia (see Skills Agency box for details). It was established in April 2021 and began its inception activities in December 2021. The Skills Agency concept was developed over many years, independently of the ISWD project. Nevertheless, stakeholders pointed to three indirect ways in which the project might have contributed to it or accelerated its development. First, the PICG courses might have helped increase the interest of the private sector in TVET—and hence interest in participating in the Agency—by increasing the visibility of skilling through the establishment high-profile, modern, high-quality, international-standard TVET courses. Second, the PICG courses helped demonstrate the potential for private sector engagement in the TVET sector, which is key to the concept of the Skills Agency, as private businesses collaborated closely with several of the PICG grantees. Third, the technical assistance related to business engagement in the TVET sector—especially around public-private partnerships and sector skills councils (now called sector skills organizations)—might have helped influence the thinking around these concepts, which will underpin much of the new Agency's work.

The Skills Agency

- Aims to **engage the private business sector** in TVET governance, implementation, and financing.
- Will **consolidate many of the TVET governance functions** that were previous distributed across the MES, the National Center for Teacher Professional Development, and NCEQE.
- All **TVET policy decisions will be made by the Agency's board**, which includes representatives from government ministries and industry associations.
- Autonomous umbrella bodies for each sector known as **sector skills organizations (SSOs) will engage a wide variety of employers.**
- **SSOs will play a key role** in setting up courses, organizing exams, and communicating and demonstrating national and regional skills needs, among other functions.
- The Agency will **guide TVET providers to adjust course offerings to reflect market demand for skills** based on input from SSOs, labor market research, a new labor market information system, and Georgia's long-run development goals.

The QAF supported during the compact is now being implemented, and stakeholders perceive that the quality of TVET has continued to improve since the end of the compact. The ISWD project's technical assistance component helped develop the QAF, which specifies mechanisms to develop TVET qualifications, authorize TVET providers and courses, conduct provider self-assessments of quality, and other aspects of quality. The National Centre for Education Quality Enhancement (NCEQE) has traditionally been the government body responsible for overseeing the implementation of these mechanisms. (Additional details on the QAF can be found in our interim report, Borkum et al. 2019.) Since the end of the compact, the legislation related to the QAF has been formally approved but providers are still in the process of fully implementing it. Recently, the government has decided to shift internal quality assurance (QA) processes (for example, self-evaluation and capacity building at providers to set up QA systems) to the new Skills Agency, while NCEQE will continue to manage external QA processes (the authorization processes). The main challenges to fully implementing the QAF at the provider level include limited capacity of internal and external assessors and limited provider capacity to establish strong internal QA systems. Since the end of the compact, NCEQE has been more fully integrated into the

international QA ecosystems, becoming a member of the European Association for Quality Assurance in Higher Education (ENQA) and the European Quality Assurance Register for Higher Education (EQAR). NCEQE is implementing several recommendations from these bodies related to quality improvement with the support of an EU-funded project. Most stakeholders agreed that efforts to improve quality have resulted in improved perceptions of the quality of TVET in Georgian society since the end of the compact. The shift from subject-based courses to competence-based modular courses (unrelated to the ISWD project), which was completed in 2021, may also have played a role in improving these perceptions by encouraging higher-quality and results-oriented curricula, and facilitating the introduction of more flexible short courses. Some stakeholders suggested that the high-quality PICG courses might also have contributed to these improved overall perceptions of quality, but recognized that this depends on the extent to which potential trainees and employers are aware of those courses.

NCEQE's reforms to institutional and course authorization processes—which were challenging during ISWD implementation—have since been streamlined; this has helped facilitate a substantial increase in authorized short certificate courses. As described in our interim report (Borkum et. al. 2019), the complex and changing nature of NCEQE authorization processes for training institutions and courses led to delays in introducing the PICG-supported courses. (Two PICG grantees, Georgian Railways and the Georgian Mountain Guide Association, had to apply for institutional authorization because they were new training providers created by the ISWD project.) Since the end of the ISWD project, NCEQE has substantially streamlined these processes, following the European Quality Assurance Reference Framework for Vocational Education and Training (EQAVET). At the institutional level, the process now involves a self-assessment component and a consolidated set of requirements. The process enables new institutions that meet some basic requirements to start operating while they work towards filling the gaps, rather than simply rejecting them. At the course level, the new process focuses exclusively on the curriculum; all other dimensions (human resources, funding resources, physical facilities, and so on) are checked at the institutional level. Both new processes involve less effort from NCEQE and providers, as well as lower fees for providers, and have helped facilitate a substantial increase in course authorizations since the end of the ISWD project, mostly for short certificate courses. Although these changes were not directly influenced by the ISWD project, they demonstrate that policymakers have made efforts to improve TVET-related regulations that proved challenging during the compact and are likely to help facilitate a longer-term shift in developing higher-level diploma courses aligned with labor market demand (following the example of the PICG-supported courses). This shift has not yet occurred because it has been challenging for providers to identify market demand and develop new courses beyond the PICG-supported courses. However, the closer engagement of the private sector with TVET providers under the new Skills Agency is expected to help facilitate this in the future.

Progress in other areas of technical assistance that the ISWD project supported has been slower, although many remain priorities as part of Georgia's new TVET strategy. Several other areas of technical assistance during the compact have not seen rapid progress since 2019, but most of these items remain priorities as part of Georgia's new 2021–2025 TVET strategy. For example:

- **TVET teacher professional development.** The ISWD project supported a training needs assessment of teachers in public TVET providers (related to their capacity to conduct competence-based training and assessments), and developed and piloted training materials for these teachers on modular program delivery and competence-based assessments. It was hoped that these materials would be widely used to train teachers after the compact, and that there would be additional initiatives to improve quality of instruction in TVET courses (for example, by systematically updating teachers' knowledge of

industry-related skills requirements). However, TVET teacher professional development has not advanced much since the end of the compact under the responsible government agency, the National Center for Teacher Professional Development, because that agency was mostly focused on general education. Moving forward, the Skills Agency will take over these efforts. They will follow a model developed by the World Bank for initial teacher training, professional development, and career advancement.

- **TVET financing.** The project assisted the MES in estimating costs for TVET strategy, TVET courses, and implementing new TVET regulations, and developed ideas for increasing the flexibility of the TVET voucher system. The goal was to set the stage for a more complete study of TVET funding needs and potential funding models after the end of the compact. Support for a new funding approach for TVET has in fact continued after the end of the compact through other donors and is now being finalized and operationalized. The key novelty is a shift to performance-based financing, based on a mix of performance indictors at the provider level. The new funding approach will be implemented in the context of the existing voucher system, which covers both public and private Georgian TVET providers (the latter since 2020). The private business sector is also expected to play a larger role in financing TVET—especially through public-private partnerships that the Skills Agency will help develop.
- **Recognition of non-formal and informal education for adults.** The project developed concept papers, training materials, and assessments related to validating non-formal and informal learning, and supported the MES in drafting new regulations in this area; the goal was to lay the groundwork for broader implementation after the end of the compact. This area has remained a government policy priority after the end of the compact. The relevant legislation has been approved and NCEQE has introduced procedures to authorize institutions to recognize non-formal and informal learning. Although only a handful have been authorized so far, several others have expressed interest and the numbers are expected to increase.

More broadly, international donors continue to be very active in the Georgian TVET sector; several ongoing projects build on the work of the ISWD project. The Georgian TVET sector has continued to attract substantial attention and resources from international donors since the end of the compact, including through several initiatives related to the ISWD project. Several individuals who were involved in implementing the ISWD project are working as key staff on these projects, enabling them to draw on their ISWD-related experience and relationships to improve implementation. The most closely related project is the five-year $24 million Industry-Led Skills Development Program funded by USAID, which was launched in 2021 and aims to support the private sector to engage more closely with TVET providers. Under the project, private sector entities—including firms and industry associations—are eligible for grants to create new training programs, typically as stand-alone providers or partners with existing providers. Smaller grants are also available for these entities to develop models of their relationships with providers and work together with them to identify priorities for the larger grants. Like ISWD, the project focuses on establishing training programs aligned with employers' skills needs, except that under the USAID project private sector entities drive the programs. Another related project is a EUR 23 million grant from the KfW, the German development bank, for creating a new "center of excellence" in Tbilisi, in the construction and logistics sector. This center is intended to be the leading TVET provider in the sector and will serve as a hub, providing support and services to a cluster of providers networked to it. The 4.5 year project launched in late 2021 and was awarded to PEM, which led the ISWD implementation. A further two centers of excellence are planned, in the wine and tourism sectors. Although the ISWD project did not specifically include activities focused on the centers of excellence

concept, the project implementation team participated in extensive discussions with experts from KfW to develop the concept both during and after the project. These centers will incorporate several features of PICG-supported courses (in particular, modern equipment, infrastructure, and curricula) and will likely be governed under the public-private partnership concept developed by the project. In the same spirit, a $70 million Asian Development bank project, the Modern Skills for Better Jobs Sector Development Program, launched in 2021 and will support the creation of innovative skills hubs in existing providers in Kutaisi and Telavi to deliver high-quality training in seven priority sectors. This project will also support the continuation of reform efforts supported by ISWD technical assistance, including in the areas of adult education and TVET financing. In addition, the EU delegation is continuing the technical assistance work it has been conducting for many years, which includes several reform areas that the ISWD project contributed to.

C. Annual TVET conference

The ISWD project conducted Annual TVET Conferences in 2016, 2017, and 2018, as a forum for dialogue and information sharing among TVET stakeholders. The 2017 and 2018 Annual Conferences included a new National TVET Awards competition, with the goal of promoting the image and reputation of TVET. The awards cover categories for the best TVET student, teacher, educational provider, and business partner. As part of the evaluation's endline interviews with government stakeholders and former project implementation staff, we examined the sustainability of these activities since the end of the compact.

The National TVET Awards competition introduced under the ISWD project has been sustained. Since the final conference and awards ceremony were held under the ISWD project in 2018, two further rounds of the ceremony have been conducted—in July 2020 and November 2021—and a third will take place in the second half of 2022. Although attendance at the 2020 and 2021 awards ceremonies was limited by COVID-related restrictions, the 2021 event was live-streamed to more than 3,000 participants via social media. The post-ISWD awards were organized by the Millennium Foundation, the successor agency to MCA-Georgia, and was sponsored by Gudavadze-Patarkatsishvili Foundation, which also partly sponsored them during the compact. The Embassy of Israel to Georgia funded a new special Excellence Prize awarded to one of the competition participants at the Embassy's discretion in 2020 and 2021, and the Georgian parliament has announced that it will fund a new award for inclusive education in TVET in 2022. The MES has been engaged in the awards as jury members or observers, and the Minister has attended the event and presented awards in both years, further increasing the event's profile. On the other hand, most of the employers interviewed for the evaluation were not familiar with recent rounds of the award ceremony, and it appears that these events could benefit from seeking broader participation from employers in the future years. Stakeholders expect the event to continue in future years and to continue to raise the profile of TVET in Georgia.

V. Conclusion

This report has presented endline findings from the Georgia ISWD project evaluation using data collected up to two and a half years after the end of the project's five-year implementation period.

Broadly speaking, the combined findings of the evaluation's interim and endline reports demonstrate that the ISWD project succeeded in meeting its central objective, which was to increase the availability of STEM technicians to meet industry demand. The interim evaluation report (Borkum et al. 2019) addressed evaluation questions related to the project's implementation, showing that the project successfully established 51 new or improved TVET courses that attracted trainees at the levels targeted by the project, and completed activities under each of the other project components that were consistent with the project's goals and theory of change. This final evaluation report answered evaluation questions related to the labor market outcomes of trainees, employers' perceptions of trainees, and the sustainability of all of the project components after the end of the compact.

In this concluding chapter, we summarize how the endline findings have contributed to answering the evaluation's evaluation questions and highlight several important policy implications from the evaluation that can help to inform future TVET-related investments in Georgia and other countries.

A. Endline findings about the PICG component

We first summarize the key findings related to each of the evaluation questions for the PICG component covered in this endline report. As described in the interim evaluation report, this component successfully established 38 diploma courses and 13 short certificate courses, which enrolled enough trainees to meet the component's expectations for the compact period (Borkum et al. 2019). Key findings from the endline report, organized by evaluation question, are as follows.

RQ3. What were the labor market outcomes (employment and wages) for graduates from PICG-supported courses?

More than three-quarters of trainees in PICG-supported courses found employment within a year of the course ending; however, only one-third found a full-time job that was relevant to their course. Most trainees (79 percent) were employed at some point in the year after the end of their PICG-supported course. However, only about one-third of trainees (35 percent) obtained a full-time job that was related to their PICG-supported training course. At follow-up, about one year after the end of the course, 64 percent were still employed and 29 percent were employed in a full-time job relevant to training. The rate of course-relevant job placements at follow-up varied substantially by course provider, from around two-thirds of the trainees (aviation and railway) to under 20 percent (information technology and aquaculture). Almost three-quarters of trainees who had been employed since the end of training found a job within the first month, and about one-half returned immediately to a job that they held before training.

The limited rate of course-relevant employment reflects both supply and demand constraints. Among the trainees who did not obtain a course-relevant job, about one-half never searched for one due to a lack of interest or availability for work, or perceptions wages would be too low. A lack of available job opportunities might have also been a constraint for some trainees, especially those with limited relevant work experience: trainees who had more than two years of prior work experience obtained full-time, course-relevant jobs at about double the rate of those with less experience. This suggests that employers in course-relevant fields may have had substantially less demand for PICG course graduates who did not also have meaningful prior work experience.

Trainees employed in full-time jobs relevant to training earned only about 8 percent more than those employed in other types of jobs. This suggests that the earnings benefits of finding a job placement that is relevant to the PICG course are modest, which is one reason why some trainees might prefer or be willing to accept other types of jobs. Consistent with this, dropout rates from PICG-supported courses were high, and trainees who dropped out had very similar employment and earnings outcomes to those who completed these courses. This suggests that dropping out was a rational choice by some trainees, in the sense that many of them found jobs that they preferred to the jobs they anticipated receiving had they completed training.

The PICG-supported courses reflected prevailing patterns of gender-based inequality in the labor market. Trainees in PICG-supported courses were disproportionately male. Only 15 percent of all trainees in PICG-supported courses were female, probably reflecting cultural gender norms associated with many of the occupations that PICG-supported courses focused on. Comparing male trainees to female trainees in the same courses, employment rates were similar by gender but employed male trainees earned about 32 percent more than employed female trainees.

The evaluation's benchmarking analyses suggest that PICG courses likely improved the employment rates of trainees. The evaluation did not include a rigorous impact analysis with a well-defined counterfactual for the outcomes of trainees in PICG-supported courses. However, compared to a national benchmark of all TVET courses in Georgia, graduates of PICG-supported courses maintained similar rates of employment before the pandemic but higher rates of employment during the pandemic, suggesting that the pandemic's effect on graduates' ability to find new jobs was a greater constraint for all graduates nationally than for PICG graduates. Specifically, for graduates surveyed during the pandemic (one year after graduation, on average), those in PICG-supported courses were 15 percentage points more likely to be in paid employment and 12 percentage points more likely to be in course-relevant paid employment than a nationally representative sample of TVET graduates. In part, this could be because many PICG courses focused on sectors and roles that tended to have more stable employment during the pandemic. Although these findings are positive, they suggest that, absent the unexpected shock of the pandemic, improvements in employment rates might not have occurred.

Results from the study's three descriptive benchmarking exercises consistently suggest that the courses were likely to have improved trainees' earnings. Among trainees from PICG-supported course who were employed one year after the end of the course, there was substantial variation in monthly earnings across grantees, with a range from 786 GEL ($253) to 1,711 GEL ($550). (These currency conversions use the average daily exchange rate of 3.11 GEL to $1 during the period of the follow-up survey for trainees in PICG-supported courses.) The highest average monthly earnings were for trainees in the tourism and aviation sectors, and the lowest for those in the IT and rail sectors. Relative to the national benchmark, PICG graduates in paid employment earned monthly wages that were 12 to 13 percent higher for male and female graduates, respectively (Figure ES.3). Further, for nine existing courses enhanced by PICG grants, trainees during the compact appear to have monthly earnings (defined as after-tax wages for those in paid employment or profits in a typical month for those in self-employment) that were 16 percent higher than those of earlier cohorts. Finally, trainees who were employed before enrolling in a PICG-supported course increased their monthly earnings (defined in the same way) by 10 percent after the end of the course, and trainees who returned to the same job experienced a 21 percent earnings boost. We do not have strong evidence about *why* these earnings improvements occurred. The project intended to boost earnings by funding new or improved courses in fields of high market demand. However, most trainees from PICG-supported courses did not find

employment in a training-relevant field, and earnings were only slightly higher for those in training-relevant jobs relative to other jobs. While it is possible that the PICG-supported courses played a role in improving the earnings of trainees who did not obtain a training-relevant job (for example, by providing a credential that helped trainees negotiate for higher wages in an unrelated field), it is also possible that these trainees would have obtained their positions even in the absence of the PICG support. (The vast majority of jobs in all these benchmarking analyses were full time jobs, so increased time worked is not driving the differences in earnings.)

Data from the evaluation suggests that the project is likely to have produced a strongly positive economic rate of return (ERR). MCC's closeout CBA model estimated an ERR of 20.9 percent, with benefits driven by higher employment rates and wages for PICG graduates relative to if the courses had not been established. MCC's closeout cost-benefit analysis (CBA) model estimated that the project produced an ERR of 20.9 percent, with benefits driven by higher employment rates and wages for PICG graduates relative to if the courses had not been established. Through the end of 2021, total post-compact enrollment in PICG-supported courses fell short of what was projected in the CBA; enrollment for many grantees was dampened by the COVID-19 pandemic, which required providers to enroll only one cohort rather than two cohorts per year in 2020 and 2021. On the other hand, employment rates in the evaluation's tracer survey are similar to or higher than those assumed in the CBA model (although details vary depending on the specific survey-based measure of employment we use) and wages for PICG graduates also appear to be higher than assumed in the CBA model. The tracer survey data also validate the CBA model's assumed wage premium for the large, improved Tetnuldi IT support specialist level III course that is an important driver of the ERR; evidence for other courses is mixed and only available for a few courses because of sample size limitations. Updating the CBA model to reflect data from the evaluation is likely to have offsetting positive and negative effects on the ERR, and still result in a strongly positive ERR well above MCC's hurdle rate of 10 percent beyond which it considers an investment to be worthwhile.

RQ4. What were employer perceptions of the graduates from the PICG-supported courses, and how did the availability of these graduates affect their hiring and training plans?

Employers were satisfied with the skills of graduates from PICG-supported courses, but the courses have only directly affected hiring practices at a few employers and have generally not affected employers' training practices. The PICG-supported courses have affected the hiring practices of some employers through internships, dual employment and training programs, and direct relationships with providers for hiring trainees. However, these formal structures are limited to a few, larger employers in specific economic sectors (such as railways and the energy sector). Linkages between these courses and changes in employers' hiring practices are weaker in sectors with smaller firms (information technology) or where self-employment is more common (agriculture, tourism). Internships in particular are associated with a greater likelihood of employment, but the number of internship offers from employers appears to have fallen short of trainee demand. PICG-supported courses also do not appear to have affected employers' internal training needs. Employers reported that all new hires typically need further on-the-job training and more practical experience, regardless of whether they graduated from a PICG-supported course.

RQ5. Will PICG-supported courses be sustained after the compact?

Grantees continued to offer all of the PICG-supported courses two years after the end of the compact. When the compact ended, it was not clear if the grantees could successfully navigate the challenge of sustaining course enrollment and maintaining teaching facilities and teaching staff in the absence of outside grant support. In practice, nearly all of these courses demonstrated a strong pattern of sustainability in the post-compact period, with the providers showing sustained enrollment patterns. State voucher funding fully covers tuition at most PICG-courses, strongly supporting continued operations. Nearly half of the grantees also expanded into newly launched course-offerings that are related to the PICG-supported courses. Among the small number of courses facing sustainability challenges, difficulties included paying for high-quality teaching staff and maintaining international affiliations in the absence of grant funding, attracting trainees attracting trainees to the handful of courses where the full cost of tuition was not covered by government vouchers, and experiencing unforeseen shifts in the demand for trainees in certain professions (such as a possible decline in demand for trainees in occupational health and safety, due to limited enforcement of the relevant regulations). Several grantees are also recording graduation rates below 50 percent, which could threaten course sustainability over time.

B. Endline findings about the STPP, technical assistance, and annual conference components

In this section, we summarize the key findings on each of the evaluation questions for the non-PICG ISWD project components—STPP grants, technical assistance for policy reform, and the annual TVET conference. These key findings are as follows.

RQ6c. Is adopting best practices sustainable, and is the extent of adoption likely to increase in the future?

STPP grants supported some best practices that grantees sustained in the years after the compact, but there is limited evidence of widespread adoption. As described in the interim evaluation report, during the compact it appeared that most of the practices supported with STPP grants had the potential for wider adoption if these practices attracted adequate outside attention and support. However, after the compact there was limited evidence of broad-scale adoption of supported practices. In several cases, the STPP grants did support development of a new course or a new set of relationships between a grantee and other organizations that continued after the compact—an encouraging result given the small size of these investments. For example, Vocational College Icarus reported lasting internal changes resulting from its STPP grant, noting that it has continued to build on conference activities and employer relationships undertaken during the compact to deepen and institutionalize several related practices during the post-compact period. However, several STPP grantees consistently cited the absence of additional funding as a limiting factor. In several cases (such as efforts to develop online learning modules that require sustained updates and maintenance) initial efforts were abandoned after the compact due to a lack of resources. More widespread adoption of new practices by other providers might have also been hindered by challenges such as outside providers' lack of awareness, inadequate financial resources, and limited capacity.

RQ7b. Are the policy reforms supported by the project sustainable, and how are these policies expected to evolve?

Some of the project's technical assistance efforts may have contributed to important policy reforms after the compact, which have the potential to further strengthen the TVET sector in the future. Strong existing relationships between implementing staff, ministry staff, and other donors active in the TVET sector helped ensure that technical assistance to the MES and related agencies remained flexible, responsive to MES needs, and policy-relevant during the compact. Two areas of technical assistance progressed particularly strongly after the compact. First, the government's new Skills Agency established after the compact is establishing deeper public-private partnerships in the TVET sector in ways that build on the reform efforts supported by the ISWD project, including establishing sector skills organizations (which were an area of focus for the technical assistance efforts during the compact). Second, the QAF for TVET providers and courses that the compact helped develop has been directly codified by legislation, and the government's authorization procedures for TVET providers and courses durably reflect these reforms (although provider-level changes in quality assurance practices have been slower to change). Progress in other areas of technical assistance that the ISWD project supported (such as teacher professional development and adult learning) has been slower, although these topics remain priorities as part of Georgia's current TVET strategy.

RQ7c. Is there any evidence of a broader shift toward higher-level, industry-driven courses in the Georgian TVET sector? If so, what was the role of the project, and if not, why not?

A broader shift towards higher-level, industry-driven TVET diploma courses has not yet occurred. The PICG courses provided a strong example of how TVET course offerings in Georgia might be reoriented towards higher-level diploma courses that are aligned with labor market demand. Stakeholders agreed that a broader shift in this direction had not yet occurred because it was challenging for providers to identify market demand and develop new diploma courses beyond the PICG-supported courses. Instead, the most visible change in TVET offerings since the end of the compact has been a broad-based increase in the number of short certificate courses, which focus largely on upskilling or reskilling existing workers whose skills fall short of employers' needs. Some stakeholders reported that the closer engagement of the private sector with TVET providers under the new Skills Agency may help to facilitate a shift towards more industry-driven diploma courses in the future.

RQ8b. Is the annual TVET conference likely to be sustained in the future?

Annual conference activities continue in the form of an annual TVET awards ceremony, which has taken place each year since the end of the compact and is expected to continue in future years. The three annual TVET conferences held during the compact were well attended and well received by stakeholders. Attendees at these conferences included industry groups in certain sectors, TVET providers, government, and donors, among others. Following the compact these activities have continued in the form of an annual TVET awards ceremony. Two rounds of the ceremony have been conducted in the two years after the compact with close government involvement and public and private financial support, and a third will take place in the second half of 2022. Stakeholders expect the event to continue in future years, and report that these continued events have the potential to contribute to improving perceptions of TVET in Georgia in a sustained fashion.

C. Policy implications

This endline evaluation of the ISWD project has several important implications for the design and implementation of the future TVET programs and policies, both in Georgia and in other settings.

MCC's TVET programs are more likely to be sustainable if they account for expected post-compact funding levels and are carried out in the context of broader government reform efforts and commitments. The ISWD project appears to have met its objective of increasing the availability of STEM technicians to meet industry demand after the compact by sustaining compact-supported course offerings and TVET reforms. These efforts would not have succeeded in the absence of post-compact support from the Georgian government and other donor agencies. Interviews with PICG grantees suggest that financial commitments to sustain the PICG courses via government tuition vouchers were critical to the survival of these courses after the compact. Indeed, the handful of courses that did face challenges after the PICG grants ended consistently cited the fact that publicly subsidized tuition vouchers were insufficient to fund expensive course operations (such as paying for international teaching staff or funding very costly equipment and operations, as with the helicopter course). In other words, the providers that aligned the cost of their operations with the available post-compact stream of public funding tended to thrive, whereas the courses that depended more heavily on other funding sources (such as private tuition revenue from trainees) faced more sustainability risks.

Similarly, it proved critical to closely align the technical assistance provided during the compact to the priorities of the government and other donors, leading to successes in building on these reforms in the post-compact period under the government's newly created Skills Agency. While the formation of the Skills Agency is not solely or directly attributable to the ISWD project, there is a striking degree of continuity between the Skills Agency's areas of focus and the ISWD project's theory of change, particularly with respect to employer involvement in the TVET sector through public-private partnerships. The reforms embodied in the Skills Agency also appear to align very well with the principles MCC is pursuing in its latest round of TVET investments (Ricou and Moore 2020), suggesting that the sustained post-compact reform efforts in Georgia may provide a useful case-study relevant to MCC's investments in other country settings.

TVET providers need to strengthen systems for identifying and enrolling trainees who are ready to pursue careers in their chosen fields. The existing literature on TVET effectiveness focuses heavily on constraints related to employer demand for trainees—but creating a supply of graduating trainees interested in pursuing a relevant career is also critical to the success of these programs. Only about one-third of the trainees graduating from PICG-supported programs placed into a full-time job relevant to their training, and a major driver of this pattern was constraints related to labor supply. For example, many trainees chose to pursue other opportunities because they decided that they were no longer interested in their field of training, or because wages in their field were lower than expected. On the other hand, some providers achieved high rates of training-relevant job placements, so an improvement is certainly possible. Pathways for improving the trainee pipeline might include: (1) encouraging providers to more fully screen and support trainees (selecting trainees appropriately, supporting enrolled trainees to graduate, and providing effective career counseling and job-placement supports to help trainees set expectations appropriately and seek a successful job placement); (2) providing career guidance during secondary school to support students in making more informed choices about vocational education (as discussed in Chapter IV, this was a technical assistance area that the project sought to support during the compact, but progress has been slow since the compact ended); and (3) establishing a well-functioning labor market information system, so that trainees would have more realistic expectations about job

opportunities and wages (a practice MCC is currently pursuing in other country settings; Ricou and Moore [2020]).

There is a need for TVET providers to engage with a broader range of employers, rather than just a few large providers in specific sectors. A few of the PICG courses benefited from very strong relationships with large employers (as with courses in the energy and railway sectors), but these relationships proved more difficult to create in sectors where employment tends to be scattered across smaller firms (as with the information technology course). Developing broader private-sector links with smaller firms could have helped to provide better pathways to employment—especially for trainees who came out of the course with no experience. There is evidence that trainees who secured internships through their course (only one-third of all trainees) found job placements at a much higher rate, so it appears likely that broadening internship opportunities for trainees could be effective in improving their labor market outcomes. Pursuing links with a broader and more representative range of employers would also help these courses to adapt more quickly to changes in employer demand for particular professions and skills. This is an explicit area of focus under Georgia's new Skills Agency, which is establishing sector skills organizations with the objective of involving a broader range of employers in TVET governance.

Closing gender-based gaps in vocational training and the labor market will require more concerted effort. While the ISWD project intended to create equitable training opportunities for both men and women, in practice the program largely replicated existing gender-based disparities in the Georgian labor market. Enrollment in PICG-supported courses was 85 percent male, and there was also a large post-graduation earnings gap between male and female trainees, with median wages for females about one-third lower than males. A labor market study commissioned by MCA-Georgia in 2014 (around the start of the compact) included detailed recommendations about how to improve female participation in TVET courses in STEM fields. These included interventions such as vocational coaching and career guidance for girls in secondary school, scholarships for women trainees, more in-course supports focused on women, and employer outreach campaigns. However, given the complexity, cost, and long-term nature of many of these interventions, they were ultimately not included in the ISWD project. A key lesson from this project is that achieving greater female TVET participation in traditionally male-dominated fields requires a deeper level of support to increase women's interest in these fields and encourage those who are interested to enroll. Wage inequities in the labor market may be more difficult to address through TVET training programs. That said, if the issue is identified in advance as a major area of concern, future programs might consider asking employers (especially employers who are participating directly in planning and delivering TVET courses) to commit to the objective of strengthening the pipeline of female employees and paying these employees equitably. Addressing structural disparities in the training and labor markets requires attention, time, and effort, and addressing these issues will require investments that are equal to the scale of the problem (Ricou and Moore 2020).

There is strong evidence that investing in well-designed and sustainable TVET programs can improve trainees' labor market outcomes and produce a positive economic return, but these effects are likely to depend on the labor market context. The evaluation's benchmarking analyses suggest that compact-supported courses may have improved trainee employment rates and earnings meaningfully (boosting earnings by 10 to 21 percent, depending on the analysis). Overall, the evidence from this evaluation is also broadly consistent with the overarching conclusion from MCC's CBA for the project: these investments are likely to have produced a positive ERR above MCC's hurdle rate (10 percent). The findings also suggest that the Georgian labor market context played an important role in mediating the

effects of the project. The unexpected labor market shock of the pandemic appears to have played a role in generating positive effects on trainee employment, possibly because the PICG-supported courses were in fields in which employment was more resilient to the pandemic. Further, many trainees found jobs in fields that were not relevant to their course, reflecting a labor market context in which some TVET-related jobs offer low pay, and with fewer relevant positions for trainees without substantial work experience. This raises questions about whether certain PICG-supported courses were well-aligned with market demand for skills—a key assumption in the project's theory of change—despite the strong ERR. Overall, establishing new TVET programs and policy reforms is difficult work, and there is no guarantee that new or enhanced course offerings will establish a sustainable business model, identify trainees appropriately, involve employers adequately, and succeed in matching graduates to well-paid positions in their fields. The evidence from Georgia suggests that TVET does have the potential to position trainees to improve their employment and earnings outcomes, despite the very real and substantial challenge of ensuring that courses remain responsive to broader contextual changes in the labor market.

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Appendix A:

Experimental Evaluations of Vocational Training Programs in Low- and Middle-income Countries

Table A.1. Experimental evaluations of vocational training programs in low- and middle-income countries

Country	Study	Population	Follow-up period relative to end of training	Impact of the offer of training				Cost per trainee (USD)
				Employment (percentage points)	Formal employment (percentage points)	Earnings (percent)	Formal earnings (percent)	
Argentina	Alzúa et al. (2016)	Low-income youth	18 months	--	**8.0**	--	**64.9**	$1,722
		Low-income youth	33 months	--	4.3	--	23.1	
Colombia	Attanasio et al. (2011)	Low-income youth	14 months	**4.5**	**6.4**	**11.6**	**27.1**	$750
	Attanasio et al. (2015)	Low-income youth	Up to 10 years	--	**4.2**	--	**13.6**	
Dominican Republic	Card et al. (2011)	Low-income youth	12 months	0.7	2.2	10.8	--	$330
	Ibarrarán et al. (2014)	Low-income youth	18 to 24 months	-1.3	1.8	6.5	--	$700
	Ibarrarán et al. (2015)	Low-income youth	6 years	-1.4	2.6	-1.9	--	$700
	Acevedo et al. (2017)	Low-income youth	3 years	0.7	--	--	--	--
India	Maitra and Mani (2017)	Low-income women	18 months	**8.1**	--	**95.7**	--	$39
Kenya	Honorati (2015)	Low-income youth	14 months	**5.6**	--	29.7	--	$1,150
Malawi	Cho et al. (2013)	Low-income youth	4 months	--	--	-19.6	--	--
Peru	Diaz and Rosas (2016)	Low-income youth	36 months	1.6	**3.8**	13.4	--	$420
		Low-income youth	36 months	--	4.5	--	--	
Turkey	Hirshleifer et al. (2016)	Unemployed	1 year	2.0	2.0	5.8	8.6	$1,700
		Unemployed	2.5 years	--	-0.1	--	-0.8	

Source: McKenzie (2017).

Notes: Impacts that are statistically significant at the 5 percent level are in bold.

USD = United States Dollars; -- = not reported.

Appendix B:

Evaluation Sample for the Follow-up Tracer Survey

Table B.1. Sample of respondents for the follow-up survey of PICG-supported courses

Training provider	Course name	Level[a]	Duration (months)[b]	First cohort		Second cohort		Third cohort	
				Start date	Number of respondents[c]	Start date	Number of respondents[c]	Start date	Number of respondents[c]
Batumi State Maritime Academy	Welder	III	6	Dec 2017	23	Dec 2018	11	–	–
	Welder	IV	14	Dec 2017	20	Jul 2018	3	–	–
	Fishing vessel navigator	V	14	Dec 2017	16	May 2018	10	Dec 2018	25
	Cargo handling logistic operator	IV	12	Dec 2017	4	Jul 2018	5	–	–
	Port logistics manager	V	8	Dec 2017	7	Dec 2018	5	–	–
	Crane operator	III	7	Dec 2017	9	Jul 2018	8	Dec 2018	9
	Crane operator	IV	16	Dec 2017	7	–	–	–	–
Georgian Mountain Guide Association	Trekking guide	V[f]	11	–	–	Nov 2017	11	–	–
	Mountain guide	IV	16	Nov 2016	5	Dec 2018	26	–	–
Vocational College Phazisi	Fish breeding technician	IV	25	May 2018	12	–	–	–	–
	Fish processing specialist	IV	24	May 2018	7	–	–	–	–
	Fish laboratory technician	IV	25	May 2018	9	–	–	–	–
Vocational College Tetnuldi	IT support specialist[b]	III	11	Nov 2017	118	May 2018	37	Dec 2018	153
	Computer net administrator[b]	V	20	Nov 2017	11	May 2018	10	–	–
	Computer network and systems technician[b]	IV	17	Nov 2018	23	–	–	–	–
Georgian Aviation University	Helicopter pilot	V	24	Oct 2018	1	–	–	–	–
	Aircraft maintenance technician (B1.1)[d]	V	24	Feb 2018	12	Oct 2018	1	–	–
	Aircraft maintenance technician (B2)[d]	V	–	–	–	–	–	–	–
Community College Spektri	Welder	III	7	Nov 2017	11	May 2018	8	–	
	Welder	IV	16	–		May 2018	13	Dec 2018	7
	Electrician	III	10	Nov 2017	16	May 2018	17	–	
	Electrician	IV	16	Nov 2017	20	May 2018	7	–	
	Air-conditioning systems technician	IV	11	Nov 2017	7	May 2018	3	Dec 2018	8

Table B.1 (*continued*)

Training provider	Course name	Level[a]	Duration (months)[b]	First cohort		Second cohort		Third cohort	
				Start date	Number of respondents[c]	Start date	Number of respondents[c]	Start date	Number of respondents[c]
	Water supply systems exploitation technician	IV	10	May 2018	6	–	–	–	–
	Water sewage systems exploitation technician[e]	IV	–	–	–	–	–	–	–
Georgian Technical University	Mechanical engineer technician	V	24	Nov 2017	10	May 2018	8	Dec 2018	4
	Industrial automation technician	V	21	Nov 2017	9	May 2018	10	–	–
	Electrical technician, high voltage	IV	13	Nov 2017	16	May 2018	11	–	–
	Mechatronics technician	V	24	Nov 2017	15	Dec 2018	2	–	–
Georgia Railway Transport College	Construction of railway track	III	20	Dec 2018	21	–	–	–	–
	Railway power supply system's mechanic	IV	22	May 2018	3	Dec 2018	9	–	–
	Rolling stock mechanic	IV	20	Dec 2018	4	–	–	–	–
	Rail car maintenance mechanic	IV	20	Dec 2018	7	–	–	–	–
	Rail carrier	IV	20	Dec 2018	13	–	–	–	–
	Rail signalization, centralization and blocking mechanic	IV	20	Dec 2018	7	–	–	–	–
	Locomotive driver	IV	20	Dec 2018	15	–	–	–	–
	Monitor of railway track	III	18	May 2018	10	Dec 2018	8	–	–
Agricultural University of Georgia	Farmer/agribusiness manager	cert	7	Nov 2017	9	–	–	–	–
	Veterinary service specialist	cert	8	Nov 2017	7	Oct 2018	7	–	–
	Viticulturist-oenologist	cert	10	Sep 2017	25	Oct 2018	15	–	–
Georgian Institute of Public Affairs	Occupational health safety and environmental specialist/manager	V	22	Feb 2018	12	Sep 2018	14	–	–
Total	**–**	**–**	**–**	**–**	**527**	**–**	**259**	**–**	**206**

Source: Information on the number of respondents is from the follow-up tracer survey. Information on course duration and start date is from the baseline tracer survey.

[a] Levels run from I to V; higher values represent more sophisticated course content with more stringent entry requirements.

Table B.1 (*continued*)

[b] About half of the PICG-supported courses had varying course duration across cohorts, based on administrative data collected by GORBI; in those cases, we reported the modal duration. Also, Vocational College Tetnuldi offers its courses at different vocational colleges across Georgia; the duration shown in the table reflects the modal duration across all colleges and cohorts. The Tetnuldi courses at different locations also had various start dates; the table shows the modal start date across colleges.

[c] Dashes (–) indicate that no graduates for a specific cohort were available because (1) the course was not implemented (several courses), (2) the course had no enrollees (Community College Spektri water sewage systems exploitation technician course), (3) the first cohort had graduated before data collection was conducted (Community College Spektri level IV welder course and Georgian Mountain Guide Association trekking guide course), or (4) the second and/or third cohort had not yet enrolled when data collection was conducted (several courses).

[d] Trainees in these two courses were surveyed together because they were enrolled in the same module when the baseline survey was conducted; we are unable to separate out responses by course.

[e] This course did not have any enrollees when baseline data collection was conducted.

[f] This course was converted into a certificate course in fall 2020.

Table B.2. Sample of respondents for the follow-up survey of PICG-supported courses and linked pre-improvement courses

Provider	Course name	Level[a]	Duration (months)	Number of respondents
PICG-supported courses				
Vocational College Tetnuldi	IT support specialist[b]	III	11	308
	Computer network and systems technician[b]	IV	17	23
Georgia Railway Transport College	Construction of railway track	III	20	21
	Railway power supply system's mechanic	IV	22	12
	Rolling stock mechanic	IV	20	4
	Rail carrier	IV	20	13
	Rail signalization, centralization and blocking mechanic	IV	20	7
	Rail car maintenance mechanic	IV	20	7
Georgian Technical University	Mechanical engineer technician	V	24	22
Total	--	--	--	**417**
Pre-improvement courses				
Vocational College Tetnuldi	IT support specialist[a]	III	16	35
	IT[b]	III	8	35
	Computer network and systems technician[b]	III	10	20
	Internet technician (web specialist)	III	12	21
Georgian Technical University	Tracklayer	III	18	4
	Railway power supply system mechanic	III	18	6
	Rolling stock mechanic	III	18	9
	Rail carrier	III	10	10
	Rail signalization, centralization and blocking mechanic	III	18	8
	Rail car mechanic	III	18	6
	Mechanical engineer technician	III	10	2
Total	--	--	--	**156**

Source: Information on the duration of PICG-supported courses is the same as in Appendix Table B.1. Information on pre-improvement courses was collected from trainees by Mathematica's local consultant during initial baseline data collection.

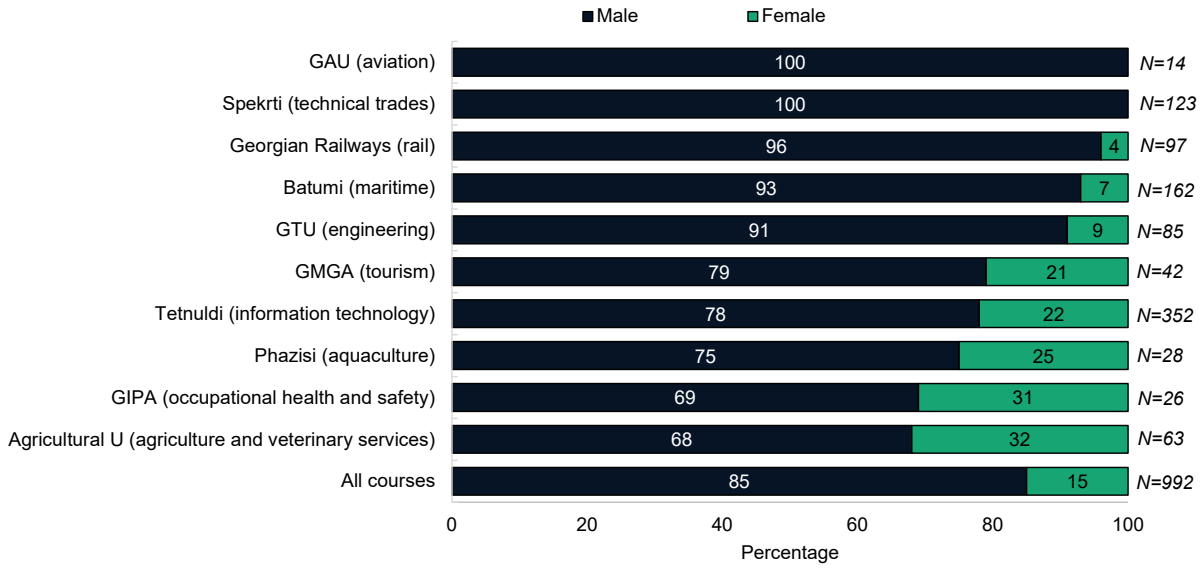
[a] Levels run from I to V; higher values represent more sophisticated course content with more stringent entry requirements.

[b] Vocational College Tetnuldi offers these courses at different vocational colleges across Georgia. For the PICG-supported courses, the table shows the modal duration across colleges, and for the pre-improvement courses it shows the modal duration across trainees (because there was some variation in trainee responses within colleges).

Appendix C:

Gender of Trainees in PICG-supported Courses

Figure C.1. Gender of trainees in PICG-supported courses, by grantee



Source: Baseline tracer survey.

Appendix D:

Sustainability of PICG-supported Courses

Table D.1. Sustainability of PICG-supported courses

✓ = no current risk; ⏸ = medium risk; ⛔ = high risk.

Grantee / course name (current level)	Current status	Trainee demand	Supply of qualified teachers	Sufficient course funding	Grantee-level enrollment patterns	Additional notes
Batumi						
Welder (III)	✓	✓	✓	✓	Enrollment has been consistently near capacity during and after the end of the Compact, with a recent large increase for the fall 2021 semester (Figure III.18).	The grantee has opened another branch in Poti, where it plans to implement the same courses. During the grant period, graduates received an international certificate. This is no longer provided due to lack of funding now that the grant has ended.
Welder (IV)	✓	✓	✓	✓		
Fishing vessel navigator (V)	✓	✓	✓	✓		
Cargo handling logistic operator (IV)	✓	✓	✓	✓		
Port logistics manager (V)	✓	✓	✓	✓		
Crane operator (III)	✓	✓	✓	✓		
Crane operator (IV)	✓	✓	✓	✓		
GMGA						
Trekking guide (formerly V, now certificate)	✓	✓	⏸	✓	The demand for these courses has been high recently and close to capacity, although there was a temporary pause in enrollment immediately after the end of the Compact (Figure III.18). There is some fluctuation by season because the trekking guide course has different versions for fall and spring enrollment.	Trekking guide was a diploma program but became an accredited certificate program. It did not meet the criteria to remain a diploma program any longer (content and curriculum has not changed but grantee would need to increase number of modules and hours to qualify). There is a lack of local specialists because they are busy during high tourism seasons. The grantee needs additional funding to continue inviting foreign specialists to train teachers. It is working with donors and the government to address this.
Mountain guide (IV)	✓	✓	⏸	✓		

Table D.1 (*continued*)

Grantee / course name (current level)	Current status	Trainee demand	Supply of qualified teachers	Sufficient course funding	Grantee-level enrollment patterns	Additional notes
Phazisi						
Fish breeding technician (IV)	✓	✓	✓	✓	Enrollment has resumed after a pandemic-related pause and is close to capacity (Figure III.18). However, capacity has been temporarily reduced to accommodate an extended training period for pandemic-affected cohorts.	The grantee continues to offer these courses and stated that there is no decrease in demand from trainees. (The lower recent enrollment numbers are related to capacity, which is temporary lower because of the pandemic.) The grantee is expanding these courses to offer them at another location as well.
Fish processing specialist (IV)	✓	✓	✓	✓		
Fish laboratory technician (IV)	✓	✓	✓	✓		
Tetnuldi						
IT support specialist (III)	✓	✓	▯▯	✓	Enrollment has continued to be strong and near capacity in the post-compact period (Figure III.18). According to the grantee, the demand from trainees for these courses is strong because this profession is in high demand.	Initially there were 8 locations; the grantee has since expanded to 10 locations. Retaining teachers with higher qualifications is a challenge as they are needed for higher-level courses.
Computer network administrator (V)	✓	✓	▯▯	✓		
Computer network and systems technician (IV)	✓	✓	▯▯	✓		
GAU						
Helicopter pilot (V)	✓	▯▯	✓	⛔	Enrollment has been consistently low since the end of the Compact (single digits) (Figure III.18). The number of available slots for these courses is much higher than the number of enrolling trainees.	The helicopter course is the most expensive course in the country and is only partially subsidized by state voucher funding. The grantee partnered with a bank to provide student loans, but enrollment remains low.
Aircraft maintenance technician (B1.1) (V)	✓	▯▯	✓	✓		
Aircraft maintenance technician (B2) (V)	✓	▯▯	✓	✓		
Spektri						
Welder (III)	✓	✓	▯▯	✓	Enrollment has continued to be strong and near capacity in the post-compact period (Figure III.18). The grantee suggested that the demand for these professions is high because there is a large outflow of workers moving abroad, leading to local shortages of workers in these fields.	During the grant period, the grantee had funding to bring in foreign experts to train teachers. However, the grantee can no longer sustain this, and there is a shortage of qualified teachers. The grantee can also no longer issue international certificates due to a lack of funding now that the grant has ended.
Welder (IV)	✓	✓	▯▯	✓		
Electrician (III)	✓	✓	▯▯	✓		
Electrician (IV)	✓	✓	▯▯	✓		
Air-conditioning systems technician (IV)	✓	✓	▯▯	✓		
Water supply systems exploitation technician (IV)	✓	✓	▯▯	✓		
Water sewage systems exploitation technician (IV)	✓	✓	▯▯	✓		

Table D.1 (*continued*)

Grantee / course name (current level)	Current status	Trainee demand	Supply of qualified teachers	Sufficient course funding	Grantee-level enrollment patterns	Additional notes
GTU						
Mechanical engineer technician (V)	✓	✓	✓	✓	Enrollment has continued to be strong and near capacity in the post-Compact period (Figure III.18).	The grantee will continue to offer these courses as long as there is demand from students and state voucher funding.
Industrial automation technician (V)	✓	✓	✓	✓		
Electrical technician, high voltage (IV)	✓	✓	✓	✓		
Mechatronics technician (V)	✓	✓	✓	✓		
Georgian Railways						
Construction of railway track (III)	✓	✓	✓	✓	Enrollment has been near capacity in the post-Compact period; capacity and enrollment have increased for the fall 2021 semester (Figure III.18).	The grantee will continue to offer all eight courses because the Georgian Railway needs employees. Currently there is a large outflow of retired workers so new workers are needed. The grantee, which was established as a TVET provider through compact support, has also created four new diploma courses since the end of the compact.
Railway power supply system's mechanic (IV)	✓	✓	✓	✓		
Rolling stock mechanic (IV)	✓	✓	✓	✓		
Rail car maintenance mechanic (IV)	✓	✓	✓	✓		
Rail carrier (IV)	✓	✓	✓	✓		
Rail signalization, centralization and blocking mechanic (IV)	✓	✓	✓	✓		
Locomotive driver (IV)	✓	✓	✓	✓		
Monitor of railway track (III)	✓	✓	✓	✓		
Agricultural University						
Farmer/agribusiness manager (certificate)	✓	✓	✓	✓	None of the courses has enrolled trainees since the fall 2019 semester (Figure III.18); they were suspended during the pandemic because the grantee was unable to offer the core in-person practical component. However, these courses will all reopen in the fall 2022 semester.	The courses at this provider do not qualify for state voucher funding and are currently fully funded by student tuition fees. Nevertheless, demand for the reopened courses in the fall 2022 semester has been strong, with a large number of applicants that exceeds the number of available slots.
Veterinary service specialist (certificate)	✓	✓	✓	✓		
Viticulturist-oenologist (certificate)	✓	✓	✓	✓		

Table D.1 (*continued*)

Grantee / course name (current level)	Current status	Trainee demand	Supply of qualified teachers	Sufficient course funding	Grantee-level enrollment patterns	Additional notes
GIPA						
Occupational health safety and environmental specialist/manager (V)	✓	⏸	✓	✓	Enrollment has been at capacity in the post-compact period; the grantee has increased capacity due to high demand (Figure III.18).	The grantee raised the tuition cost (which is subsidized by state voucher funding), and it is one of the most profitable courses at GIPA. According to the grantee, enforcement of labor safety rules in Georgia is lacking and there is no punishment for violations, which could reduce the need for this profession in the future (although demand has so far been strong in the post-compact period).

Source: Grantee interviews and administrative data MCA-Georgia and the Millennium Foundation collected from grantees.

Appendix E:

Assessment of Assumptions in the Closeout CBA Model

Table E.1. Enrollment and graduation in administrative data compared to closeout CBA assumptions, by provider

Difference of less than 50 ([a] shaded in gray)
Negative difference of 50–100 ([b] shaded in light pink)
Negative difference of more than 100 ([c] shaded in red)
Positive difference of 50–100 ([d] shaded in light green)

	Number of enrollees through 2021			Number of graduates through 2021			
	Admin data	CBA	Diff	Admin data	CBA	Diff	Projected enrollment patterns beyond 2021
Batumi	585	564	21[a]	301	355	-54[b]	The long-term CBA projections for enrollment (increasing from 131 enrollees in 2022 to 205 per year by 2036) are consistent with the total number of enrollees in 2021 (197). However, high dropout rates could continue to dampen the number of graduates relative to the projections.
GMGA	153	105	48[a]	102	57	45[a]	The long-term CBA projections are 30 enrollees in the mountain guide level IV course and 15 enrollees in the trekking guide level V course every two years. For the mountain guide course, these projections align with the administrative data, However, the trekking guide course was recently split into two short certificate courses that saw high enrollment levels (50 enrollees between fall 2020 and spring 2021). Therefore, the projected enrollments for this course might be underestimated; at the same time, the benefits per graduate might be lower than a full diploma course.
Phasizi	84	124	-40[a]	29	55	-26[a]	The long-term CBA projections of between 96 and 124 enrollees every three years is substantially higher than the 41 enrollees seen in the three years between 2019 and 2021. However, the extent to which enrollments will recover after the pandemic remains to be seen; enrollment decreased substantially during the pandemic relative to previous years.
Tenuldi	1,110	1,541	-441[c]	645	884	-239[c]	The long-term CBA projections for enrollment (increasing from 368 enrollees in 2022 to 479 per year by 2036) are plausible given the last pre-pandemic enrollment (331 in 2019) but much higher than enrollment during the pandemic (141 in 2020 and 124 in 2021). The extent to which enrollments will recover after the pandemic remains to be seen.
GAU	61	77	-16[a]	19	25	-6[a]	The long-term CBA projections for enrollment (increasing from 18 enrollees in 2022 to 45 per year by 2036) might be overestimated given a downward trend since these courses were established (most recently, 11 in 2019, 8 in 2020, and 4 in 2021).
Spektri	636	880	-244[c]	202	303	-101[c]	The long-term CBA projections for enrollment (increasing from 223 enrollees in 2022 to 282 per year by 2036) might be overestimated given that 2021 enrollments were less than half of that (likely because the pandemic resulted in a single intake). The extent to which enrollments will recover after the pandemic remains to be seen; the projected enrollment levels in the CBA model were last seen in 2019.
GTU	232	316	-84[b]	93	147	-54[b]	These courses have had only one intake per year since 2019 (even before the pandemic). The long-term CBA projections for enrollment (increasing from 68 enrollees in 2022 to 94 per year by 2036) might be overestimated unless there is a strong post-pandemic recovery, as enrollment has been about half of that for the past three years.

Table E.1 (*continued*)

	Number of enrollees through 2021			Number of graduates through 2021			
	Admin data	CBA	Diff	Admin data	CBA	Diff	Projected enrollment patterns beyond 2021
Georgian Railways	620	1126	-506[c]	67	415	-348[c]	The long-term CBA projections for enrollment (increasing from 305 enrollees in 2022 to 392 per year by 2036) are substantially larger than recent enrollments, suggesting that they might be overestimated. However, it remains to be seen how enrollment will recover after the pandemic, which substantially affected enrollment in the past two years (only one intake per year, with much reduced numbers in 2020).
Agricultural University	230	365	-135[c]	131	192	-61[b]	The number of enrollees and graduates to date has fallen behind the CBA projections, in large part because these courses have not operated since fall 2019 due to the pandemic. All three courses will resume in fall 2022.
GIPA	217	147	70[d]	69	65	4[a]	The number of enrollees through 2021 was higher than CBA projections, but higher dropout rates led the provider to generate a similar number of graduates relative to assumptions in the CBA. It is plausible that this pattern will continue in the long term. Specifically, the long-term CBA projections for enrollment (increasing from 25 enrollees in 2022 to 36 per year by 2036) might be underestimated given enrollment of 48 per year over the past three years, but high dropout rates would produce a number of graduates that is similar to what is projected.
Total	**3,928**	**5,245**	**-1,327**	**1,658**	**2,498**	**-840**	

Source: Administrative data from MCA-Georgia and the Millennium Foundation, and MCC's closeout CBA model.

Note: We focus on absolute rather than percent differences because the absolute numbers of graduates drives benefits in the CBA model.

Table E.2. Employment rates, wages, and wage premia in survey data compared to closeout CBA assumptions, by course

Differences of 5 percentage points or less in employment/1,000 GEL or less in wages ([a] shaded in gray)

Negative differences of 5–10 percentage points in employment/1,000–2,000 GEL in wages ([b] shaded in light pink)

Negative differences of more than 10 percentage points in employment/more than 2,000 GEL in wages ([c] shaded in red)

Positive differences of 5–10 percentage points in employment/1,000–2,000 GEL in wages ([d] shaded in light green)

Positive differences of more than 10 percentage points in employment/more than 2,000 GEL in wages ([e] shaded in dark green)

	Employment rate			2020 annual wages (2013 GEL)		Wage premium (2013 GEL)		
	Closeout CBA	Observed employment during the first year	Observed employment at 12-month follow-up	Closeout CBA	Observed wage level	Closeout CBA	Evaluation: course pre-post	Evaluation: trainee pre-post
Batumi								
Welder (III)	79%	76%[a]	53%[c]	9,133	11,364[e]	830	--	-1,080[c]
Welder (IV)	75%	78%[a]	61%[c]	9,008	8,484[a]	--	--	--
Fishing vessel navigator (V)	75%	95%[e]	78%[a]	12,869	11,520[b]	2,491	--	156[c]
Port logistics manager (V)	75%	75%[a]	50%[c]	--	--	--	--	--
Crane operator (III)	79%	85%[d]	69%[b]	9,133	12,324[e]	830	--	3,204[e]
GMGA								
Trekking guide (formerly V, now certificate)	80%	91%[e]	91%[e]	--	--	--	--	--
Mountain guide (IV)	78%	87%[d]	68%[b]	8,897	15,420[e]	1,483	--	-516[c]
Phasizi								
Fish breeding technician (IV)	80%	92%[e]	83%[a]	--	--	--	--	--
Tetnuldi								
IT support specialist (III)	80%	66%[c]	46%[c]	6,746	7,242[a]	1,557	1,920[a]	660[a]
Computer net administrator (V)	74%	86%[e]	62%[c]	7,722	7,680[a]	--	--	--
Computer network and systems technician (IV)	74%	70%[a]	52%[c]	--	--	--	--	--

Table E.2 (*continued*)

	Employment rate			2020 annual wages (2013 GEL)		Wage premium (2013 GEL)		
	Closeout CBA	Observed employment during the first year	Observed employment at 12-month follow-up	Closeout CBA	Observed wage level	Closeout CBA	Evaluation: course pre-post	Evaluation: trainee pre-post
GAU								
Aircraft maintenance technician (B1.1) (B2) (V)	69%	85%[e]	85%[e]	--	--	--	--	--
Spektri								
Welder (III)	75%	89%[e]	74%[a]	11,640	11,148[a]	2,218	--	1,224[a]
Welder (IV)	81%	90%[d]	65%[c]	--	--	--	--	--
Electrician (III)	75%	88%[e]	64%[c]	11,186	9,612[b]	2,165	--	-648[c]
Electrician (IV)	81%	93%[e]	93%[e]	10,599	13,140[e]	2,052	--	4,440[e]
Air-conditioning systems technician (IV)	81%	78%[a]	67%[c]	--	--	--	--	--
GTU								
Mechanical engineer technician (V)	77%	82%[a]	73%[a]	--	--	--	--	--
Industrial automation technician (V)	77%	79%[a]	79%[a]	--	--	--	--	--
Electrical technician, high voltage (IV)	77%	85%[d]	78%[a]	7,882	9,024[d]	--	--	--
Mechatronics technician (V)	77%	94%[e]	76%[a]	8,669	11,124[e]	1,678	--	3,576[d]
Georgia Railways								
Construction of railway track (III)	79%	100%[e]	100%[e]	7,268	6,312[a]	661	--	348[a]
Railway power supply system's mechanic (IV)	79%	92%[e]	92%[e]	--	--	--	--	--
Rail carrier (IV)	79%	85%[d]	77%[a]	--	--	--	--	--
Locomotive driver (IV)	83%	93%[d]	87%[a]	--	--	--	--	--
Monitor of railway track (III)	83%	94%[e]	89%[d]	6,545	8,052[d]	--	--	--
Agricultural University								
Veterinary service specialist (certificate)	82%	64%[c]	43%[c]	--	--	--	--	--

Table E.2 (*continued*)

	Employment rate			2020 annual wages (2013 GEL)		Wage premium (2013 GEL)		
	Closeout CBA	Observed employment during the first year	Observed employment at 12-month follow-up	Closeout CBA	Observed wage level	Closeout CBA	Evaluation: course pre-post	Evaluation: trainee pre-post
Viticulturist-oenologist (cert)	82%	75%[b]	70%[c]	13,699	11,448[c]	1,245	--	-1,632[c]
GIPA								
Occupational health safety and environmental specialist/manager (V)	79%	65%[c]	46%[c]	--	--	--	--	--

Source: Follow-up tracer survey data and MCC's closeout CBA model.

Note: We focus on absolute rather than percent differences because the absolute numbers of graduates drives benefits in the CBA model. Cells with fewer than 10 observations are denoted "--".

Appendix F:

Sustainability of Practices Developed Under STPP Grants

Table F.1. Sustainability of practices developed under STPP grants

Grantee	Project name (grant amount)	Project description	Findings from final interviews
Grantees whose practices were partially or fully sustained			
Vocational College Icarus	Employers' Forum for Industry Engagement in TVET Sector ($10,000)	Increase the responsiveness of the college's tourism courses to labor market needs. The project identified needs through trainee and employer surveys, and modified its courses accordingly. It also developed an electronic resources portal for trainees, teachers, and employers. The project convened an employers' forum (conference) to share the results of the project, demonstrate the electronic portal, and promote training in the tourism sector.	• The employer's conference continued for one year after the grant ended, funded by the college. Representatives from partner colleges in Georgia and abroad attended, as well as employers. The grantee had to cancel the conference in the past two years due to the pandemic. The grantee plans to continue organizing the conference in the future as long as the pandemic restrictions are lifted. • The grantee paused the electronic resources portal developed through the grant due to the pandemic but expects it to become active again in 2022. • The grantee has used some electronic resources developed through the grant for remote instruction (for example, master classes taught by chefs, which were developed as part of conference activities). • The grantee has more than doubled the number of employers and partner organizations they are associated with since the STPP grant, which they attribute to the engagement promoted by the grant. • The grantee continues to conduct regular, systematic research with employers and graduates to learn what skills are needed in the tourism sector and determine what specific positions their courses should focus on, as promoted by the project.
The Georgian Patriarchate Community College of Decorative Gardening	Promoting TVET Related to Decorative Gardening Professions Among General School Students ($10,000)	Develop and pilot an integrated lesson in decorative gardening for general education students to increase their interest in the profession and vocational training in the field (which the grantee offers). Teachers were trained and the lesson was delivered to more than 20 schools in Tbilisi.	• Teachers who were trained during the grant are still in contact with the grantee to request field visits to the college for their classes, and to refer to the college students who are interested in pursuing the vocation after graduating from school. This indicates continued interest and engagement by the teachers who were originally trained, although the extent to which they are still implementing the lesson itself is unclear. • The materials created during the grant period are still available on the grantee website, but the grantee is not aware of whether they have been used more broadly. The grantee is being contacted by other schools (not just those that participated in the grant) to request site visits to the college, but it is unclear if this is related directly to the materials produced under the grant.

Table F.1 (*continued*)

Grantee	Project name (grant amount)	Project description	Findings from final interviews
Georgian Technical University	Development of E-Learning Course in Information Technology ($10,000)	Develop a web-based electronic course on basic information technology for TVET trainees, which was piloted in 12 colleges.	• The grantee does not know if the course was ever more widely adopted beyond the 12 colleges engaged during the grant period. • However, the content in the course has now become outdated (it is based on an obsolete operating system). The grantee thinks that if the content gets updated, more colleges will be interested in this course. • Even if the material is updated, a lack of electronic management systems for e-courses might still constrain adoption. Many colleges do not have these systems set up and do not have the funds to hire IT specialists to do so.
Kutaisi Public School #33	Social Enterprise in Public Schools ($9,894)	Develop and implement short vocational training courses for general education (secondary school) students at the grantee and four partner schools, as a first step in their professional education. Participants received some business experience by selling their products created during the courses (furniture, clothing, and mushrooms) at a charity exhibition.	• The sewing, furniture production, and mushroom cultivation courses lasted for two or three years after the grant (the sewing course with the support of another donor), but were then suspended because of the pandemic and have not resumed. • The computer course continues. This course continues in the form of a “coding club” where teachers teach programming to their students. • The school and its staff view computer skills as a priority and are therefore willing to devote their own resources to continuing that course. Other courses are unlikely to resume without funding. Initially, the school sold the products students made in these courses but there was no legal way to repurpose those funds to continue funding the courses. The grantee would need support in setting up the appropriate legal structure (a social enterprise) to facilitate this.
Akaki Tsereteli State University	New Professional Personnel for the Use of Solar Energy ($19,900) and New Professional Personnel for the Green Building Sector in Georgia ($20,000)	Develop and implement two new, short vocational training courses in maintenance of solar energy equipment and three short vocational training courses in green (energy efficient) building. The projects also included other activities to support training and employment opportunities in the field of energy, including a summer camp for school children, a workshop on TVET programs in clean energy, and an employment forum for graduates from the new courses.	• All the training courses created under the grant are still active, under the University’s continuing education sector. Anyone can contact the center and the trainings will be implemented for them for a fee. • However, there have been only a handful of participants in these training courses since the compact ended; they were also suspended for a time because of the pandemic. The University is not seeing high demand for these courses as these fields are still underdeveloped in Georgia. • The University plans to create a center in these fields to offer re-training courses for employees in solar energy and green building, as well as other areas related to reducing carbon emissions.

Table F.1 (*continued*)

Grantee	Project name (grant amount)	Project description	Findings from final interviews
Grantees whose practices were not sustained			
Mindworks Ltd.	Flipped Classroom Deployment in Bleksi and Erkvani Colleges ($17,500)	Introduce an innovative model of teaching and learning that expands the range of activities conducted in the classroom. A Georgian language handbook for implementation was created and the model was piloted in two colleges.	• During the grant period, the management at the two participating colleges was very interested in participating but teachers were not. The budget of the grant did not provide monetary compensation for teachers, so teachers were not motivated or very engaged in the training. However, the potential for adoption by these colleges might have improved during the pandemic, as the practice was highly relevant for remote instruction. • The grantee thinks the training materials they prepared became especially relevant during the pandemic. The posting on their website still gets engagement via likes and shares, although it is difficult to say how this might translate into adoption. • One entrepreneurial teacher reached out to the grantee to ask for the training materials so she could use them to provide consulting services to private schools on how to implement these materials; this is an important avenue for potentially broader adoption.
EasySoft Ltd.	Learning Platform of Innovation Technology for Professional Education ($16,885)	Develop a modular training course for a type of software that enhances the use of industrial laboratories at TVET providers. Trainings were conducted for teachers from several providers and a web-based learning platform was created to make the course more widely available for teachers and trainees.	• The grantee created marketing and communication materials to promote the original video tutorials but exceeded their budget by 50 percent. They had hoped for more support from private sector partners. Because of the high costs, they are not eager to continue this work. Also, there was not a lot of engagement (only two organizations contacted them to express interest in the materials). • The software the tutorial is based on is being updated constantly and the materials uploaded on the website already need to be updated, but the grantee does not have the funding to do that. • The grantee stopped the hosting domain (which housed these tutorials) in the summer of 2021.
Business Academy of Georgia	Development of assessment tools for the Entrepreneurship and Introductory Practice Modules ($9,350)	Develop competence-based assessment tools for two new compulsory TVET modules and pilot them in 10 colleges.	• The grantee has updated the assessment tools to reflect changes to the underlying modules. • The grantee is no longer in communication with the 10 colleges in which the tools were piloted and has not partnered with any new institutions to implement this tool since the grant ended. • The materials are still available on the grantee's website and interested parties can download and use them, but the extent to which this has occurred is unclear.

Appendix G:

Follow-up Tracer Survey Instrument

Survey supplement for those not employed in a job relevant to training since graduation

Hello. Is this [RESPONDENT'S NAME]? My name is [INTERVIEWER'S NAME]. I'm calling you from GORBI in Tbilisi. We are working with Mathematica, an American company that is conducting a study and evaluation of vocational training in Georgia. You might remember that we spoke with you a few months ago and asked you some questions about yourself and your personal experience with vocational training and employment. We are calling today to ask a few short additional questions for our study, which should only take 5 minutes of your time.

Like the last time we spoke, your responses are very important to help improve the success of vocational training. Any information you provide that can identify you will be kept confidential by the parties conducting this study to the maximum extent permitted by the laws of the United States of America and the laws of the country of Georgia. These users will use data for statistical purposes only.

It is your choice whether to answer our questions or not. There are no risks and no direct benefits to you in answering them. If you feel uneasy with any of the questions, you can refuse to answer without any penalty.

And if you have any questions, concerns or complaints about this survey or your rights as a participant, you may call [Consultant Name] at [Local Phone Number].

Would you like me to repeat any of the information I just provided? Do you have any questions before we begin?

INTERVIEWER: ANSWER ANY QUESTIONS ASKED AND THEN CONTINUE WITH Q1.

1. When we last spoke in [MONTH/YEAR INITIAL INTERVIEW COMPLETED], we understood that in the period since you left your vocational training course you had *not* worked in a paid job or self-employment in the same field as your vocational training. Is that correct?

   1 ☐ That is correct, I did not work in a relevant job
   2 ☐ That is not correct, I did work in a relevant job — GO TO Q4
   d ☐ Don't know — GO TO Q9
   r ☐ Refused — GO TO Q9

2. I will now read several reasons that might explain why you did not work in in a paid job or self-employment in the same field as your vocational training over this period. Please tell me whether each of these reasons applied in your case.

   INTERVIEWER: READ EACH REASON AND MARK WHETHER OR NOT IT WAS APPLICABLE (1 = Yes, 2 = No, d = don't know, r = refused).

   a. Employers offer limited job opportunities relevant to my field of training 1 ☐ 2 ☐ d ☐ r ☐
   b. I lack the work experience required by employers 1 ☐ 2 ☐ d ☐ r ☐
   c. I lack the technical skills required by employers 1 ☐ 2 ☐ d ☐ r ☐
   d. Employers offer pay that is too low 1 ☐ 2 ☐ d ☐ r ☐
   e. I was not available for work 1 ☐ 2 ☐ d ☐ r ☐

f. I was not interested in taking on a job in this field 1☐ 2☐ d☐ r☐
g. The economic downturn caused by the COVID-19 pandemic 1☐ 2☐ d☐ r☐
h. Other (specify)_____ 1☐ 2☐ d☐ r☐

IF THE RESPONDENT SELECTED ONE OR ZERO "YES"S, GO TO Q5

3. What was the <u>main reason</u> why you did not work in in a paid job or self-employment in the same field as your vocational training over this period?

INTERVIEWER: MARK ONE RESPONSE ONLY. YOU MAY ONLY MARK OPTIONS SELECTED AS "YES" IN Q2.

1☐ Employers offer limited job opportunities relevant to my field of training
2☐ I lack the work experience required by employers
3☐ I lack the technical skills required by employers
4☐ Employers offer pay that is too low
5☐ I was not available for work
6☐ I was not interested in taking on a job in this field
7☐ The economic downturn caused by the COVID-19 pandemic
8☐ Other (specify)_____
d☐ Don't know
r☐ Refused

GO TO Q5

4. To make sure I understand correctly, in the period since you left your vocational training course to [MONTH/YEAR INITIAL INTERVIEW COMPLETED], did you work at a paid job or were you self-employed in the same field as your vocational training at any time? Please only include jobs or self-employment activities that generated an income. Do not include internships.

1☐ Yes	GO TO Q9
2☐ No	GO TO Q2
d☐ Don't know	GO TO Q9
r☐ Refused	GO TO Q9

5. Did you search for any jobs in the same field as your vocational training over this period?

1☐ Yes	
2☐ No	GO TO Q9
d☐ Don't know	GO TO Q9
r☐ Refused	GO TO Q9

6. Did you find any job openings in the same field as your vocational training over this period?

   1 ☐ Yes
   2 ☐ No — GO TO Q9
   d ☐ Don't know — GO TO Q9
   r ☐ Refused — GO TO Q9

7. Did you apply for any jobs in the same field as your vocational training over this period?

   1 ☐ Yes
   2 ☐ No — GO TO Q9
   d ☐ Don't know — GO TO Q9
   r ☐ Refused — GO TO Q9

8. Were you invited to any interviews for any jobs in the same field as your vocational training over this period? Please include interviews that were conducted in person, by phone, or virtually.

   1 ☐ Yes
   2 ☐ No
   d ☐ Don't know
   r ☐ Refused

9. Thank you for your time and patience! We have reached the end of the survey. If you have any questions about this survey, please contact Dr. Natia Gorgadze at [Local Phone Number].

   INTERVIEWER: END THE CALL.

Appendix H:

Responses to Stakeholder Comments

Table H.1. Responses to stakeholder comments

No.	Page	Comment	Evaluator response
1	iii	Technically Jenny is the contracting officers representative (COR), Jackie is the CO	Modified.
2	iii	Spell out PEM, or explain what the company is? I've never seen it spelled out but it seems odd to have the acronym without an explanation	PEM does not appear to be an acronym, but we have clarified in the text that they are an international development firm that led implementation.
3	vii	A. Overview of the Georgia Compact and interventions evaluated i am not sure where this should fit in exactly, but somewhere in the exec summary it should state the STEM fields the TVET providers represented (for example you list on p. 1: IT, ag, veterinary services, aquaculture, etc.)	We have added the list of fields to the ES.
4	vii	B. Evaluation Type Please mention the MCC-standardized methodology type of this eval as, “pre-post with comparison population.” Please also mention the MCC-standardized methodology type in Section II. Eval design > B. Eval Design (p. 9)	As discussed during the drafting of the evaluation brief, we do not believe that this label is accurate, but have added a more accurate description in the ES and body of the report.
5	vii	"These efforts were conducted in coordination with other TVET-related technical assistance provided contemporaneously to the MES by other donors." • Please insert footnote listing other donors.	Added (in the text).
6	ix	"the courses enrolled 1,935 trainees in MCC-supported courses by the end of the compact in July 2019 (exceeding the compact’s target of 1,500 enrollees by about 30 percent)..." • reword: "1,935 trainees had enrolled in MCC-supported courses..."	Modified.
7	ix	Component 1, 2, 3, 4 • Please include the descriptive titles of the components from p. vii	Added.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
8	ix	C. Implementation Summary does not need so much detail, when it is only summarizing the Interim Report I think that we cut down this text considerably and can instead reframe this section to address General Eval Q #1: (1) To what extent was the project implemented according to plan (in terms of quantity and quality of outputs)?	We would prefer to retain this text. The feedback from our internal reviewer was that the report was difficult to follow for an external reader without this background; for the report to be more widely used, it would be helpful to include it. As we note at the start of this section, "This evaluation's interim evaluation report (Borkum et al. 2019) found that the project had been implemented in a manner that closely aligned with the project's original theory of change, meeting most of the project's implementation and output targets." We have added an explicit reference in the text that this addresses evaluation questions 1 and 2 (with more detail in the interim report).
9	ix	RQ3. • add section sub-headers for "Employment" and "Wages" • make it clear to the reader which dimensions of employment and wages were explored early on in the section/paragraph, before diving into the particulars of results • for employment, answer the questions: ALL PICG TRAINEES: **1.** are PICG trainees employed? **2.** How quickly found employment? **3.** Maintain their employment over time? OF THOSE EMPLOYED: **4.** Where employed? Note: Half went back to previous employer **5.** In what industry? **6.** Formal/informal? Where appropriate, answer the question, "why?" (MPR analysis of why data showed what it did) Where appropriate, answer how employment outcomes compare to relevant comparison group	Our updated draft includes edits that more clearly separate the findings on employment rates from the findings on wages. We cover most of the points raised in the comment in the employment findings, but would prefer to retain the (revised) structure to keep the executive summary concise and focused on the main takeaways.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
10	x	Figure ES.1 "Since leaving the PICG-supported course" • Reword: "Ever employed since the end of the PICG-supported course" or some other neutral wording, since it includes graduates + dropouts Apply all changes to Figures wherever they appear in Report (since the ones in ES also appear later on in the report).	Modified to address this comment while limiting the number of words in the revised phrase for readability.
11	x	"At follow-up, about one year after leaving the course" • Discuss with MPR how best to word this, given not all survey at BL completed the course • Reword: "At follow-up, about one year after the course ended" or some other neutral wording • Be very clear that according to p. 23, PICG trainees refers to trainees who go on to complete the course (graduates) and those who did not complete the training. • This wording also holds for Figure ES 1. "Since leaving the PICG-supported course" • Reword: "Since enrolling in/[the end of] the PICG-supported course" or some other neutral wording	• We have modified the wording throughout • The ES notes ". Our analysis sample is based on trainees who were administered a baseline survey while they were still enrolled in the PICG-supported training. About 23 percent of respondents in the follow-up analysis sample reported that they had not ultimately completed the training. However, our findings are very similar if we restrict the analysis to those who completed training (for example, employment rates are almost identical). Therefore, unless stated otherwise, our analyses in this chapter use the full sample of follow-up respondents in PICG-supported courses, including those who did not complete the training. " • We have modified figure ES1, per comment #10.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
12	x-xi	Section with header: "The evaluation's benchmarking analyses suggest that PICG courses likely improved the job placement and earnings outcomes of trainees" • since RQ3 asks about (1) income and (2) WAGES, as a reader I expected to see a paragraph on wages, specifically. Right now it is bundled with job-placement. Consider making the statement, "PICG graduates' wages were 12 to 13 percent higher X years after training, relative to the national benchmark" its own paragraph. • explicitly define wages indicator in ES (i.e. wages as after-tax monthly wages from a typical month, including profit from self-employment) • if possible, explain if the wage increase is due to working more (ex: more trainees in full-time employment; more trainees employed at all) vs. higher base rate per hour. The CBA models an increase in wages as "higher expected wages for those employed," according to p. 4 of this report. • according to p. 20, we expected PICG grads to earn a wage premium; please include this concept in executive summary; include the context listed on p. 21 concerning " Because of sample size limitations we could only conduct this analysis for one of the nine improved courses, the Tetnuldi IT support specialist level III course. However, because this course contributes the largest number of graduates out of all courses in the CBA model, these estimates are still valuable." • and according to p.5, the increase in wages was not as large as initially modeled. • higher for male and female graduates, respectively (Figure ES.3). • add language to the paragraph specifying MONTHLY wages improved X percent (so it matches the figure)	• We have split up the paragraph into an employment and wages paragraph, as suggested. • We have clarified the definition of earnings/wages, which differs a bit for the different benchmarking approaches (for example, for the national benchmarking it is only wages from paid employment, for the other approaches it includes profits from self employment). Please note that "typical month" only applies to profits from self employment (which are likely to be variable from month to month) and not wages from paid employment (which are likely to be fixed). • Wages are conditional on employment, so the overall employment rate does not affect these wage estimates. Further, the vast majority of jobs in all analyses are full time, so time worked is not driving these differences; we have now mentioned that in the text. • We have added mention of the wage premium to the CBA discussion, but have kept this brief, as befitting the ES. • To clarify, the information on p.5 was not a finding, but a description of how MCC's CBA model changed over time. • The percent increase in wages would be the same whether measured annually or monthly, but we have added "monthly" to the text for consistency with the figure.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
13	xi	In general, the figures are lacking in detail. Fig ES.3. Rephrase the key to "Trainees of PICG courses"; rephrase "all courses" to specify if this means "trainees of all public TVET courses" (this language taken from p. 11) Fig ES.2&3: Please include footers that gives the exchange rate between 2021 GEL and USD, similar to the footnote #21 on p. 35 • clarify in notes that these are self-reported wages • clarify that these are typical monthly wages	• We have modified the key in ES.3 and similar figures later in the body of the report. • We have added a note on USD conversions in the ES where we present USD numbers. • We have added a note that earnings are self-reported (here and for similar figures later in the body). • As noted in response to comment #12, these are not earnings in a "typical month" per se. We asked those who were self employed about typical monthly profits (given that they likely fluctuate), but for those in wage employment we simply asked what wage they were earning. We have clarified this in the figure titles and notes.
14	xi	"MCC's closeout cost-benefit analysis (CBA) model estimated that the project produced an ERR of 20.9 percent" • give time horizon of ERR (20 years)	Added.
15	xii	"State voucher funding fully covers tuition at most PICG-courses, strongly supporting continued operations. " • Are the trainees the recipients of the state vouchers? Trying to figure out if reduced upfront student costs = more PICG course enrollments	Yes, the vouchers are available to trainees who can then decide to spend them on programs of their choice. We find that the vouchers are sufficient to cover the costs of most programs, but not a few of the especially expensive ones (e.g. at GAU).
16	xiv	I'm confused about the "right-sized" recommendation, are you suggesting a smaller funding amount during the compact? I agree with the sustainability concerns, just I wonder if there's a different way to frame this given MCC's constraints in how we fund projects	"Right-sized" was an unintentionally misleading term; we have modified to "take account of" post-compact funding levels.
17	xv	"large post-graduation earnings gap between male and female trainees." • add "with median wages for females about one-third lower than males" from p 40	Added.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
18	xv	Edit to better address general eval Q #3: (3) Did the results of the project justify the allocation of resources towards it? Why or why not? • Contextualize the project ERR compared to other TVET ERR projects in other locations at MCC or elsewhere.	According to the CBA--which we largely validated, as described in the ES and body of the report--the project did justify the allocation of resources as the ERR is likely to be well above the hurdle rate of 10 percent. We have made that clear in the report. It is challenging to compare to other ERRs. MCC's "first Generation" TVET programs generally fell short of their goals and likely did not have strong ERRs, but those CBAs were not necessarily updated based on evaluation findings. For example, neither we nor MCC produced an updated CBA in Namibia: the version on MCC's website still shows an ERR of 22 percent, but the evaluation found zero impact so it was likely much lower. And the other MCC "second Generation" TVET programs like Morocco are still in progress. Studies of other TVET programs typically either do not conduct cost-benefit analyses or produce other cost-benefit metrics that are not directly comparable to MCC's ERR. For example, Hirchleifer et al.'s [2016] study of training programs in Turkey estimates the number of months of earnings that the program would require to recoup its costs. The broader finding by McKenzie (2017) is that most training programs would fail a CBA of any sort, because impacts are low; this motivates our finding that this project provides some cause for optimism that TVET programs can be worthwhile.
19	General	State exposure period of the evaluation	The relevant exposure period for trainees in the tracer survey is one year after the end of the course, and for the qualitative work it is ~2.5 years after the end of the compact. We have added some text to emphasize this in the ES, Chapter II, and Chapter IV.
20	3	"Although funding had not been secured to continue similar events at the conclusion of the compact, the MES indicated that it intended to provide support for additional TVET conferences as part of its post-compact activity plan." • Can this info be updated from conclusion of compact to time of this report?	This part of the report was intended to summarize implementation as of the end of the compact. The findings that funding was in fact secured (from a private foundation and other sources rather than the MES) appear in Chapter IV.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
21	3	"In the medium term..." "Finally, in the long term..." • I know it's not written in the logic, but can we define medium term (i.e. 3-5 years) and long term (5+ years), or whatever the appropriate # is?	In this context, medium- and long-term does not respond to a particular calendar date but rather to timing relative to graduation. We have clarified this in the text.
22		"with the employment rates of these trainees rising by 9 percent, and the wages of these trainees rising by 911 GEL per annum, or 23.8 percent, over a counterfactual wage of 3,828 GEL per annum in 2010 currency (Georgia II Monitoring and Evaluation Plan, as published by MCA-Georgia in 2016)." • it would be great to have more discussion in the Exec Summary of what the project accomplished compared to the targets; as this would speak to the general eval question #2, (2) Did the project achieve its stated objective in the timeframe and magnitude expected, as documented in the M&E Plan? Why or why not?	There might be some confusion here--these numbers for wages and employment were from the CBA and were not M&E targets. The implementation summary in Chapter I fully addresses the M&E targets, as summarized in the STAR report. This links to general evaluation question 2 mentioned in the comment, which corresponds to evaluation questions 1 and 2 for this evaluation (both addressed in the interim report). To help clarify, we have mentioned in the ES that the interim evaluation found that M&E targets were met.
23	4-5	Section B. Cost-Benefit Analyses and projected economic rates of return depicts the information accurately, providing a nice high-level summary for the readers.	Thank you.
24	5	"The updated model increased the estimated number of project beneficiaries from 25,000 to 81,769" • similar to my comment above on general eval question #1, it would be great to add this stat to the Exec Summary to demonstrate how the program exceeded its enrollment expectations/targets	There might be some confusion here--these numbers were from the CBA and were not M&E targets. The project did exceed its targets for the number of enrollees, as noted in the implementation summary, and now added to the ES too.
25	6	Summary of Chakravarty et al. (2019) findings. The last couple sentences are a bit unclear to me, on how to interpret 'no impacts on overall employment' followed by stating that the impacts were largely driven by women starting their own businesses in their homes. Is the last sentence only meaning to be referred to for salaries? Are entrepreneurs not considered employed or did they just shifts types of employment?	We have edited the text to clarify.
26	9	Change to "Research" to "Evaluation" questions, to keep consistent with MCC EMG	We have changed this throughout.
27	10	Outcomes Study • State when the data was collected, so that this section matches the Qualitative Study description.	Added.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
28	11 (top)	A national benchmarking approach' description is confusing/unclear/incorrect. Sentence starting with "This approach, . . ." It seems to put two ideas into one statement or mix information on the primary data collection (MPR-led tracer studies) and secondary data from the MES-led nationwide tracer study. This is further complicated by not stating outright what is behind compared here, and what that benchmarking (secondary data) covers. I think that the intention is to state that source 1 is the tracer study led by MPR that covers the 41 PICG courses, and then separately the secondary source is from MES and that covers many more than the 41 PICG courses. It would be beneficial to at least note the sample size within the secondary data, and that an estimated 12% of these are from the PICG courses. The remaining details can be left for Chapter III, as noted in the text.	We have edited the text to clarify.
29	12 (bottom)	"The follow-up sample included up to three cohorts in each course . . ." seems to contradict what is said a couple of paragraphs below that data was collected from 'at least one cohort in 40 of the 41 PICG-supported courses". The former statement sounds like each course had at least 1 cohort and up to 3, but the latter indicates that one program had no cohorts. Is that correct?	We have edited the text to clarify. There was one course with no enrollees, and the other 40 had between 1 and 3 cohorts each.
30	14	"One of the supplements was for trainees who were employed in course-relevant jobs (111 trainees), with the goal of obtaining information about their employers to help us identify the sample for qualitative interviews." state explicitly if this data was not used in the actual analysis, just to identify employers, which is how it currently reads.	Added.
31	15	Table ii.2 "Earnings: Monthly wages from employment (or profits from self-employment)" • based on Appendix G, this should state "Earnings: Monthly wages from employment (or profits from self-employment) in a typical month" • it may be necessary to emphasis elsewhere (such as in Exec Summary) that both employment and wage outcomes are based on self-reports only (this may seem obvious but good to explicitly state).	We edited this slightly, but please note that the survey question for wage earners simply asked about wages and did not refer to a typical month as salaries are more regular: "typical month" applies to self-employment profits. We have added table/figure notes throughout that earnings are self-reported.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
32	15 (bottom)	Perhaps a question for MCC and a discussion with MPR to better understand the situation: Does it make sense to push for additional coordination to obtain the MES-led tracer studies? What were the difficulties in obtaining the actual data - deanonymized? It seems important for at minimum removing those that were in one of the 41 PICG-supported courses.	We made several unsuccessful attempts to obtain these data. Strict data protection laws in Georgia would preclude us accessing the microdata without further efforts to anonymize it. Given major staffing changes and restructuring at MES/TVET since the data were collected, it is unclear who would do that, or if there is even anyone still on staff who knows where to find the microdata. Removing 12 percent of the sample would be unlikely to alter the overall conclusions in any case.
33	16	Table ii.3 "Earnings: Monthly wages from employment (or profits from self-employment)" • based on Appendix G, this should state "Earnings: Monthly wages from employment (or profits from self-employment) in a typical month"	Please see response to comment #31.
34	16	Table II.3. under Employment domain: Minor, but ordering a bit strange as second bullet is really a sub-bullet of the third. And isn't the first bullet more like the 3rd bullet where you are looking at status overall? Then 5th bullet is actually related to the second bullet.	We have reordered slightly so that the order of the bullets follows the order of the analysis in the text, which we think will help the reader follow the findings discussion.
35	general	Were any efforts made to contextualize or caveat the findings based on hours worked or was an hourly wage estimated to avoid the question on number of hours?	We focused on monthly earnings and did not make adjustments for hours worked since the primary focus was on total earnings. However, the vast majority of jobs were full time, so this adjustment would not substantively affect the findings.
36	16	Minor, description of regression (1), may be helpful to describe Z at the end with the caveat ", depending on the regression run/specified" - just to clarify.	Added.
37	17	"For the trainee-level pre-post design, we used our survey data..." • refer to the survey data by official name	We have modified to "our trainee tracer survey data".
38	16-17	Idea for a Table: • compare 3 types of quantitative analysis approaches, with columns for "Comparison Group", "Regression" (Y/N), "Controls for trainee characteristics" (Y/N), etc. • In figure, note that no particular analysis is "primary" as you stated on p. 11: "Because none of the analyses represents a rigorous empirical framework for estimating the impacts of PICG-support courses, we do not focus on any individual analysis or set of results as “primary,” but ultimately seek to triangulate across them"	We have added a table along these lines in the findings chapter (another reviewer had a similar suggestion for the findings in comment #65, and we think it makes sense to show the methodology and findings together there).

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
39	17	" The project grantees included both PICG and STPP grantees, and the employers included both those who hired PICG grantees and a broader set of employers in sectors for which TVET graduates are relevant. " • I am confused; I think the phrase, "those who hired PICG grantees" should be replaced with "those who hired graduates from PICG-supported courses", since PICG-grantees are not hired	Modified.
40	18	Table II.4. Interviews conducted for the final report • reverse the order of table headers such that "Interviews conducted by GORBI" & "Interviews conducted by Mathematica" appears before the "respondent/sample size/sampling approach..." • In the Sampling Approach column, expand "All 10 PICG grantees" to "All 10 TVET providers who received PICG grants"* • In the Sampling Approach column, expand "8 STPP grantees..." to "8 TVET providers who received STPP grants"* *The purpose of these comments is to ensure the reader knows at a glance that a "grantee" is actually a TVET provider	We have reviewed the formatting of the table and have made the change requested for PICG grantees. However, we have retained "STPP grantees" because many grantees were not providers (as noted in the comments on the issue brief).
41	18	Table II.4. (1) STPP Grantees: Helpful to give scope of sampling by providing the number of total potential grantees selected from and why they were selected. Text above table states that this will be given in the table, but this level of detail is not provided, and leaves some question about coverage of interviews. (2) Add symbol to indicate to the reader that acronyms are spelled out below the table.	We have added details on the total number of grantees; as explained in the table, we selected those with the highest potential for scale-up replication. We are following our standard formatting for MCC and other reports by including acronyms below the table.
42	20	Bullet on 'Post-training wages', last sentence starting "As for employment": Please clarify this sentence, do you mean to say employment here? If yes, then what does this mean for employment as this bullet seems to be focused on wages and the employment findings directly above this bullet did not seem to have been limited to the extent suggested here.	We have edited to clarify: for both wages and employment, we did not report results for courses with small sample sizes.
43	20	Analysis Approach to Assess Assumptions in the Closeout CBA Model This section is strong. MPR utilized a thoughtful approach to the analysis completed and insights demonstrate familiarity with the Closeout CBA model and appropriate considerations in how to use the evaluation results within the context of a CBA. This is not only helpful for Georgia II CBA model, but overall for TVET models in general.	Thank you.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
44	23	A. Descriptive and benchmarking findings intro, last sentence. Do you think that this is suggesting some kind of selection/signaling aspect for those that enrolled in these programs vs. others?	We believe this comment is referring to the note that findings are mostly similar if we restrict to graduates. It's possible that this is a selection effect: those who found acceptably attractive jobs during training might have been more likely to drop out, and would not have been worse off for it. More generally, there isn't much evidence from the qualitative interviews that employers were prioritizing jobseekers who enrolled in or completed PICG courses, except for Georgia Railways, which manages the Railways College.
45	24	It would be great to draw a stronger connection to the causal pathways in the program logic when discussing the findings. I think it's important to emphasize that the goal of using a grant facility to fund new/improved tvet providers was to motivate those providers to offer degrees in labor market relevant fields. If participants are not employed in their field of study this presents a breakdown of that chain and begs the question, did we need to have a grant facility? Should we just have funded schools that were implemented by employers like the railroad?	We have adjusted the conclusion to address this point.
46	24	Finding that 53% maintained some form of employment while enrolled is not in Table III.1 below, but would be helpful to have here. This relates to the potential opportunity cost considered within the CBA model. Is this fully captured below in this way?	To clarify, these numbers are already in the table as "baseline employment" since the baseline was conducted while trainees were enrolled. We have clarified with a footnote.
47	25	Sentence near bottom starting with "Consistent with this, ..." A bit more this is needed to fully interpret. That is, what percentage went back to a job that they already held. More info needed or delete. Hard to follow which percentage of which, etc.	Modified.
48	25	" Therefore, we used a regression framework to compare employment for males and females accounting for these factors, effectively conducting this comparison within provider while controlling for observed baseline differences in trainees' age, education, and baseline employment status" • specify "TVET provider"/"PICG grantee"	Modified.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
49	25	"Consistent with this, more than two-thirds of survey respondents employed at follow-up who did not return to a job they already held before training thought that they would have found their job without having attended the PICG training." • is the focus on finding the job, or rather on being qualified for the job without the PICG training? I believe it's the latter, unless PICG imparts some job placement advantages due to industry linkages.	We have rephrased to "would have obtained their job", which was the intent of the question and how it was phrased. The point here is that many trainees did not believe that their PICG-supported training was necessary for them to be hired (which requires a match between trainee supply/job search and employer demand that is difficult to disentangle).
50	25	Add a sentence or two on how female trainees differed on average compared to men, if possible. Were they younger/more educated/less likely to be employed before enrollment/etc.?	Added, though please note that we control for these differences in our gender results using regression controls, as noted in the text.
51	26	Figure III.2. Employed is not clearly defined in the first two bars - e.g., full-time. Would be helpful to add for clarity.	Modified.
52	27	"Almost three-quarters of trainees who had been employed since leaving training found a job within the first month, and about one-half returned immediately to a job that they held before training" "52% of employed trainees returned to previous job" -Question: were these return-jobs mostly in STEM? • these statements seems important to include in the ES.	We have added this information to the ES. There are no obvious patterns in returning to an existing job by STEM vs. not (especially given that most courses were STEM), but GMGA and Georgia Railways had the highest rates of return-jobs, as noted in the text.
53	28	The report notes that graduates employed in fields not related to their training were better off both in terms of employment and wages then the comparison groups. Do the evaluators have any sense of what it was about the compact-supported programs that contributed to this. Was there soft skills training or some signaling effect from completing a training?	The finding on p.28 is that *job satisfaction* was equally high for those employed in a relevant and non-relevant field. That said, we also find that trainees employed in full-time jobs relevant to training earned only slightly more than those employed in other types of jobs (p.37). We do not have strong evidence to explain these findings, but it's possible that trainees were only interested in taking up non-relevant jobs that were attractive (that is, there is a selection effect). More broadly though, there was little evidence from the qualitative interviews that employers placed special value on soft skills or having completed a PICG training.
54	29	3. Constraints to employment • add three sub-headers for "3.1 Labor Supply", "3.2 Labor Demand", and "3.3 Pandemic's Effects on Labor Demand"	Added.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
55	29	Paragraph under Figure III.5: This paragraph could benefit from review and further clarifications in a few spots as it is hard to understand which sample is being referred to and therefore the size of the group impacted by the statements made. It may be easiest to provide a graphic that shows the various categories (unemployed, out of the labor force, employed): (1) 'Among the trainees who were not employed at follow-up' - would be useful to add here that percentage, the numbers that follow are less meaningful without giving this higher figure to position thinking. (2) 'More specifically, 16 percent of all respondents were unemployed and 19% were out of the labor force' - I assume that this is not actually of all respondents, as this would seem like a lot. However, it is hard to understand from the text. (3) same for comment on 13 percent enrolled in further training.	We have clarified in the text.
56	New Figure Request	Map of Georgia with locations of PICG grantee sites. If not a separate figure, state geographic distribution of sites.	Given that most of the grantees are in Tbilisi, we opted to describe the geographic distribution in the text rather than add a map.
57	30	"Although dropout rates from PICG-supported courses were high, trainees who dropped out had very similar employment and earnings outcomes to those who completed these courses. This suggests that dropping out was a rational choice by some trainees, who found jobs that they preferred equally or more relative to the jobs they anticipated receiving had they completed training." • the dropout rate and rationale for why it doesn't negate the TOC can be featured in the ES.	Added.
58	31	"trainees had prior work experience: trainees who had more than two years of prior work experience obtained full-time, course-relevant jobs at about double the rate of those with less experience" • this seems relevant to the ES as it describes which TVET trainees benefitted most from the course/were most successful in the "employment" dimension	This statement already appears in the ES.
59	35	" Among those who were employed, ... grantees' monthly earnings ...ranged from 786 GEL ($253) to 1,711 GEL ($550)" • include this in ES	Added.
60	36	Figure III.11.: Summarize these results in ES, for which PICG providers/industries led to highest wages for employed trainees (tourism, aviation, trade)	Added.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
61	37	"Trainees employed in full-time jobs relevant to training earned only slightly more than those employed in other types of jobs. The former earned 1,077 GEL ($346) on average, about 8 percent higher than the latter after accounting for differences in providers and trainee characteristics (not shown). This suggests that the earnings benefits of finding a job placement that is relevant to the PICG course are modest, which is one reason why some trainees might prefer or be willing to accept other types of jobs." • include this in ES	Added.
62	39	"Employment rates for graduates from PICG-supported courses were similar to a national benchmark before the pandemic but substantially higher during the pandemic... [suggesting that] the pandemic's effect on graduates' ability to find new jobs was a greater constraint for all graduates nationally than for PICG graduates." • add this to ES	Added.
63	44	"Among the trainees who were employed both immediately before training and at follow-up, monthly earnings increased by about 87 GEL ($28), on average (Figure III.17). This represents an increase of about 10 percent over the average pre-training earnings for this sample (869 GEL), which comprises about half of the full sample of those employed at follow-up. For the subset of these trainees who returned to the same job they held before training, earnings increased by a more substantial 190 GEL ($61), or about 21 percent over their average pre-training earnings. This provides suggestive evidence that PICG training was associated with an increase in earnings among trainees, which is consistent with the evidence from the national benchmarking and course-level pre-post analyses." • include consolidated version in ES (wages)	We believe this information is already included in the ES (now in a separate paragraph about earnings, as suggested in an earlier comment).

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
64	45	"Results from the study's three descriptive benchmarking exercises also consistently suggest that the courses were likely to have improved trainees' wages. Compared to a national benchmark of all TVET courses in Georgia, graduates of PICG-supported courses earned wages that were 12 to 13 percent higher for male and female graduates, respectively. (However, there remained a substantial gender disparity in wages.) Similarly, for pre-existing courses enhanced by PICG support, trainees during the compact appear to have earned wages that were 16 percent higher than earlier cohorts. Finally, trainees who were employed before enrolling in a PICG-supported course and one year after the end of training increased their real earnings by 10 percent, and trainees who returned to the same job increased them by 21 percent. " • Relevant info should be included in ES (wages)	We believe this information is already included in the ES (now in a separate paragraph about earnings, as suggested in an earlier comment).
65	45	There is a lot of information across the 4 types of data. I think that it would be helpful to include some type of summary table within the main document to highlight similarities and differences in the various estimates and further clarify main findings, demonstrating the triangulation of the data more clearly.	Thank you for this helpful suggestion--we have added a summary table to the findings chapter (Table III.4).
66	47	The dropout rates are strikingly high. Is there any explanation for this? How does this compare to other programs in Georgia? Is there a COVID link or something more fundamental/durable? Any explanation for the wide variation in dropout rates among providers?	We do not much evidence about why these dropout rates vary, but they do seem to be a feature of the system. A European Training Foundation report from 2019 mentions completion rates of only 66 percent in public TVET courses based on MES data for 2018 and 2019 (i.e. before COVID).
67	50	Bottom of page: Can you clarify that the text comparing the enrollees and graduates from the administrative data and CBA projections is for the same period in time. I assume that, but helpful to state explicitly. If not, then I can support MPR with CBA model calculation for that time period.	Yes, these numbers cover the same period of time (by the end of 2021).
68	58	The streamlined process for authorization is really important, I'm wondering if there is a way to highlight the challenges and delays the project faced under the old process, since they did present big barriers to the newer courses	This was addressed in some detail in the interim report, which we refer to in this section.
69	59	"five-year $24 million Industry-Led Skills Development Program funded by USAID" • Include the year this program was launched.	Added.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
70	59	" Another related project is a EUR 23 million grant from the KfW, the German development bank" • Include the year this program was launched/duration of project (if known) • I am trying to establish if the work of USAID and KfW were contemporaneous/overlapping with the Compact ISWD Project or "build on" the work of Compact, as claimed	Added. This and the other projects referenced in the report are all post-ISWD.
71	60	"In the same spirit, a $70 million Asian Development bank project will support the creation of innovative skills hubs in existing..." • Include project's name • Include the year this program was launched/duration of project (if known) • Include names of 2 cities (or reference if they are in the Tbilisi metro area/outside the area)	Added.
72	60	"Since the final conference and awards ceremony were held under the ISWD project in 2018, two further rounds of the ceremony have been conducted—in July 2020 and November 2021." • State if the ceremony is planned/has been held for 2022 at the time of this Report (this is implied since the Georgian Parliament committed to funding a new award for 2022)	Added.
73	61	A. Endline findings about the PICG component; specifically RQ3. What were the labor market outcomes (employment and wages) for graduates from PICG-supported courses? • Carry over any edits to content from the ES to this section (the text seems to be identical/closely related to the ES) • Note that this section can be more detailed than the ES if MPR desires, just ensure consistency across them	Thank you for flagging this--we have checked for consistency.
74	64	RQ8b: "The annual conference activities continued after the compact in the form of an annual TVET awards ceremony." • Rephrase this topic sentence such that it directly answers RQ8b (likelihood of sustainability) and is more forward looking, e.g. "Annual conference activities continue in the form of an annual TVET awards ceremony, which has taken place each year since compact end and is expected to continue in future years"	Modified.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
75	64	RQ8b: "Two rounds of the ceremony have been conducted in the two years after the compact with close government involvement and public and private financial support." • State if the ceremony is planned/has been held for 2022 at the time of this Report	Added.
76	66	"There is a strong argument that investing in well-designed and sustainable TVET programs can improve trainees' labor market outcomes and produce a positive economic return." • Can the word "argument" be changed to "evidence" without changing the underlying meaning? • If necessary, can limit the statement to this project adding to the body of evidence supporting this result.	Modified.
77	66	"There is a strong argument that investing in well-designed and sustainable TVET programs can improve trainees' labor market outcomes and produce a positive economic return." • Consider including your assessment of to what extent labor market deficiencies (such as TVET jobs being poorly paid, so a large portion of TVET trainees will decide to take jobs outside the sector but will ultimately still earn higher wages even outside of TVET) may hinder TVET programs' success in contexts where this is the case. Or how a TVET program can succeed in increasing employment/wages in spite of this context. • Based on the evaluation, it seems that TVET programs still improve labor market outcomes even when TVET trainees don't ultimately get jobs in TVET. • also interesting how many TVET trainees chose not to even look for a job in TVET (and how this decision may have been a rational one)	We have revised this policy implication in response to this comment and the related comment #45.
78	C.3	Important insight from Figure C.1: No women were enrolled in 2 out of the 3 TVET providers that led to highest wages (aviation, technical trades), according to Figure III.11 • Somewhat anecdotal but is suggestive that women are missing out on most lucrative industries/programs	This is a good point and we have added it to the text where we discuss the gender gap in wages. Note, however, that this does not affect the estimated gap, which is conducted within TVET provider.
79	Appendix E	The tables will be immensely helpful in developing an evaluation-based CBA model, and estimating its resulting NPV and ERR. The work provided by MPR is detailed, informative and thoughtful.	Thank you.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
80	Appendix E: Table E.1	It would be helpful to have a color code at top of page to guide reader rather than a small note with no colors below the table. Also, the page number is incorrect (D.3, but should be E.3).	Modified.
81	Appendix E: Table E.2	The CBA model also provides percent increases in wages. Will MPR consider whether that makes sense to include within the table. Note that page number is incorrect (D.5 but should be E.5). Also consider color coding suggestion made for Table E.1 as well.	Our understanding from the CBA model is that the absolute wage premium drives benefits rather than percentage wage premium. Therefore we focused on the absolute numbers--although, as noted, we were only able to do this for a few courses because of design and sample size limitations. We have modified the page numbers and color coding key as suggested.
82	general	Compact amount should be $140M (Compact + CDF), consistent with the STAR report, in order to avoid confusion by the average reader	The numbers are accurate according to final compact/project disbursement figures; we have clarified in the text that this is the source of the data.
83	19	After studying Final Report Draft, we decided to gather information on employment of the graduates of veterinary service specialist, viticulture-oenology and agribusiness manager programs. In limited time frame we were able to interview 63% of graduates from all cohorts of all three programs (80 graduates). Based on the data 54.5% of interviewed graduates of veterinary service specialist program are employed in a full-time job relevant to training; the interviewed graduates of viticulture-oenology program this figure reached 64.6%, while among the interviewed graduates of agribusiness manager program this figure was 60%. It has to be mentioned that a large part of these graduates have opened their own vet-pharmacies, consultation services, zoo shops, own wine cellars with guesthouses, vineyards, non-governmental organizations in agriculture and so on. These small businesses/services are spread across the country and support regional development. We want to state that mission of programs were to equip our graduates with valuable knowledge and skills for enhancement of their career path and income level. This goal is reachable in both ways: via employment in relevant organizations or starting own small entrepreneurships/providing services. Based on the provided information we would like the MCC Final Report Draft to be amended regarding the AUG. Please see word file	Thank you for sharing this information. There are several reasons why these employment rates might be different from those reported in the final report. A key reason is a difference is in survey timing: trainees in our study sample were surveyed one year after the end of training, which for many fell during the pandemic. This might explain lower employment rates reported in our study, especially for self employment that requires person-to-person contact with clients. Other reasons include potential differences in question wording on relevance of job to training and differences in response rates. To ensure consistency in reported employment rates across all PICG grantees, it is important to use a common approach to the data collection and common data source, as described in the report.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
84	23	According to the MCC Final Report Draft about one-third of the trainees were female at AUG. We would provide additional information on this issue. Based on the data the tendency is changing and every year more and more female trainees are registered for the programs in viticulture-oenology and veterinary service. For example, in the last cohort of viticulture-oenology program percentage of female trainees reached 43%, while on veterinary service specialist program – 56%. We offer this information to be included in the report. *Please see word file.*	Thank you for sharing this information. It is encouraging that the percentage of female trainees has continued to increase. However, in the report we believe it is appropriate to report this percentage for the study sample, which comprises trainees enrolled during the compact. As we note in the report, AUG had the highest percentage of female trainees in the study sample out of all grantees.
85	26	After studying Final Report Draft, we decided to gather information on employment of the graduates of veterinary service specialist, viticulture-oenology and agribusiness manager programs. In limited time frame we were able to interview 63% of graduates from all cohorts of all three programs (80 graduates). Based on the data 54.5% of interviewed graduates of veterinary service specialist program are employed in a full-time job relevant to training; the interviewed graduates of viticulture-oenology program this figure reached 64.6%, while among the interviewed graduates of agribusiness manager program this figure was 60%. It has to be mentioned that a large part of these graduates have opened their own vet-pharmacies, consultation services, zoo shops, own wine cellars with guesthouses, vineyards, non-governmental organizations in agriculture and so on. These small businesses/services are spread across the country and support regional development. We want to state that mission of programs were to equip our graduates with valuable knowledge and skills for enhancement of their career path and income level. This goal is reachable in both ways: via employment in relevant organizations or starting own small entrepreneurships/providing services. We would like this statement to be removed from the report and corresponding table (page 27) amended according to our data. In table we think it will reasonable to state that employment rate of AUG graduates in full-time job relevant to training represents more than 61% (61.25%).	Please see the response to comment #83.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
86	46	According to the Draft Report the only grantee that did not offer PICG-supported courses as of early 2022 is the Agricultural University. We want to clarify that University has postponed providing the courses due to the pandemic situation in the country. The most of the certificate programs at Agricultural University are based on learning-by-doing approach and large part of the programs is devoted to the practical trainings. During the pandemic period (2020-2021), Georgian Government has introduced regulations according to which schools and universities switched to the on-line learning process. Despite the high interest, Agricultural University has postponed receiving of new cohorts on certificate programs as on-line learning process does not allow to provide practical vocational courses properly. During the in depth interview with Natia Samushia, vice-rector of the Agricultural University and Free University, and Meri Gogoladze, coordinator of vocational programs at both universities, it was precisely stated, that all three certificate programs are announced. Vice-rector said that viticulture-oenology and veterinary service specialist programs were very popular and indicated high number of applicants registered for those programs. Regarding the agribusiness manager program, it was said that university would receive new students in case of high interest. Consequently, based on the high number of applicants (more than 50) university decided to continue providing agribusiness manager program. Currently more than 400 applicants are registered for the viticulture-oenology program and approximately 150 applicants for veterinary service specialist. Registration of applicants is still going on. Competitive-base selection process of applicants will start in September (based on motivation letters, interviews, tests). All three programs will start in the October, 2022. Accordingly, we were very surprised to read in Final Report Draft that Agricultural University plans to announce the programs in case of demand while all three programs were already announced and registration of applicants is in progress. This information was already shared during the interview and easily reachable on the web-site of Agricultural University.	Thank you for this updated information on the status of these courses. We have revised the report accordingly.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
		Here are the links on the announcements on all three certificate programs: http://agruni.edu.ge/ge/node/1645 http://agruni.edu.ge/ge/node/1646 http://agruni.edu.ge/ge/node/1640 We also want to emphasize that these programs were not accredited because agribusiness manager vocational standard was never elaborated by the competent authorities and vocational standards in viticulture-oenology and veterinary service are outdated and they are not reflecting labor market needs. Based on the provided information we would like the MCC Final Report Draft to be amended regarding the AUG. *Please see word file.*	
87	47	The report stated that Agricultural University has not sustained its courses in the post-compact period but intends to restart two of them in fall 2022 if demand is sufficient. We don't agree with this formulation as Agricultural University has continued providing certificate courses in viticulture-oenology and veterinary service in post-compact period. During 2019-2020 university has received two cohorts of students (66 trainees in total). Despite the high interest, University has postponed (not terminating) receiving of new cohorts during the pandemic period (2020-2021) as regulations issued by the Georgian Government was limiting learning-by-doing teaching process while the certificate programs require lots of practical training. In Autumn 2021 university has announced all three certificate programs and more than 600 applicants have already registered. Registration process is still active. Selection of applicants will be conducted in September (based on motivation letters, interviews, tests) and all the three programs will start by the October, 2022. Based on the provided information we would like the MCC Final Report Draft to be amended. *Please see word file.*	Thank you for this updated information on the status of these courses. We have revised the report accordingly.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
88	51	The Final Report Draft states that almost all the PICG-supported courses have been sustained after the end of the compact, with the possible exception of those at the Agricultural University. As already mentioned above Agricultural University has continued providing certificate courses in viticulture-oenology and veterinary service post-compact period. During 2019-2020 university has received two cohorts of students (66 trainees in total). Despite the high interest, University has postponed (not terminating) receiving of new cohorts during the pandemic period (2020-2021) as regulations issued by the Georgian Government was limiting learning-by-doing teaching process while the certificate programs require lots of practical training. In Autumn 2021 university has announced all three certificate programs and more than 600 applicants have already registered. Registration process is still active. Selection of applicants will be conducted in September (based on motivation letters, interviews, tests) and all the three programs will start by the October, 2022. Based on the provided information we would like the MCC Final Report Draft to be amended. *Please see word file.*	Thank you for this updated information on the status of these courses. We have revised the report accordingly.
89	D.6	In the Table D.1 second comment says that University has permanently stopped offering certificate program in Agribusiness Manager. In Autumn 2021 Agricultural University has announced certificate program in agribusiness manager and based on the demand (already more than 50 applicant) on the mentioned course, University has decided to continue the program and the learning process will start in October 2022. Accordingly, second paragraph should be deleted. Regarding the other two courses more than 400 applicants are registered for the viticulture-oenology program and approximately 150 applicants for veterinary service specialist. All the three programs will start in October of the current year. Accordingly, the third paragraph should be revised in the following manner: The veterinary service specialist and viticulture-oenology programs were on hold due to the pandemic restrictions. In Autumn 2021 Agricultural University has announced all three certificate programs and more than 600 applicants have already registered. All these programs will start in October 2022, after the completion of selection process in September.	Thank you for this updated information on the status of these courses. We have revised the report accordingly.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
90	E.4	Table E.1 comment says that is uncertain AUG will resume the courses. We are surprised and have concerns regarding this part taking into account the following arguments: • During in-depth interview with representatives of Agricultural University, it was precisely stated, that the programs are postponed (not terminated) because of pandemic restrictions on teaching process. It was allowed only on-line learning process, which did not give possibility to ensure learning-by-doing approach and provide practical trainings properly. • During in-depth interview with representatives of Agricultural University, it was precisely stated, that there is a huge demand on veterinary service specialist and viticulture-oenology programs, because they are announced and hundreds of applicants are registered. It was mentioned, that agribusiness manager program will be started if there will be demand. • The information on announcement of all three programs was available on the web-site of Agricultural University. • The Agricultural University never planned to strop the programs. During 2019-2020 (post-compact period) university has received two cohorts of students (66 trainees in total). Accordingly, the above-mentioned Paragraph should be revised: The number of enrollees and graduates to date has fallen behind the CBA projection, because during pandemic period Agricultural University postponed receiving new cohorts. In Autumn 2021 Agricultural University has announced all three certificate programs and more than 600 applicants have already registered. All these programs will start in October 2022.	Thank you for this updated information on the status of these courses. We have revised the report accordingly.
91	n.a.	In the general discussion of employment outcomes, the report should emphasize the effects of COVID-19—particularly during the first 6 months of the pandemic when the government shut down a wide range of employers and economic activities	We have noted the potential effects of the pandemic in several places in the report, and also conducted analyses separately for pre-pandemic and pandemic cohorts. In practice, it appears that employment rates were not substantially lower for pandemic cohorts, possibly because many of the PICG courses were in sectors that were fairly resilient to the pandemic (for example, the largest share of trainees was in the IT sector).

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
92	n.a.	It was hard to understand why half of the trainees who did not find course-relevant jobs never searched for one. Can the report provide more information about how this occurred?	As discussed in the report, this appears to have been due to a combination of supply-side factors (e.g. trainees not being interested in jobs in the field, perceiving wages as too low, etc.) and demand-side factors (relevant opportunities not being available for someone of the trainee's profile).
93	n.a.	Be careful to explain that COVID-19 restrictions (limiting providers to 1 cohort per year rather than 2) is the primary reason why PICG enrollment rates did not meet post-enrollment targets. Enrollment exceeded MCC's targets prior to the compact and likely would have continued to exceed targets if the pandemic restrictions hadn't been in place	We have noted this explicitly in the report.
94	n.a.	Regarding the number of female PICG trainees, please review MCA-G's early-compact report on general disparities which found a very small percent of trainees in STEM-related courses are female (2 percent). Relative to this low baseline the 14 percent female enrollment rate in PICG courses is a meaningful improvement.	We have reviewed this early-compact report, but it seems to suggest that 24% of enrollees in STEM-related TVET programs in Georgia in 2012-2013 (levels I-IV) were female (Table 1.1 of the report). That said, it is difficult to directly compare this figure to female enrollment in PICG-supported courses because (1) the PICG courses were typically at higher levels, and (2) STEM encompasses a wide variety of fields, some of which are more traditionally male-dominated than others.
95	n.a.	The report should note the project's spillover effects on other international donors like USAID, which are now implementing programs that look very similar to the ISWD model	We have noted this explicitly in the report.
96	n.a.	Regarding the STPP grants, the report should explain more clearly that the grants only ranged in size from $5k-$25k, and were not larger. MCA-G advocated for making these grants larger and agrees that they needed to be larger to have more pronounced effects. Also, there are more examples of practices being adopted widely outside of the 8 grantees Mathematica spoke with.	We have added a description of the grant sizes to the report. We acknowledge that focusing on only 8 grantees is a limitation of the study; given resource constraints, we focused on grantees that PEM viewed as having the greatest potential for practice replication.
97	n.a.	The report should reference the fact that the PICG grants greatly exceeded the compact's co-funding requirement (with co-funding of 50% rather than the target of 15%).	We have noted this explicitly in the report.

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
98	n.a.	The benchmarking analyses should clarify how the study addressed the confounding influences of (1) the pandemic and (2) the difference between brand new courses and established courses.	As noted in the report, we addressed the confounding influence of the pandemic by conducting national benchmarking separately for pre-pandemic and pandemic cohorts. We are unable to adjust for the influence of the pandemic in the course- and trainee-level pre-post designs, but those designs focus on wages, which appear not to have been substantially influenced by the pandemic. We had initially planned to conduct separate analyses for early and later cohorts in PICG courses to assess changes in outcomes as the courses became more established, but the pandemic (which would have affected later cohorts only) negated the value of that analysis.
99	n.a.	The report should acknowledge that the pandemic likely depressed the number of trainees who sought a job relevant to their course	We do not observe substantial differences in the rate of trainees who searched for a course-relevant job between pre-pandemic and pandemic cohorts; the pandemic therefore does not appear to explain the low fraction that searched for a course-relevant job.
100	n.a.	The report should include some potential explanations for *why* PICG course trainees were more resilient to the pandemic than other TVET trainees	Our hypothesis, which we note in the report, is that PICG courses were more heavily focused on sectors that were resilient to the pandemic (for example, IT) relative to public TVET courses, on average.
101	n.a.	Please clarify how we identified the names and contact information of which employers to interview	As described in Chapter II, we implemented a supplemental survey for purposively-selected group of tracer survey respondents to gather this information.
102	n.a.	Is it possible to share the list of employers who hired graduates from PICG courses?	Unfortunately, we are unable to do so as we have committed to maintain the confidentiality of those responses.
103	n.a.	COVID-19 pandemic disclaimer and its impact during the evaluation process should be presented as a footnote on each page where survey data are presented. Again, Covid 19-pandemic occurred within the 03/2020 – 03/2022 period, when the surveys and corresponding analysis took place.	We have noted the potential effects of the pandemic in several places in the report and do not believe that additional footnotes are necessary. (Please also see our responses to comments 91, 98, and 99.)

Table H.1 (*continued*)

No.	Page	Comment	Evaluator response
104	n.a.	Please review the statement: "The new courses did not reduce prevailing patterns of gender-based wage inequality in the labor market". The direct goal of the ISWD project was not to address gender-based wage inequality in the labor market. Instead, the project focused on the Inputs, Activities, and outcome side of the interventions, which aimed to improve the alignment between the skills of technical and vocational education and training (TVET) graduates and the skills demanded by the labor market. Therefore, direct interventions on the labor market, as it is currently considered under USAID Industry-led Skills Development Program, were not the main focus of the MCC ISWD program.	We have adjusted this statement to remove the implication that the project sought to address gender-based wage inequality. However, we believe it is still of interest to stakeholders to note that the project reflected existing pattens of gender inequality in labor market outcomes.

n.a. = not applicable.

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