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FINAL REPORT FOR THE WORKFORCE DEVELOPMENT STUDY

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ACRONYMS

APE	Average Partial Effect
Bridges	Bridges to Employment Project
CDCS	USAID Country Development Strategy
INSAFORP	Spanish acronym for *Instituto Salvadoreño de Formación Profesional (Salvadoran Institute for Professional Training)*
MARS	Multivariate Adaptive Regression Splines
SAS/STAT	A software for data analysis
USAID	United States Agency for International Development

Executive Summary

OBJECTIVES OF THE STUDY, PURPOSE AND QUESTIONS

The purpose of this study is to conduct a statistical analysis of the data collected under the United States Agency for International Development (USAID) Bridges to Employment (Bridges) Project; to provide evidence and identify trends to inform future interventions under the newly approved Country Development Cooperation Strategy (CDCS); and to identify beneficiary professional and academic profiles in the key business sectors of agroindustry, retail trade and tourism, energy, manufacturing, and information technology.

The study seeks to answer the following research questions:

1. By key sectors, how can participants' specific technical, academic, and vocational skills (alone and/or combined) be most effectively leveraged for being hired into jobs above the minimum wage?
2. How do sector-specific academic and skills requirements act as a barrier to either men or women looking for employment typically sought by Bridges participants?
3. As specifically as possible, by sector, how much does having a 1) high school degree or 2) at least some high school education contribute to employment? Is there a wage differential?
4. What data knowledge discovery was identified by sector and beneficiary profiles?
5. How do formal[1] or informal[2] minimum academic requirements by the private sector affect the potential for youth to be employed? Based on the data at hand, is there a minimum academic level required by the private sector to employ youth?
6. Based on the data at hand, which economic sectors would be the best value for investment to increase youth employment and support improved income for youth? How might workforce development programs complement this potential?

PROJECT BACKGROUND

The objective of the Bridges Project was to increase employment within targeted, high-growth economic sectors by strengthening the technical and soft skills of at-risk youth in high-crime municipalities. The activity promoted formal and non-formal vocational and technical training that responded to market demand and improved workforce development services to help at-risk youth successfully compete for work in targeted growth sectors. Other key focus areas included:

- Improve the collection and analysis of labor market demand data for public use.
- Improve workforce development programs to promote a skilled workforce.
- Promote youth entrepreneurship and self-employment to increase employment and create jobs.

[1]Academic level certifications approved by the Ministry of Education.

[2]Academic level achievements not approved by the Ministry of Education, but recognized by INSAFORP (Instituto Salvadoreño de Formación Profesional).

- Advocate for effective corporate social responsibility programs to advance respect for inclusive and fair human resource practices related to young workers.

In addition, Bridges invested in the development of a beneficiaries' data management system called SisPuentes. Bridges provided support and technical assistance to adopt this customized system which was also used to report data back to USAID. This platform allows training centers to track youth beneficiaries during the course of the training, *i.e.*, to monitor enrollment, attendance and performance through pre- and post-tests; monitor their employment status after they graduate; and evaluate progress toward the targets for the project indicators. Data extracted from the SisPuentes system had more than 20,000 sanitized records from young people who benefited from this USAID-funded workforce development project as well more than 1,200 records from companies that hired these young people.

Through Bridges, USAID supported the following economic sectors:

1. Manufacturing (including plastics and textiles);
2. Tourism, commerce, and services (high end services as logistic services, and lower end services as waiters, cashiers, bartenders, sales, display, *etc.*);
3. Agroindustry (including the food and beverages sector);
4. Energy; and
5. Information Technology and Communications

Moreover, the program also supported the following additional sectors:

- Positive Youth Development;
- Private Sector Engagement;
- New Partners Initiative Development;
- Female and women empowerment; and
- Diversity and inclusion (emphasis in youth with disabilities).

DATA, METHODS AND LIMITATIONS

Research questions pulled data from three SisPuentes databases: one containing data on 26,393 beneficiaries of Bridges, a second with 15,981 records with data on all the courses attended by 13,535 beneficiaries, and a third with 4,708 records containing data on employment outcomes. A single data set was created by merging the beneficiaries, courses, and employment files.

The main factors affecting employability were assessed by fitting separate logistic regression models to estimate the probability of employment for each of the key economic sectors. The technique known as Multivariate Adaptive Regression Splines (MARS)[3] was used to assess the factors affecting youth salaries.

[3] MARS is a non-parametric regression method that builds multiple linear regression models across the range of predictor values. The MARS algorithm builds a model in two steps. First, it creates a collection of so-called basis functions (BF). In this procedure, the range of predictor values is partitioned in several groups. For each group, a separate linear regression is modeled, each with its own slope. The connections between the separate regression lines are called knots. In the second step, MARS estimates a least-squares model with its basis functions as independent variables. (Friedman, 1991; Hastie, Tibshirani & Friedman, 2009).

The codes, analyses and outputs for this report were generated using SAS/STAT software, Version 9.4 of the SAS®[4] System for Windows.

Research Question 2 could not be answered from the Bridges data as the variables included in the files refer to the jobs made available to the project beneficiaries and not to the type of jobs typically sought by Bridges participants.

Similar challenges were faced to answer Research Question 4 on the identification by sector of data knowledge discovery and beneficiary profiles. The factors affecting youth employability and salaries were those predicted by the standard economic theory of employment and earnings [5]. The relatively small number of observations for each of the economic sectors prevented the team from pursuing a meaningful exercise of extracting previously unknown and potentially useful information from data stored in databases.

The findings from this study are valid to describe the flow from training to employment for the youth registered as beneficiaries of Bridges. The findings are not generalizable to the training-to-employment experience of the whole youth population, nor are they valid to provide answers to evaluation questions.

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[5] Human Capital Theory (Becker, 1993) deals with the effects of education and training on earnings and other labor outcomes. "Human capital" can be defined as knowledge, skills, attitudes, aptitudes, and other acquired traits contributing to production. There are two main components of human capital with strong complementarity: early ability (whether acquired or innate) and skills acquired through formal education or training (Blundell et al, 1999). The stock of human capital is the major contributor to the earnings of individuals (Ishikawa & Ryan, 2002; Mincer, 1974). The human capital theory predicts that earnings increase with formal education, training and experience, after controlling for local labor market conditions. Research indicates that formal education, training and experience account for most of the observed variation in salaries (Mincer, 1989). Better educated and more skilled workers receive a premium, resulting to higher earnings. Also, education has a positive effect not only in facilitating access to employment, but also in improving the chances of gaining quality employment.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Table A1: Summary of Findings and Conclusions

Questions	
Q1: By key sectors, how can participants' specific technical, academic, and vocational skills (alone and/or combined) be most effectively leveraged for being hired into jobs above the minimum wage? **Q1.1: How do such factors as level of education, quantity and quality of Bridges training, social skills influence the salaries at which Bridges beneficiaries are hired?** **Q1.2: Do the effects of these variables vary across sectors of capacitation, gender, or area of residence of the Bridges beneficiary?** **Q1.3: Are there any other factors that affect the earnings of the Bridges beneficiaries?**	
Findings	**Conclusions**
Q1.2 There are no salary differentials due to the economic sector, after accounting for the effect of the other variables in the model.	1. Salaries did not differ across economic sectors. (Q1.2) 2. Salaries for men and women were similar. (Q1.2) 3. Living in a rural area did not make a difference on youth salaries as compared to living in an urban area. (Q1.2) 4. As expected, formal education and training emerged as the main factors affecting Bridges beneficiaries' salaries. (Q1.1) 5. Experience matters for youth earnings. (Q1.1) 6. Employment conditions have an impact on youth salaries. Youth on full-time or part-time employment and being paid on a fortnightly or monthly basis, have higher salaries than those on other forms of employment or payment period. (Q1.3)
Q1.2 There are no salary differentials due to either sex or area of residence, after accounting for the effect of the other variables in the model.	
Q1.1 Salary grows 2.7 percent for each additional year of education beyond high school, and increases by 1.3 percent for each additional year of experience (as measured by whether the youth was 22 years and older).	
Q1.1 Each additional training course a youth attends increases his/her salary by 15 percent.	
Q1.3 Not being on a temporary job, or not being hired on an hourly basis, or not being an entrepreneur, either formal or informal, increases the salary by 5.9 percent.	
Q1.3 Being paid monthly or fortnightly increases the salary by 25 percent.	

Findings	Conclusions
Q3: By sector, how much does having a 1) high school degree or 2) at least some high school education contribute to employment? Is there a wage differential?	
Having an educational level above a high school certificate increased a youth likelihood of employment in the energy, manufacturing, and information technology and communications sectors.	1. The sectors of energy, manufacturing, and information technology require an educational level above high school to hire youth. This is expected as the relative sophistication of the business and production processes in these sectors demand workers equipped with competencies and skills beyond those provided by the basic and middle education system. 2. In the agroindustry and retail trade/tourism sectors, holding a high school degree seems to be enough for employment. 3. Having a high school certificate makes little difference in earnings when a special level of effort is provided by implementers to support beneficiaries with less than high school degree [6].
The strongest effect of having an educational level above a high school certificate was observed for the energy sector. A high school graduate was 6 times as likely to be employed as a non-high school graduate.	
The information technology and communications sector recorded the second strongest effect of having an educational level above a high school certificate. A high school graduate was twice as likely to be employed as a non-high school graduate.	
An effect was also observed for the manufacturing sector. A youth with an educational level above high school was 1.6 times as likely to be employed as a non-high school graduate.	
Having an educational level above a high school certificate did not affect the likelihood of employment in both the retail/trade and agroindustry sectors.	
Salaries grow 2.7 percent for each additional year of education beyond high school.	

Findings	Conclusions
Q4: What data knowledge discovery was identified by sector and beneficiary profiles?	
No factors explaining youth employability or salaries beyond those predicted by standard economic theory were identified from the data.	The information extracted from the data is consistent with the actual implementation of the Bridges

[6] The findings from this study are valid to describe the flow from training to employment for the youth registered as beneficiaries of Bridges. The findings are not generalizable to the training-to-employment experience of the whole youth population, nor are they valid to provide answers to evaluation questions. Out of every 10 young people that were placed through the Bridges Project, eight have a high school degree and two do not have a high school degree. The total universe assessed was the +/- 5,000 youth who attained employment as documented in the SisPuentes database.

The information contained in the databases reflects the way the Bridges Project was implemented to meet employment, salary, gender equity, and private sector engagement goals.	Project and with its theory of change.
Q5: How do formal or informal minimum academic requirements by the private sector affect the potential for youth to be employed? Based on the data at hand, is there a minimum academic level required by the private sector to employ youth?	
Having a high school degree increased a youth likelihood of employment in the energy, manufacturing, and information technology and communications sectors.	1. The sectors of energy, manufacturing, and information technology demand an educational level above high school to hire youth. 2. In the agroindustry and retail trade/tourism sectors, holding a high school degree seems to be enough for employment. 3. In the manufacturing sector, having completed a course recognized by INSAFORP has a strong beneficial effect on youth employability beyond the benefits due to having a formal certification.
The strongest demand for high school graduates was observed for the energy sector. A high school graduate was 6 times as likely to be employed as a non-high school graduate.	
The information technology and communications sector recorded the second strongest demand for high school graduates. A high school graduate was twice as likely to be employed as a non-high school graduate.	
The manufacturing sector ranked third in demand for high school graduates. A high school graduate was 1.6 times as likely to be employed as a non-high school graduate.	
Both the retail/trade and agroindustry sectors demanded youth with education levels below high school.	
Only for the manufacturing sector, did having completed a course backed by *Instituto Salvadoreño de Formación Profesional* (INSAFORP) increase a youth likelihood of employment beyond the positive effect of a high school certification. Independent of the other variables in the model, the probability of employment for a youth with high school certificate was assessed at 0.60. This probability increased to 0.77 when the youth completed a course certified by INSAFORP, a 17 percent increase in the likelihood of employment.	

Findings	Conclusions
Q6A: Based on the data at hand, which economic sectors would be the best value for investment to increase youth employment and support improved income for youth? **Q6B: How might workforce development programs complement this potential? (Which economic sectors offer the highest rates of employment, higher earnings, and lower gender differentials?)**	
Bridges *training effects on youth employability*: ● Retail Trade/Tourism and Manufacturing were the sectors where youth employability was most positively impacted by Bridges training. The average partial effect (APE) of training on the probability of employment was assessed at 0.45 for retail trade/tourism, and 0.44 for manufacturing. These effects indicate how much the probability of employment increases by each additional training course completed. ● In the information technology and communications sector, the APE of training was assessed at 0.25. ● The weakest average effects of training were observed in the energy and agroindustry sector. The APE for the former was only 0.03 and it was null in the agroindustry sector. ***Formal education effects on youth employability***: ● Energy was the sector where formal education impacted the most on employability. The APE of an additional year of formal education beyond high school on the probability of employment was 0.26. ● The APE was assessed at 0.10 and 0.09 for the sectors of information technology and manufacturing, respectively. ● The smallest APE on the probability of employment was observed for the retail trade/tourism sector (0.04). **The Bridges training premium: A measure for USAID value for investment to increase youth employment**. ● The training premium was assessed from the ratio of training to formal education APE effects on the probability of employment. ● Retail trade/tourism was the sector where the training premium was larger. The APE of training was 11.25 times the APE for formal education beyond high school. ● Manufacturing and information technology followed with training premiums of 4.9 and 2.5, respectively. ● Energy recorded a training premium of 0.12, higher only to agroindustry where this premium was 0.	1. In terms of efficacy of Bridges training, retail trade/tourism was the sector representing the best value for investment, followed by manufacturing and information technology. 2. Whether a youth has attained a level of education of high school or above is key to obtaining employment in the energy, manufacturing, and information technology sectors. 3. Education influences both the prospects of youth employment and their salaries. It provides youth with the basic knowledge that is required for a successful completion of any training program. 4. Regardless of the economic sector being considered, providing youth with incentives to complete high school and to undertake further studies is a key factor for the efficacy of any workforce development program.
Salary and sex differentials: ● No salary differentials due to both sector and sex were detected.	

Table A2: Recommendations

Recommendations
Q6A: On the economic sectors that offer the best value for USAID support to increase youth employment and improve income for youth:
In terms of youth employment:
• Energy, manufacturing, and information technology are the sectors offering the greatest potential to employ youth with a minimum of 13 years of formal schooling.
• Retail commerce/tourism is the sector with the most potential to employ youth with completed high school education or lower.
In terms of youth earnings:
• Earnings are sensitive to the formal education level achieved and the quantity and quality of training. Therefore, USAID workforce development programs might focus in the sectors of energy, manufacturing, and information technology that require levels of education above high school and technical skills.
Q6B: How might workforce development programs complement this potential?
Initiatives to increase youth educational attainment:
• Combining flexible vocational education with part-time apprenticeships through public-private partnerships.
• Combining technical education scholarships, both formal (MINED) and professional (INSAFORP), with part-time apprenticeships.
Initiatives to increase youth employability:
• Supporting INSAFORP training and certification programs for youth who complete high school.
• Designing programs to improve soft and labor market skills among the youth.
• Providing grants to increase the youth intake by businesses.
Initiatives to increase youth income:
• Supporting relevant technical and tertiary education retention programs (*i.e.*, scholarships, internships, *etc.*).

1.0 Study Purpose and Questions

1.1 STUDY PURPOSE

This report presents primary findings, conclusions, and recommendations from the analysis of data collected under the United States Agency for International Development (USAID) Bridges to Employment (Bridges) Project. The purpose of the study is threefold. First, it finds insights, patterns, relationships, and trends through diverse data mining analysis methods, not previously identified. Second, the study aims at providing evidence and identifying trends that might inform future interventions under the newly approved CDCS, and third, to support knowledge discovery in data processes that identifies beneficiary professional and academic profiles in the business sectors participating in the Bridges Project.

The main audience of this study will be USAID El Salvador, particularly the Office of Economic Growth and Education (EGE) and the Regional Program Office (RPO).

1.2 RESEARCH QUESTIONS

The study seeks to answer the following research questions:

1. By key sectors, how can participants' specific technical, academic, and vocational skills (alone and/or combined) be most effectively leveraged for being hired into jobs above the minimum wage?
2. How do sector-specific academic and skills requirements act as a barrier to either men or women looking for employment typically sought by Bridges participants?
3. As specifically as possible, by sector, how much does having a 1) high school degree or 2) at least some high school education contribute to employment? Is there a wage differential?
4. What data knowledge discovery was identified by sector and beneficiary profiles?
5. How do formal or informal minimum academic requirements by the private sector affect the potential for youth to be employed? Based on the data at hand, is there a minimum academic level required by the private sector to employ youth?
6. Based on the data at hand, which economic sectors would be the best value for investment to increase youth employment and support improved income for youth? How might workforce development programs complement this potential?

2.0 Project Background

2.1 PROJECT CONTEXT

The objective of the Bridges Project was to increase employment within targeted, high-growth economic sectors by strengthening the technical and soft skills of at-risk youth in high-crime municipalities. The activity promoted formal and non-formal vocational and technical training that responded to market demand and improved workforce development services to help at-risk youth successfully compete for work in targeted growth sectors. Other key focus areas included:

1) improve the collection and analysis of labor market demand data for public use; 2) improve workforce development programs to promote a skilled workforce; 3) promote youth entrepreneurship and self-employment to increase employment and create jobs; and 4) advocate for effective corporate social responsibility programs to advance respect for inclusive and fair human resource practices related to young workers.

In addition, Bridges invested in the development of a beneficiaries' data management system called SisPuentes. This platform allows training centers to track youth beneficiaries during the course of the training. Data extracted from the SisPuentes system have more than 20,000 records from young people who benefited from USAID's Bridges workforce development project as well more than 1,200 records from companies that hired these young people.

Through the Bridges program, USAID supports the following economic sectors: 1) manufacturing (including plastics and textiles); 2) tourism, commerce and services (high end services as logistic services, and lower end services as waiters, cashiers, bartender, sales, display, *etc.*); 3) agroindustry (including the food and beverages sector); 4) energy; and 5) information technology and communications. Moreover, the program also supported the following additional sectors: 1) positive youth development; 2) private sector engagement; 3) new partners initiative development; 4) female and women empowerment; and 5) diversity and inclusion (emphasis in youth with disabilities).

2.2 PRELIMINARY FINDINGS FROM THE SISPUENTES DATA MANAGEMENT SYSTEM

Some preliminary findings from the SisPuentes data management system are listed:

- The training completion rate of young people with or without a high school degree is similar. Both groups tend to finish at an average rate of 80 percent.
- Out of every 10 young people that were placed through the Bridges Project, eight have a high school degree and two do not have a high school degree. The total universe assessed was the +/- 5,000 youth who attained employment as documented in the SisPuentes database.
- More than half of the youth employed without a high school degree have at least an academic level of 9th grade.
- USAID Bridges had a wide number of companies (*i.e.*, over 1,200) hiring participating youth. In fact, 88 percent of the companies hired five youth or less, and less than 1 percent hired 50 youth or more.
- There are significant differences in the beneficiary profile by sector. This results in a varied employment and wage rate. Sector jobs have specific academic requirements. Youth with a specific profile were consistently able to attain employment and/or earn wages higher than the legal minimum (+/- $305 per month). Similarly, youth who attained a job, but did not meet the wage threshold established in the Monitoring, Evaluation, and Learning (MEL) Plan for the USAID Bridges Project had a well-defined profile (these were youth in the textile industry where the minimum wage required by law is +/- $295 p/month).

3.0 Data, methods and limitations

3.1 DATA

Research questions pulled data from three SisPuentes databases: one containing data on 26,393 beneficiaries of the Bridges program, a second with 15,981 records with data on all the courses attended by each beneficiary, and a third with 4,708 records containing data on employment outcomes.

For data analysis, the course file only included data on the last course attended by each youth besides data on the total number of courses taken and demographic and geographical variables. This file contained data on 13,535 observations. A single data set was created by merging the beneficiaries, last course, and employment files. This analysis data set included 26,393 beneficiaries, 13,535 youth enrolled in a course, and 4,708 employed youth. The variables contained in this data set are listed in Appendix 1.

The codes, analyses, and outputs for this report were generated using SAS/STAT software, Version 9.4 of the SAS®[7] System for Windows.

3.2 METHODS

3.2.1 Assessing the factors affecting the likelihood of employment among Bridges participants

This analysis addressed Quarter 4 (Q4) (part 1), Q5, and Q6 — all related to factors affecting the likelihood of employment. Data on the 13,535 youth enrolled in at least one course were used to fit separate logistic regression models to estimate the probability of employment by key economic sector. The predictor variables were the following: 1) whether the youth had completed high school prior to participation in Bridges; 2) whether the youth had education above high school prior to participation in Bridges; 3) whether the youth was male or female; 4) whether the area of residence was urban or rural; 5) cohort of admission into Bridges; 6) age at time of enrolment in a Bridges course; 7) whether the youth completed the last course attended; 8) whether the youth improved his/her level in the last course attended; 9) whether the course was part of the *Instituto Salvadoreño de Formación Profesional* (INSAFORP) curricula (informal), or not (formal); 10) whether received life-skills and completed input and output assessments; and 11) whether the youth returned to study.

3.2.2 Assessing the factors affecting the salaries of the Bridges participants

This analysis wholly addressed Q2 and the second part of Q4. Salaries and earnings depend upon factors such as education, experience, quality of relational networks, employment duration, job tenure, employment shocks, shocks to general skills, and draws of new job opportunities offering different hours and wages (Altonji, Smith Jr. & Vidangos, 2013). That the relationship between salaries and most of these variables is nonlinear is a well-known fact. However, there is enough evidence to suggest that this relationship is roughly linear in the logarithm of salaries. The

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standard approach is to regress the logarithm of salaries on education, experience, and other labor market variables. The working hypothesis is that salary increases are larger among the most educated and experienced individuals. A key assumption is that salaries vary widely both across individuals and over the values of the intended explanatory variables.

The apparent absence of a linear relationship between most of the candidate explanatory variables and the logarithm of salaries, led us to fit a prevented us Multivariate Adaptive Regression Splines (MARS) model for the natural logarithm of wage instead of the traditional regression model.

3.3 LIMITATIONS

Research Question 2 could not be answered from the Bridges data as the variables included in the files refer to the jobs made available to the project beneficiaries and not to the type of jobs typically sought by Bridges participants.

Similar challenges were faced to answer Research Question 4 on the identification by sector of data knowledge discovery and beneficiary profiles. The factors affecting youth employability and salaries were those predicted by the standard economic theory of employment and earnings. The relatively small number of observations for each of the economic sectors prevented the team from pursuing a meaningful exercise of extracting previously unknown and potentially useful information from data stored in databases.

The COVID-19 global pandemic, staff rotation in the private sector due to COVID-19 impacts, and job seasonality were not factored in at the time of implementation. Thus, the data studied in this report does not contemplate these external factors, per the SOW. Readers are advised to consider these external factors when reading the report.

The findings from this study are valid to describe the flow from training to employment for the youth registered as beneficiaries of Bridges. **The findings are not generalizable to the training-to-employment experience of the whole youth population, nor are they valid to provide answers to evaluation questions at a country-level. Data is focused on the successful beneficiary profile attained by the USAID Bridges to Employment interventions.**

4.0 Findings and conclusions

4.1 FINDINGS

4.1.1 Q1: By key sectors, how can participants' specific technical, academic and vocational skills (alone and/or combined) be most effectively leveraged for being hired into jobs above the minimum wage?

No salary differentials due to the economic sector of employment were detected. Once the variation in salaries was controlled for the effects of education, experience, training, and working conditions, no differential effects due to the economic sector of employment were detected. The economic sector was not selected for inclusion in the set of final basis functions in the MARS model (refer to Table 1).

Table 1: MARS Basis Functions and Their Coefficients – Model for the Logarithm of Salary

Transformed Variable (Basis Function)	Coefficient
Intercept	5.834
Attended one training course	-0.280
Attended two training courses	0.137
Attended three training courses	0.366
Attended four training courses	-0.073
First Bridges cohort	-0.189
Second or third Bridges cohort	-0.067
Fourth Bridges cohort	0.206
Paid monthly or fortnightly	0.253
Hired on a casual or hourly basis, or entrepreneur (formal or informal)	-0.059
More than 13 years of schooling	0.027
Being older than 22 years of age	0.013
Mean square error	0.073
R Square	0.207

No salary differentials due to either sex or area of residence were detected. Neither sex nor area of residence were included among the set of final basis functions in the MARS model (refer to Table 1).

Salary grows with formal education beyond high school, and with experience. As expected, salary grew 2.7 percent for each additional year of education beyond high school, and increased by 1.3 percent for each additional year of experience, as measured by whether the youth was 22 years and older (refer to Table 1).

Bridges training had a strong impact on youth salaries. Each additional training course a youth attends increases his/her salary by 15 percent (refer to Table 1).

Working and payment conditions had an effect on youth salaries. Not being on a temporary job, or not being hired on an hourly basis, or not being an entrepreneur, either formal or informal, increased the youth salary by 5.9 percent. Besides, being paid monthly or fortnightly increased the salary by 25 percent. (refer to Table 1).

4.1.2 Q3: By sector, how much does having a 1) high school degree or 2) at least some high school education contribute to employment? Is there a wage differential?

Having an educational level above a high school certificate increases youth likelihood of employment in the energy, manufacturing, and information technology and communications sectors. The strongest effect of having an educational level above a high

school certificate was observed for the energy sector. A high school graduate was 6 times as likely to be employed as a non-high school graduate[8] (refer to Table 2).

Table 2: Logistic Regression Models Coefficients for the Likelihood of Employment by Economic Sector

	Agro-industry	Retail Trade/ Tourism	Energy	Manufacturing	Information Technology
Being a male	1.01**			0.21	
Age at Bridges registration			0.19**	0.07**	0.11**
Education above high school prior to Bridges		-3.80	1.85**	0.41**	0.68**
Number of courses attended		0.16**			0.89**
Cohort					-0.21**
Last course was on integral skills				-5.63**	-0.71**
Completed the last course		1.99**			0.79**
Improved in the last course				3.24**	
Course was part of INSAFORP curricula (informal)				1.21**	
Intercept	-2.06	-3.80	-5.72	-0.91	-4.78
Number of observations	252	2,774	216	2,426	2,611
Pearson Chi-Square	8.8	191.5	48.6	411.7	729.8
Average Partial Effect (APE)					
Education above high school		0.04	0.26	0.09	0.10
Training		0.45	0.03	0.44	0.25

** Significant at the 5% level.

[8] The number of times a high school graduate was more likely to obtain employment than a youth with no high school is known as the odds of employment. It is equal to the exponential of the logistic regression coefficient. An odds value of 1 means that high school graduates are equally as employable than non-high school graduates ones. An odds value greater than 1 means that a high school graduate is more likely to be employed than a youth with no high school certificate, and an odds value lower than 1 means the opposite.

The information technology and communications sector recorded the second strongest effect of having an educational level above a high school certificate. A high school graduate was twice as likely to be employed as a non-high school graduate. A weaker effect was observed for the manufacturing sector. A youth with an educational level above high school was 1.6 times as likely to be employed as a non-high school graduate. Having an educational level above a high school certificate did not affect the likelihood of employment in both the retail/trade and agroindustry sectors (refer to Table 2).

Salary grew 2.7 percent for each additional year of education beyond high school (refer to Table 1). Having a high school certificate makes little difference in earnings when a special level of effort is provided by implementers to support beneficiaries with less than high school degree. The monthly salary differential due to high school completion was $10. The monthly salary for a youth with high school was assessed at $313. The salary for a youth with education below high school was assessed at $303.

4.1.3 Q4: What data knowledge discovery was identified by sector and beneficiary profiles?

No factors explaining youth employability or salaries beyond those predicted by human capital theory were identified from the data. The information contained in the databases reflects the way the Bridges Project was implemented to meet employment, salary, gender equity, and private sector engagement goals (refer to Tables 1 and 2).

4.1.4 Q5: How do formal or informal minimum academic requirements by the private sector affect the potential for youth to be employed? Based on the data at hand is there a minimum academic level required by the private sector to employ youth?

Having a high school degree increased youth's likelihood of employment in the energy, manufacturing, and information technology and communications sectors. The strongest demand for high school graduates was observed for the energy sector. A high school graduate was 6 times as likely to be employed as a non-high school graduate. The information technology and communications sector recorded the second strongest demand for high school graduates. A high school graduate was twice as likely to be employed as a non-high school graduate. The manufacturing sector ranked third in demand for high school graduates. A high school graduate was 1.6 times as likely to be employed as a non-high school graduate. Only for the manufacturing sector, having completed a course backed by INSAFORP increased a youth's likelihood of employment beyond the positive effect of a high school certification. Independent of the other variables in the model, the probability of employment for a youth with a high school certificate was assessed at 0.60. This probability increased to 0.77 when the

youth completed a course certified by INSAFORP, a 17 percent increase in the likelihood of employment (refer to Table 2).[9]

4.1.5 Q6: How do formal or informal minimum academic requirements by the private sector affect the potential for youth to be employed? Based on the data at hand is there a minimum academic level required by the private sector to employ youth?

The Bridges training effects on youth employability. Retail trade/tourism and manufacturing were the sectors where youth employability was most positively impacted by Bridges training. The average partial effect (APE) of training on the probability of employment was assessed at 0.45 for retail trade/tourism, and 0.44 for manufacturing.[10] In the information technology and communications sector, the APE of training was assessed at 0.25. The weakest average effects of training were observed in the energy and agroindustry sector. The APE for the former was only 0.03 and it was null in the agroindustry sector (refer to Table 2).

Formal education effects on youth employability. Energy was the sector where formal education impacted employability the most. The APE of an additional year of formal education beyond high school on the probability of employment was 0.26. The APE was assessed at 0.10 and 0.09 for the sectors of information technology and manufacturing, respectively. The smallest APE on the probability of employment was observed for the retail trade/tourism sector (0.04). (refer to Table 2).

The Bridges training premium: a measure for USAID value for investment to increase youth employment. The training premium was assessed from the ratio of training to formal education APE effects on the probability of employment. Retail trade/tourism was the sector where the training premium was larger. The APE of training was 11.25 times the APE for formal education beyond high school. Manufacturing and information technology followed with training premiums of 4.9 and 2.5, respectively. Energy recorded a training premium of 0.12, higher only to agroindustry where this premium was 0 (refer to Table 2).

Salary and sex differentials. No salary differentials due to sex were detected (refer to Table 2).

Economic sectors that offer the best value for USAID support to increase youth employment and improve income for youth:

a. ***In terms of youth employment***: Energy, manufacturing, and information technology are the sectors offering the greatest potential to employ youth with a minimum of 13 years of formal schooling. Retail trade/tourism is the sector with potential to employ youth with

[9] The findings from this study are valid to describe the flow from training to employment for the youth registered as beneficiaries of Bridges. The findings are not generalizable to the training-to-employment experience of the whole youth population, nor are they valid to provide answers to evaluation questions. Out of every 10 young people that were placed through the Bridges Project, eight have a high school degree and two do not have a high school degree. The total universe assessed was the +/- 5,000 youth who attained employment as documented in the SisPuentes database.

[10] The APE indicates by how much the probability of employment increases by each additional training course completed. For the logic model, the APE is equal to the regression coefficient for training multiplied by the average of the probabilities of employment assessed at the means of the explanatory variables across all observations.

a high school education or lower (refer to Table 1).

b. ***In terms of youth earnings***: Earnings are sensitive to the formal education level achieved and the quantity and quality of training. Therefore, USAID workforce development programs might focus on the sectors of energy, manufacturing, and information technology that require levels of education above high school and specific technical skills (refer to Table 2).

4.2 CONCLUSIONS

4.2.1 Q1 Conclusion

Salaries do not differ across economic sectors, gender, or the area of residence. Salary differentials are due to factors such as formal education and training. These are the main factors affecting Bridges beneficiaries' salaries. Consistent with expectations, experience matters for youth earnings. Also, employment conditions have an impact on youth salaries. Youth with full-time or part-time employment who are paid on a fortnightly or monthly basis have higher salaries than those on other forms of employment or payment periods.

4.2.2 Q3 Conclusion

The sectors of energy, manufacturing, and information technology require an educational level above high school. This is expected as the relative sophistication of the business and production processes in these sectors demand workers equipped with competences and skills beyond those provided by the basic and middle education system. In the agroindustry and retail trade/tourism sectors, holding a high school degree seems to be enough for employment.

Having a high school certificate with no further studies makes little difference in earnings, when vulnerable youth receive support from USAID programs. The high school premium was assessed at $10 a month. The result here refers to youth who participated in the Bridges to Employment program who were employed and therefore included in the salaries model. Within this group, employed youth with only a high school certificate represented 62% of the total, and those with studies above high school represented 14.4%. The predicted salary for a youth with high school but no further studies was $313. This salary was $10 higher than the salary for a youth with education below high school. The average academic level of the employed youth without a high school certificate was equivalent to first year of high school. The predicted salary was $330 for a youth with education level above high school. This confirms our expectation that salary increases with education.

4.2.3 Q4 Conclusion

The information extracted from the data is consistent with the actual implementation of the Bridges Project and with its theory of change.

4.2.4 Q5 Conclusion

The sectors of energy, manufacturing, and information technology require that youth possess an educational level above high school in order to be hired. In the agroindustry and retail trade/tourism sectors, holding a high school degree seems to be enough for employment. In the

manufacturing sector, having completed a course recognized by INSAFORP has a strong beneficial effect on youth employability beyond the benefits due to having a formal certification.

4.2.5 Q6 Conclusion

In terms of the efficacy of Bridges training, retail trade/tourism was the sector representing the best value for the investment, followed by manufacturing and information technology. Whether a youth has attained a level of education of high school or above is key to obtaining employment in the energy, manufacturing, and information technology sectors. Education influences both the prospects of youth employment and their salaries. It provides youth with the basic knowledge that is required for the successful completion of any training program. Regardless of the economic sector being considered, providing youth with incentives to complete high school and to undertake further studies is a key factor for the efficacy of any workforce development program.

4.2.6 Q6 Recommendations - How might workforce development programs complement this potential?

Although the SisPuentes data do not enable answering this question, the findings seem to provide evidence to suggest some initiatives that might be included as part of a revised new version of the Bridges Project. These initiatives are grouped in three areas: 1) initiatives aimed at increasing youth educational attainment; 2) initiatives to increase youth employment; and 3) initiatives to increase youth income.

Initiatives to increase youth educational attainment

- Combining flexible vocational education with part-time apprenticeships through public-private partnerships.
- Combining technical education scholarships with part-time apprenticeships.

Initiatives to increase youth employability

- Supporting INSAFORP training and certification programs for youth who complete general high school.
- Designing programs to improve soft and labor market skills among the youth.
- Providing grants to increase the youth intake by businesses.

Initiatives to increase youth income

- Supporting relevant technical and tertiary education retention programs (*i.e.*, scholarships, internships, *etc.*).

APPENDICES

APPENDIX I: STATEMENT OF WORK (SOW)

USAID/El Salvador
Workforce Development Study

A. Purpose of the Study

The purpose of this study is to analyze data collected under the USAID Bridges to Employment Project. Using data mining the contractor is expected to find insights, patterns, relationships, and trends through diverse analytical methods, not previously identified. The data to be analyzed have been collected in the beneficiaries' data management system called SisPuentes which was developed under this Project. The study will extract usable data to expand on findings. Usable data should include, but not be limited to beneficiary profile, employment by educational level, education related dropout rates and completion rates, possible wages related to specific sectors (*e.g.*, agroindustry, commerce and tourism, energy, manufacturing, and information technology and communications (ITC)), and demonstrating potential wages to varying educational levels.

This study will also provide evidence and will identify trends to inform future interventions under the newly approved Country Development Cooperation Strategy (CDCS). The study shall support knowledge discovery in data processes[11] that identifies beneficiary professional and academic profiles in diverse key business sectors—at a minimum, the study should describe beneficiary profiles[12] for each sector identified in the data. The beneficiary profiles should also reference El Salvador's National Policy for diversification and productive transformation and consider key investments sectors that promote economic growth.

The main audience of this study will be USAID El Salvador, particularly the Office of Economic Growth and Education (EGE) and the Regional Program Office (RPO).

The study is scheduled to occur during the first quarter of FY 2021.

B. Background Information about USAID Bridges to Employment Project

The objective of the Mission's Bridges to Employment program was to increase employment within targeted, high-growth economic sectors by strengthening the technical and soft skills of at-risk youth in high-crime municipalities. The activity promoted formal and non-formal vocational and technical training that responded to market demand and improved workforce development services to help at-risk youth successfully compete for work in targeted growth sectors. Other key focus areas included:

- Improve the collection and analysis of labor market demand data for public use.
- Improve workforce development programs to promote a skilled workforce.
- Promote youth entrepreneurship and self-employment to increase employment and create jobs.
- Advocate for effective corporate social responsibility programs to advance respect for inclusive and fair human resource practices related to young workers.

[11] Knowledge Discovery in Databases refers to the nontrivial extraction of implicit, previously unknown, and potentially useful information from data stored in databases.

[12] By sector, each beneficiary profile should include weighted variables such as, but not limited to age, academic level, etc. The Study Team must review the variables included in the database and select those ones that are statistically significant.

In addition, Bridges invested in the development of a beneficiaries' data management system called SisPuentes.

Bridges provided support and technical assistance to adopt this customized system which Bridges also used to report data to USAID. This platform allows training centers to track youth beneficiaries during the course of the training, *i.e.*, to monitor enrollment, attendance, and performance through pre- and post-tests; monitor their employment status after they graduate; and evaluate progress toward the targets for the project indicators. Data extracted from the SisPuentes system has more than 20,000 sanitized records from young people who benefited from USAID's Bridges workforce development project as well more than 1,200 records from companies that hired these young people.

Through the Bridges to Employment program, USAID supports the following economic sectors:

- Economic Sector 1: Manufacturing (including plastics and textiles)
- Economic Sector 2: Tourism, commerce and services (high end services as logistic services, and lower end services as waiters, cashiers, bartender, sales display, *etc.*)
- Economic Sector 3: Agroindustry (including the food and beverages sector)
- Economic Sector 4: Energy
- Economic Sector 5: Information Technology and Communications

Moreover, the program also supports the following additional sectors:

- Positive Youth Development
- Private Sector Engagement
- New Partners Initiative Development
- Female and women empowerment
- Diversity and inclusion (emphasis in youth with disabilities)

Preliminary data findings from the SisPuentes data management system

- The training completion rate of young people with or without a high school degree is similar. Both groups tend to finish at an average rate of 80 percent.
- Out of every 10 young people that were placed through Bridges, eight have a high school degree and two don't have a high school degree. The total universe assessed was the +/- 5000 youth who attained employment as documented in the SisPuentes database.
- More than half of the youth employed without a high school degree have at least an academic level of 9th grade.
- USAID Bridges to Employment had a wide range of companies (*i.e.*, over 1,200) hiring participating youth. In fact, 88 percent of the companies hired 5 youth or less, and less than 1 percent hired 50 youth or more. There are significant differences in the beneficiary profile by sector. This results in a varied employment and wage rate. Sector jobs have specific academic requirements. Youth with a specific profile were consistently able to attain employment and/or earn wages higher than the legal minimum (+/- $305 per month). Similarly, youth who attained a job, but didn't meet the wage threshold established in the MEL Plan for the USAID Bridges to Employment project had a well-defined profile (these were youth in the textile industry where the minimum wage required by law is +/- $295 p/month).

C. Research Questions

Research questions include, but are not limited to the following questions**:**

1. By key sectors, how can participants' specific technical, academic, and vocational skills (alone and/or combined) be most effectively leveraged for being hired into jobs above the minimum wage? (Please rank the importance or value of these skills, either individually or combined. Please disaggregate the findings, to the degree possible, by gender).
2. How do sector-specific academic and skills requirements act as a barrier to either men or women looking for employment typically sought by Bridges participants? (Please rank these barriers and disaggregate the findings by gender.)
3. As specifically as possible, by sector, how much does having a 1) high school degree or 2) at least some high school education contribute to employment? Is there a wage differential?
4. What data knowledge discovery was identified by sector and beneficiary profiles?
5. How do formal[13] or informal[14] minimum academic requirements by the private sector affect the potential for youth to be employed? Based on the data at hand, is there a minimum academic level required by the private sector to employ youth?
6. Based on the data at hand ,which economic sectors would be the best value for investment to increase youth employment and support improved income for youth? How might workforce development programs complement this potential?

D. Methodology, Data Collection, and Analysis

Data to answer the research question above will be analyzed from the following SisPuentes databases which will be delivered to the Expert(s). USAID/El Salvador will provide the SisPuentes databases which includes all beneficiaries assisted under the Bridges to Employment Program.

The main variables of the SisPuentes databases include:

- Database of Beneficiaries:
    1. Código Joven
    2. Departamento
    3. Municipio
    4. Área (rural o urbana)
    5. Sexo
    6. Rango de edad
    7. Rango PPR (17 o menos/18 o mas)
    8. Discapacidad (si o no)
    9. Nivel Educativo
    10. Tipo de Evento (del primer contacto)
    11. Nombre del Evento (del primer contacto)
    12. Municipio del evento (del primer contacto)
    13. Fecha de Inicio del evento (del primer contacto)

[13] Academic level certifications approved by the Ministry of Education.

[14] Academic level achievements not approved by the Ministry of Education, but recognized by INSAFORP (*Instituto Salvadoreño de Formación Profesional*).

14. Fecha de Fin del evento (del primer contacto)
15. Periodo del evento por trimestre
16. RFA (para que grant se realizó el onboarding (inducción) del jóven)
17. Centro de Formación del joven
18. Vulnerabilidad (En base al índice de vulnerabilidad de Puentes fue o no aceptado el joven)

- Training-Employment database main variables:
    1. Código Jóven
    2. Edad
    3. Rango de edad
    4. Sexo
    5. Nivel Educativo más alto alcanzado
    6. Clasificación nivel educativo
    7. Municipio (del joven)
    8. Área (rural o urbana)
    9. Matricula (en principio un joven podía tomar dos cursos con Puentes ejemplo: terminar bachillerato y un entrenamiento específico, o habilidades blandas para la vida y un entrenamiento técnico)
    10. # de Cursos
    11. Completado
    12. Mejorado
    13. Nombre del curso
    14. Clasificación del curso
    15. Clasificación de formación
    16. Sector
    17. Fechas (inicio y final - varias columnas)
    18. RFA (para que grant se realizó el onboarding (inducción) del jóven)
    19. Centro de Formación del joven
    20. Municipio del curso
    21. Retorno a estudiar (si o no)
    22. Evento
    23. Empleo (1er empleo, nuevo empleo o mejor empleo más detalles de ubicación y sector - varias columnas)
    24. Empresa (más detalle - tres columnas)
    25. Salario

It is expected that the Expert(s) process—through data mining—and analyze the existing quantitative data extracted from the SisPuentes system with quantitative techniques designed to elicit primary data from a wide range of beneficiaries, and enterprises.

In addition, the Study Team should incorporate, to the extent feasible, analysis for any differences between effects on men and women or male and female participation.

Desk review of relevant documents

As minimum, the consultant(s) shall review the following documents:

- Final Performance Evaluation: Bridges to Employment in El Salvador

- Country Development Cooperation Strategy 2013-2020 and 2020-2025 (?)
- Journey to Self-Reliance Strategy and Learning Agenda
- USAID Private Sector Engagement Policy

It is expected that qualitative data from the Final Performance Evaluation might be used to triangulate and analyze the results from this study, appropriately.

Meetings

An initial team-planning/kick off meeting will be held between USAID staff and the Expert(s) before the submission of a Study Plan so that USAID El Salvador staff can clarify any questions from the Expert(s), expectations, and guidelines. The expected results of this meeting are to:

- Clarify each team member's role and responsibilities
- Confirm the anticipated timeline and deliverables
- Discuss data analysis and methodologies

Additional meetings may be held as deemed necessary by USAID staff and/or the Expert(s).

E. Deliverables

It is estimated that no more than 30 working days of services from the starting date of the study will be required to complete a high-quality analysis as required under this SOW. During that time frame, the Study Team shall submit the following deliverables:

1. A **Study Plan**, in Word Gill Sans font[15] size 12, to be completed by the Study Team after the Team Planning Meeting, no later than 5 calendar days after the starting day of the Study. The Study Team is encouraged to propose analysis methods in this Study Plan that Expert(s) considers can yield stimulating, robust evidence in answering each of the research questions.

   USAID will receive the Study Plan via electronic mail and review it to provide comments no later than 5 working days after receiving the document. The Study Plan will provide details of how the various deliverables, tasks, and activities will be undertaken. It must include at least:

   - Timeline and/or Milestone Plan, including tentative starting time for data analysis and duration of each activity conducted under the study;
   - Study Team composition, roles, and responsibilities;

   The Mission will review and approve the final Study Plan at the start of the consultancy.

2. A **Preliminary Findings Briefing** for USAID staff, and other stakeholders that USAID/El Salvador consider necessary on the preliminary findings, results, and data-based recommendations and conclusions for data-driven decision making identified by the Expert(s) immediately after finalizing the data analysis phase and before starting the draft report. According to the audience, the briefing may be conducted in English or Spanish using USAID approved slide templates. Only the Team Leader needs to be present for this briefing; however, all the members of the Study Team may also attend. The

[15] If the Evaluation Team does not have Gill Sans font available, they must use any other approved font as per the USAID Graphics Manual and Partners Co-Branding Guide.

Preliminary Findings Briefing will be used by the Expert(s) as a feedback exercise to prepare the Draft of the Final Report.

3. A **Draft of the Final Report** in Word, Gill Sans font size 12, submitted for review due no later than 5 calendar days after the Preliminary Findings Briefing. RPO in USAID/El Salvador will be responsible for coordinating the peer-review process with different offices within the Mission for comments. RPO will consolidate all comments and send the draft back to the Study Team within 7 working days. At a minimum, and in accordance with the USAID Evaluation Policy and ADS 201, the Final Report and its draft versions must include the following sections:

    - Executive Summary of the purpose, background, evaluation questions, findings, conclusions, and recommendations;
    - Study purpose and questions;
    - Through description of the study design and any challenge/limitations,[16] with emphasis on the timeliness and methods for data analysis;
    - Relevant data analysis tables;
    - Findings and conclusions drawn from the analysis of the findings;[17]
    - Appendices:
        - Original SOW, annotated with any changes approved by USAID
        - Review matrix of documents consulted
        - Meeting notes
        - Complete schedule of study activities, meetings, and interviews
        - List of individuals and organizations contacted and sites visited, as appropriate
    - Tables, graphs, pictures taken during site visits, maps, Reporting and Dissemination plan (including upload to USAID's Development Experience Clearinghouse based on approval by USAID)
    - Any statements of difference regarding significant unresolved differences of opinion by funders, implementers, and/or members of the review team;
    - All sources of information, properly identified and listed;
    - In accordance with ADS 201, the contractor will make the final sector review report publicly available through the Development Experience Clearinghouse within three months of the approval of the final report.

USAID/El Salvador expects to receive a high-quality Draft Report from the Study Team, USAID/El Salvador will assess the quality of it using the Evaluation Report and Review Template.

4. **Final Report** in PDF, font Gill Sans size 12, no longer than 15 pages in its body, excluding the cover page; Table of Contents; List of Acronyms; and Appendices. The report should be written in American English.

[16] The Evaluation Team must identify (a) steps taken to mitigate limitations, and (b) how/whether the limitations affect any particular finding, conclusions, or recommendations.

[17] In moving from findings to conclusions, the analysis must be clear as to how findings are synthesized through different techniques such as divergence, convergence, and amalgamation; propensity; weighting; *etc*.

The approved Final Report must adhere to USAID's Evaluation Policy and ADS 201, Criteria to Ensure the Quality of the Study Report,[18] and must be submitted in English and Spanish and have incorporated USAID's comments, as appropriate.

The Final Report will be due to USAID/El Salvador 7 working days after the Study Team receives comments on the draft. Two high quality printed, bound copies in English and Spanish of the Final Report must be submitted to USAID/El Salvador within 10 calendar days of acceptance of the Final Report.

5. A **One-Page** summary of the study purpose, findings, conclusions and recommendations. The One-Page summary will be prepared in English and Spanish in PDF.

F. Study Team

Team Leader/Local Data Analyst Specialist

Minimum qualifications

Education: Bachelor degree in Education, Economics, Finance, Business Administration, Accounting, Industrial Engineering, Statistics, Data Management, or other disciplines related to financial inclusion, workforce development, or economic development. Master, Ph.D. or Doctorate degree or professional with Doctoral candidacy is a plus. Formal training in monitoring and evaluation is preferred.

Language Proficiency: English Level IV and Spanish Level IV

Work Experience: At least six years of relevant prior experience in data management and analysis using quantitative and qualitative methods for different types of research and evaluations. In addition, at least six years of experience managing and analyzing socio-economic, sociodemographic and citizen security variables. Experience in Latin America or Central America is an advantage. Experience with management of a multidisciplinary team is a plus.

Position Description: The Team Leader will be responsible for overseeing, presenting, editing, and coordinating all documents and activities related to this study and for ensuring the production and completion of quality deliverables in a professional manner, in conformance with this SOW.

One Data Specialist

Minimum qualifications

Education: Bachelor in Education, Statistics, Social Research, Engineering, Economics, Business Administration, or other fields related to data analysis. Master's degree is a plus. Formal training in monitoring and evaluation is preferred.

Language Proficiency: Spanish Level IV and American English Level III.

Work Experience: At least two years of experience in cleaning and processing of quantitative and qualitative data. Experience in data management and analysis. Knowledge of research methods and techniques is a plus. Familiarity with USAID's objectives, approaches, operations, and policies, particularly as they relate to evaluation is a plus.

[18] See ADS mandatory reference 201maa, available at https://www.usaid.gov/sites/default/files/documents/1870/201maa.pdf

Position Description: The Expert will be responsible to clean and analyze the SisPuentes data, and prepare any visualization of the data, if necessary.

Level of Effort (LOE)

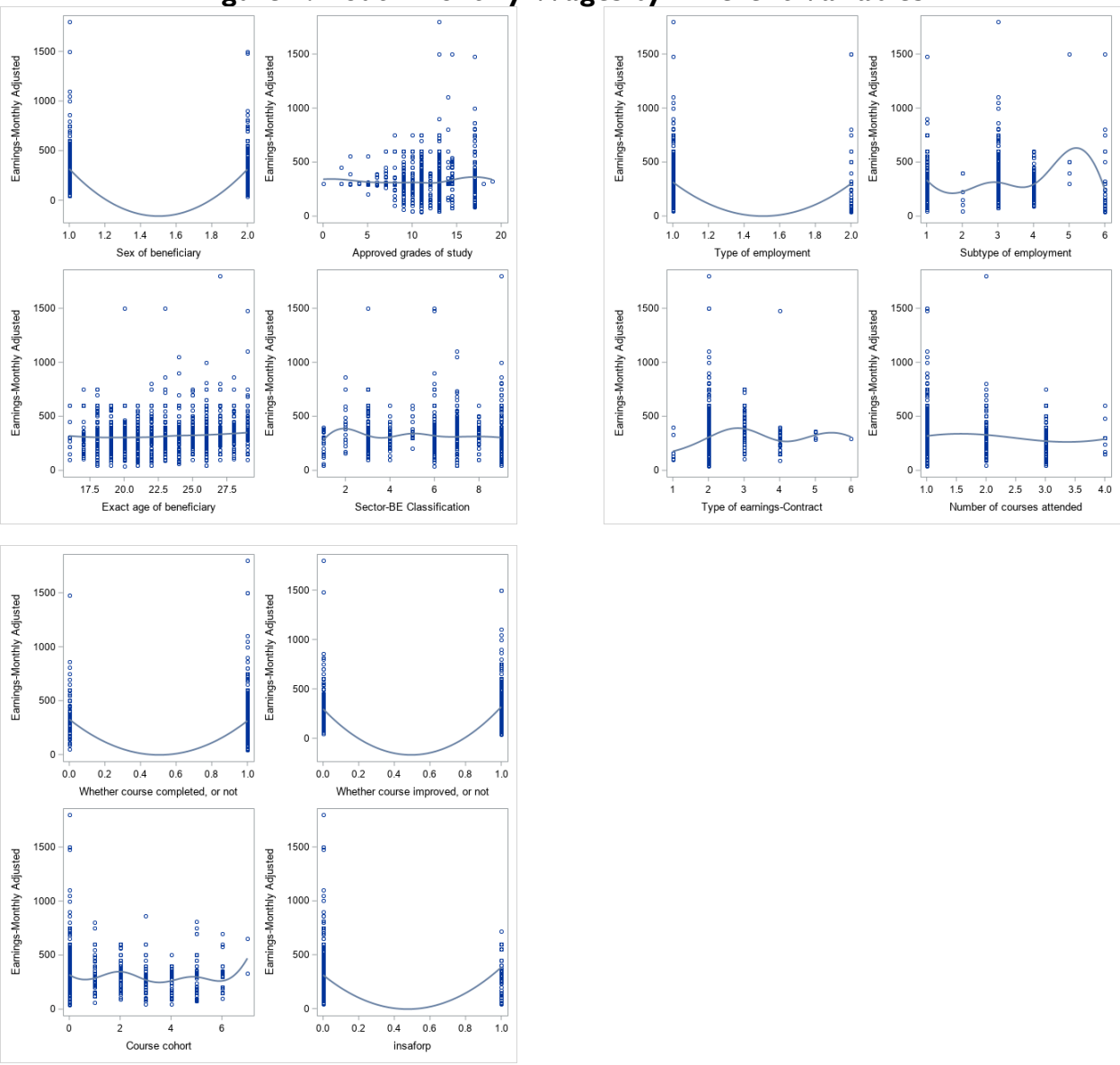
Position	LOE
Team Lead	30
Data Specialist	30

APPENDIX 2: TABLES AND GRAPHS

2.1 Exploring the linearity of the relationship between logarithms of salaries and potential predictors

We examined data on 3,932 employed youth with complete information on the attended and course files. Figure 1 shows the distribution of monthly wages by each of the following variables: (1) number of approved years of formal education, (3) age at time of enrolment in BE; (3) cohort of admission into BE; (4) number of courses completed; (5) number of courses with improvement level; (6) type of employment (full-time, part-time, other); (7) type of contract (monthly, daily, hourly, other); (8) type of qualification (formal or informal); (9) sex; (10) area of residence (urban or rural); (11) region of residence (San Salvador metro area or other); and (12) economic sector. A degree 3 spline curve was added to each graph.

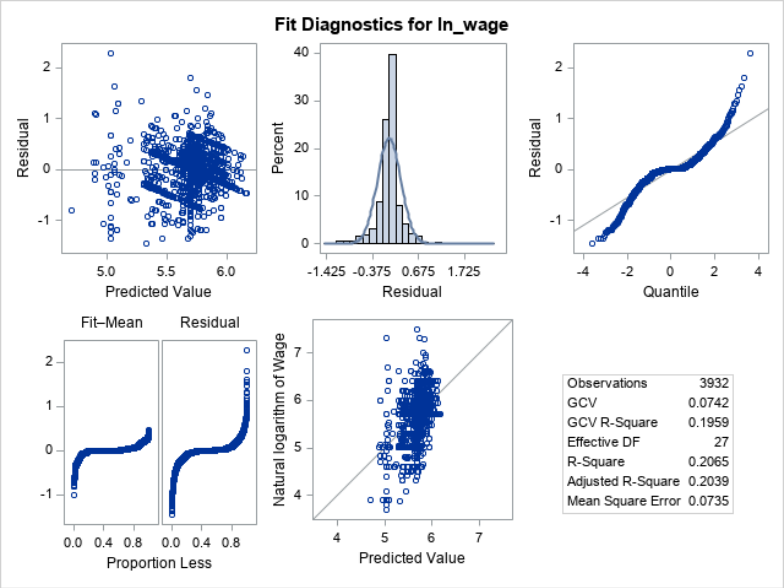
Figure 1: Youth Monthly Wages by Different Variables

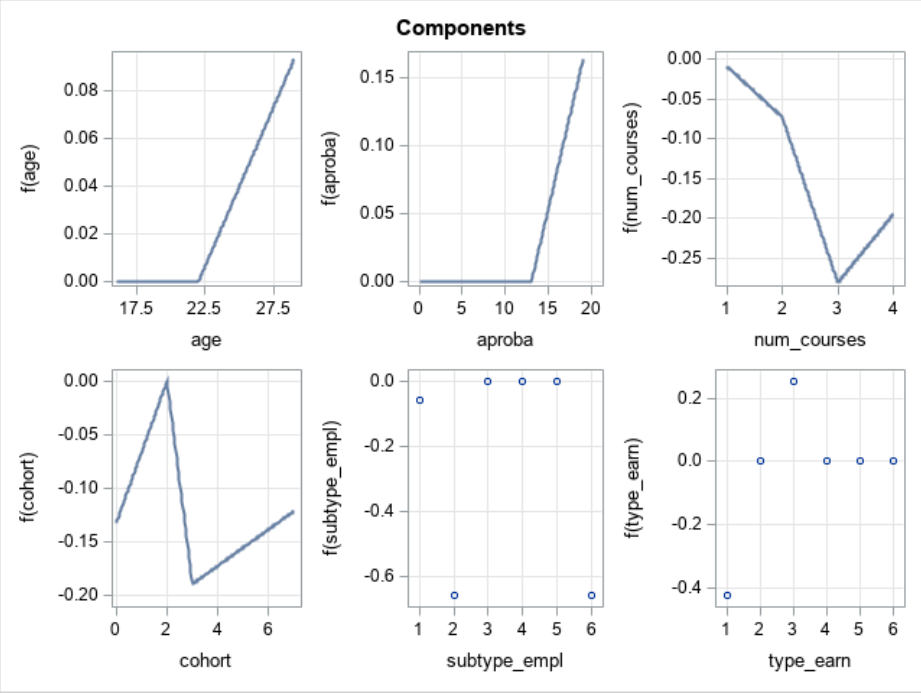


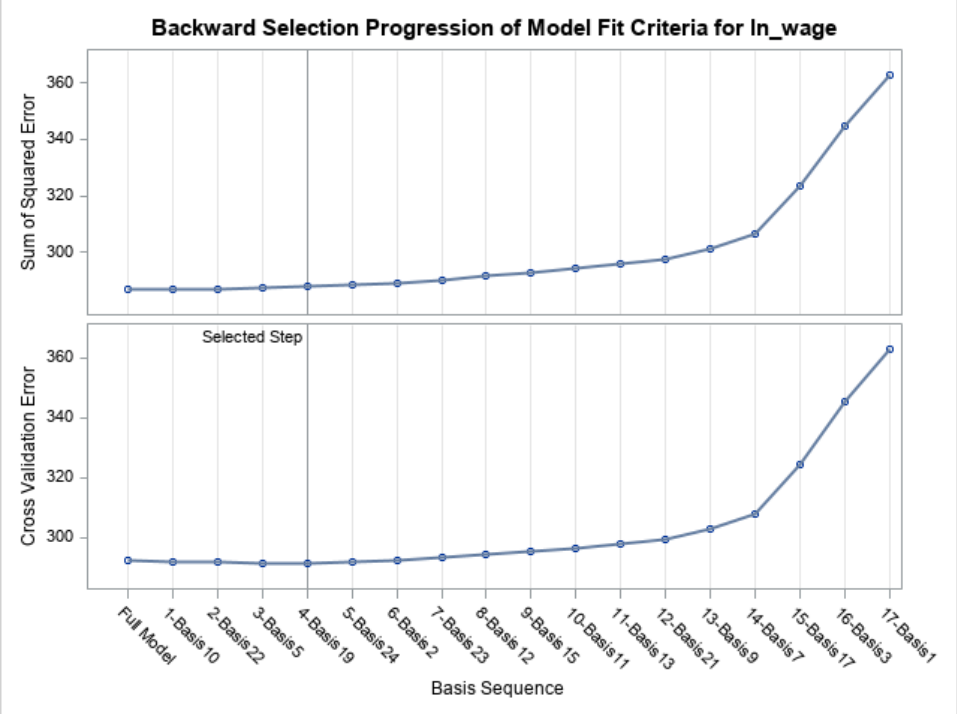
Reading from left to right, the data in Figure 1 indicate that: (1) salaries do not vary by sex; (2) as expected, salary variability increases with education; (3) there is more variation in the salaries of those working as employees than among entrepreneurs; (4) salaries are higher for youth hired for either temporary or full-time jobs; (5) age does not seem to impact on salary differentials; and (6) salaries do not vary across economic sectors. There is a slightly higher variation in the manufacturing and information-technology sectors, and a larger concentration above the mean in the salaries for the energy sector; (7) salaries do not differ across different forms of payment. However, the salaries of youth paid on a monthly basis show more variability than other payment periods; (8) there seems to be a weak nonlinear relationship between salaries and number of courses attended. The salary declines as the number of courses increases from one to three when it shows a slight increase; (9) youth who either completed or recorded an improvement in their last course seem to have higher salaries than those who either did not complete or did not have an improved performance in it; (10) there is not clear relationship between the cohort a youth was part of and salary; (11) there was lesser variability in the salaries of youth attending a course included in the INSAFORP curricula than those attending other courses.

2.2 Fit diagnostics for the MARS model for the logarithm of wages

Figure 2: Model Diagnostics -MARS




Components
f(age)
age
f(aproba)
aproba
f(num_courses)
num_courses
f(cohort)
cohort
f(subtype_empl)
subtype_empl
f(type_earn)
type_earn


Backward Selection Progression of Model Fit Criteria for ln_wage
Sum of Squared Error
Cross Validation Error
Selected Step
Full Model
1-Basis 10
2-Basis 22
3-Basis 5
4-Basis 19
5-Basis 24
6-Basis 2
7-Basis 23
8-Basis 12
9-Basis 15
10-Basis 11
11-Basis 13
12-Basis 21
13-Basis 9
14-Basis 7
15-Basis 17
16-Basis 3
17-Basis 1
Basis Sequence

APPENDIX 3: BIBLIOGRAPHY OF DOCUMENTS REVIEWED

Altonji, J.G., A.A. Smith Jr. & I. Vidangos (2013). Modeling earnings dynamics. *Econometrica* 81(4): 1395-1454.

Becker, G.S. (1993), *Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education*. 3rd ed. Chicago, IL: The University of Chicago Press.

Blundell, R.L., L. Dearden, C. Meghir & B. Saniesi (1999). Human capital investment: The returns from education and training to the individual, the firm and the economy. *Fiscal Studies* 20(1): 1-23.

Friedman, J.H. (1991). Multivariate adaptive regression splines. *The Annals of Statistics* 19 (1): 1-67.

Ishikawa, M. & D. Ryan (2002). Schooling, basic skills and economic outcomes. *Economics of Education Review* 21(3): 231-243.

Hastie, T. J., R. J. Tibshirani, & J. H. Friedman (2009). *The Elements of Statistical Learning: Data Mining, Inference, and Prediction*. 2nd ed. New York, NY: Springer-Verlag.

Mincer, J. (1974). *Schooling, Earnings, and Experience*. New York, NY: Columbia University Press.

Mincer, J. (1989). Human capital and the labor market: A review of current research. *Educational Research* 18(4), 27-34.

USAID El Salvador, 2014, *Country Development Cooperation Strategy 2013-2017 (CDCS)*, https://www.usaid.gov/sites/default/files/documents/1862/CDCS%203-3-14%20Public%20Version%20FINAL.pdf , accessed December 2020.

USAID El Salvador, undated, *Country Development Cooperation Strategy 2020-2024 (CDCS)*, https://www.usaid.gov/sites/default/files/documents/CDCS-El_Salvador_PUBLIC.pdf, accessed January 2021.

USAID, undated, *The Journey to Self-Reliance*, https://www.usaid.gov/selfreliance, accessed January 2021.

USAID El Salvador, undated, *Fact Sheet USAID Bridges to Employment*, https://www.usaid.gov/sites/default/files/documents/1862/Fact_Sheet-_USAID_Bridges_to_Employment_Final.pdf , accessed January 2021.

Wooldridge, J.M. (2016). *Introductory Econometrics. A Modern Approach*, 6th ed. Boston, MA: Cengage Learning.