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JOB CREATION ASSESSMENTS

September 2016

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INTRODUCTION

Project Background

The Monitoring and Evaluation Support Project (MESP) is designed to improve the functioning and utility of USAID/Jordan Mission performance monitoring, evaluation and project planning, and design systems through a combination of targeted direct monitoring and evaluation (M&E) implementation, expert technical assistance, formal training, and knowledge sharing and M&E collaboration support.

Purpose and Objectives

USAID/Jordan activities in the Office of Economic Development and Energy (EDE) were designed with high-level targets based on economic growth trends and assumptions of several years prior to the activities' implementation. While existing activities were designed for long-term economic development based on growth figures from 2010-2012, regional dynamics in recent years have curtailed economic growth in Jordan. The results of the three assessments contained in this document provide guidance on the current and future potential for employment-related growth in USAID's targeted sectors.

Introduction to Assessments

The first assessment in this document focuses on Job Creation, with a specific focus on USAID target sectors of tourism, ICT, clean technology, medical tourism, pharmaceuticals, transportation, and manufacturing. The purpose of this assessment is to assist USAID in establishing realistic expectations for job creation and job placement in the target sectors. It employs previously unused data sources and applies an empirically rigorous methodology in order to estimate ranges for direct job creation, due to exports, and indicators of foreign direct investment in JCP's target sectors. The assessment identifies the type of interventions that are most effective in increasing employment and the types of interventions that lead to more rapid increases in employment. It builds on the Jordan Competitiveness Program (JCP) Jobs Creation Study and verifies the methodology used in the JCP Jobs Creation Study to estimate targets for exports and foreign direct investment (FDI) in JCP's target sectors.

The purpose of the second assessment in this report, the Cost-Per Jobs and In-direct Jobs assessment, is to assess the quality of the cost-per-job methodology presented in the JCP Assessment Report and provide complementary methodology on how to measure cost-per-jobs, and provide a summary of the methodologies that should be applied in order to measure overall employment creation due to new interventions. This assessment also provides complementary methodologies that could help better estimate any job impacts of the desired interventions. In terms of indirect employment, this assessment provides several alternative methodologies that have been employed by researchers in recent years.

The third assessment in this document reviews available data on Technical and Vocational Education and Training (TVET) in order to ascertain which areas of TVET investments yields the most productive employment outcomes over the short to medium term. This assessment also offers review and analysis of the available data from TVET institutions such as tracking graduates, employment rates, duration of employment, sectors of employment, and patterns of graduation and employment. The assessment also contains statistics on employment of TVET graduates by sector, institution, and gender and estimation of cost per graduate trained and cost per graduate employed.

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CONTENTS

ACRONYMS

ADS	Automated Directives System
DEC	Development Experience Clearinghouse
EDE	USAID Office of Economic Development and Energy
FDI	Foreign Direct Investment
FY	Fiscal Year
ICT	Information and Communications Technology
JCP	Jordan Competitiveness Program
M&E	Monitoring and Evaluation
MESP	Monitoring and Evaluation Support Project
SOW	Statement of Work
USAID	U.S. Agency for International Development

PROJECT BACKGROUND

The MESP project is designed to improve the functioning and utility of USAID Mission Performance Monitoring, Evaluation and Project Planning and Design systems through a combination of targeted direct monitoring and evaluation (M&E) implementation, expert technical assistance, formal training, and knowledge sharing and M&E collaboration support.

USAID/Jordan activities in the Office of Economic Development and Energy (EDE) were designed with high-level targets based on economic growth trends and assumptions of several years prior to the activities' implementation. While existing activities were designed for long-term economic development based on growth figures from 2010-2012, regional dynamics in recent years have curtailed economic growth in Jordan. The results of this assessment will be used to inform USAID about the current and future potential for employment-related growth in their targeted sectors. This assessment will focus on the USAID target sectors of: tourism, ICT, clean technology, medical tourism, pharmaceuticals, transportation, and manufacturing. It will also disaggregate data by governorate and sex where feasible. As stated by USAID, the purpose of this assessment is to:

A. Assist USAID in establishing realistic expectations for job creation and job placement in the USAID target sectors. The assessment will build on the Jordan Competitiveness Program (JCP) Jobs Creation Study, if deemed methodically sound. The assessment will identify each of these according to governorate and sector. Which types of interventions are most effective in increasing employment? Which types of interventions lead to the most rapid increases in employment? These questions were clarified to be framed in terms of which sectors or types of jobs can increase employment most rapidly, and which activities are focused on those and hence most effective.

B. Verify the methodology used in the JCP Jobs Creation Study to estimate targets for exports and foreign direct investment (FDI) in JCP's target sectors (ICT, clean technology, medical tourism and pharmaceuticals). If considered solid, estimate FDI targets for the remaining USAID target sectors and devise confidence intervals for those estimates. If not methodically sound, propose realistic expectations for FDI in all USAID target sectors, and expectations for exports in ICT and pharmaceuticals.

C. Assess existing methodologies for calculating indirect jobs within above listed sectors and propose additional algorithms for those sectors that international donors have not studied.

EVALUATION METHODS AND LIMITATIONS

BACKGROUND

This report employs previously unused data sources and applies an empirically rigorous methodology in order to estimate ranges for direct job creation, due to exports, and indicators of foreign direct investment in JCP's target sectors that goes beyond simple linear extrapolation. The design includes a strategy to include confidence intervals and apply simple econometric methods (ordinary least squares) and simulations (Monte Carlo), which may provide a more robust assessment of targets.

ASSESSMENTS OF PREVIOUS METHODOLOGIES

Previous job assessment methods have employed a "bottom up" empirical methodology, which while reasonable may be seen as too simplistic. The essence of the approach employed is to take averages of a particular available data series obtained mostly from government sources and extrapolate corresponding target numbers using estimates derived from previous studies. While the resulting "ballpark figures" may be correct, there may be areas for improvement. In particular, averaging time series with high variance risks masking the "true" trends of the variables under consideration. Furthermore, this methodological approach does not take into consideration the fact that variables may be jointly impacting the estimates. This occurs because the target calculations do not "control" for other observable variables. As a result, any findings using this bottom up approach may not be accurate or realistic enough and may escape a reasonable margin of error.

ALTERNATIVE EMPIRICAL STRATEGY

In order to estimate the effect of the relevant variables on the level of employment in Jordan we will employ a so-called ordinary least squares estimation. This empirical approach allows us to uncover deterministic patterns between two variables, for instance, investment in information technologies and new job creation. Unlike simple extrapolation, this method also takes into account the possible effect that other related variables may have in our outcome variable, thus allowing us to isolate the direct effect of our variable of interest, only. In our example, if the aim is to measure direct jobs, we have to make sure that any change in jobs are due to the presence of ICTs, and not due to changes in other variables such as the rate of growth of the country, the education of the population, or the quality of the firms involved. This method assures that any statistical correlation found is due to the link between jobs and ICTs and nothing else. Formally, the idea is to estimate the following statistical correlation:

$$\ln(Y_{ij}) = \alpha + \boldsymbol{\beta X_{ij}} + \boldsymbol{\gamma C_{ij}} + \epsilon_{ij}$$

Where $\boldsymbol{X}$ represents our group of variables of interest, namely, foreign direct investment, exports, information technologies, manufacturing, and transports. More specifically, (i) foreign direct investment is a dimension measured as the level of expenditure from abroad investors in the sector; (ii) level of exports is a variable that will be measured as the share of the production sold abroad; (iii) medical

tourism may be proxied by using a variable that captures medical procedures carried out on the locality of the firm to non-residents; and (iv) information and communications technologies may be constructed as an index based on the standard ICT indicators. Similarly, ***C*** represents the group of variables that we need to "control", those that need to be accounted for in order to make sure that we capture the correct correlation between ICT and employment, in our example above. This group in variables in ***C*** includes the rate of growth of the firms, legislation, credit history, type of employment, gender, and several others. In particular, the specific variables that we would like to control for are (i) locality's level of poverty, typically measured as the headcount poverty ratio of the locality, that means the amount of household living below the poverty line; (ii) locality's level of growth, measured as the last year's percentage increase in the GDP per capita of each location; (iii) size of the locality, measured by the amount of citizens living in it, which give us and idea of the potential capacity of that local economy, and (iv) the legal status of the firm, as its formal or informal status is an important variable controlling for the employment rate. In addition, the indexes *i* and *j* represent the firms and their localities of origin since we have variables at different levels of aggregation; similarly, while ϵ_{ij} represents the statistical error that will be corrected for homoscedasticity and possible clustering of the firms.

As mentioned above, the approach above, while useful for our purposes, is not particularly innovative. In fact, with perfect data, there is no need for anything else, but as the description above shows, data requirements can be onerous. In fact, assessing job creation is not particularly complicated when (i) data are available, (ii) the economic context is stable, and (iii) time restrictions are not binding. Whereas (ii) and (iii) are purely exogenous issues, on the data side for Jordan we have identified high quality firm-level data, which were employed in the JCP Assessment of High Level Targets. In fact, there is good potential that using the World Bank Enterprise Surveys we might obtain useful results. This was also mentioned in the Independent Review of the JCP High Level Target Assessment. However, since these data were not collected with the JCP in mind, it cannot capture all the specific impact nuances required to make accurate estimates. Still, it is possible to produce reasonable, realistic estimates using these data when using an additional empirical method, in particular, Monte Carlo simulations.

APPROACH TO ADDRESSING LIMITATIONS

Monte Carlo Simulations

An additional component of our analysis will take advantage of systematic simulation techniques that will simulate "shocks" or "exogenous changes," for example, a dramatic increase in investment in a sector, such as medical tourism, in order to test possible impacts in terms of direct jobs, foreign direct investment and exports. Since we have a deterministic set of data that does not take account for exogenous shocks that affects the firms, we are going to implement simulations of these shocks employing these Monte Carlo methods to generate three different scenarios: (i) light shocks, (ii) moderate shocks, and (iii) strong shocks. The Monte Carlo method is a technique that involves using random numbers within a systematic approach in order to measure impact. It uses iteratively evaluation of a deterministic model, such as the one shown above, but uses empirically-based random parameters as inputs in the estimation of impact. By using random inputs, one is essentially turning the deterministic model into a stochastic model. That means we are including randomness in our model, as we will except from the exogenous shocks since they are not perfectly anticipated by the firms. Monte Carlo simulation

provides a number of advantages over *deterministic,* or "single-point estimate" analysis, which is typical of ordinary least squares: (i) *Probabilistic Results.* Results show not only what could happen, but how likely each outcome is (ii) *Graphical Results.* Because of the data a Monte Carlo simulation generates, it is easy to create graphs of different outcomes and their chances of occurrence; (iii) *Sensitivity Analysis.* With just a few cases, deterministic analysis makes it difficult to see which variables impact the outcome the most. In Monte Carlo simulation, it is easy to see which inputs had the biggest effect on bottom-line results.

DATA SOURCES IDENTIFICATION AND LIMITATIONS

The ideal data sources required to make realistic calculations of direct job creation, FDI, and exports, are a combination of detailed firm census or firm surveys that are representative at the industry level, as well as administrative data that can be matched with the firm data. Of these data, the only information source that approximates to what is needed is the World Bank Enterprise Surveys, which were conducted twice in Jordan, once in 2006 and more recently in 2013[1]. These data, while useful, have limitations. First, they were collected prior to the Syria crisis and as such, they present a limitation to any calculation on job estimates. Second, while these data can be very useful to uncover "elasticities" and relevant links between basic firm categories, job creation and exports, they are not useful in the case of "frontier" industries such as clean technologies, medical tourism, and even information and communication technologies. The reason is simple. On the one hand, these emerging industries barely show up in any firm survey, as nationally representative as the survey may be. On the other hand, these surveys were not designed for the purposes needed to assess job creation, and thus lack critical variables needed in order to produce realistic, accurate, numbers. Short of the ideal data needed, the World Bank Enterprise Survey, along with data already collected from other sources still appear to be a useful source of reliable information, with some caveats. First, under some assumptions, they can help produce reasonable direct job estimates. Second, these assumptions will depend on the industry to be studied and involve using parameters at a more general level applied to the industry level. As useful as the World Bank Enterprise data are, it is simply impossible to make any calculations for medical tourism and clean technologies. For these two, specifically targeted surveys are needed. For the sectors in which it will be possible to produce realistic direct job creation numbers, it will also be possible to produce basic exports estimates. It is unlikely, however, that FDI estimates can be produced as they do not have these data[2]. Given the limitations above, the existing job creation and export assessments are rather rudimentary and the fact that these unexploited data already exist can help reaffirm the existing estimates at a low cost and in a short period of time. If realistic estimates are required in the longer run, the best course of action would be to do field work that should include the design of a targeted survey at the firm level in the industries that cannot be covered with the existing data.

World Bank Enterprise Surveys

The Enterprise Surveys, through interviews with firms in the manufacturing and services sectors, capture business perceptions on the biggest obstacles to enterprise growth, the relative importance of various

[1] https://www.enterprisesurveys.org/data

[2] In spite of the fact that there are other data sources that do provide some kind of data related to frontier industries as well as FDI there are several factors that make them difficult to use. First, these data usually capture one point in time and they exist at the national level, only. As mentioned above, the WBES data are firm-level data. Second, most of the estimates and elasticities that have been used rely on their own set of assumptions.

constraints to increasing employment and productivity, and the effects of a country's business environment on its international competitiveness. They are used to create statistically significant business environment indicators that are comparable across countries. The Enterprise Surveys are also used to build a panel of enterprise data that will make it possible to track changes in the business environment over time and allow, for example, impact assessments of reforms (World Bank, 2013).

The sample for Jordan was selected using stratified random sampling, following the methodology, which was preferred over simple random sampling in order to obtain unbiased estimates for different subdivisions of the population with some known level of precision, to obtain unbiased estimates for the whole population, and to make sure that the final total sample includes establishments from all different sectors and that it is not concentrated in one or two of industries/sizes/regions (World Bank, 2013)[3].

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

In this section, we present the key job creation assessment using the data and methodologies described above, namely ordinary least squares along with Monte Carlo simulations.

ESTIMATION OF TARGETS

We were able to obtain job estimates that fall within the range of the JCP Jobs Creation Study Assessment, and also add and expand some of its results, including possible job growth ranges given some basic assumptions on the expected performance of Jordan's economy. In what follows we provide our findings by sector and gender for the areas where our empirical strategy could be applied. Given data limitations, it is not possible to produce estimates by governorate.

FINDINGS

Information and Communications Technologies

In order to estimate job creation for ICT we obtained data on firm ICT connectivity and created an "ICT Index," which allowed us to estimate future direct employment growth. This index, while not exactly analogous to the project components of USAID, is still indicative of the linkages that ICT can produce in the economy and how this may reflect on employment. The variables included to create this index are email usage by the firm, cellphone usage for operation, presence of business website, whether

[3]The whole population, or universe of the study, is the non-agricultural economy. It comprises: all manufacturing sectors according to the group classification of ISIC Revision 3.1: (group D), construction sector (group F), services sector (groups G and H), and transport, storage, and communications sector (group I). Note that this definition excludes the following sectors: financial intermediation (group J), real estate and renting activities (group K, except sub-sector 72, IT, which was added to the population under study), and all public or utilities-sectors (World Bank, 2013).

the firm was ever granted a patent, existence of investment in research and development, and, any recent change in software used in business operations. The index goes from zero to six, where zero means no ICT connectivity and six means full ICT connectivity. Our findings using the ICT Index as our variable of interest are shown in Table 1.

When assuming a conservative Monte Carlo simulation shock that improves that ICT index in one point we find that for a base of one million employees, full time employment increases by 27,000 in the following year[4]. In other words, ICT help create 27,000 jobs for each existing million jobs in the Jordanian economy in one year. Similarly, when assuming a somewhat more realistic scenario that improves that ICT index in one point we find that for a base of one million employees, full time employment increases by 29,000 in the following year. That is, using our measure of ICT we find that an intervention that helps improve connectivity in the economy helps create 29,000 jobs for each existing million jobs in the Jordanian economy in one year. In a more positive scenario, such job increase reaches 30,000 full time positions according to our calculations. In terms of five-year periods, the full-time job increases range from 138,000 in a more pessimistic scenario to 173,000 in a more optimistic one. In addition, the increase in full time employment might be more pronounced in terms of females rather than males. Female full time jobs may range from 104,000 in a pessimistic scenario to 130,000 jobs in a positive scenario. On the other hand, male full time jobs may range from 35,000 to 43,000 in analogous scenarios.

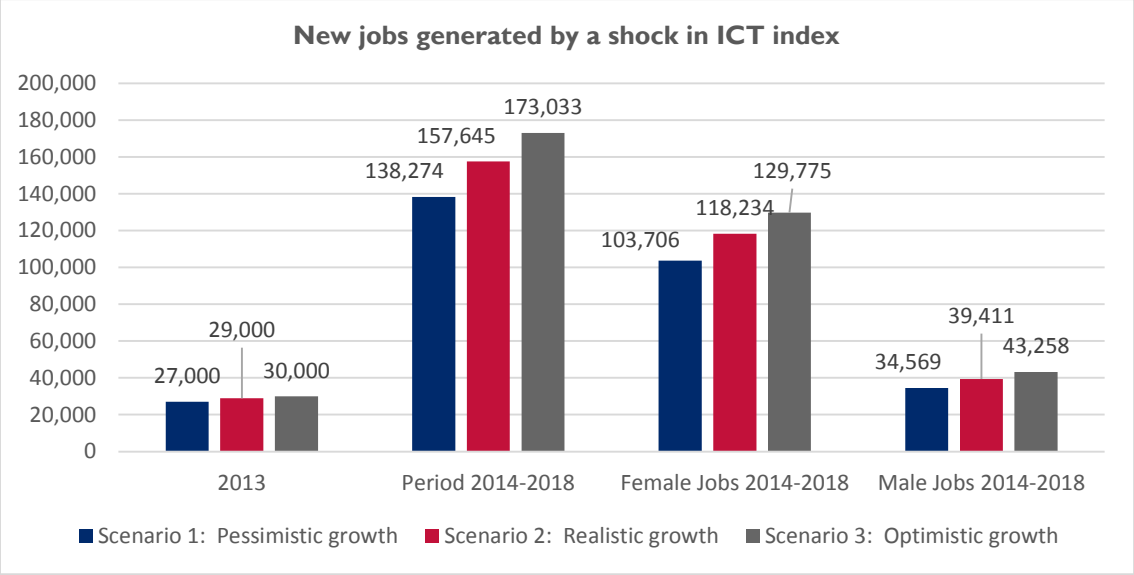
It is important to mention that these numbers do not consider migration issues, a crucial recent feature of the Jordanian economy. According to the JCP Assessment of High-Level Targets, about 55 percent of all jobs created by the Jordanian private sector were taken by migrant workers during the period 2000-2008.[5] This suggests that our actual full time employment growth numbers are overestimated. Since the World Bank Enterprise Survey for Jordan does not have migration data it is not possible to adjust our findings to include this issue.

Table 1[6] and Figure 1:

New jobs generated by a shock in ICT index	Scenario 1 Pessimistic growth	Scenario 2 Realistic growth	Scenario 3 Optimistic growth
2013	27,000	29,000	30,000
Period 2014-2018	138,274	157,645	173,033
Female Jobs 2014-2018	103,706	118,234	129,775

[4] The Monte Carlo shock is assumed to be one of 1000 repetitions randomly distributed in the economy.
[5] Please note however that these do not include all the sectors USAID focuses on, for example the ICT sector is not included.
[6] We use 2013 as the base year as this is the year of the WBES survey. Scenarios refer to the Monte Carlo simulations applied. These simulations assume a random increase in the ICT index of (a) zero to ten percent, (b) zero to twenty percent and (c) zero to thirty percent. These shocks, which are statistically significant at ten percent, are then associated with an expected growth rate of the economy using an employment growth of 1.2 per year, which is based on IMF data. To this baseline we calculate an optimistic rate (+1 percent) and a pessimistic growth rate (- 1 percent with respect to the baseline). Based on our Monte Carlo simulations, the parameters employed are as follows: Scenario 1: Elasticity = 0.027, growth rate = 0.2%. Scenario 2: Elasticity = 0.029, growth rate = 1.2%. Scenario 3: Elasticity = 0.03, growth rate = 2.2%.

New jobs generated by a shock in ICT index	Scenario 1 Pessimistic growth	Scenario 2 Realistic growth	Scenario 3 Optimistic growth
Male Jobs 2014-2018	34,569	39,411	43,258

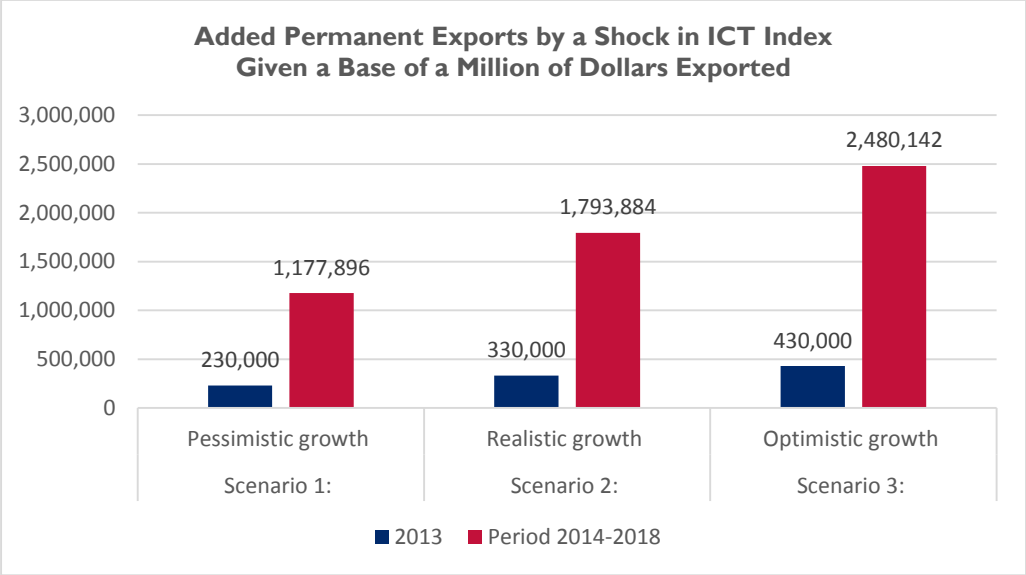


In terms of exports we apply a similar statistical procedure to the one applied to estimate full time jobs. First, we assume an increase in our ICT Index of one point. Second, we introduce random shocks distributed normally to the economy, assuming three scenarios that are statistically significant at ninety percent or higher (a) random shocks that range from zero to ten percent; (b) random shocks that range from zero to twenty percent, and (c) random shocks that range from zero to thirty percent. Finally, we link such random shocks with growth scenarios (please see footnote 6).

When considering a pessimistic Monte Carlo simulation shock that improves that ICT index in one point, we find that for a base of one million dollars, the amount of total national exports increase by US$ 230,000 in the following year. In other words ICT connectivity helps increase exports by the latter amount in one year. In a more realistic scenario, the amount of exports increase by US$ 330,000 in the following year, and in a positive scenario the corresponding amount may increase to around US$ 430,000. In addition, we find that the corresponding five-year increases in exports range from US$ 1,177,896 to US$ 2,480,142 depending on the type of scenario considered. These results are shown in Table 2.

Table 2 and Figure 2:

Added Permanent Exports by a Shock in ICT Index Given a Base of a Million of Dollars Exported	Scenario 1 Pessimistic Growth	Scenario 2 Realistic Growth	Scenario 3 Optimistic Growth
2013	230,000	330,000	430,000
Period 2014-2018	1,177,896	1,793,884	2,480,142



Tourism

We did not find any measurable impacts of tourism on employment or exports.[7] This does not mean that any interventions on the sector will not result in either job creation or increased national income to the country, but simply that the data employed was not adequate enough to uncover any statistical patterns. There were too few firms in our establishment data that could be identified as belonging to the tourism sector (only 13 out of about 530), which explains our findings.

Methodologically, we followed the same approach as in the case of ICTs. We first constructed a random variable to capture the percentage of the total investment in tourism that was carried out in 2013 that each firm received. Then we employed a US$ 1,000,000 dollar base in order to assess the impact on employment per million dollars. However, our employment and export results were a statistical zero in both cases.

[7] The World Bank data employed in these calculations do not make any explicit reference to medical tourism, but just to a general category. The estimated numbers may be capturing some of the job effects of medical tourism, but they cannot be disentangled from the more general category.

Manufacturing and Transports

Table 3 shows our findings in relation to manufacturing and transports. Given the type of data we employed, the results in the case of these two sectors can be established with more confidence than in previous cases. This is possible because representative data were collected at the national level in particular in the case of manufacturing[8]. The drawback, however, is that given how the data were collected, the results must be reported relative to another industry category. In the case of manufacturing we use services as our "base" or comparator variable.

According to the World Bank data we employed, in a pessimistic growth scenario we find that for every million jobs in the service sector about 1.6 million jobs will be created in the manufacturing sector in one year, and that for every million jobs in services, about 3.9 million will be created in manufacturing in the subsequent five years. Similarly, in a realistic growth scenario we find that for every million jobs in the service sector about 4 million jobs will be created in the economy in the subsequent five years. Finally, in a positive growth scenario we find that for every million jobs in the service sector about 4.4 million jobs will be created in manufacturing in the subsequent five years.

In the case of transport we use "other services" as our comparison. We find that in a pessimistic scenario, for every million jobs in the other services about 300,000 jobs will be created in the transportation sector in one year, and that for every million jobs in other services, about 900,000 will be created in the economy in the subsequent five years, in total. Similarly, in a realistic growth scenario, we find that for every million jobs in other services about 1 million jobs will be created in the economy in the subsequent five years. Finally, in a positive growth scenario we find that for every million jobs in other services about 1.3 million jobs will be created in the economy in the subsequent five years.

Table 3[9] and Figure 3:

Scenarios	Scenario 1 Pessimistic Growth	Scenario 2 Realistic Growth	Scenario 3 Optimistic Growth
Relative Jobs in manufacturing for one million jobs in services			
2013	1,640,000	1,640,000	1,640,000
Period 2014-2018	3,949,331	4,099,966	4,357,339
Relative Jobs in transport for million jobs in other services			
2013	320,000	740,000	740,000
Period 2014-2018	922,259	1,035,350	1,251,482

[8] The exact manner in which "manufacturing" was defined can be obtained in the World Bank Enterprise Survey supporting documentation.

[9] Employment growth rate in Jordan was 1.2 (2010). Using this, we simulate three possible scenarios: pessimistic employment growth (0.2), realistic employment growth (1.2) and positive employment growth (2.2) for the progression of the employment growth through the years. The parameters used in manufacture were Scenario 1: Elasticity = 0.64, growth rate = 0.2%. Scenario 2: Elasticity = 0.64, growth rate = 1.2%. Scenario 3: Elasticity = 0.64, growth rate = 2.2%. Finally, the parameters used in transports were Scenario 1: Elasticity = -0.26, growth rate = 0.2%. Scenario 2: Elasticity = -0.26, growth rate = 1.2%. Scenario 3: Elasticity = -0.26, growth rate = 2.2%

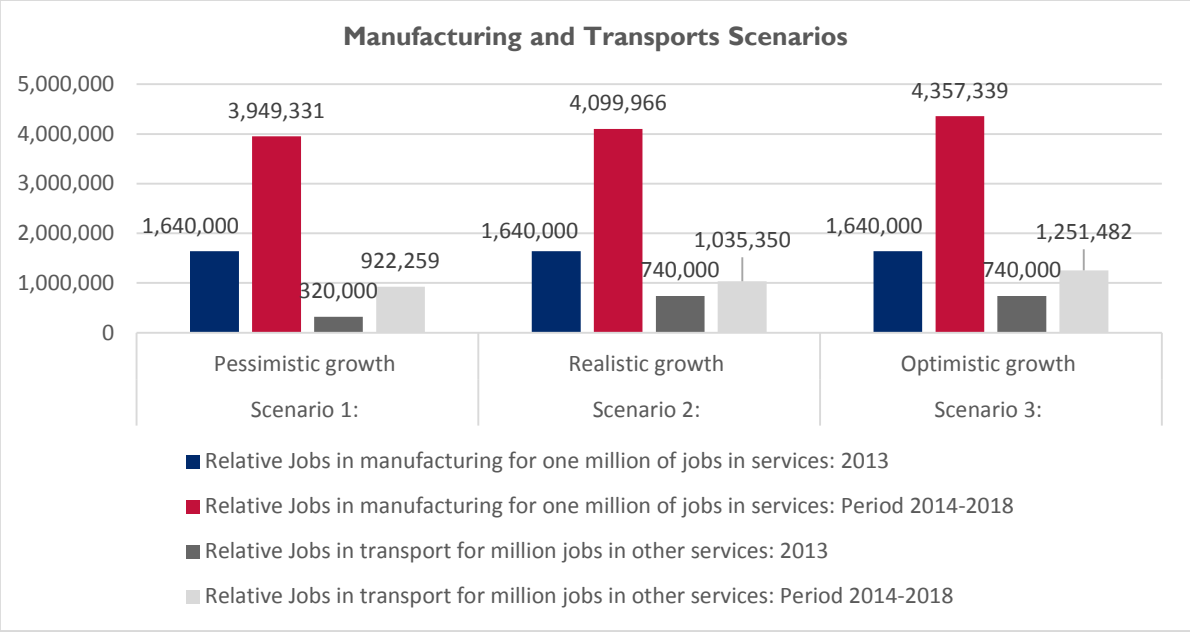
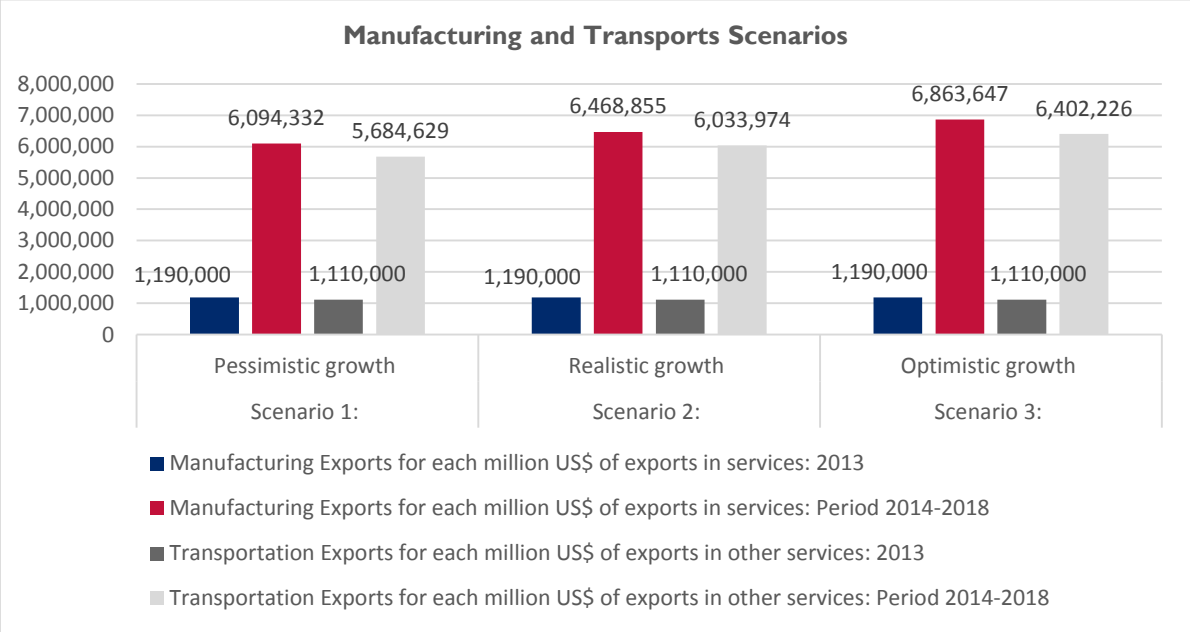


Table 4 shows related results for exports. Again, we use services as the category to compare, as the data do not allow us to produce projections in absolute terms. We find that for each million dollars of exports in services, the manufacturing sector will export US$1,200 million dollars. When introducing different growth scenarios, we find that in a pessimistic one, for each million dollars exported in services, manufacturing will export about six million dollars in the subsequent five years. Similarly, we find that in a realistic growth scenario, for each million dollars exported in services, manufacturing will export about US$ 6.5 million dollars. Finally, in an optimistic growth scenario, manufacturing will export about US$ 6.8 million dollars for each million exported by services. Table 4 also shows the case of transport. The increase in transportation exports is about US$1.2 million per million exported in the services sector. Also, the range of exports in transportation goes from a pessimistic US$ 5.7 million dollars for every million exported in the services sector, to an optimistic of US$ 6.4 million dollars, for every million exported in the services sector.

As in the case of the other sectors, it is very important to state that these findings are based on a firm-survey for 2013 and as such the data, while statistically representative at the national level, have limitations. In particular, the data do not capture migration issues, which in the case of Jordan have become a major economic factor in the national economic dynamics.

Table 4[10] and Figure 4:

Scenarios	Scenario 1 Pessimistic Growth	Scenario 2 Realistic Growth	Scenario 3 Optimistic Growth
Manufacturing Exports for each million US$ of exports in services			
2013	1,190,000	1,190,000	1,190,000
Period 2014-2018	6,094,332	6,468,855	6,863,647
Transportation Exports for each million US$ of exports in other services			
2013	1,110,000	1,110,000	1110000
Period 2014-2018	5,684,629	6,033,974	6,402,226



Foreign Direct Investment

In the case of Foreign Investment, the JCP Assessment of Employment was unable to provide usable predictions, as there is no disaggregated data on FDI inflows into Jordan by category of investment or by sector. That same report cites unsubstantiated sources that claim that adding one million JD to total investment in the economy as a whole would create 46.3 employment opportunities in Jordan. The data employed in this report is somewhat more consistent with the FDI target of JCP, which refers basically to "greenfield investments," which are equity investment in new projects. The specific variable that we

[10] We are assuming three scenarios for the growth rate of exports according to the GDP growth rate (2.8% in 2013). Using this, we simulate three possible scenarios: bad export growth (0.8), same export growth (2.8) and good export growth (4.8) for the progression of the export growth through the years. The parameters used in manufacture were Scenario 1: Elasticity = 1.19, growth rate = 0.8%. Scenario 2: Elasticity = 1.19, growth rate = 2.8%. Scenario 3: Elasticity = 1.19, growth rate = 4.8%. The parameters used in manufacturing were Scenario 1: Elasticity = 1.11, growth rate = 0.8%. Scenario 2: Elasticity = 1.11, growth rate = 2.8%. Scenario 3: Elasticity = 1.11, growth rate = 4.8%

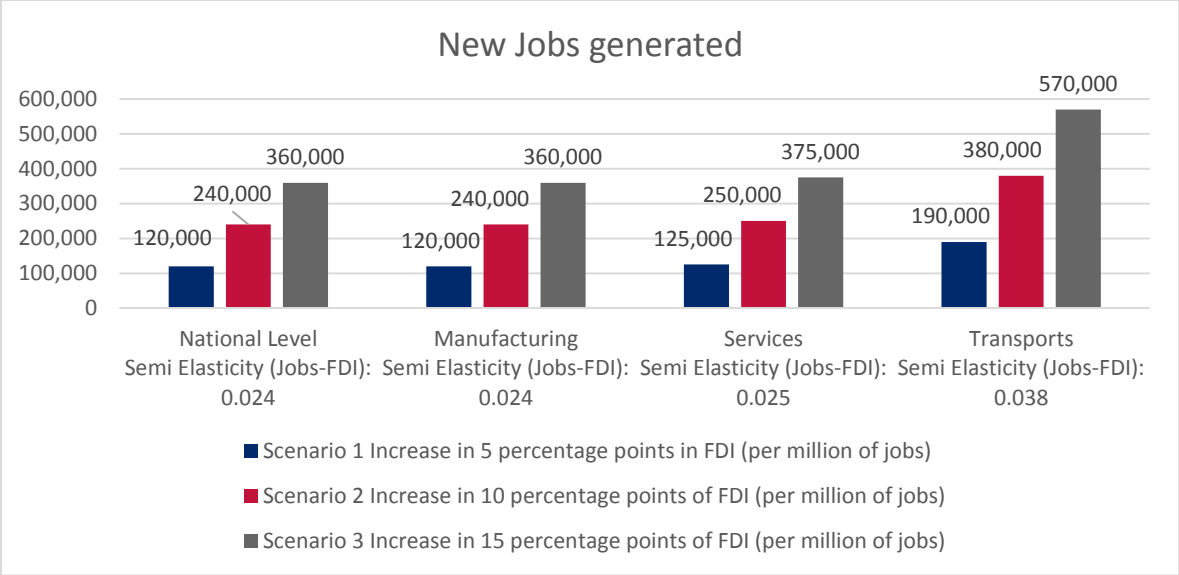
are able to use as a proxy of FDI in this report is the "percentage owned by private foreign Individuals, companies or organizations", which is closer to a Greenfield Investments definition targeted by JCP.

Table 5 reports our findings regarding FDI. We find that a one percent increase in our FDI variable, namely, a one percentage point increase by private foreign individuals, companies, or organizations, will be translated in an increase of 0.024 percentage points in employment at the national level[11]. Thus, for a scenario in which FDI increases by five percentage points of FDI this translates in a job increase of 120,000 jobs due to FDI per million of jobs in the economy. Similarly, in a second scenario, an FDI increase by ten percentage points of FDI will translate in a job increase of 240,000 jobs due to FDI per million of jobs in the economy. Table 5 produces analogous results for different sectors, including manufacturing, transportation, and services.

Table 5 and Figure 5:

New Jobs generated	Semi Elasticity (Jobs-FDI)	Scenario 1 Increase in 5 percentage points in FDI (per million of jobs)	Scenario 2 Increase in 10 percentage points of FDI (per million of jobs)	Scenario 3 Increase in 15 percentage points of FDI (per million of jobs)
National Level	0.024	120,000	240,000	360,000
Manufacturing	0.024	120,000	240,000	360,000
Services	0.025	125,000	250,000	375,000
Transports	0.038	190,000	380,000	570,000

[11] Interestingly, the JCP Jobs Assessment provides studies that yield somewhat similar elasticities when employing different definitions of FDI to the one used here.

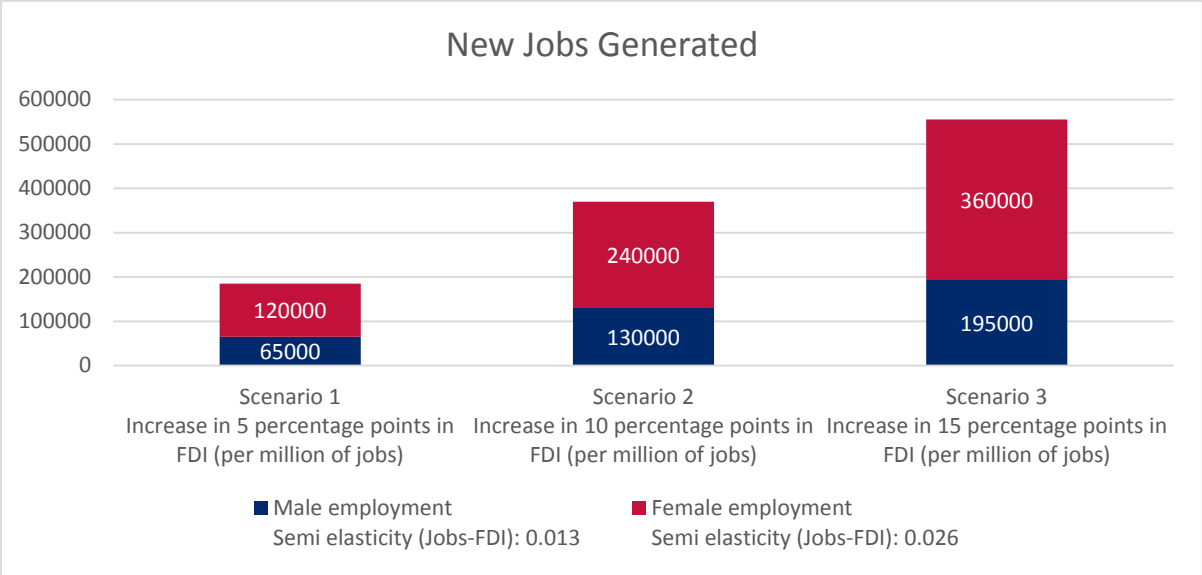


While the Table above provides the subsequent annual increase of corresponding increases in five, ten, and 15 percentage points in FDI, it would be possible to linearly estimate the increase in the subsequent five years, too. For instance, assuming a fully linear correlation, an increase in five percentage points in FDI (per million jobs) would translate in 600,000 jobs at the national level in five years. But in order to achieve this high number, the change in FDI would have to be substantial. With a change of one percentage point in FDI the job increase would be 24,000 per year and 120,000 in five years, only.

Table 6 provides corresponding FDI findings by gender. Given that the elasticity between job-gender and FDI that is, the percent association between FDI and female employment is higher in females than in males, the overall impact in terms of gender will favor job creation for women relative to men. This is illustrated in the table for the three scenarios considered previously.

Table 6 and Figure 6:

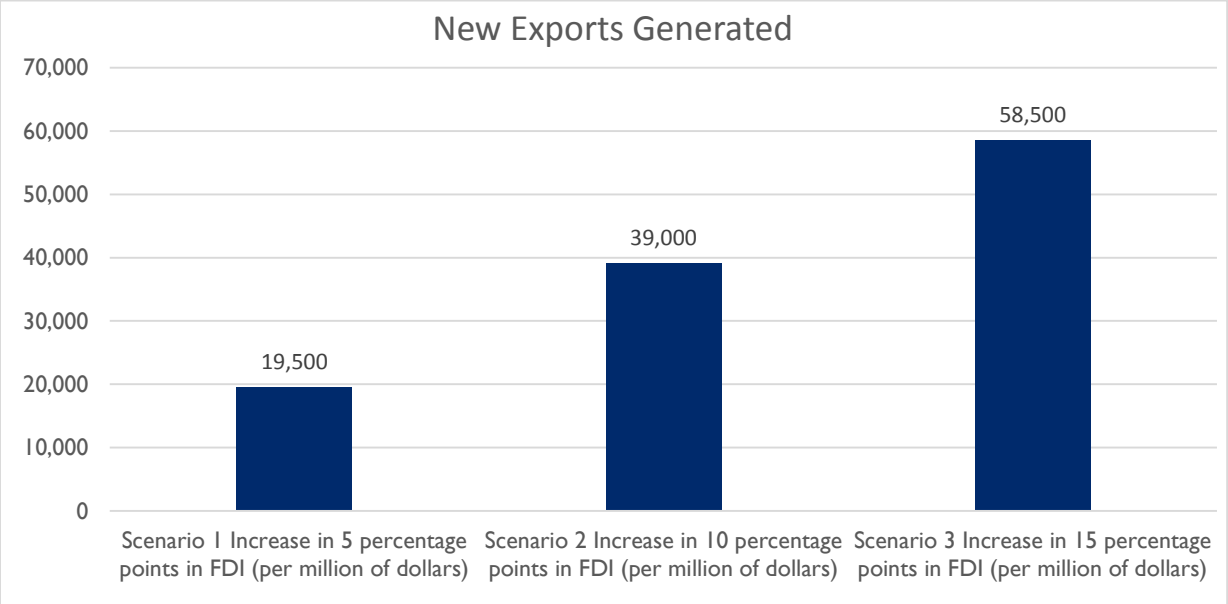
New jobs generated	Semi elasticity (Jobs-FDI)	Scenario 1 Increase in 5 percentage points in FDI (per million of jobs)	Scenario 2 Increase in 10 percentage points in FDI (per million of jobs)	Scenario 3 Increase in 15percentage points in FDI (per million of jobs)
Male employment	0.013	65,000	130,000	195,000
Female employment	0.026	120,000	240,000	360,000



Finally, Table 7 produces analogous findings for exports and provides three illustrative FDI scenarios per one million jobs. For instance, in Scenario 1, under the assumption that FDI increases in five percentage points, the new exports that FDI will generate will be US$ 19,500 per million of dollars.

Table 7 and Figure 7:

New exports generated	Marginal Effect (Job-FDI)	Scenario 1 Increase in 5 percentage points in FDI (per million of dollars)	Scenario 2 Increase in 10 percentage points in FDI (per million of dollars)	Scenario 3 Increase in 15 percentage points in FDI (per million of dollars)
Exports US$	0.39*	19,500	39,000	58,500



Jobs Not Assessed

Given the limitations of the World Bank data employed and given the unavailability of alternative data, it is not realistic to provide even gross estimates of such sectors as clean technologies or medical tourism. The best way to assess future growth jobs in these and related sectors is through a careful enterprise survey able to collect detailed information on workers, firm linkages, external and internal support, and technology.

CONCLUSIONS

We take advantage of previously unused data from the World Bank, in particular, a nationally representative survey of firms in Jordan done in 2013. While these data have weaknesses, they allow us to provide some cautiously realistic estimates on job creation. The resulting numbers are consistent with the previous assessment performed, although this report also offers additional results in some additional areas and sectors, in particular, manufacturing, transportation, and foreign direct investment. Overall, it is difficult to disagree with the key findings of previous assessments. That is, that the original high level targets[12] for employment, investment, and exports for most activities are excessively optimistic and alternative calculations, such as the one presented here confirm that more realistic estimates are drastically lower than originally estimated. Still, the estimates presented in this report should be taken with care as they rely on a series of assumptions and on data that while useful, have their limitations.

[12] For the targets included in the JCP Report please refer to Annex IV

ANNEXES

ANNEX 1: SCOPE OF WORK (SOW)

Job Creation Assessment

Scope of Work

March 27, 2016

1. Assessment Background and Purpose

USAID/Jordan activities in the Office of Economic Development and Energy (EDE) were designed with high-level targets based on economic growth trends and assumptions of several years prior to the activities' implementation. While existing activities were designed for long-term economic development based on growth figures from 2010-2012, regional dynamics in recent years have curtailed economic growth in Jordan. The results of this assessment will be used to inform USAID about the current and future potential for employment-related growth in their targeted sectors.

This assessment will focus on the USAID target sectors of: tourism, ICT, clean technology, medical tourism, pharmaceuticals, transportation, and manufacturing. It will also disaggregate data by governorate and sex where feasible.

As stated by USAID, the purpose of the assessment is to:

A. *Assist USAID in establishing realistic expectations for job creation and job placement in the USAID target sectors. The assessment will build on the JCP Jobs Creation Study, if deemed methodically sound. The assessment will identify each of these according to governorate and sector.*
    - *Which types of interventions are most effective in increasing employment?*
    - *Which types of interventions lead to the most rapid increases in employment?*[13]
B. *Verify the methodology used in the JCP Jobs Creation Study to estimate targets for exports and foreign direct investment (FDI) in JCP's target sectors (ICT, clean technology, medical tourism and pharmaceuticals). If considered solid, estimate FDI targets for the remaining USAID target sectors and devise confidence intervals for those estimates. If not methodically sound, propose realistic expectations for FDI in all USAID target sectors, and expectations for exports in ICT and pharmaceuticals.*
C. *Assess existing methodologies for calculating indirect jobs within above listed sectors and propose additional algorithms for those sectors that international donors have not studied.*
D. *Using similar methodologies as the above-mentioned study assess historic trends for job placement of vocational/technical jobs throughout Jordan, examining both public and private VoTec institutions and their numbers of graduates and job placement statistics. If possible, also assess the cost of job placement efforts (e.g. include metrics on cost per job placement, the aggregate number of job placements relative to amount spent and number of graduates, etc.)*
E. *Verify the methodology used to calculate the cost per job in the JCP Jobs Creation Study for the JCP target sectors (ICT, clean technology, medical tourism and pharmaceuticals) and if considered solid,*

[13] These questions were clarified to be framed in terms of which sectors or types of jobs can increase employment most rapidly, and which activities are focused on those and hence most effective.

devise confidence intervals for those estimates. If not methodically sound, propose measures to estimate cost per job in the USAID target sectors.

The assessment purpose outlined above will be addressed through the following tasks:

1. Job Creation, Indirect Jobs, FDI, and Export Analysis

2. TVET Analysis

3. Cost per Job Analysis

II. MESP Role and Responsibilities

MESP will follow its established processes to identify consultants through professional and social networks, MSI's database, and other online sources. MESP will follow procedures established with USAID for submitting and approving consultants.

MESP staff will take an active role in identifying data sources, contacting informants to secure data and to facilitate. MESP will consolidate analyses into a final report.

Job Creation/Indirect Jobs/FDI/Exports Analysis

I. Objective: Address topics listed in bullets A, B & C of the Job Creation Assessment.

II. Tasks

1. Identify data sources that will inform the assessment, including the *JCP Assessment of High Level Targets* (October 2015), the *Independent Review of the JCP High Level Target Assessment* (February 2016), *World Bank Enterprise Survey,* the *Jordan Household Expenditures and Income Surveys*, the *Jordan Labor Market Panel Survey,* and the *Employment and Unemployment Survey* sources used for the previous assessments, and other relevant data sources that may have been underexploited.
2. Design an empirically rigorous methodology for estimating ranges for direct job creation, exports and FDI in JCP's target sectors that goes beyond simple linear extrapolation. Estimates should include confidence intervals and apply simple econometric methods (ordinary least squares), which may provide a more robust assessment of targets. If data is available disaggregate targets by governorate and sex.
3. Identify limitations to this methodology, and identify which limitations could be alleviated if additional time were available.
4. Apply methodology to estimate target ranges for direct job creation, exports and FDI in JCP's target sectors. Consider the implications for economic conditions remaining the same, worsening and improving, and produce scenarios guidance or formulas to revise expectations in these events.
5. Assess existing methodologies for calculating indirect jobs within the USAID target sectors and propose additional algorithms for those sectors.
6. Present findings to USAID.

Dependencies

As medical tourism and clean technology are emerging sectors in Jordan, the assessment may not be able to identify reliable data sources within the short time frame required for the assessment.

III. Deliverables

1. Assessment Design Report that contains the following:
   a. Data sources and methodology proposed for calculating direct jobs, FDI and exports.
   b. Description of the data sources that are required to conduct calculations and of those, which are available.
   c. Description of the extent to which calculations are and are not feasible given the lack of data, and a description of the additional steps and the amount of time that would be required to acquire the missing data sources.
2. Draft report of 10 to 15 pages that contains the following:
   a. Realistic estimates for job creation in the USAID target sectors for the next five years. These will be expressed in terms of governorate and sex.
   b. Realistic expectations for foreign direct investment (FDI) in the USAID target sectors in general for the next five years.
   c. Expectations for exports in ICT and pharmaceutical industries in general for the next five years.
   d. Links to sources of data; when links are not available provide soft (Excel, pdf, SPSS, or word) and hard copy of data source.
   e. Estimates should include ranges and confidence intervals, and scenarios for worsening and improving economic conditions over the next five years.

f. Graphic representations of data and information contained in the report.
g. Clear statements of formulas and modeling approaches that could be applied if/when updated data is available.
h. Suggestions for types of jobs or sectors not currently targeted but that *could* result in more extensive or more rapid employment than those currently targeted in USAID/Jordan activities.

3. Draft report assessing the different approaches and formulas for calculating indirect jobs for each sector, and recommending best practice.

IV. Period of Performance and Level of Effort (LOE)

1. The Assessment Design Report for methodologies to calculate direct jobs, FDI and exports, and explanation of limitations and time required to alleviate limitations is allocated **five days of LOE to commence immediately after contracting.**

2. The draft report applying methodologies for calculating direct jobs, FDI, and exports is allocated **seven days of LOE to commence after approval of the design.**

3. The draft report on indirect jobs is allocated **10 days of LOE and will be submitted April 30.**

ANNEX 11: ASSESSMENT DESIGN REPORT

Basic Methodology for Estimating Direct Jobs of Targeted Industries in Jordan

Background

The aim of this note is to identify data sources that will inform the assessment, including the *Jordan Competitiveness Program (JCP) Assessment of High Level Targets* (October 2015), the *Independent Review of the JCP High Level Target Assessment* (February 2016), *World Bank Enterprise Survey,* and other sources as well as other relevant data sources that may have been underexploited. According to the Scope of Work, this note will present a design of an empirically rigorous methodology for estimating ranges for direct job creation, exports, and foreign direct investment in USAID's target sectors (tourism, information and communication technologies, clean technology, medical tourism, pharmaceuticals, transportation and manufacturing) that goes beyond simple linear extrapolation. The design will include a strategy to include confidence intervals and apply simple econometric methods (ordinary least squares), which may provide a more robust assessment of targets. If data are available, disaggregate targets by governorate and gender.

Empirical Strategy

In order to estimate the effect of the relevant variables on the level of employment in Jordan we will employ a so-called ordinary least squares estimation. This empirical approach allows us to uncover deterministic patterns between two variables, for instance, investment in information technologies and new job creation. Unlike simple extrapolation, this method also takes into account the possible effect that other related variables may have in our outcome variable, thus allowing us to isolate the direct effect of our variable of interest, only. In our example, if the aim is to measure direct jobs, we have to make sure that any change in jobs are due to the presence of Information and Communication Technologies (ICTs), and not due to changes in other variables such as the rate of growth of the country, the education of the population, or the quality of the firms involved. This method assures that any statistical correlation found is due to the link between jobs and ICTs and nothing else. Formally, the idea is to estimate the following statistical correlation:

$$\ln(Y_{ij}) = \alpha + \boldsymbol{\beta X_{ij}} + \boldsymbol{\gamma C_{ij}} + \epsilon_{ij}$$

Where $\boldsymbol{X}$ represents our group of variables of interest, for instance, foreign direct investment, exports, and information technologies. More specifically, (i) foreign direct investment is a dimension measured as the level of expenditure from abroad investors in the sector; (ii) level of exports is a variable that will be measured as the share of the production sold abroad; (iii) information and communications technologies may be constructed as an index based on the standard ICT indicators. Similarly, $\boldsymbol{C}$ represents the group of variables that we need to "control", those that need to be accounted for in order to make sure that we capture the correct correlation between ICT and employment, in our example above. This group in variables in $\boldsymbol{C}$ include the rate of growth of the firms, legislation, credit history, type of employment, gender, and several others. In particular, the specific variables that we would like to control for are (i) locality's level of poverty, typically measured as the headcount poverty ratio of the locality, that means the amount of household living below the poverty line; (ii) locality's level of growth, measured as the last

year's percentage increase in the GDP per capita of each location; (iii) size of the locality, measured by the amount of citizens living in it, which give us and idea of the potential capacity of that local economy, and (iv) the legal status of the firm, as its formal or informal status is an important variable controlling for the employment rate. In addition, the indexes *i* and *j* represent the firms and their localities of origin since we have variables at different levels of aggregation; similarly, while ϵ_{ij} represents the statistical error that will be corrected for heteroscedasticity and possible clustering of the firms[14].

As mentioned above, the approach above, while useful for our purposes, is not particularly innovative. In fact, with perfect data there is no need for anything else, but as the description above, shows, data requirements can be onerous. In fact, assessing job creation is not particularly complicated when (i) data are available, (ii) the economic context is stable, and (iii) time restrictions are not binding. Whereas (ii) and (iii) are purely exogenous issues, on the data side for Jordan we have identified high quality firm-level data, which were not employed in the JCP Assessment of High Level Targets. In fact, there is good potential that using the World Bank Enterprise Surveys we might obtain useful complementary results to the existing ones. This was also mentioned in the Independent Review of the JCP High Level Target Assessment. Having said this, since these data were not collected with the JCP in mind, it obviously cannot capture all the specific impact nuances required to make accurate estimates. However, it is possible to produce reasonable, realistic estimates using these data when using an additional empirical method, in particular, Monte Carlo simulations.

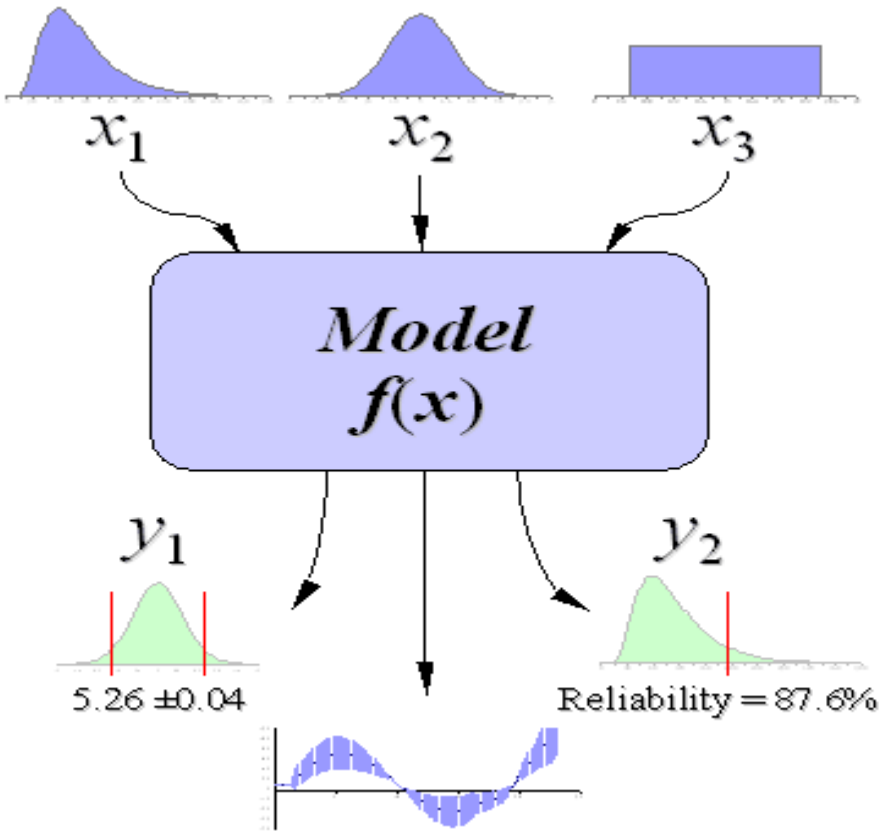
Monte Carlo Simulation Methods as a Key Complementary Method[15]

An additional component of our analysis will take advantage of systematic simulation techniques that will simulate "shocks" or "exogenous changes," for example, a dramatic increase in investment in a sector, such as medical tourism, in order to test possible impacts in terms of direct jobs, foreign direct investment and exports. Since we have a deterministic set of data that does not take account for exogenous shocks that affects the firms, we are going to implement simulations of these shocks employing these Monte Carlo methods to generate three different scenarios: (i) light shocks, (ii) moderate shocks, and (iii) strong shocks. The Monte Carlo method is a technique that involves using random numbers within a systematic approach in order to measure impact. It uses iteratively evaluation of a deterministic model, such as the one shown above, but uses empirically-based random parameters as inputs in the estimation of impact. By using random inputs, one is essentially turning the deterministic model into a stochastic model. That means we are including randomness in our model, as we will except from the exogenous shocks since they are not perfectly anticipated by the firms. The figure below summarizes our approach:

[14] The term natural log term (Ln) denotes the natural logarithm of the variable, and help us to obtain estimated semi-elasticities so we can interpret the results in percentage levels.

[15] This section heavily draws from http://www.vertex42.com/ExcelArticles/mc/MonteCarloSimulation.html

Figure 1: Basic Scheme of Monte Carlo Simulations



The inputs for the simulation will be randomly generated from probability distributions to approximate the process of sampling from an actual population. We choose a distribution for the inputs that most closely matches data or represents our current state of knowledge. Monte Carlo simulation performs risk analysis by building models of possible results by substituting a range of values—a *probability distribution*—for any factor that has inherent uncertainty. It then calculates results repeatedly, each time using a different set of random values from the probability functions. Depending upon the number of uncertainties and the ranges specified for them, a Monte Carlo simulation could involve thousands or tens of thousands of recalculations before it is complete. Monte Carlo simulation produces distributions of possible outcome values.

Monte Carlo simulation provides a number of advantages over *deterministic,* or "single-point estimate" analysis, which is typical of ordinary least squares: (i) *Probabilistic Results.* Results show not only what could happen, but how likely each outcome is (ii) *Graphical Results.* Because of the data a Monte Carlo simulation generates, it is easy to create graphs of different outcomes and their chances of occurrence; (iii) *Sensitivity Analysis.* With just a few cases, deterministic analysis makes it difficult to see which variables impact the outcome the most. In Monte Carlo simulation, it is easy to see which inputs had the biggest effect on bottom-line results.

Data Sources and Limitations

The ideal data sources required to make realistic calculations of direct job creation, Foreign Direct Investment (FDI), and exports, are a combination of detailed firm surveys that are representative at the industry level, as well as administrative data that can be matched with the firm data. Of these data, the only data source that approximates to what is needed is the World Bank Enterprise Surveys, which were conducted twice in Jordan, once in 2006 and more recently in 2013. While these data can be very useful to uncover "elasticities" and relevant links between basic firm categories, job creation and exports, they are not useful in the case of "frontier" industries such as clean technologies, medical tourism, and even information and communication technologies. The reason is simple. On the one hand, these emerging industries barely show up in any firm survey, as nationally representative as the survey may be. On the other hand, these surveys were not designed for the purposes needed to assess job creation, and thus lack critical variables needed in order to produce realistic, accurate, numbers.

Short of the ideal data needed, the World Bank Enterprise Survey, along with data already collected from other sources still appear to be a useful source of reliable information, with some caveats. First, it will likely be able to help produce direct job estimates, provided that some assumptions be made. Second, these assumptions will depend on the industry to be studied and involve using parameters at a more general level applied to the industry level. A preliminary examination of the data shows that will be the case for tourism and, perhaps, some weak measure of ICTs. However, as useful as the World Bank Enterprise data are, it is simply impossible to make any calculations for medical tourism and clean technologies. For these two, specifically targeted surveys are needed. For the sectors in which it will be possible to produce realistic direct job creation numbers, it will also be possible to produce basic exports estimates. It is unlikely, however, that FDI estimates can be produced as they do not have these data[16]. Given the limitations above, the existing job creation and export assessments are rather rudimentary and the fact that these unexploited data already exist can help reaffirm the existing estimates at a low cost and in a short period of time. If realistic estimates are required in the longer run, the best course of action would be to do field work that should include the design of a targeted survey at the firm level in the industries that cannot be covered with the existing data.

[16] In spite of the fact that there are other data sources that do provide some kind of data related to frontier industries as well as FDI there are several factors that make them difficult to use. First, these data usually capture one point in time and they exist at the national level, only. As mentioned above, the WBES data are firm-level data. Second, most of the estimates and elasticities that have been used rely on their own set of assumptions.

Appendix I

Wages and Quality of Employment

While we are focusing on job creation, a related issue is quality of jobs. We consider an empirical approximation for analyzing the role of quality through the level of wages earned by workers. This kind of analysis is commonly known in labor economics as the Mincer's equation whose principal objective is to determine the relevance of different kind of variables on the observed level of wage of the workers. In order to be able to estimate an unbiased parameter for each of the relevant variables in this stage, we are going to replicate the technique of using control variables. This will to obtain an estimate of each of the relevant dimension as it were changing their levels *ceteris paribus*, that means holding every other aspect as constant.

Our wage estimation has one major caveat that will be addressed with the proper technique recommended by the literature on the topic. It is called selection bias and occurs since we are using observed wage data. We can think that the decision to search for a job is an economic process of decision that is endogenous for each individual. Each person will decide if it's convenient for him/her to go to the market and search for a job instead of not doing it considering a major set of variables but principally the cost of opportunity of working and the expected wage (which can be think as a function of the education, experience, etc.). Since our estimation only relies on observed wage date, we are missing the individuals who decided not to search for a job or the ones that while searching for one at the labor market decided their opportunity cost is too big to accept one given the salaries' level. This kind of bias was treated vastly by James Heckman (1979)[17] which proposes the statistical correction, which carries his name for the selection bias. Considering the Heckman's and homoscedasticity correction for the model, we will obtain a regression equation in the next form:

$$\ln(W_{ij}) = \alpha + \boldsymbol{\phi X_{ij}} + \boldsymbol{\psi C_{ij}} + \epsilon_{ij}$$

This reduced form of the model is very similar to the one we propose in the first stage although the variables contained in the **X** and **C** are substantially different. Another point of divergence between this model and the previous one is the level of analysis in which this estimated. For the latter equation, the index i and j are now the identifications of the worker and the locality in which he has a job. In the left side of the equation, we have the variable W_{ij}, which is the notation for the level of salary the individual i in the locality j perceived in that year. Taking advantages of the properties of the natural logarithms, we apply this operator to this variable as a monotonic transformation in order to understand our results as semi-elasticities. That means we are measuring the percentage change in the outcome variable, salaries, when one of our independent variables change in one point. In concordance with the large amount of literature of empirical tries to estimate Mincer's equation in a heterogeneous set of context, we employ a standard and conservative specification trying to control for as many relevant aspects as possible while trying to maintain parsimony in the model avoiding the irrelevant variable bias. In the interest variables' vector, we will consider four dimensions:

- Years of education. This variable will measure the number of years the employee invested in his/her education. It will be a continuous variable within a range starting at zero, for no educational level,

[17] Heckman, J. (1979). *Sample Selection Bias as a Specification Error*. Econométrica, Vol. 47 (1), pp. 153-161

to 21 for the one who obtained a Ph.D. This variable will be in the regression context as a second-degree polynomial to obtain any possible nonlinear effects.

- Number of training session/courses in last three years. This dimension will measured the effect of the continuous training and learning of new knowledge that can be applied directly in the job which usually has a positive effect on the salaries
- Years working in the sector. The experience of the employee surely will mean a higher level of productivity in comparison to newcomers. As the experience is unobservable by definition, we will approximate to it by the years of the employee working in the sector of his/her actual position.
- Employment's sector. The level of wages independently of the other observed variables is not similar between industries or sector. In order to identify this dimension we will assess the effect using dummy variables for each of the sector in analysis.

In this control variables' vector, we will consider the following dimensions:

- Gender. The inclusion of the gender of the employee will control for the gender gap vastly demonstrated in the labor economics literature.
- Age. Identification of the cohort levels by the continuous variable of age at the moment of the survey. This variable will be in the regression context as a second-degree polynomial to obtain any possible nonlinear effects.
- Locality's level of poverty. Measured as the headcount poverty ratio of the locality, that means the amount of household living below the poverty line (World Bank sets international poverty lines at US $2 per day per household member)
- Locality's level of growth. Measured as the last year's percentage increase in the GDP per capita of each location.
- Marital status. This dimension will be considered by introducing a dummy variable indicating if the employee is married. It will show as any possible effect on the household composition.
- Number of children. The number of children could reveal different strategies and we theorize that its impact will be differentiated by gender, that why it also will be included in the regression as a multiplicative term of gender.

As in the previous regression, we interpret the result as semi-elasticities since we have the natural logarithm of wages at the left side. That means if we got, for example, and estimate of the parameter of years working in the sector equals to 2 ($\hat{\beta}_{years} = 2$) and increase of one year more of experience in the job will increase the employee wage level in 2 percent.

ANNEX III: REGRESSION TABLES

Regression Analysis for Manufacturing Sector

OLS for employment and exports: Manufacture	ln(Employ)	% of exported output
Manufacture (vs. other services as base category)	0.642***	19.133***
	(0.118)	(2.710)
City with population over 1 million other than capital	0.049	10.735***
	(0.161)	(3.852)
Population: 250000-1000000	-0.372***	2.549
	(0.140)	(3.361)
Population: 50000-250000	-0.587***	-8.576***
	(0.174)	(4.174)
Population: Less than 50000	0.209	21.484***
	(0.311)	(7.426)
Establishment Is Part Of A Large Firm	-0.848***	-1.422
	(0.144)	(3.459)
Has Credit Or Loan?	0.645***	2.515
	(0.140)	(3.351)
% of sales: National sales	-0.017***	
	(0.002)	
Constant	5.027***	9.433***
	(0.216)	(3.537)
R-squared	0.316	0.129
F-test	32.4967	11.9464
Prob > F	0.0000	0.0000
Observations	573	573

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Regression Analysis for Manufacturing Sector: Employment by Gender

OLS for employment by Gender: Manufacture	ln(Fem. Employ)	ln(Male Employ)
Manufacture (vs. services as base category)	-1.648***	0.736***
	(0.168)	(0.118)
City with population over 1 million other than capital	-0.392*	0.007
	(0.230)	(0.162)
Population: 250000-1000000	-0.604***	-0.308**
	(0.200)	(0.140)
Population: 50000-250000	-0.142	-0.530***
	(0.250)	(0.177)
Population: Less than 50000	-0.253	0.193
	(0.447)	(0.314)
Establishment Is Part Of A Large Firm	1.503***	0.815***
	(0.206)	(0.145)
Has Credit Or Loan?	-0.056**	-0.067***
	(0.028)	(0.020)
% of sales: National sales	-0.004	-0.016***
	(0.003)	(0.002)
Constant	-4.050***	3.419***
	(0.378)	(0.266)
R-squared	0.272	0.306
F-test	26.4041	31.0376
Prob > F	0.0000	0.0000
Observations	573	572

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Regression Analysis for Transportation Sector

OLS for employment and exports: transports	ln(Employ)	% of exported output
Transports (vs. other services as base category)	-0.263	11.326**
	(0.265)	(5.592)
City with population over 1 million other than capital	-0.370	-16.835**
	(0.367)	(7.742)
Population: 250000-1000000	-1.075***	-16.479**
	(0.302)	(6.313)
Population: 50000-250000	-0.741**	-12.915**
	(0.290)	(6.108)
Population: Less than 50000	1.568***	4.696
	(0.568)	(12.218)
Establishment Is Part Of A Large Firm	0.549**	1.873
	(0.239)	(5.146)
Has Credit Or Loan?	-0.090**	-1.399*
	(0.035)	(0.745)
% of sales: National sales	0.003	
	(0.004)	
Constant	2.419***	15.530**
	(0.505)	(7.221)
R-squared	0.300	0.204
F-test	5.7386	3.9619
Prob > F	0.0000	0.0007
Observations	116	116

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

- OLS estimated for all the services firms in the database.
- Dependent variable in first case is the log of employment, betas are interpreted as semi elasticities. In the second set of regressions dependent variable is in percentage.
- Crucial variable is transport dummy. Positive and significant only for the exports regression

- Being a transport firms does not differentiate the amount of labor demanded in comparison with other services firms
- A transport firm exports 13% and 11% more output than other services firms

Regression Analysis for Transportation Sector: Employment by Gender

OLS for employment by gender : Transports	ln(Fem. Employ)	ln(Male Employ)
Manufacture (vs. services as base category)	0.572	-0.309
	(0.670)	(0.266)
City with population over 1 million other than capital	-0.729	-0.426
	(0.930)	(0.369)
Population: 250000-1000000	-2.260***	-1.023***
	(0.765)	(0.303)
Population: 50000-250000	-0.174	-0.764***
	(0.733)	(0.291)
Population: Less than 50000	1.453	1.641***
	(1.437)	(0.570)
Establishment Is Part Of A Large Firm	1.860***	0.488**
	(0.605)	(0.240)
Has Credit Or Loan?	-0.010	-0.091**
	(0.089)	(0.035)
% of sales: National sales	-0.015	0.004
	(0.011)	(0.004)
Constant	-3.018**	2.368***
	(1.278)	(0.507)
R-squared	0.251	0.291
F-test	4.4894	5.4880
Prob > F	0.0001	0.0000
Observations	116	116

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Foreign Direct Investment (FDI)

FDI and Manufacturing

OLS for employment: Manufacture	ln(Employ)	ln(Employ)
FDI: % owned by Foreign Individuals/Companies	0.026***	0.024***
	(0.003)	(0.003)
Establishment Is Part Of A Large Firm	0.493**	
	(0.241)	
Number years' operating	0.024***	
	(0.005)	
Has Quality Certification?	-0.082**	
	(0.040)	
Size Of Locality		-0.099
		(0.063)
Has Credit Or Loan?		-0.446***
		(0.137)
Plans to increase size of the establishment		-0.347**
		(0.165)
Constant	2.570***	4.789***
	(0.301)	(0.337)
R-squared	0.270	0.250
F-test	30.2001	17.6790
Prob > F	0.0000	0.0000
Observations	324	324

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

FDI and Services

OLS for employment: Services	ln(Employ)	ln(Employ)
FDI: % owned by Foreign Individuals/Companies	0.022***	0.025***
	(0.006)	(0.006)
Establishment Is Part Of A Large Firm	0.668***	
	(0.205)	
Number years' operating	0.022***	
	(0.006)	
Has Quality Certification?	-0.096*	
	(0.050)	
Size Of Locality		-0.172***
		(0.064)
Has Credit Or Loan?		-0.589***
		(0.127)
Plans to increase size of the establishment		-0.035
		(0.169)
Constant	1.694***	4.104***
	(0.261)	(0.316)
R-squared	0.295	0.264
F-test	22.3072	18.3093
Prob > F	0.0000	0.0000
Observations	249	249

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

FDI and Transportation

OLS for employment: Transportation	ln(Employ)	ln(Employ)
FDI: % owned by Foreign Individuals/Companies	0.063***	0.038**
	(0.009)	(0.014)
Establishment Is Part Of A Large Firm	0.726	
	(0.502)	
Number years' operating	0.003	
	(0.016)	
Has Quality Certification?	-1.891***	
	(0.436)	
Size Of Locality		0.008
		(0.139)
Has Credit Or Loan?		-0.957***
		(0.325)
Plans to increase size of the establishment		0.472
		(0.308)
Constant	5.539***	3.797***
	(1.281)	(0.742)
R-squared	0.443	0.531
F-test	.	.
Prob > F		
Observations	24	24

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

FDI and Gender

OLS	ln(Female Employment)	ln(Male Employment)	% of exported output
FDI: % owned by Foreign Individuals/Companies	0.013***	0.024***	0.390***
	(0.004)	(0.003)	(0.068)
Manufacture (vs. services as base category)	-1.957***	0.762***	17.177***
	(0.193)	(0.107)	(2.467)
	-0.147*	-0.132***	0.152
Size Of Locality	(0.075)	(0.044)	(1.022)
	-0.381**	-0.505***	-4.546*
Has Credit Or Loan?	(0.161)	(0.096)	(2.400)
	-0.383**	-0.195	0.088
Plans to increase size of the establishment	(0.172)	(0.121)	(2.793)
	-1.418***	4.024***	15.715***
Constant	(0.481)	(0.242)	(6.013)
	0.013***	0.024***	0.390***
R-squared	0.227	0.316	0.192
F-test	20.6994	39.0547	22.2415
Prob > F	0.0000	0.0000	0.0000
Observations	573	572	573

Standard errors in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

ANNEX IV: JORDAN COMPETITIVENESS PROGRAM IMPACT TABLE

JCP Impact on Employment, Investment and Exports

(Source Jordan Competitiveness Program (JCP) Jobs Creation Study)

New job Creation by Clusters	
ICT sector	875
CT cluster	1,900
Medical cluster	1,160
Workforce development activities	1000
Investment	
Investment generated by JCP	$238 million
Total jobs created by attracting $700 million in FDI from JCP	13, 300
Exports increase by cluster	
Medical cluster yearly export increase	25%
Pharmaceutical product export increase	30%
ICT sector export increase	13.5%

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COST-PER-JOBS AND INDIRECT JOBS

ASSESSMENT AND METHODOLOGIES

September, 2016

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USAID/Jordan Monitoring and Evaluation Support Project (MESP)
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CONTENTS

ACRONYMS

CBA	Cost Based Analysis
CE	Cost-Effectiveness Ratio
CEA	Cost Effectiveness Analysis
CGE	Computable General Equilibrium
EC	Effectiveness-Cost Ratio
EDE	Economic Development and Energy
FDI	Foreign Direct Investment
IFC	International Finance Corporation
JCP	Jordan Competitiveness Program
JEDCO	Jordan Enterprise Development Corporation
JIC	Jordan Investment Commission
JOD	Jordanian Dinar
MSI	Management Systems International
M&E	Monitoring and evaluation
MESP	Monitoring and Evaluation Support Project
SAM	Social Accounting Matrix
SEM	Structural Equation Modeling
USAID	United States Agency for International Development

INTRODUCTION

PROJECT BACKGROUND

The Monitoring and Evaluation Support Project (MESP) is designed to improve the functioning and utility of USAID/Jordan Mission performance monitoring, evaluation and project planning, and design systems through a combination of targeted direct monitoring and evaluation (M&E) implementation, expert technical assistance, formal training, and knowledge sharing and M&E collaboration support.

PURPOSE AND OBJECTIVES

USAID/Jordan activities in the Office of Economic Development and Energy (EDE) were designed with high-level targets based on economic growth trends and assumptions of several years prior to the activities' implementation. While existing activities were designed for long-term economic development based on growth figures from 2010-2012, regional dynamics in recent years have curtailed economic growth in Jordan. The results of this assessment will be used to inform USAID about the current and future potential for employment-related growth in their targeted sectors. As stated by USAID, the purpose of the assessment is to:

- Verify the methodology used to calculate the cost per job in the JCP Jobs Creation Study for the JCP target sectors and if considered solid, devise confidence intervals for those estimates. If not methodically sound, propose measures to estimate cost per job in the USAID target sectors.

METHODOLOGIES FOR COST-PER-JOB

ASSESSMENT OF PREVIOUS METHODS

While the JCP Assessment does not apply any new methodology in order to estimate either cost per job or benefits from the program in monetary measures, the report summarizes estimates of previous studies that have tried to approximate the potential impact of the JCP in terms of cost per job.

A first estimate was based on a thesis that employed input-output tables that claim that "adding one million JOD to total investment in the economy as a whole would create 46.3 employment opportunities in Jordan."[18] There are advantages of using this input-output methodology, but there are also shortcomings. On the one hand, this method allows for estimation of direct and indirect jobs. On the other hand, the method is very rigid and relies on rather demanding assumptions, in particular, the way the economy behaves when producing outputs. More importantly, however, is the fact that the findings of this thesis have not been vetted by peer reviewers, and as such, it is rather difficult to assess

[18] Link: https://theses.ju.edu.jo/Original_Abstract/JUF0725393/JUF0725393.pdf

the quality of its estimates. In addition, the data employed is for 2006, which probably renders any estimate as potentially outdated. [19]

A second estimate presented in the JCP Assessment Report is based on work by Al-Abdulrazag, A. Bashier, and Ameerah N. Wahban (2013) and Bashier Alaa[20]. Based on the review of the work the JCP Assessment states "the employment elasticity with respect to FDI has been estimated to be 0.267 and even lower at 0.043." In relation to this elasticity, the report does not indicate the unit in which both labor and the FDI were measured. However, the original paper indicates that "FDI is defined as direct investment in productive assets by the company established in foreign country," which while approximate to the aim of measuring investment-per-jobs, is a somewhat weak proxy for this purpose. In addition, the methodology used in the original paper appears to be very questionable[21]. Finally, as a matter of academic credibility, the paper was not published in a recognized journal, but in a so-called "predatory" journal of very questionable quality.[22]

The third estimation cited is from Jordan Investment Commission (JIC) data and The Jordan Times[23]. Here the JCP Assessment Report describes two ratios that appear to be quite different as they came from different program objectives: JOD 22,271 of investment per job created and $300,000 per job created (most of the investment is in high capital-intensive activities). With the partial information that we were able to uncover it appears that these estimates are based on incomplete data, which were simply extrapolated without consideration to other confounding factors that may be impacting potential results. As such, these estimates appear to be highly unreliable.

An additional estimate presented in the JCP Assessment report employs data from the Jordan Enterprise Development Corporation (JEDCO). While a corresponding reference of the source employed was unable to be found, the JCP report provides an estimate by simply dividing the number of employment generated in a project and the total investment in Euros (€): "Therefore, the total investment generated by these projects was € 54,303,005. The employment generated by these investments is estimated at 3,715 full time jobs. The average investment per job was € 14,614, or around $17,537 per job." The report then employs this parameter to derive an estimate of the JCP: "If JCP would directly utilize its entire budget of $45 million in increasing investment at the firm level, according to this parameter, it would potentially generate 2,566 new jobs." This simple arithmetic calculation, while useful to understand very basic trends, is highly unreliable as too many implicit assumptions are included, some of them rather significant.

[19] Ibid.
[20] The exact reference on the latter was not available in the JCP Assessment report.
[21] The authors apply Ordinary Least Squares modified to provide estimates with co-integration. However, they are not taking into account the simultaneity of the variables used in the model, in particular, foreign direct investment, labor, and gross domestic product, which may result in bias estimates. A preferable method would be to use a SEM, which will be explained below.
[22] Note on predatory journals: https://scholarlyoa.files.wordpress.com/2015/01/criteria-2015.pdf
[23] The citation was not complete, so we were unable to verify the corresponding methodology in more detail.

Finally, the JCP Assessment report presents a study conducted by the International Finance Corporation (IFC)[24] in which the authors implement input-output table analysis and multiplier analysis. This is the most reliable work presented in order to calculate cost per job estimation. The IFC report makes a number of assumptions in order to be able to apply an input-output methodology. A crucial assumption is one of "fixed production function" as required by this method, which essentially assumes a linear combination of inputs in order to produce corresponding outputs. This assumption in highly dynamic sectors such as those targeted by the JCP may be debatable as part of the aim of this program is precisely to invest in sectors with potentially high economies of scale. Other weaknesses of these estimates are that there is no differentiation by size, and hence productivity, of firms within a sector. In spite of these shortcomings, the application is very sensible and the methodology allows the quantification of the wider impacts of investing in various economic sectors including direct, indirect and induced impacts. Authors implemented the analysis using the last social accounting matrix (SAM) available that dates back to 2004, but make an effort to update it using data from the Jordan Statistical Office for the year 2009. The main results are shown in table 1.

TABLE 1: OUTSTANDING FINANCE (JUNE, 2011) AND ASSOCIATED IMPACT FINDINGS (IFC)

Client Segment	IFC Outstanding Finance in $ min	Associated Value Added in $ min		Associated Employment in '000 jobs	
		Direct/ Indirect	Induced Effect	Direct/ Indirect	Induced Effect
Non-FIs	243.7	90.5	30%	3.4	45%
FIs	52.8	122.0	33%	5.6	40%
Total	**296.5**	**212.5**	**32%**	**9.1**	**42%**
Total	**Participants**				
	138.7	**37.5**	**32%**	**3.2**	**21%**

Kapstein, Kim, & Eggeling (2012)

The JCP Assessment Report employs the IFC estimates in a straightforward manner: "The study concludes that with $297 million in operations outstanding as of June 2011 with client financial institutions and private sector companies, IFC has contributed, directly and indirectly, supporting at least 9,100 jobs. That is $32,637 per job supported." Among all the estimates reviewed in the present report, these are the ones that appear to be the most reliable.

COMPLEMENTARY EMPIRICAL STRATEGIES

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http://www.wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/10/24/000356161_20131024140824/Rendered/PDF/820370WP0SEIA000Box379851B00PUBLIC0.pdf

In order to analyze the potential effect of the implemented program in relation to the amount of resources invested in it, it may be possible to apply additional methodologies at relatively low cost in terms of data sources. One approach is to employ a Cost Benefit Analysis (CBA), which includes the total amount of expenses, financial and non-financial, in relation to the total amount of benefits in the whole economy, measured in monetary units. A second approach is to use a Cost Effectiveness Analysis (CEA), which presents the relationship between the expense incurred and the amount of the desired output (i.e. jobs, year of education, etc.) achieved by the program and allows us to compare the results between different interventions.

Cost Benefit Analysis (CBA)

The CBA allows us to compare the total costs of a project with the overall benefits using a common metric, usually a monetary unit. In order to do this the CBA identifies the sectors and industries of interest and proceeds with an estimation of the benefits and cost associated to each of the involved groups. As a technique, it is commonly applied at the start of the project to evaluate if, under a set of assumptions, the project is associated to a net benefit for the society, which means greater benefits than the costs (Boardman, et al, 2006). The CBA organizes the involved agents into winner and loser groups and the associated monetary amount linked to both. The analysis assumes that a monetary value can be placed on all the costs and benefits of a program, including tangible and intangible returns. The decision of applying the project is made by comparing the net present value of the project's costs with the net present value of its benefits. This net present value is estimated through a necessary discount of the future quantities to place them on par with costs and benefits incurred today. We can think of this discount as an exchange rate through time periods (Baker, 2000).

As a guideline for applying CBA of a project we can enumerate the essential steps in the process. Nevertheless, each CBA may vary in the number of steps or even in the order of them due to its particularities and the context in which the project has been implemented. To do this we follow Boardman, et al., (2006), Baker (2000) and Better Evaluation (2015):

1. Definition of the project and other alternatives: clarify the objectives of the project and identify the attributable costs and benefits. For this step, a base situation must be defined in which the project "does not occur." The imposition of this counterfactual also requires the assumption of the affected sectors. It is essential in this step to think if the actions done by the project can truly affect our outcome variable and to keep in mind other options.
2. Identification of winners and losers: all the sectors and industries that could obtain some kind of benefit or loss by effect of the project must be listed. The monetized amounts of benefits for the winners will be that group benefits, while for the losers this will introduce in costs its corresponding costs.
3. Types of effects: Effects may be categorized through valuation of three aspects; monetary (directly evaluated from market prices), susceptible of valorization (may be monetized using regression analysis) and non-susceptible of valorization (no methods accepted for monetizing). In addition, effects may also be seen as direct and indirect. The latter correspond to impacts produced in the market, which are directly affected by the project, while the former are affected through impacts in related markets like substitutes, complements, inputs or derivate markets.
4. Estimation of direct costs and benefits: Once the winners and losers are identified, the next step will be to valorize these effects. It is basic to consider only the cost and benefits that will not

occur in the absence of the project and that can be attributed to it. All the monetary measures must be in the same unit in order to assure comparability.

5. Estimation of indirect costs and benefits: For this step, we must think in all the markets that we are not directly affecting through the channels of our project but in all the possible markets sensible to any attributable effect due to its linkages. We must define a relevant market in which we consider inputs, derivate, complements and substitute goods. Additional methods that may capture indirect effects are described below.
6. Price adjustment and valorization for non-existing markets: Potentials adjustment must be done in the case of not competitive markets, different time periods and ambiguity. Market prices should not be used in the presence of market failures, since they do not reflect the real social costs and benefits. Instead, shadow prices must be estimated in which we take account of the imperfections (such as artificial supply shortage due to monopolists) and correct them. The value of time has to be present for projects developed in different periods since inflation and interest rates affect directly the value of money along time also the value of the outcomes achieved.

Cost Effectiveness Analysis (CEA)

The CEA is a common alternative to the CBA although its main objective differs since the latter compares the relative costs to the outcomes or effects of the course of action. The CEA does not need to monetize all the quantities during analysis, which can be useful in context where it is difficult to put a value on an outcome or benefit such as a human life saved. In comparison with the CBA analysis, the CEA can only be done with reliable data at the end of the project that gives us the amount of outcome achieved. Another option to implement the CEA is with a reliable estimation of the outcome of the project, but that usually requires another methodology to obtain the estimator (Ortiz de Zevallos and Guerra Garcia, 1998).

Following Edejer, et al. (2002) it is clear that CEA requires only two inputs: the total costs in a common monetary value and the effectiveness of an option in terms of physical units (i.e. number of jobs created, number of schools constructed, etc.). Since the two of them are not comparable because of its correspondent units, we can only obtain a criterion of measure through the computation of ratios. In this sense, we can obtain the Cost-Effectiveness ratio (CE) and the Effectiveness-Cost ratio (EC):

$$CE = {}^{C_i}/_{E_i}$$

$$EC = {}^{E_i}/_{C_i}$$

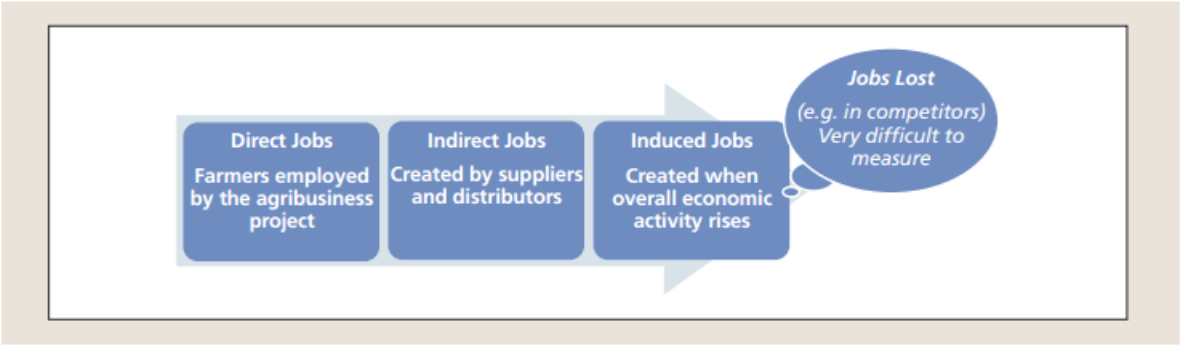
Where the variable C_i denotes the total cost of the project i, while E_i represents the effectiveness of the option i in physical units. The first equation can be understood as the cost per unit of effectiveness (i.e. thousands of dollars spent per job created), while the second is the effectiveness per unit of cost (i.e. number of job created per thousands of dollars spent). The main advantage of the CEA is straightforward capacity to compare different project options through the values of these ratios. Projects can be ranked by CE from lowest to highest so the most cost-effective project will obtain the lowest CE ratio. CEA can also be used to build counter-factual scenarios comparing the effectiveness of the program to alternative approaches which were not used and to other similar programs.

A disadvantage is that CEA only takes account of one outcome or result of the project. The CEA does not let us differentiate between winners and losers neither permits a whole analysis of all the benefits at the same time since different ratios should be computed in the case of several outcomes of interest.

METHODOLOGIES FOR OVERALL JOBS

When trying to evaluate projects in terms of employment potential, evaluators should consider not only the number of direct jobs, but also the number of indirect jobs, induced jobs, and as well as overall job creation, as described by the International Finance Corporation (2013). Indirect jobs refer to the employment created through economic linkages in the society or jobs that were created because of the change in the situation of the suppliers and distributors of the targeted sector or area. Induced employment refers to the jobs generated in the economy uniquely through the process of the multiplier, which result from direct and indirect employees increasing their consumption and hiring using more labor as a productive input. That is, induced jobs refer to the job creation due to the fact that the overall economic activity may increase as a result of the project intervention. The net job creation should also take into account any jobs lost because of competition or natural job destruction, which means that theoretically net job creation of a project may even be negative. This latter potential result simply emphasizes the fact that cost-benefit analysis prior to intervention is very important.

FIGURE 1: TYPES OF JOB CREATION BY A POLICY



Source: International Finance Corporation IFC (2013)

Usually, the estimation of job creation is done through a comparison with a counterfactual, that is, an unobserved comparable situation where the project was not administrated. However, finding a proper counterfactual is rather difficult and can be a complex task. One alternative is to estimate all the linkages of the original project via corresponding estimated multipliers, which would help assess all the jobs created at every primary and secondary rounds of economic impact. The problem is that multipliers are context specific and may vary across the industries in the economy, which makes them difficult to estimate. Another shortcoming is that estimation through multipliers cannot be considered to be causal

since there is not a counterfactual present in the evaluation and can only be interpreted as approximation benchmarks. Using the IFC approach, which itself summarizes from the existing literature, an example of possible relevant multipliers is shown in Table 2.

TABLE 2: INDIRECT AND INDUCED EMPLOYMENT

Effect	Definition	Multiplier
Indirect Employment effect	Change in employment in a client's supply and distribution chain	**Type I** = $\frac{\text{\# Direct Jobs + \# Indirect Jobs}}{\text{\# Direct Jobs}}$
Induced Employment effect	Change in employment resulting from increased demand associated with extra labor income generated by new jobs	**Type II** = $\frac{\text{\# Direct Jobs + \# Indirect Jobs + } \Delta \text{ Induced Jobs}}{\text{\# Direct Jobs}}$

Source: International Finance Corporation IFC (2013)

A wide range of methodologies to estimate job creation multipliers are available. In particular, we will describe briefly the usage of Input-Output tables through Social Accounting Matrix, the Structural Equation Modelling and the Computable General Equilibrium techniques[25].

Social Accounting Matrix (SAM)

Most sectors have the ability to raise the output and employment rates of other sectors through backward or forward linkages and to generate indirect jobs. The employment and output multipliers calculate the value of production in all sector that will be necessary to meet a final level of demand taking into account the direct and indirect effects through linkages of all the economy.

The data needed for the calculation of multipliers are the linkage type and dimension of each sector with each other through purchasing and inputs. This information is usually calculated in national input-output table for a certain level of aggregation of the sectors. This matrix represents the transfers and transactions between sectors and institutions. A SAM matrix is an extension of the traditional input output table because it displays Inputs, Outputs, Factor incomes created in domestic production, Distribution of these factor incomes, Redistribution of these factor incomes over these institutions, Expenditure of the institutions on consumption, investment, and Savings made by them (World Bank, 2013).

Assuming an exogenous shock in any variable of the economy will raise the output in a sector, which will result in both direct and indirect job effects. As mentioned above, direct effects are those occurring in the sector where the new project bears direct effect. Additionally, this shock will have indirect and induced job effects coming from the linkages of the sector that was first struck to other sectors. This will result in a movement of the production and employment rates on these other influenced sectors accordingly to the type and dimension of the linkage. Adding the direct and indirect effects produced by the shock, we get a measure of the multiplier effect on the whole economy (World Bank, 2013; Mekantsishvili, 2009).

[25] In Annex 11 we also present a summary of so-called Impact Evaluation methods, which is the one that tries to establish counterfactuals and thus, help establish causality between variables of interest.

FIGURE 2: SOCIAL ACCOUNT MATRIX (EXAMPLE)

	Production	Consumption	Accumulation	Rest of the world	Σ
Production	Intermediate consumption	Final consumption	Gross capital formation	Exports plus balance of goods and services	
Consumption	GDP minus consumption of fixed capital			Balance of primary incomes and current transfers	
Accumulation	Consumption of fixed capital	Net saving		Capital transfers (net)	
Rest of the world	Imports		Net lending or borrowing (including statistical discrepancy)		
Σ					

There are two types of linkages in the context of multiplier effects, backward linkages and forward linkages (World Bank 2013). Backward linkages refer to increases in jobs of the corresponding account and how it cascades on the incomes of all other endogenous accounts. In Figure 2, the column-wise sum of all these effects constitutes its total backward linkage. Similarly, the column-wise sum within each account is the total partial linkage. Backward linkages refer to the demand-side connections a firm has with other existing firms in the country (Mekantsishvili, 2009). On the other hand, forward linkages are represented by the row-wise additions in Figure 2. They represent the amounts of expenditures per account that are made available for the expansion in other accounts and may be understood as market potential availability. Thus, forward linkages refer to the supply-side connections a firm has with other existing firms in the country and provide a measure of the size of the potential market for an entrant into the country (Mekantsishvili, 2009; World Bank, 2013).

Structural Equation Modeling (SEM)

Structural Equation Models (SEMs) are an alternative method that can help assess the overall impact of new projects on jobs. They are designed to study complex relationships among variables and typically consist of a set of stochastic equations that specify causal connections between the variables in the model and various auxiliary assumptions. This method tries to deal with a pervasive problem in statistics and econometrics, which is related to the fact that it is very difficult to disentangle causality from correlation[26].

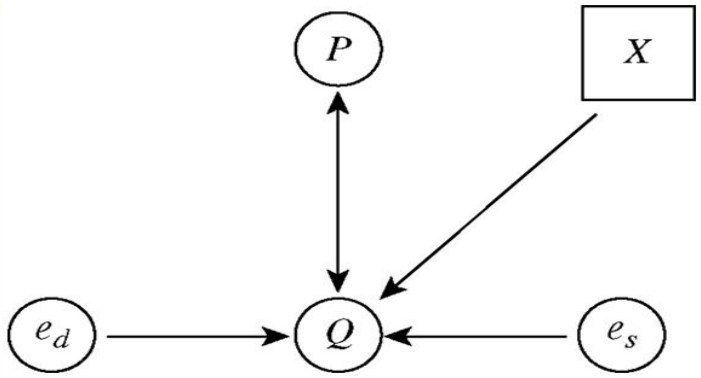
In the context above, SEMs are representations of the economy that try to give "structure" in the way this representation is done. In practical terms, it consists of a series of regression specifications that try to reflect the behavior of one or more economic agents in reaction to changes exogenous explanatory variables, for instance, new projects. These behavioral equations are also known as structural equations as they contain others endogenous variables in its specification. For example, a simple SEM model would

[26] A typical reason that makes it difficult to disentangle correlation from causality is simultaneity, which is the fact that one or more of the "explanatory" variables are jointly determined with the "dependent" variable in a regression specification. For instance, if the discussion is between jobs and productivity, it is unclear to what extent more productivity is conducive to more jobs or whether more jobs are conducive to more productivity.

require one equation for the demand of some good and a second equation for the supply of such good. Since both equations are interlinked by the price and quantity variables, they are considered to be simultaneous and structural (Hox and Bechger, 2009). The structural equations from a SEM can be rewritten in the form of reduced equations, which will depend solely on a set of exogenous variables in the entire system. To do this, we need to gather data and a theoretical specification for each of the SEM regression specifications and run a statistical analysis called two stages least squares because the commonly used regression method, ordinary least squares, does not take into account the observed simultaneity (Fabra and Camisón, 2009; Dell, 2015).

Figure 3 provides a simple example of a SEM approach. Here we have a situation in which the endogenous variables are prices (p) and quantities (q), both of them which are determined simultaneously. In addition, we consider an exogenous shock (e) and other exogenous variables (x) that may affect the quantities directly. In a case of a model corresponding with this structure we should highlight the simultaneous determination of the variables and take into account the indirect effects that will occur because of it. In this example, the prices at equilibrium will be affected indirectly through the impacting the quantities variable and its corresponding linkages (Hill, et al., 2008).

FIGURE 3: STRUCTURAL APPROACH



Source: Hill, Griffiths, & Lim (2008).

Computable General Equilibrium (CGE)

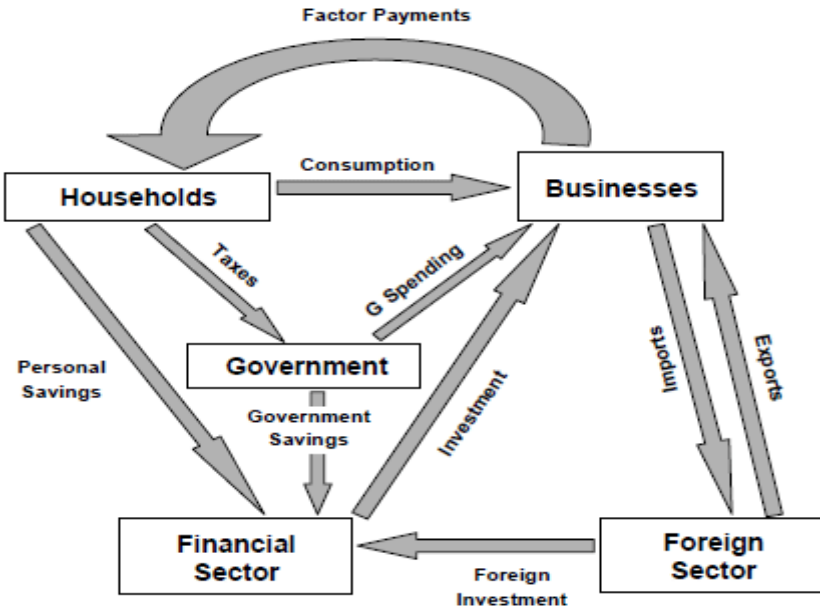
Although the input-output and SAM technique described above can be used to capture the direct and indirect effects on an economy, these techniques suffer from some limitations. In particular, they (i) are entirely demand driven, (ii) do not recognize supply constraints and (iii) ignore price effects and substitutability between primary inputs such as land, labor, and capital (Barry, 2009).

Some researchers have attempted to use a more sophisticated analytical tool known as the Computable General Equilibrium (CGE) model. This approach is related to the input output approach, but a crucial difference is that it takes into account the role of prices. In addition, it does try to make a more accurate representation of the economy by employing a series of equations that describe the relationships in the economy using related data that are applied to such model equations. These data

typically come input output tables or SAM that covers the whole economy and disaggregates it by a number of sectors, commodities, factors and relevant agents (Fernando, et al., 2015; Barry, 2009). Another crucial input for CGEs is the elasticities employed, which work as parameters that capture behavioral response between the agents or sectors. In general, CGE modelling is able to introduce other elements of the economy in order to obtain a better grasp of reality. For example, they may allow for unemployment, Imperfect competition, demand not influenced by price, taxes, and others. Figure 4 illustrates the complexity that can be introduced in CGE modelling and the extent to which different variables and sectors may be introduced in order to measure overall job impact.

A CGE can explore the effects of policies over time on a variety of different macroeconomic parameters, including future employment scenarios. These models allow policy-makers the opportunity to calculate the long-term impacts of policies. They are useful when trying to estimate the effect of changes in one part of the economy holding the rest constant (Fernando, 2015; Barry, 2009).

FIGURE 4: CIRCULAR FLOW OF THE CGE



Source: Barry, M. (2009)

CONCLUSIONS

The objectives of this report were to (a) assess the quality of the cost-per-job methodology presented in the JCP Assessment Report, (b) provide complementary methodologies on how to measure cost-per-jobs, and (c) provide a summary of the methodologies that should be applied in order to measure overall employment creation due to new interventions. Among all the methodologies reported in the JCP Assessment report, the SAM approach by the IFC, while limited to IFC projects, is the one that provides the more reasonable methodological approach and as such, provides a higher degree of confidence relative to the other approaches reported.

In addition, we provide complementary methodologies that could help better estimate any job impacts of the desired interventions. Given the scope of the tasks and the time constraint, it is not possible to provide a systematic guide on how to pursue these methodologies; we provide reasonable guidance on the type of methodological tasks that should be followed. In terms of cost-per-job issues, a sensible direction to take would be to estimate cost-benefit analysis, as they are relatively economical, and provide very intuitive results that can help guide the cost of an intervention relative to its results. In terms of indirect employment, we provide several alternative methodologies that have been employed by researchers in recent years, and while most would probably give overall reasonably similar estimates, the most complete and accepted approach to apply would be a CGE model. The trade-off between applying this methodology and alternative ones is that CGEs tend to be more time consuming than other methods. However, the advantage of being able to focus on different specific sectors of the economy and assess their specific employment impact may be well worth the investment. This, under the assumption, that reasonable data are available –which appears to be the case.

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ANNEX II: IMPACT EVALUATION

The main idea of the impact evaluation techniques come from the concept of finding a counterfactual. Ideally, we want to replicate exactly a treated observation, for example, a new project in a sector, with a similar sector, identical in all its observable and non-observable characteristics, with the exception of such said new project. If we had this perfect counterfactual, a clone, we would only care about comparing the outcome variable, in our case number of jobs, between them. That would give as a perfect estimation of the causal impact of the policy in analysis. Since this is impossible to do in the real world for we cannot have the same individual treated and non-treated at the same time or the same country treated and non-treated at the same time, researcher use impact evaluation techniques, which help construct counterfactuals using random sampling.

There are two conceptually similar methodologies in impact evaluation, experimental designs, and pseudo-experimental designs. Experimental designs are very similar to the natural science experiments. First, a representative population is selected, and then the treatment that will be applied is randomized between the individuals in order to evade the selection bias of choosing by some observable characteristic. This randomization and the exogenous assign of the treatment to the individuals result in and exogenous shock for the treated that will report a causal impact or effect of the policy when the outcome measure is compared with the control group.

There are several requirements and assumptions to assure the validity of this technique, but the basics are the representative choice, statistical power of the sample and specially, the exogeneity of the applied treatment. When the project has already begun and one can no longer randomize the treatments, or when the treatment has some ethical consideration to not be randomized, pseudo-experimental techniques may be useful. The latter try to simulate a randomized control trial scenario when no randomization has been done. There are four methodologies widely employed in public policy:

A. Double Difference requires the use of longitudinal or repeated cross sectional data. With data on treated and control individuals before and after the program intervention each observation is compared with its initial position and then this first difference is compared between the treated and control group, thus generating the double difference.
B. Instrumental Variables corrects endogeneity in the individual participation or selection bias involving the use of an exogenous variable called instrument, which must be highly correlated with the program placement or participation but not correlated with the unobserved characteristics that could affect the outcomes.
C. Regression Discontinuity exploits the program eligibility rules as an instrument for exogenously identifying treated and non-treated observations. Observations within a certain neighborhood of the eligibility threshold are used as the sample for estimating the impact of the policy.
D. Propensity Score Matching constructs a statistical comparison group based on the estimated probability of a model predicting the probability of participating in the treatment, although uses only observed characteristics of the individuals and matches treated and non-treated individuals, The treatment effect is calculated as the mean difference in outcomes across the groups.

U.S. Agency for International Development

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TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) ASSESSMENT

September 2016

This publication was produced at the request of the United States Agency for International Development. It was prepared by Dan Killian of Management Systems International (MSI), a Tetra Tech Company.

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ACRONYMS

ADS	Automated Directives System
BEST	Building Economic Sustainability through Tourism project (USAID-funded)
DEC	Development Experience Clearinghouse
EU	European Union
FY	Fiscal Year
GIZ	Deutsche Gesellschaft fur Inernationale Zusammenarbeit (German Corporation for International Cooperation)
JICA	Japan International Cooperation Agency
KOICA	Korea International Cooperation Agency
LOE	Level of Effort
MESP	Monitoring and Evaluation Support Project (USAID-funded)
SOW	Statement of Work
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNRWA	United Nations Relief and Works Agency for Palestinians in the Near East
USAID	U.S. Agency for International Development
VTC	Vocational Training Corporation
VTI	Vocational Training Institutions
WFD	Jordanian Workforce Development Project (USAID-funded)

EXECUTIVE SUMMARY

This rapid assessment reviews available data on Technical and Vocational Education and Training (TVET) in order to ascertain which areas of TVET investments yields the most productive employment outcomes over the short to medium term. The TVET Assessment Statement of Work (SOW) calls for three primary tasks:

- Description of available data from TVET institutions such as tracking graduates, employment rates, duration of employment, sectors of employment, and patterns of graduation and employment

- Statistics on employment of TVET graduates by sector, institution, and gender

- Estimation of the cost per graduate trained and cost per graduate employed

The key audience for this study is for the USAID/Jordan Economic Development and Energy (EDE) team to identify potential opportunities for support to expand employment opportunities in Jordan. The study is designed as a rapid assessment to survey the current state of research and strategy addressing employment in Jordan. This rapid assessment utilized key informant interviews, review of available administrative data among TVET institutions, and examination of public economic survey data. The primary limitation to this study is the lack of raw data on extant tracer studies, lack of availability of administrative data such as from Al Balqa University, and uncertain data quality of data provided in summary form.

This rapid assessment concludes that employment is higher among TVET educational levels than university graduates, and that future employment growth will likely be driven by the TVET sector. Within TVET training/educational tracks, there is high demand for industrial and technical professions. Furthermore, female employment trends are generally positive for TVET occupations, suggesting that employment growth in TVET will have additional benefit for women in the labor force, and may have the eventual effect of drawing more women into the labor force. Rough estimates of the costs to gain an employed graduate from a TVET education or training program show wide variation (ranging from $1,600 - $3,600), however taking into account the total number of employed in addition to cost shows more parity.

This assessment recommends continued support to TVET education in general, and to the industrial and service sectors in particular. However, there also seems to be a need for more targeted communications to Jordanian youth, and society in general, of the burgeoning demand for technical labor gained through secondary vocational education or two-year associate degrees. Any public awareness strategy should include messaging to build more positive perceptions of skilled and technical labor. Current proposals to shift the institutional makeup of the TVET sector, including the creation of a TVET educational track that could lead to a university degree, seem well-warranted and should be supported.

PROJECT BACKGROUND

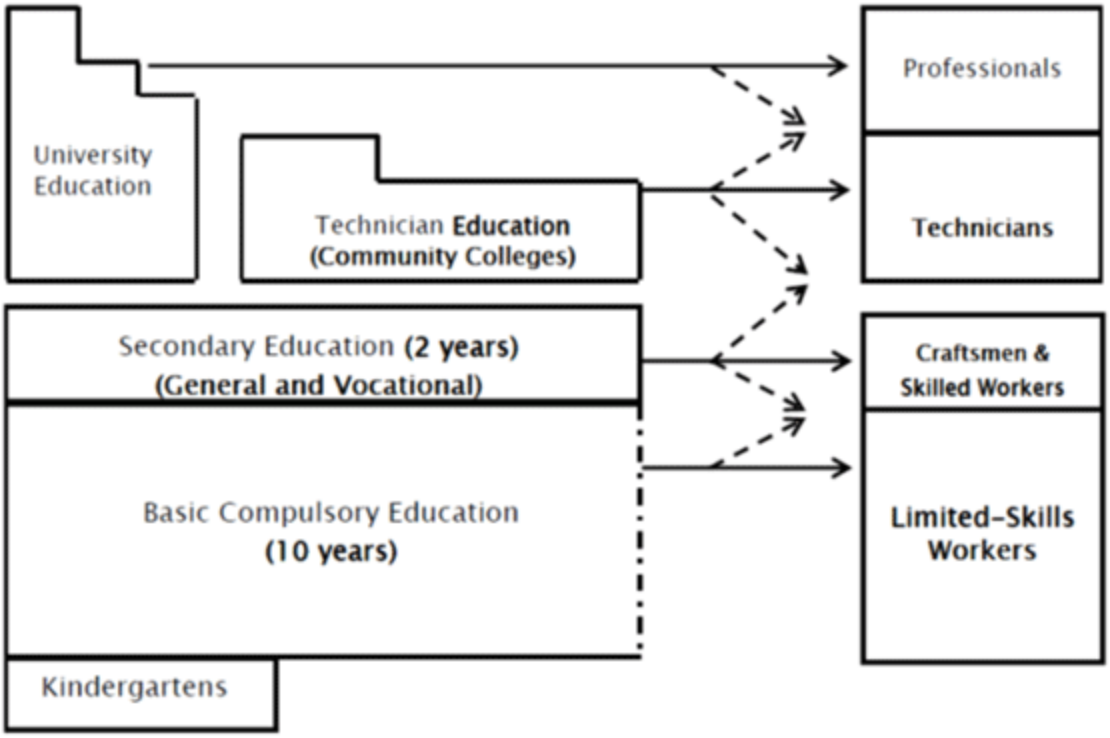
The Hashemite Kingdom of Jordan is committed to modernizing its national education system, but faces challenges such as a large youth population, low private sector job creation, mismatch between education levels and the skills demanded in the labor market, and structural inefficiencies. Jordan's educational system consistently over-produces university graduates and under-produces secondary or post-secondary graduates with vocational and technical skills suitable for market demand. Since 2010, the labor force consisted of 12-14 percent skilled workers[27] against an estimated demand of 40-60 percent of skilled labor's share of the workforce. Overall labor force participation is also low – less than 40 percent according to the Employment and Unemployment survey – while most economies commonly see participation rates exceeding 50 or 60 percent.[28] There is a great need to supply vocational and technical education at the secondary and post-secondary levels to alleviate the social pressures associated with unemployment, especially youth unemployment, while addressing the long-term structural imbalance in the makeup of Jordan's labor force.

EVALUATION PURPOSE AND QUESTIONS

This rapid assessment responds to Task D of the Job Creation Assessment SOW. Task D of the Job Creation Assessment is to address the question "Which TVET has the best outcome for employment of graduates?" The purpose of this question is to determine where TVET resources can be best spent in order to maximize increasing employment in the near term.

UNESCO's World TVET Database shows the following correspondence between Jordan's education levels and occupational tracks:

[27] Measured as the proportion of the work force with associate degree or other form of post-secondary education.
[28] See here for cross-country comparison.



Relationship between the Educational Levels and Occupational Levels

As illustrated in the above graphic, the Technical and Vocational Education and Training (TVET) sector consists of the following institutions:

- Vocational secondary schooling through the Ministry of Education, contributing to the Craftsman and Skilled Worker occupational tracks.

- Applied vocational secondary or post-secondary schooling through the Vocational Training Corporation (VTC) and their member Vocational Training Institutions (VTIs), contributing to the Semi-skilled, Skilled, and Craftsman occupational tracks.

- Technical training through two year associate degrees at technical colleges through the Ministry of Higher Education, contributing to the Technician occupational track.

- Technical training / employment stimulus programs publicly funded through the TVET Fund, or provided through private firms, contributing to the Semi-skilled and Skilled Worker occupational tracks.

This assessment reviews available data for each of these TVET tracks, utilizing the following data sources:

Table 1 Interviews and data sources by TVET track

TVET track	Relevant institution / provider	Data sources / Interviews
Vocational secondary schooling	Ministry of Education	Jordan Unemployment Survey
Applied vocational secondary or post-secondary schooling	Vocational Technical Corporation	VTC administrative data and tracer studies, Jordan Unemployment Survey
Technical colleges	Ministry of Higher Education	Institutional administrative data from Al Quds College, Al Balqa University, and UNRWA, Jordan Unemployment Survey
Technical training / employment stimulus programs	TVET Fund, Private firms	Institutional data and interviews with TVET Council and Fund, Mercedes Benz, Petra Engineering

See Annex 2 for a complete list of key informants interviewed for the rapid assessment. The Ministry of Labor is also a relevant stakeholder insofar as providing matchmaking services between job seekers and employers. From these sources of TVET data, the assessment SOW establishes three primary tasks:

- Description of available data from TVET institutions such as tracking graduates, employment rates, duration of employment, sectors, and patterns
- Statistics on employment of TVET graduates by sector, institution, and gender
- Estimation of the cost per graduate trained and cost per graduate employed

Collectively, data and findings from these principal tasks are meant to inform the issue of where USAID might profitably invest in employment-stimulating activities over the short to medium term. See Findings and Conclusions for this assessment's report on the primary tasks.

The Statement of Work also tasks the assessment with a bibliography including reports produced by international donors investing in the TVET sector. Primary past and current actors in the TVET sector include the EU, JICA, GIZ, and World Bank. The following table summarizes:

Table 2 International donor investments in TVET

Donor	Past investment	Current investment
JICA	VTC support through three "Centers of Excellence" (2006-2010)	None
GIZ	VTC support (2011-2015)	Employment support with Ministry of Labor (2016-)
EU	Institutional support to E-TVET Council, grant support to E-TVET Fund under previous strategy (2008-2013)	Continued support for current strategy (2014-2020)
KOICA	VTC support / volunteer instructors	--
World Bank	--	Loan financing for job creation
USAID	Siyaha, Y4F	WFD, BEST

ASSESSMENT METHODS AND LIMITATIONS

This rapid assessment relies on key informant interviews with stakeholders and institutions, as well as consultation with public data records such as the Jordan Unemployment Survey, Higher Education Graduate Survey, and the Labor Market Panel Survey. As such, the assessment findings and recommendations make no claim to be comprehensive or definitive, merely descriptive and suggestive. Qualitative statements are offered where they are generally corroborated by at least two interview or other data sources. Disaggregated employment trends from the Unemployment Survey are the result of several disagreggations within the data (educational or training specialty within a specific educational credential) and do not reflect other sources of variation that may affect trends.

FINDINGS AND CONCLUSIONS

The Findings section below presents descriptive analysis and miscellaneous notes on the three primary tasks of the assessment. The conclusions and recommendations sections build on these findings to offer some simple suggestions on possible ways forward to support employment generation over the short- to medium-term.

FINDINGS

Task 1 Description of available data

This rapid assessment has found that TVET institutions generally have good M&E systems to track enrolment, graduation and, in the case of TVET Fund investments, employment immediately after graduation, with all three outcomes usually disaggregated by training specialty, and geographic location, and in some cases by sex. The Vocational Training Corporation (VTC) conducts annual tracer studies on a sample of graduates one year later, while Al Quds College reported recently contracting a private firm to do a tracer study of graduates one year after graduation. The assessment team could not ascertain whether Al Balqa University conducted tracer studies. The United Nations Relief and Works Agency for Palestinians in the Near East (UNRWA) education network likely has the most robust tracking system for vocational and technical graduates in that career placement support starts six months prior to graduation and continues for up to one year after graduation. Tracer measurements are taken at quarterly increments for reporting purposes, and any graduate who reports not being employed is offered continued support with matchmaking services between applicants and employers.

As employers, private sector firms receive graduates rather than discharge them into the workforce, but will generally keep careful track of a worker's capacity and skills development depending on what occupational track the employees follow. Firms will have some intrinsic motivation to maintain thorough tracking and performance data for its employees insofar as it relates to successful advancement through and graduation from employee training programs. For academic institutions, such motivations are not as acute, and it's generally left to the intrinsic motivation of the student to succeed.

Unfortunately, this rapid assessment could only assess private sector training programs for two firms. Petra Engineering works with VTC to place semi-skilled workers in its facilities, but these employees do not typically have any opportunity to advance – mainly due to the very specific and technical labor skills needed to perform a variety of mechanical functions. Mercedes Benz partner T. Gargour & Fils, on the other hand, takes vocational secondary school, VTC, and technical graduates and places them on a three-year path of on-the-job training culminating in a technician occupational status with respect to vehicle repair and maintenance. There are qualifying exams at the end of each year to progress to the next stage of training, apprenticeship, and salary. The extent of private sector investment in TVET training is therefore highly dependent on the level of skills needed at initial entry into the workforce and the capacity of the employees to absorb and benefit from training.[29]

[29] The 2006 Enterprise Survey indicates that 28 percent of firm employees have a high school education or less. Twenty-four percent of firms offered formal training, which reached 77 percent of production employees and 55 percent of non-production employees.

Task 2 Statistics on TVET participation and employment

While assessment team could not access raw data from tracer studies tracking employment rates, with one exception the team was able to get summary statistics from those studies. In only one case, however, was the data sex-disaggregated. The following table shows the summary results of employment rates for TVET education and training.

Table 3 Aggregate employment rates of TVET institutions

Institution	Employment rate	Annual graduates
VTC[30]	67% (78% M 25% F)	8,000 (58% M 42% F)
Al Quds	89%	2,768
UNRWA	94%	2,400
TVET Fund	39%	11,446

UNRWA boasts the highest employment rate, but is least relevant for advising how to support broad-based employment generation. On the other hand, the TVET Fund has the lowest employment rate but the highest participation rate (number of employed graduates). Furthermore, one may wish to consider additional social benefits associated with TVET Fund support such as rural, youth, and female employment.

Of these data sources, VTC also offered data for 2013 disaggregated by occupational type and specific training specialty.[31] Employment includes formal labor, self-employment, and "inconvenient" labor that is outside of the training specialty.[32]

Table 4 VTC Employment by Occupational Track

Skill level	Duration	Graduated	Employed	Employment Rate
Craftsman	1-2 years	45	25	56%
Skilled	1-2 years	383	275	72%
Semi-skilled	1 semester	81	39	48%
1st level	6 months	113	84	74%

Demand for labor is highest for the Skilled Worker occupational track, requiring 1-2 years of applied vocational training after primary school.

Table 5 Employment by Training Specialty, minimum 15 graduates

Training Course	Graduated	Employed	Employment rate
Vehicle Electricity	48	41	85%
Household installation electrician	19	16	84%
Light vehicles mechanics	28	23	82%
Western sweets chef	16	13	81%
Men's barber	30	24	80%

[30] VTC tracer data is for 2012, while the other institutional data is for 2013-2014.
[31] Al Quds College also offered a table of employment rates by technical faculty, but the sample sizes are too small to compare across faculties.
[32] Inconvenient labor averages 1.3 percent across occupations, with a high of 2.2 percent.

Training Course	Graduated	Employed	Employment rate
Hospitality, cooking and housekeeping	113	84	74%
Household cooling and conditioning mechanics	36	23	64%
Computerized machinery technology	20	12	60%
Women's barber assistant	22	5	23%
Women's barber	36	8	22%

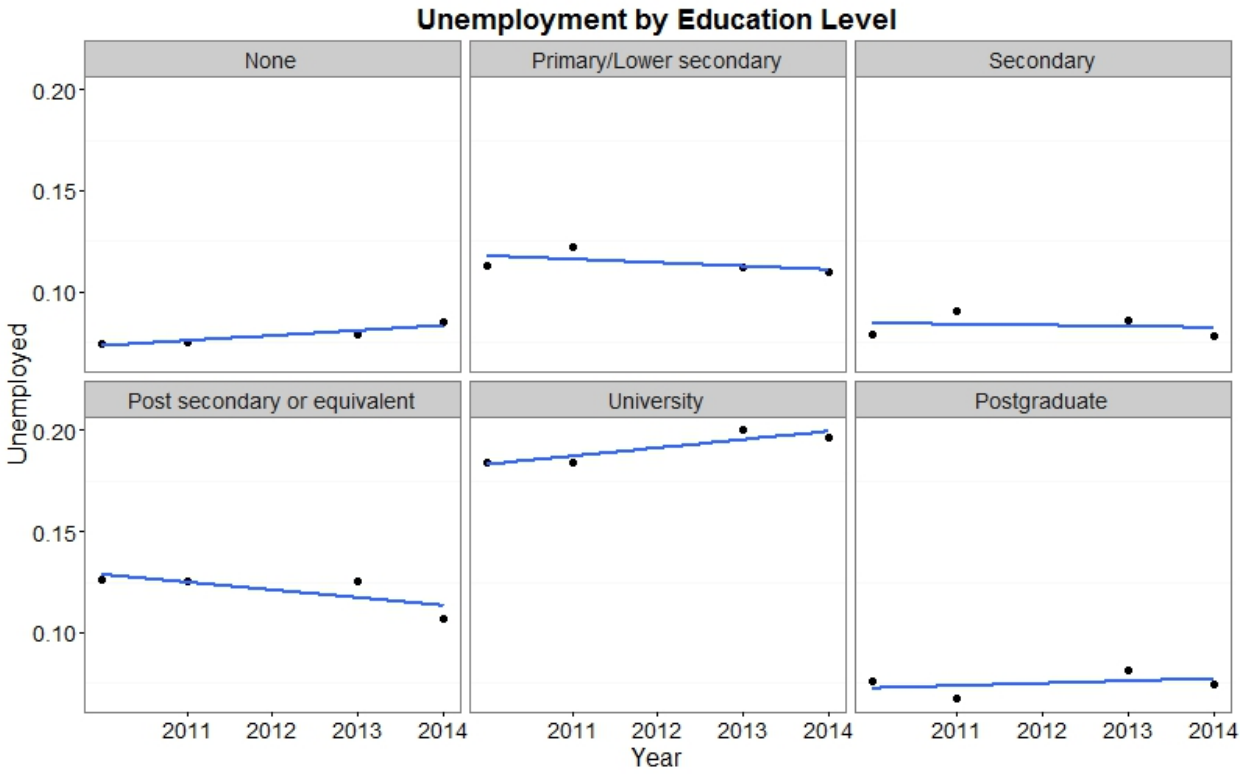
Consistent with national priorities emphasizing employment growth in the industrial and service sectors, demand for labor is highest among electrician and vehicle maintenance positions, followed by service sector positions.

To help answer the question of which TVET has the best outcome for employment of graduates, it is possible to turn to public data sources, primarily the Jordan Employment and Unemployment Survey (EUS). From 2010-2014, the labor force has consisted primarily of participants with 9th grade education (49 percent), university graduates (21 percent), and secondary school graduates (13 percent). Participants with post-secondary schooling make up 10 percent of the labor force, while labor force participants with no education or post-graduate education each make up less than five percent.

Reviewing 2010-2014 trends[33] highlights the overproduction of university graduates (19.1 percent unemployment) and the high demand (12.1 and 10.3 percent respective unemployment) for those with secondary or post-secondary schooling.

[33] 2012 EUS data was not available. Therefore, the trends presented here reflect a linear interpolation of the values for 2010, 2011, 2013, and 2014.

Figure 2 Unemployment by level of education, 2010-2014

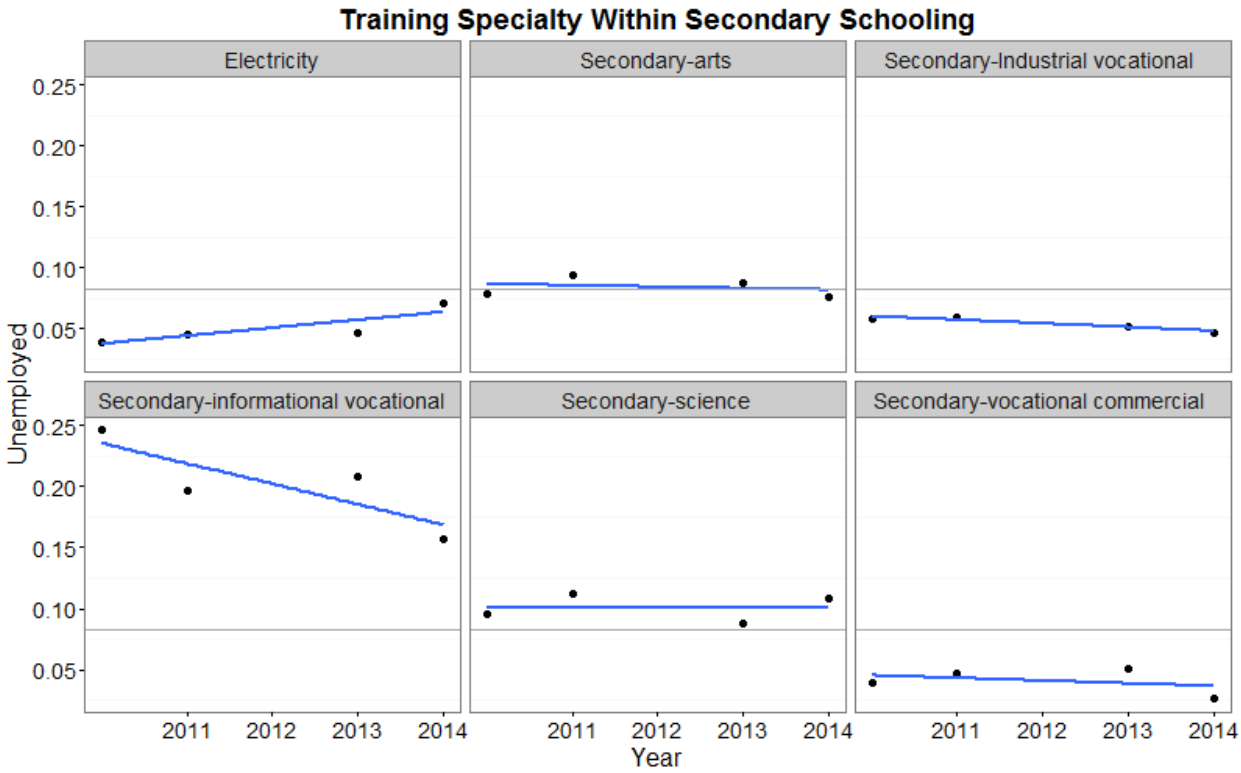


Participants with 9th grade education (primary / lower secondary school) have the next highest unemployment rate, which may reflect an inability to complete for technical vocational positions but overqualification for menial jobs that may be occupied by those without education.

These surveys ask the respondent to specify what specific education track they pursued for education beyond primary school, allowing a review of which training specialties are most in demand. Selected results[34] are presented by training specialty within each educational track: secondary, post-secondary, and university.

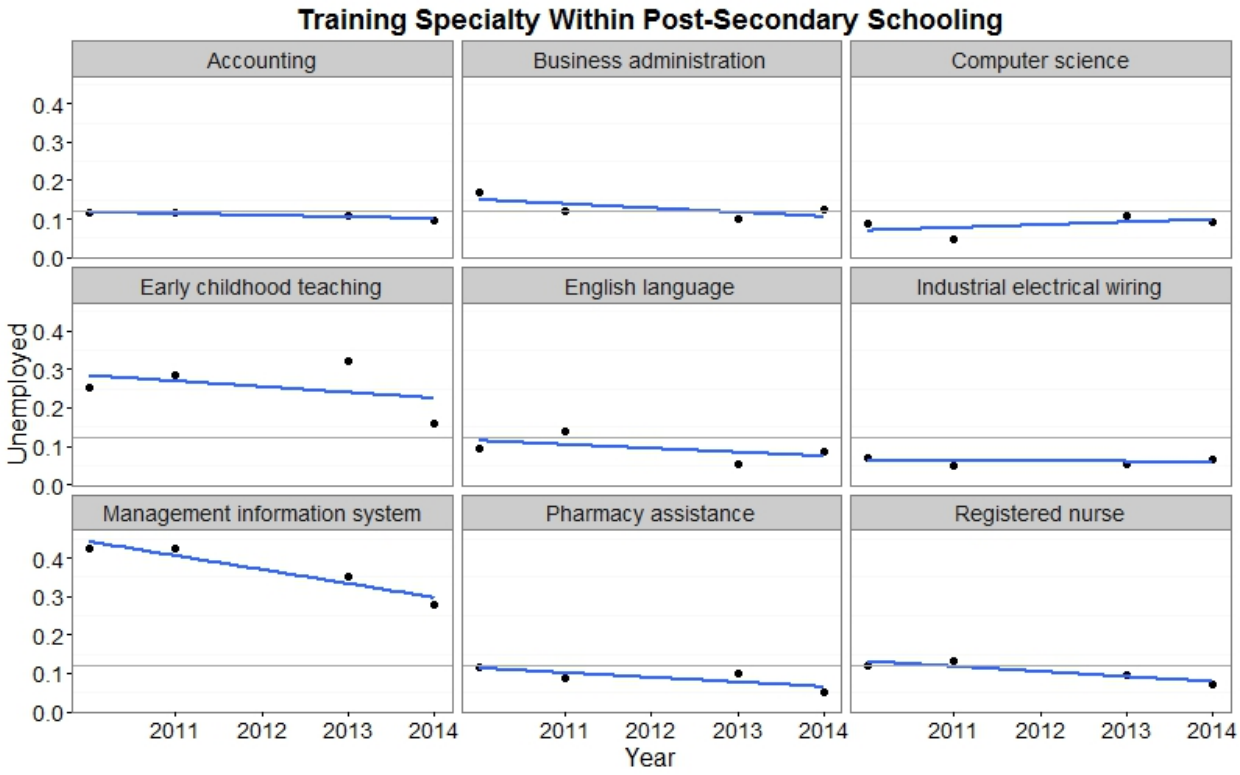
[34] First the training specialties are sorted by the total number of graduates from each specialty, and then specialties with the lowest unemployment are selected.

Figure 3 Training specialty within secondary schooling



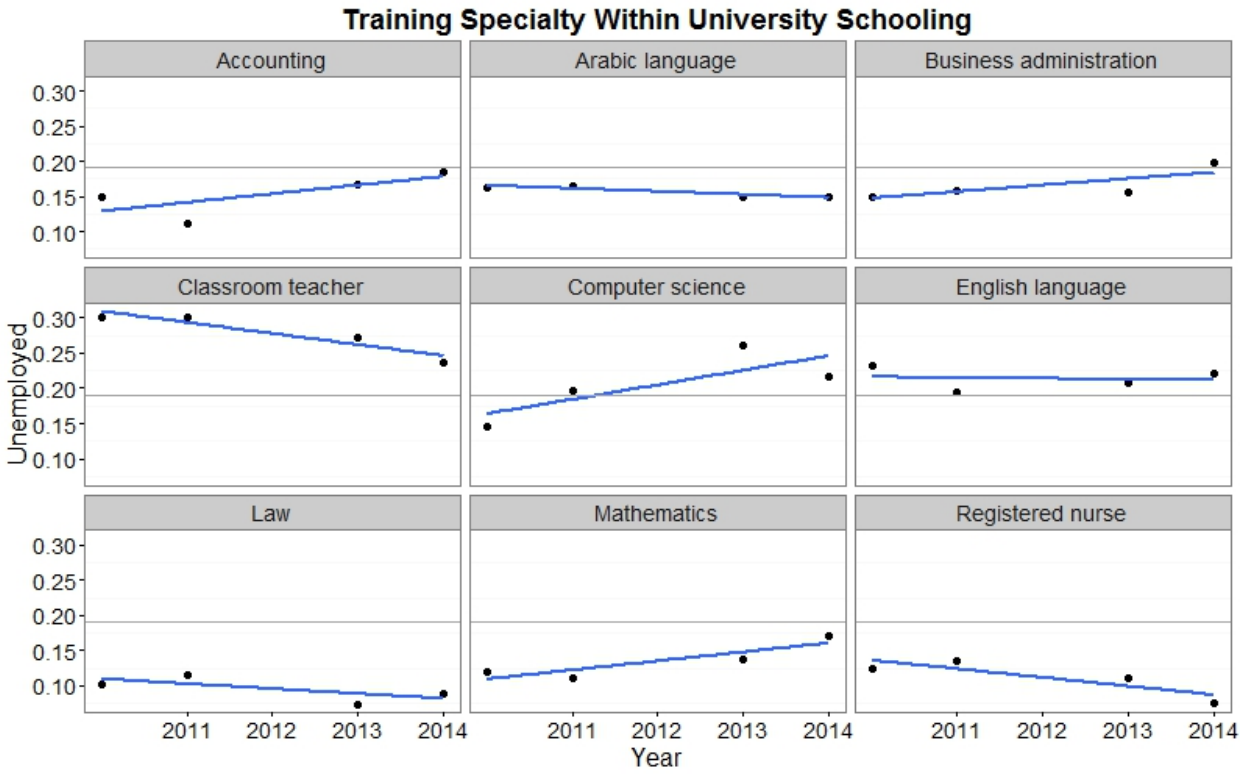
In the figure above, the blue line is the linear trend of the annual data points, while the grey line is the overall unemployment rate for that education track (8.3 percent for secondary schooling). Electricity and commercial vocational education are in highest demand, while informational vocational education shows the highest unemployment.

Figure 4 Training specialty within post-secondary schooling



For those with post-secondary schooling, unemployment is lowest for English language, electrical wiring, pharmacy assistant, and nursing. A certification in Management Information Systems is well above the overall unemployment rate of 12.1 percent for post-secondary schooling.

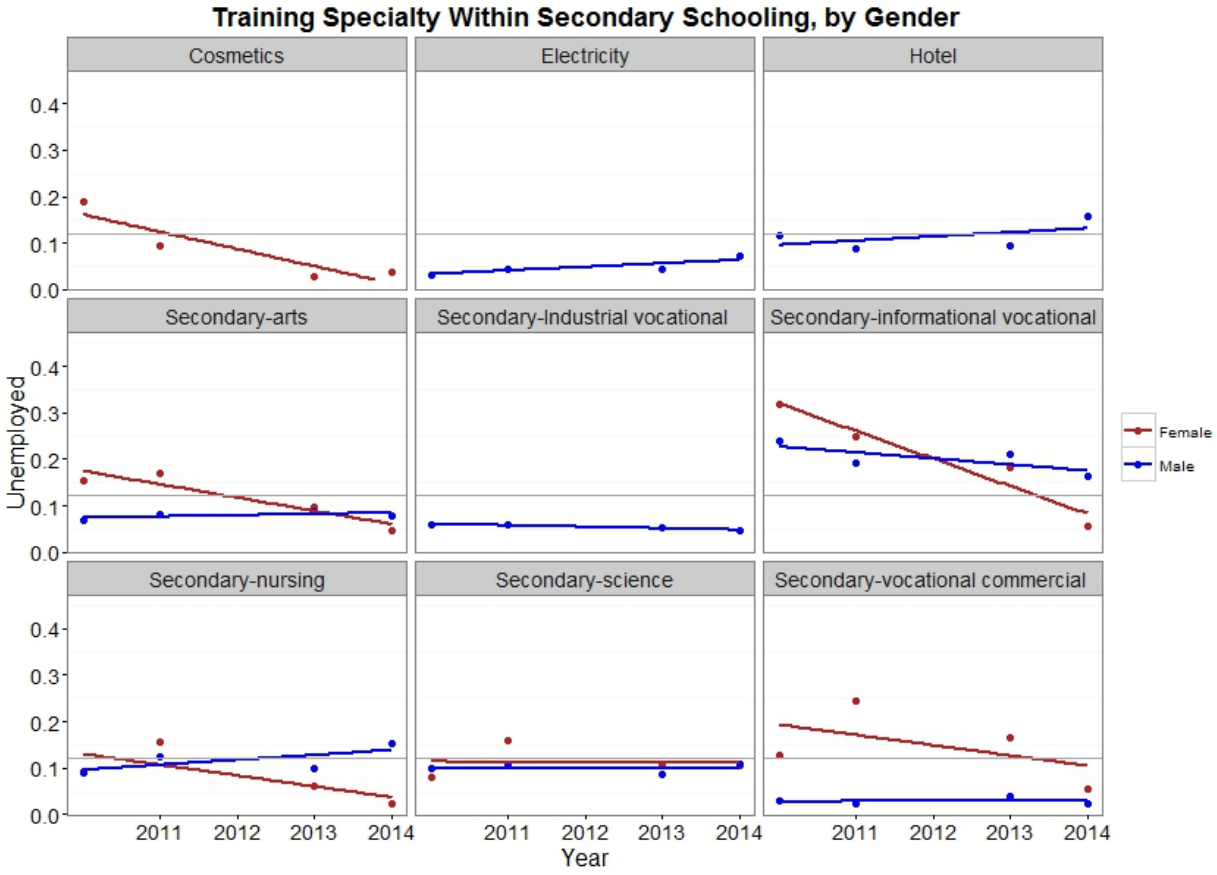
Figure 5 Training specialty within University schooling



University graduates in law, mathematics and nursing are highest in demand, while teaching and computer science graduates are above the overall unemployment level of 19.1 percent for university graduates. Note that while both teaching and computer science graduates are above the mean for unemployment, they reveal opposing trends. Examining the overall number of graduates by their training specialty may help explain the different employment trends observed here.

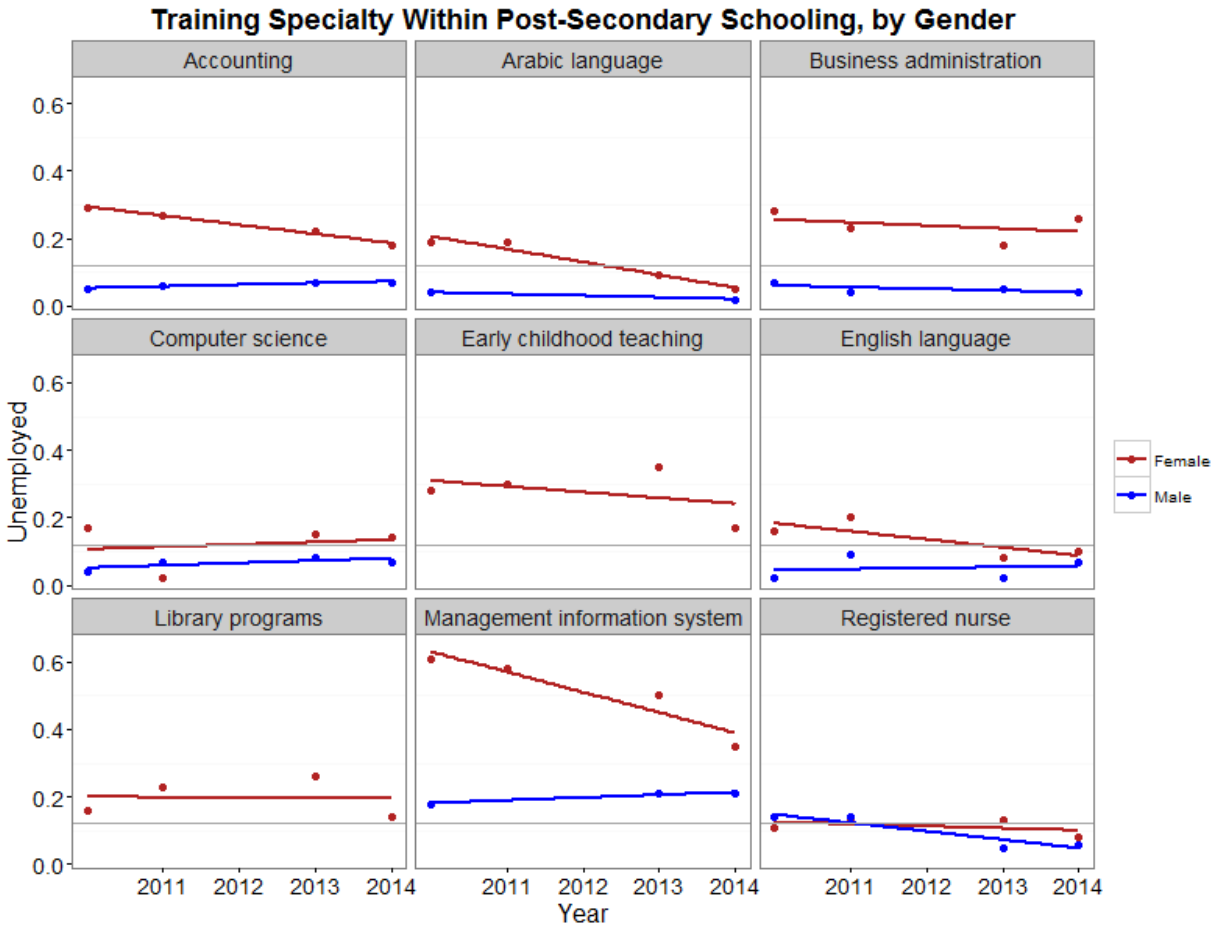
These figures may be disaggregated by sex, which reveals an interesting dynamic of positive trends for female employment relative to males for secondary and post-secondary schooling, but no such effect for female university graduates.

Figure 6 Training specialty within secondary schooling, by sex



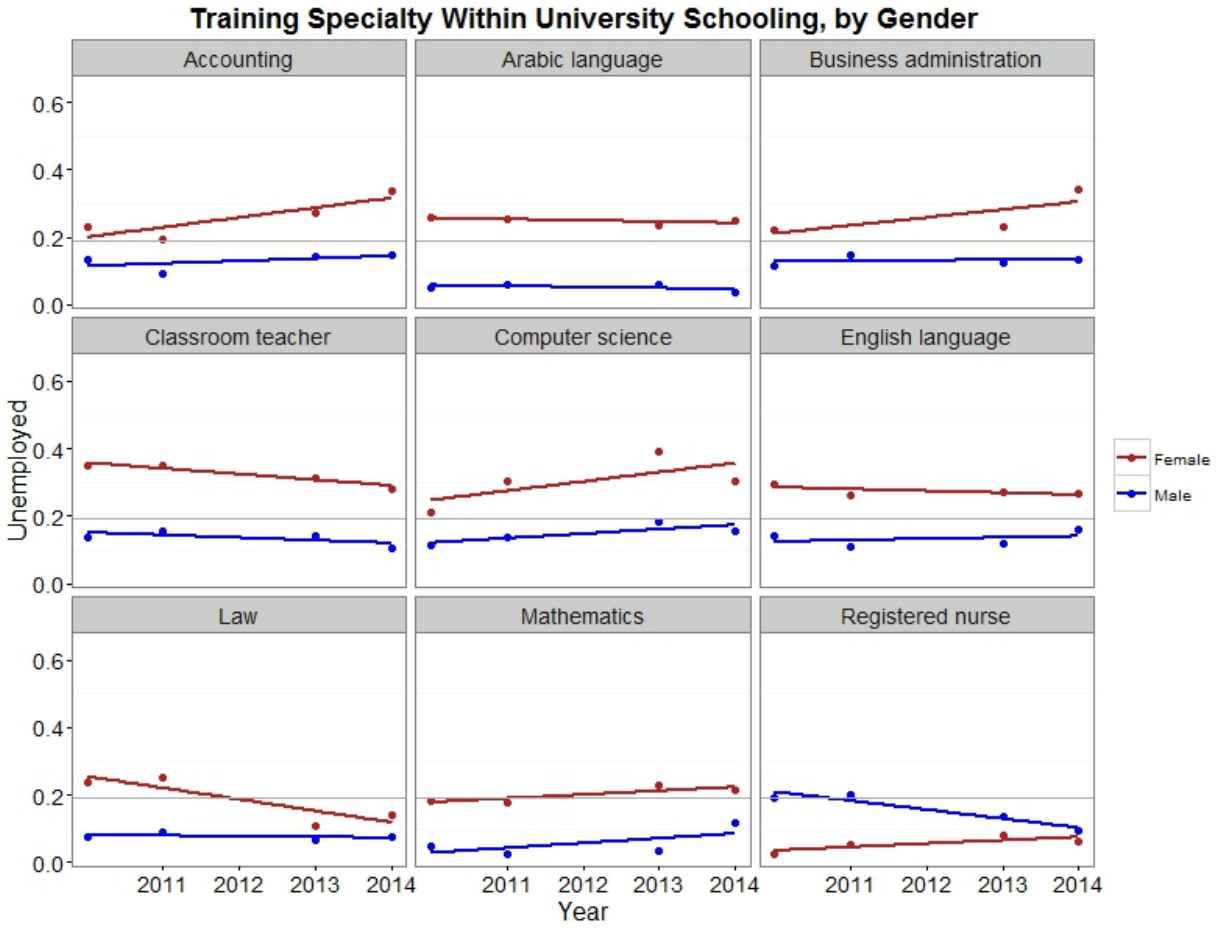
For those with secondary schooling, female unemployment is decreasing sharply in all training/educational tracks where they are active.

Figure 7 Training specialty within post-secondary schooling, by sex



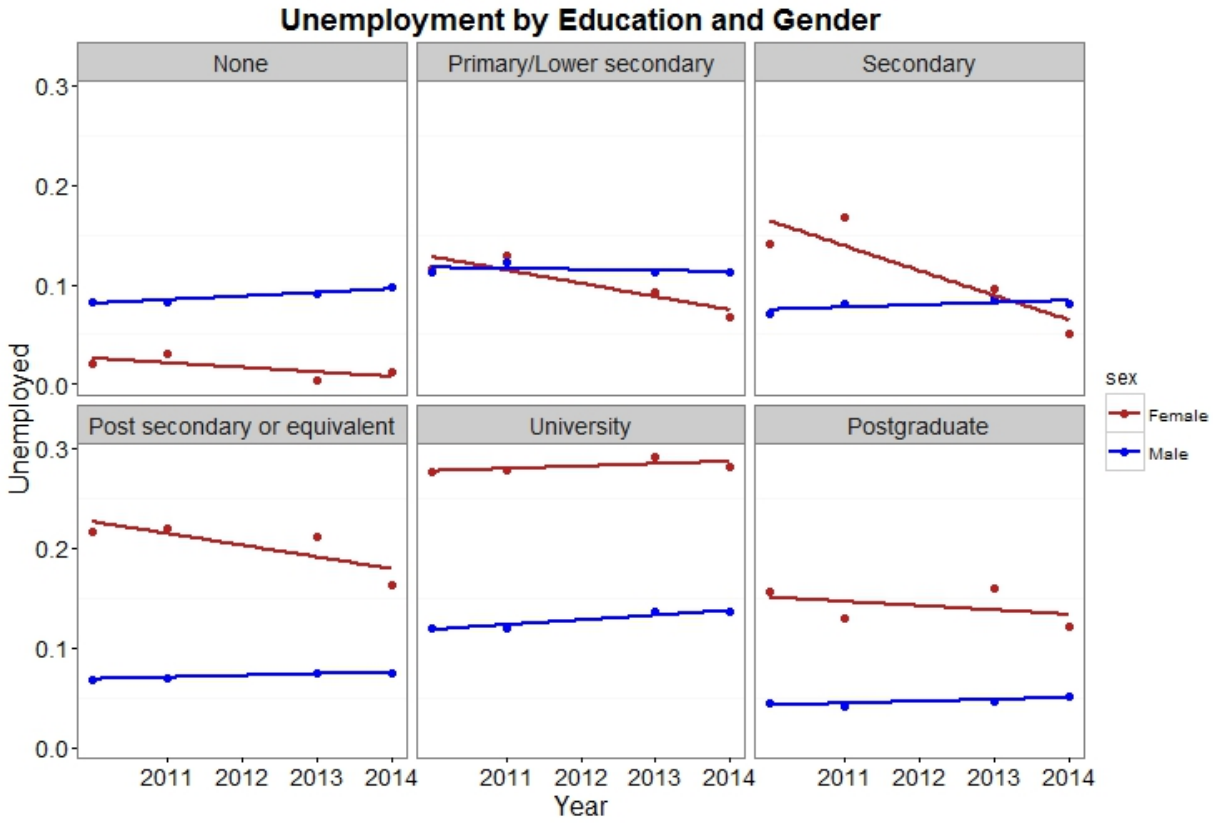
For those with post-secondary schooling, female unemployment is decreasing in fields such as accounting, Arabic and English languages, and management information system.

Figure 8 Training specialty within university schooling, by sex



For those with university schooling there is no general trend in male or female unemployment rates for different faculties. This leads to the interesting finding that employment trends for females are generally improving for those with vocational level education, but flat for women with university degrees. This can be seen most clearly by re-examining the gender disaggregation across all training specialties, but still within educational credentials.

Figure 9 Employment by education and sex



Here it becomes clear that female employment trends are favorable for women with secondary and post-secondary education. This dynamic may partially reflect a departure of women from the labor force; female participation has declined for each year presented here, from 18.4 percent in 2010 to 17 percent in 2014. On the other hand, key informant interviews consistently produced reports of increased female vocational employment through the TVET fund, especially in rural areas. This question therefore merits further attention to determine if continued investments in the TVET sector will especially benefit female employment.

Task 3 Estimation of cost per graduate trained and cost per graduate employed

Using aggregate data from TVET institutions enables a rough estimation of the cost to produce a graduate and, using available tracer study findings to extrapolate, the cost to produce an employed graduate.

Table 6 Cost per employed graduate of TVET training

Institution	Cost per graduate	Placement rate	Total graduates	Total employed	Monthly salary	Cost per job	Economic value
VTC	1,100	0.67	8,000	5,360	300	$1,642	$1,608,000
Al Quds	3,200	0.89	2,768	2,464	600	$3,595	$1,478,112
UNRWA	2,100	0.94	2,400	2,256	600	$2,234	$1,353,600
TVET	1,400	0.39	11,446	4,464	300	$3,590	$1,339,182

The total number of graduates and cost per graduate is from administrative records or estimates from institutional administrators.[35] It reflects total project budget allocations for VTC and TVET, while Al Quds costs come from student tuition. UNRWA costs reflect both tuition and donor support. The placement rate comes from available tracer studies. Total employed applies the employment rate estimates to the total graduates. The monthly salary is an approximation from informant interviews, administrative records, and the Employment and Unemployment survey. The cost per job is derived from the total cost (cost per graduate x total graduates) and total employed. The economic value is the monthly salary times the total number of employed – while this gives a crude overall welfare measure, it does not take into account other possible social benefits such as female, youth, or rural employment.

CONCLUSIONS AND RECOMMENDATIONS

This rapid assessment observes that employment is higher among TVET educational levels than university graduates, and concludes through a review of documents and interviews with key informants that future employment growth will likely be driven by the TVET sector. Within TVET training/educational tracks, there is high demand for industrial and technical professions. Furthermore, female employment trends are generally positive for TVET occupations, suggesting that employment growth in TVET may have additional benefit for women in the labor force; however this question requires additional attention. Rough estimates of the costs to gain an employed graduate from a TVET education or training program show wide variation (ranging from $1,600 - $3,600), however taking into account the total number of employed in addition to cost (the Economic value metric) shows more parity.

This assessment recommends continued support to TVET education in general, and to the industrial and service sectors in particular. However, there also seems to be a need for more targeted communications to Jordanian youth, and society in general, of the burgeoning demand for technical labor gained through secondary vocational education or two-year associate degrees. Any public awareness strategy should include messaging to build more positive perceptions of skilled and technical labor. Current proposals to shift the institutional makeup of the TVET sector, including the creation of a TVET educational track that could lead to a university degree, seem well-warranted and should be supported.

[35] If one wishes to include cost of a university degree for comparison, double the tuition amount from Al Quds University and use the employment rate for university graduates as the estimate of the placement rate.

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ANNEX I: TVET ASSESSMENT SOW

I. TVET Assessment Questions

The large question to be answered with the TVET Assessment is, "Which TVET has the best outcome for employment of graduates?" The purpose of this question is to determine where TVET resources can be best spent to maximize increasing employment in the near term. In answering this question, the assessment should consider the following aspects of TVET:

1. Statistics on employment (held for at least six months) of TVET graduates by sector and by institution (private and public), disaggregated by gender. This should include the total number of graduates and total number successfully employed for six months or more.

2. Cost per graduate employed. While such data may not be readily available, the assessment should propose one or more algorithms based on available data.

3. Description of data that is available from TVETs relative to tracking graduates, employment rates, duration of employment, sectors, and patterns of graduation and employment.

4. An estimate of the cost to get a person trained and employed through TVET. It is acknowledged that financial information may be limited or may not be available to the assessment. The assessment will endeavor to construct an approach to calculating these costs based on data that is available.

II. TVET Assessment Tasks

1. Conduct inception meeting with EDE to review and clarify purpose and areas of focus.
2. Conduct literature review on TVET in Jordan including reports produced by international donors working in Jordan including GIZ, World Bank, EU, JICA, KOICA, and USAID/Workforce Development (WFD).
3. Contact public and private TVET institutions to determine data availability for employment and financial analysis (up to five year history).
4. Conduct meetings with Ministries, implementing partners, TVET institutions, and private sector associations to triangulate data and gauge prospects for continued job absorption.
5. Propose an approach to calculating cost/graduate employed based on availability of financial data and produce calculations.
6. Conduct out-briefing meeting with EDE to review findings.

Dependencies

Successful completion of these tasks is dependent upon the following actions by USAID:

1. Provide MESP with a list of private TVET providers

2. Notify WFD that MESP requires information from them including VTC/VTI contacts to determine data availability and WFD reports on subsector employment

III. Deliverables

1. Assessment Design Report
2. Draft report of 10 to 15 pages that contains the following:

    a. Statistics on numbers and rates of graduates successfully employed for six months or more, disaggregated by sector, type of TVET, and gender; duration of employment, and patterns of

graduation and employment. Extrapolation of statistics triangulated with data from key informants to project realistic figures for employment of TVET graduates over the next three years.

b. Description of graduate tracking/tracing used by various TVETs.
c. Cost per graduate employed and method(s) of calculation.
d. Links to sources of data; when links are not available provide soft copy of data source.
e. List and contacts of people met in-country.
f. Graphic representations of data and information contained in the report.
g. Suggestions for types of jobs or sectors not currently targeted but that *could* result in more extensive or more rapid employment than those currently targeted in USAID/Jordan activities.

IV. Period of Performance and LOE

1. The Assessment Design Report and literature review is allocated **five days of LOE to commence immediately after contracting.**

2. Field work will be conducted from approximately March 28-April 8, 2016 **with LOE of up to 15 days** (depending on consultant availability).

3. Analysis and reporting is allocated **10 days of LOE out of country and will be submitted April 30.**

ANNEX II: KEY INFORMANTS INTERVIEWED

Donors					
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1.	Mr. Shinichiro KATO	JICA	06 5858921	06 5858924	kato.shinichiro@jica.go.jp
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Private TVET Institutions/ None Governmental Institutions					
No.	**Name**	**Organization**	**Telephone**	**Fax**	**Email**
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Governmental Institutions					
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2.	Eng. Tareq Rashdan	Secretariat of the E-TVET Council	5802666 07777799914		Tarek-alrashdan@hotmail.com
3.	Eng. Hiba Abuhamdieh	Vocational Training Corporation	0796433922		Hiba.Abuhamdiah@VTC.gov.jo
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