INVESTING IN EARLY CHILDHOOD EDUCATION AND CARE SERVICES IN JORDAN: AN ASSESSMENT OF COSTS AND RETURNS

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Table of Contents

Tables

Figures

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EXECUTIVE SUMMARY

Jordan's very low employment rate (30.9 percent) coupled with a high unemployment rate (20 percent as of 2021) indicates that job creation remains a crucial challenge for the Jordanian economy.[1] The situation is exacerbated by the influx of refugees since the 2010s as well as the prevailing economic crisis under the COVID-19 pandemic. Jordan's National Employment Strategy (NES) 2011–20 had identified job creation of adequate quantity and quality as a top priority. The National Economic Priorities Program (NEPP) 2021–23 maintains the emphasis on job creation. The Jordanian Five-Year Reform Matrix (FYRM) 2019–24 names "growth along with jobs" as the main objective. In 2023, the Economic Modernization Vision (EMV 2023) made a commitment to creating one million new jobs by 2033.[2]

Each of the above policy documents emphasizes the need for job creation particularly for women (and youth) given the large gender disparities in employment with a female employment rate at only 10.2 percent, versus a male employment rate of 49.3 percent as of 2021. Hence, the policy documents also underline the importance of gender-aware labor market measures for equal opportunities in access to jobs. The NES 2011–20 pointed to limited access to early childhood education and care (ECEC) services as a major factor facilitating constraints on female labor supply. In a similar vein, the FYRM 2019–24 lists *"*improving women's economic opportunities through childcare*"* as one of the reform pillars. The framework for action, though—as foreseen by these policy documents—on improving access to ECEC services is limited to improving the regulatory framework for licensing of childcare centers, cost effective programs rather than center-based services, or childcare centers by workplaces and non-governmental organizations rather than through public investments (MoP 2019; EMV 2023).

This study aims to explore the potential of public investments in the expansion of ECEC services as an effective policy strategy for simultaneously meeting both policy objectives: job creation and women's economic empowerment in Jordan. While the NEPP 2021–23 has identified agriculture,

[1] These labor force statistics include both Jordanians and non-Jordanians. The rate of employment for Jordanians is even lower at 25.8 percent, and unemployment rate higher at 24.1 percent.

[2] See for NES 2011–20, Ministry of Planning and International Cooperation MoP 2010, p.1; for NEPP 2021–23 MoP 2021; for FYRM 2019-2024 MoP https://mop.gov.jo/EN/List/Reform_secertariat?View=1088 and for the EMV 2023 https://www.jordanvision.jo/ar

tourism, and information technology as the priority sectors to lead economic growth and job creation, this study aims to highlight the importance of the social care services sector (including ECEC services) as another target for jobs generation, given the labor intensity of care services provisioning, and hence its high employment multiplier effects.

The data analysis was undertaken in four stages:

1. an assessment of the deficit in ECEC services toward the policy objective of universal coverage of children under age six;
2. an estimation of the costs of eliminating this deficit, i.e., the required magnitude of public expenditures;
3. an estimation of the magnitude of new direct and indirect job creation in response to increased public expenditures on ECEC services sector: i.e., the number of new jobs to be created directly in the ECEC sector and indirectly in the other related sectors through backward linkages and induced effects;
4. a simulation of distributional outcomes of job and income creation in terms of the characteristics of the potential job recipients and the magnitude of their labor earnings.

The returns to increased public expenditures on a hypothetical expansion of ECEC services in terms of employment and income generation were evaluated in a comparative framework, with reference to the returns if a similar magnitude of public expenditures were to be allocated to physical infrastructure and the construction sector instead.

The findings show that achieving a long-run policy objective of universal access to quality ECEC services by all children aged 3 to 5 and at least 50 percent of children aged 0 to 2 (including non-Jordanians), requires the enrollment of close to 793,000 additional children in childcare centers and preschools. If such an expansion takes place on the condition of high-quality services and decent jobs in the ECEC sector, the cost is estimated at 1.39 billion JD (2020 prices), equal to 4.36 percent of GDP. While this is a substantial amount, an expansion plan can be implemented over the medium run prioritizing the disadvantaged households and regions. In addition, the substantial jobs and income creation will enhance its feasibility through increased tax revenues in the short-run, and increased labor force participation and productivity over the longer run.

The simulation findings show that increased expenditures of this magnitude for improving children's access to ECEC services, has the potential to create a total of 218,000 new jobs (21.2 percent in sectors other than ECEC); almost 60 percent of the new jobs would employ women. If the same amount of public expenditures is allocated to the construction sector instead, employment creation is limited to 60,500 new jobs; only 5 percent of the jobs would employ women. Under the ECEC expansion scenario, women's share in total employment improves to 20.2 percent as compared to a baseline of 14.8 percent. Under the construction boom scenario, women's share deteriorates further to 14.4 percent. While in relative terms, job creation through ECEC spending

favors women as job recipients, in terms of absolute numbers it has the potential to create more employment opportunities for men (89,000 male jobs under a hypothetical ECEC services expansion) than spending of similar magnitude on construction (57,600 male jobs under a hypothetical construction boom). Hence a sectoral allocation of public spending towards ECEC services does not only have the potential to create almost four times more jobs than allocation of spending to the construction sector, but also does so in a gender-balanced manner, narrowing the gender gaps in employment.

Exploring jobs distribution in more detail, we find that job creation through ECEC spending tends to favor married women (improving their share in total employment from 8 to 13 percent) and women living in households with small children (improving their share in total employment from 10 to 14 percent). More than 100,000 women previously excluded from the labor market due to engagement in homemaking enter employment, in addition to 27,000 unemployed women and 26,000 unemployed men.

The estimation of labor earnings of new job recipients shows that jobs created under the ECEC expansion scenario improve the mean monthly earnings of women with post-secondary education by 27 percent, of those with no schooling and basic education by 18 and 11 percent respectively. The overall gender earnings gap narrows under the ECEC expansion scenario while it further deteriorates under the construction spending scenario. The substantially higher number of jobs created via ECEC spending has the potential to generate labor earnings at 81.1 million JD per month with almost 60 percent accruing for female job recipients. The labor earnings generated via construction spending of similar magnitude, is estimated at 27 million JD per month, where women's share is at a meagre 3.2 percent.

These findings underline that the integration of the ECEC services as a target sector into Jordan's economic growth vision has the potential to unlock a virtuous cycle of inclusive growth through substantial employment creation and earnings generation, while simultaneously narrowing gender gaps and decreasing inequalities amongst children and households.

I. Introduction

Both the Jordanian National Employment Strategy (NES) 2011–20 and the National Social Protection Strategy (NSPS) 2019–25 identify job creation and the narrowing of currently large gender gaps in employment and income as priority policy objectives. The NSPS is based on three pillars: access to jobs for families to be economically self-sufficient through the labor market; access to services in education (including early childhood education and care), health care, and social services; and targeted social assistance for poor households to maintain a basic level of consumption (NSPS 2019). Numerous assessments of the extremely low levels of women's

employment in Jordan (at around 11 percent, one of the lowest rates globally) underline an overlapping nexus across the first two pillars. Namely, limited access to care services, particularly childcare, is a major impediment in women's access to jobs and a slack labor market acts as a further enhancing factor in promoting women's conventional responsibility for unpaid work (NSPS 2019; UN Women Jordan 2020). The enrollment rate of children in nurseries and preschools is low, at 16 and 68 percent for ages 4 and 5, respectively. Access to services for children under age three is negligible such that there are no official statistics for this age group. The restrictions posed by the nexus of women's limited access to services and jobs have an implication for the third pillar: in the absence of jobs and services, the only tools that remain for enhancing women's welfare are social transfers. This study aims to explore the feasibility of a more effective and sustainable policy strategy for job creation and women's empowerment in Jordan: investing in care services to simultaneously generate employment opportunities for all, while improving women's access to jobs and services.

The recognition, reduction, and redistribution of unpaid care work (the so-called 3R strategy) were adopted as one of the agreed conclusions of the 58th Commission on the Status of Women (CSW) in 2014. The 3R was also identified as a priority in UN Women's strategic plan for 2022–25 (UN Women 2021). Investing in a social care infrastructure (foremost in childcare) was an important component of the 3R strategy and a primary policy intervention for closing the gender economic gaps. Under Sustainable Development Goal (SDG) 5, which calls for the achievement of gender equality and empowerment of all women and girls, target SDG 5.4 emphasizes "*Recogni(tion) and valu(ing of) unpaid care and domestic work through the provision of public services, infrastructure, and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.*" Universal access to quality care services enables reduction of unpaid care work, borne disproportionately by women, through its redistribution from the domestic sphere (unpaid work) to the public sphere (paid work). In addition, universal access to quality care services serves toward SDGs 3 and 4 by ensuring good health and well-being and education for all. Public investments in and expenditures on care services, however, are a question of fiscal policy in the realm of macroeconomists and policy-makers who are often gender-blind and adopt the mainstream bias of fiscal restraint. As such, proposals for increasing social care expenditures are likely to and do meet resistance on the basis of limited fiscal space and fiscal priorities. Even in cases of fiscal expansion or stimulus spending, the conventional target is physical infrastructure and the construction sector. A series of research studies emerging since the 2010s approach the issue of care services expansion and its implications for women's employment in the context of the allocation of public resources.[3] They compare the economic returns to public investments in the social care infrastructure with those in physical infrastructure in terms of the magnitude of new employment generation, narrowing of the gender gaps in employment, generation of new labor earnings, and poverty alleviation. To this end, they undertake an assessment of care coverage gaps in different sub-sectors of care services (namely

[3] See Appendix 1 for a comprehensive list of these studies.

early childhood education and care, primary and secondary education, health, and long-term care services), estimate the magnitude of the costs (required expenditures) to eliminate these coverage gaps, and estimate the afore-mentioned economic returns to increased public expenditures on care service expansion in comparison to returns to expenditures of equal magnitude on other sectors such as physical infrastructure and construction.

The findings of these studies converge on two points:

1. Public spending on the expansion of care services produces a substantially higher jobs generation effect than spending on other sectors such as the construction and physical infrastructure—a common target of public investments and fiscal stimulus packages. This outcome derives from the labor intensity and higher employment multiplier of the care services sector. Hence, an expansion of care services does not only benefit workers with care responsibilities by alleviating the constraints on their labor supply, but also facilitates the reduction of unemployment and the increase of labor force participation by contributing to the creation of labor demand and earnings for *both women and men*.
2. The labor demand that emerges from care spending favors female workers, given the gender composition of employment in the care services sector. Thus, the demand also contributes to a narrowing of the gender employment and earnings gap—unlike, for example, spending on construction (an extremely male-dominated sector in most countries) which further widens the gender gaps.

This study on the expansion of institutional childcare services in Jordan is inspired by these earlier studies. It approaches the issue of childcare service expansion and its implications for improving women's employment in Jordan from a macroeconomic perspective, situating its analysis within the context of public expenditures and fiscal policy in Jordan. To this end, we first assess the care coverage gap in early childhood education and care (ECEC) services in Jordan and estimate the required increase in public expenditures to eliminate this gap. We then estimate the economic returns to increased public spending on an ECEC expansion in terms of jobs generation, both directly in the ECEC services sector and indirectly in other sectors from which ECEC purchases inputs. We compare the number of jobs generated through ECEC spending to the number of jobs likely to be generated if expenditures of similar magnitude were to have been directed to physical infrastructure and construction instead. Finally, using a microsimulation model, we allocate the new jobs generated through increased public spending on alternative sectors (under the two scenarios of ECEC expansion and a construction boom) to the various unemployed and labor market–inactive individuals observed in household data, based on their employment propensities. Therefore, we show how the jobs are likely to be distributed by observed characteristics such as gender, age, education, marital status, household income, and labor market status. The simulation estimates the earnings of new job recipients, the change in their household income, and the consequent impact on poverty alleviation.

The Jordanian context provides an appropriate background for the undertaking of the policy simulation as described above. Women's employment (labor force participation) rate in Jordan, at a dismal level of 10.9 percent (14.7 percent) as of 2020, is one of the lowest globally. Various analyses point to the lack of access to care services and the consequent restrictions on women's labor supply as two of the contributing factors. In addition, high unemployment, the limited capacity of economic growth to generate jobs, and, thus, the lack of access to decent jobs and demand for women's labor are other significant impediments to improving female employment levels. In line with these assessments, the Jordanian five-year reform matrix identifies its main objective as growth and jobs, and improving women's economic opportunities through childcare as one of the reform pillars. Yet the framework for action is limited to improving the regulatory framework for the licensing of childcare centers rather than public investments (MoP 2019).

The context of the COVID-19 pandemic has further exacerbated these bottlenecks. A study by UN Women (2020) using Jordanian time-use data from a private survey finds that the increased demand for care within the household under the pandemic conditions is likely to trigger significant time-squeeze effects on women in employment by further augmenting their unpaid workload. In addition, for women employed in the health and education sectors—which comprises 56.1 percent of the female employment in Jordan—paid workload is also likely to increase due to heightened demand for health care under the pandemic conditions and the transformations in modalities of service provisioning in the education sector. The dual increase in the paid and unpaid workloads of women may further weaken their attachment to the labor market (UN Women 2020).

The economic crisis triggered by the pandemic also increased pressures on labor demand. Comparing the second quarter of 2021 (for when the most recent official labor statistics are available from the Jordanian Department of Statistics JDoS at the time of writing this report) to the annual averages for 2019, the unemployment rate increased by 3.8 percentage points (from 16.8 to 20.4 percent) and the employment rate decreased by 2.2 percentage points (from an already low level of 32.6 to 30.4 percent in 2019). The increase in men's unemployment rate is 3.4 percent (from 15.5 to 18.9 percent) and the decrease in men's employment rate is –3.2 percent (from 51.7 to 48.5 percent). Women's unemployment rates are substantially higher than men's, but they experienced a slightly lower unemployment increase during the pandemic (3.2 percent increase from 24.2 to 27.4 percent). Comparing women's employment rate in the second quarter of 2021 to the 2019 average, it remains stable at 10.2 percent.[4]

When disaggregated by national origin (Jordanians versus non-Jordanians who constitute about one-third of the working-age population), we observe a decrease in the female employment rate

[4] UN Women (2020) predicts a relatively smaller employment decline for women due to their higher representation in sectors (such as health and education) that were relatively less affected by the pandemic shut down measures.

for Jordanians but an increase for non-Jordanian women. Moreover, the deterioration in labor market indicators is worse for Jordanians generally (men and women) than for non-Jordanians; Jordanian men, for example, experienced a 5.6 percentage point increase in the unemployment rate from 2019 to 2021.[5] The policy of allocating increased resources to ECEC services promises to address these problems both on the supply and the demand sides by alleviating the constraints on women's time and labor supply, and by creating ample labor demand for both female and male workers.

The remainder of this report is structured as follows: Section II provides an overview of the Jordanian context in terms of the three components of the economics of investing in care: gendered trends in the labor market and poverty, the current status of care services (in this case ECEC) and the macroeconomic context in terms of growth, jobs generation, fiscal expenditures, and public investments. Section III explains the methodology and data. Sections IV presents the findings of the assessment of the care coverage gap and its cost. Section V presents the estimates on direct, indirect (and induced) employment creation through increased spending on the ECEC services sector versus the construction sector. Section VI presents the findings of the microsimulation on the distribution of new jobs by gender, age, education, marital and labor market status and household income, the consequent wage earnings, change in household income, and impact on poverty. Section VII concludes with a summary of the findings and their policy implications.

II. An Overview of the Jordanian Context

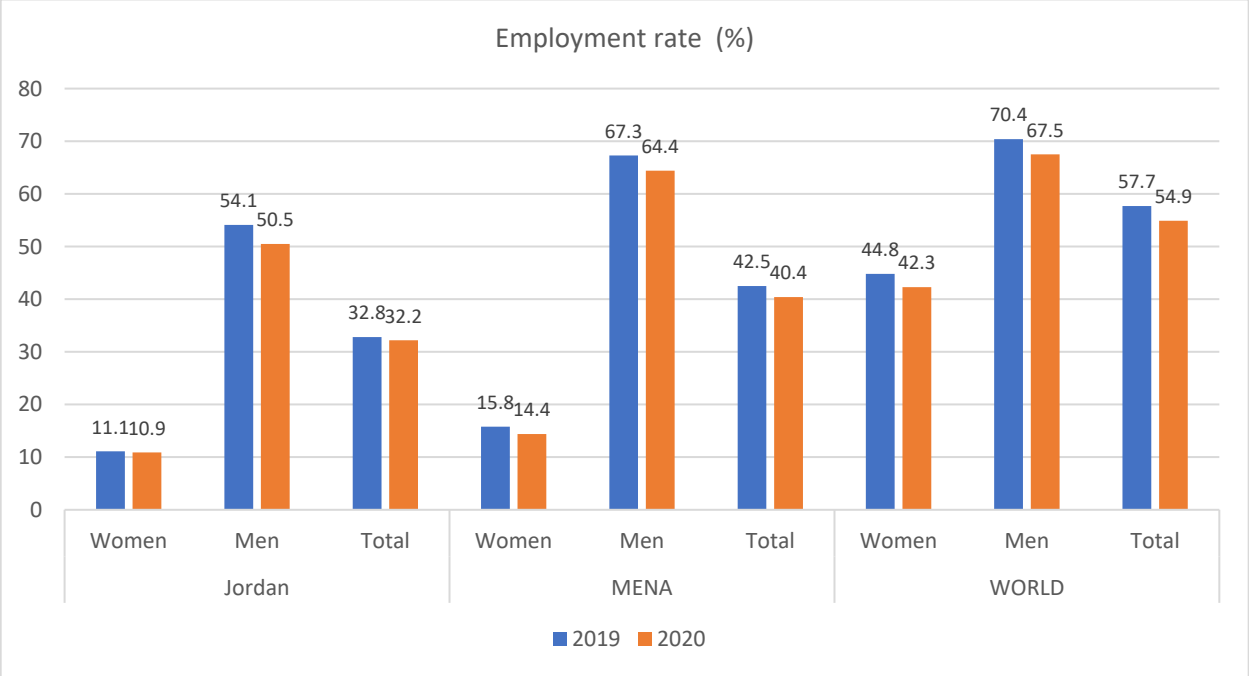
II.A. Gendered Trends in the Labor Market and Time Use

According to ILO (2020) labor statistics for 2019, Jordan ranks at the very bottom amongst 189 countries in terms of the total and the female employment rate (for the age 15 and over population) with 32.8 (30.9) and 11.1 (10.1) percent respectively. Figure 1 shows that both the total as well as male and female employment rates for Jordan are well below the world and MENA averages. The total employment rate in 2020 for Jordan at 30.9 percent by ILO (32.2 percent by JDoS) is almost 10 percent below the MENA average (40.4 percent) and 24 percent below the world average (54.9 percent). The female employment rate for Jordan in 2019 (11.1 percenr) is slightly below the already low MENA average (15.8 percent) with a substantial gap from the world average (44.8 percent). There is also a substantial gap between the Jordanian male employment rate (54.1

[5] These statistics are for the entire population, including non-Jordanians who constitute about one third of the working age population. For the Jordanians, comparing the second quarter of 2021 (for when the most recent official labor statistics are available at the time of writing this report) to that in 2019, the unemployment rate increased by 5.6 percentage points (from 19.2 to 24.8 percent) and the employment rate decreased by 2.7 percentage points (from an already low level of 28.0 to 25.3 percent in 2021). The increase in men's unemployment rate is 5.6 percentage points (from 17.1 percent to 21.5 percent) and the decrease in men's employment rate is –3.4 percentage points (from 44.7 to 41.3 percent). Women have higher unemployment rates and they experienced a relatively higher unemployment increase under the pandemic (5.9 percentage point increase from 27.2 to 33.1 percent), while their employment decreases –1.3 percentage points (from 10.6 to 9.3 percent).

percent) and the MENA average (67.3 percent) and the world average (70.4 percent). Hence both male and female employment rates are very low by global standards (more so, even, for women), indicative of significant labor under-utilization. Furthermore, Jordan's employment rates declined in 2020 under the pandemic similar to the MENA region and globally.

Figure 1: Employment Rate in Jordan vs. MENA vs. the World (15+ population, %), **2020 (2019)**



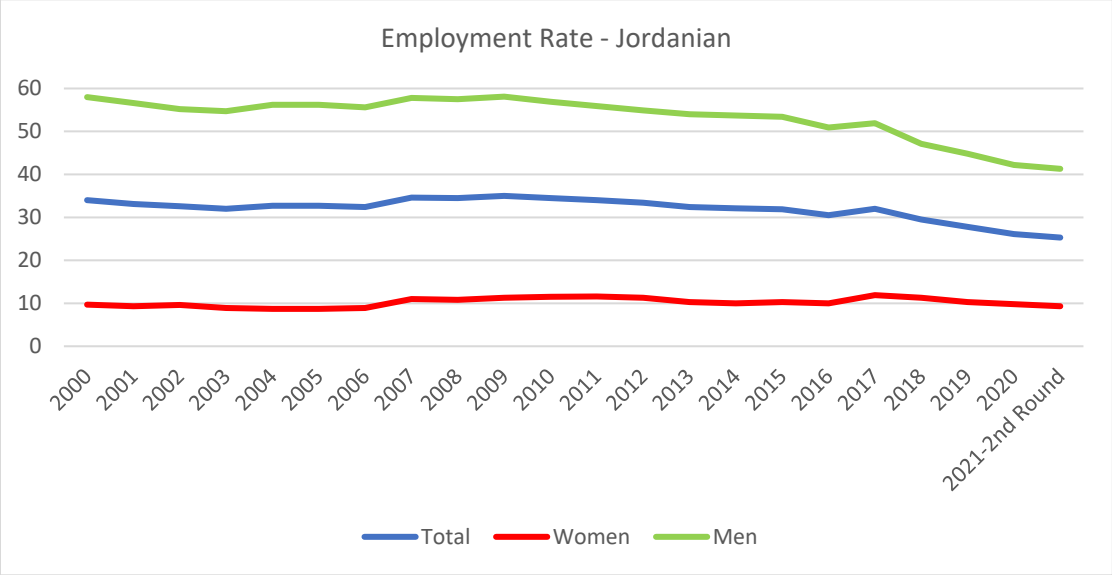
Source: ILO Statistics (For Jordan, the 2020 employment rate was available only for total and not by gender breakdown).

Beyond the current context, trends in employment and unemployment rates throughout the 2000s in Jordan show a deteriorating trend. Figures 1 and 2 show the gender-disaggregated employment and unemployment rates for the Jordanian population from 2000 to the second Quarter of 2021 which are the earliest and the most recent labor market statistics available (at the time of writing) from the JDoS website. JDoS started reporting on non-Jordanian and total labor market statistics only from 2017 onwards, hence in terms of examining overall trends through time, we use the statistics for Jordanians only. The male (and overall) employment rate starts to decline in 2010; the trend becomes particularly strong from 2017 onwards. Women's employment rate is persistent at around 10–11 percent, reaching its highest point at 11.3 percent in 2011. From 2017 onward, we also observe a declining trend in women's employment, with further deterioration during the pandemic (Figure 2).

Looking at trends in unemployment rates, the overall unemployment rate is in two-digit figures throughout the past two decades, with its lowest point at 11.9 percent in 2011. There is an increasing trend in unemployment from 2009 onward (in the context of the global economic crisis),

parallel to the decreasing trend in employment. Women's unemployment is strikingly higher than men's, reaching 33.1 percent as of 2021. The gender gap in unemployment seems to narrow in more recent years due to a sharper increasing trend in men's unemployment. The effects of the pandemic have been particularly dire for the youth unemployment rate (ages 15–24), which rose to 40.8 percent in 2020 (from 36.8 percent in 2019). The female youth unemployment rate stands at 54.5 percent as of 2020 (from 49.4 percent in 2019) and the male youth unemployment rate stands at 37.8 percent in 2020 (from 34.1 percent in 2019).[6]

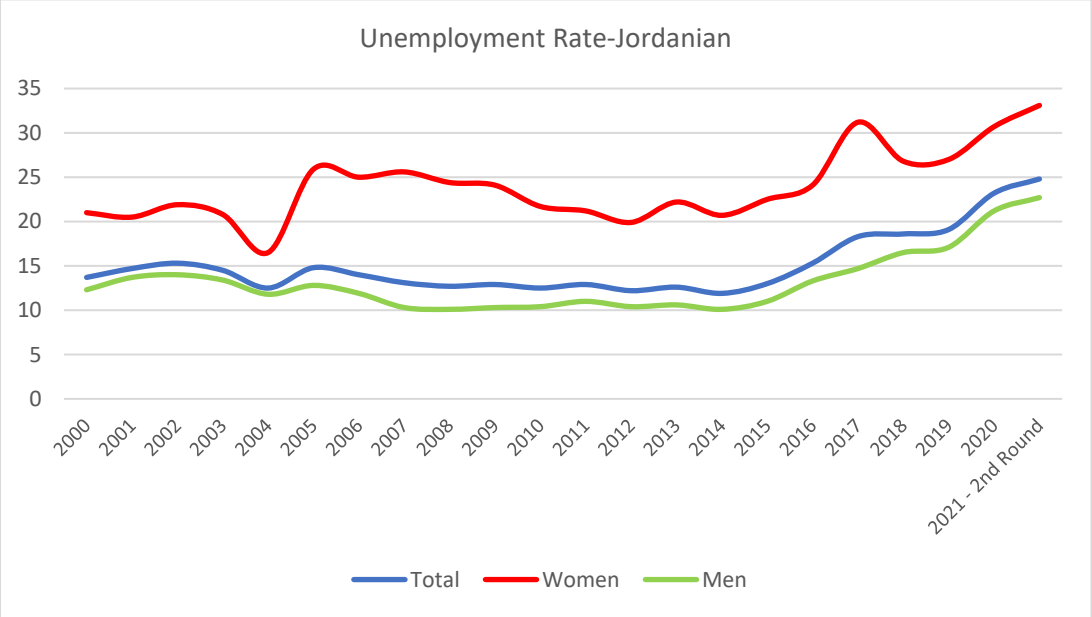
Figure 2: Employment Rate (Jordanian 15+ population) %, 2000–2021



Source: Jordanian Department of Statistics, Employment and Unemployment Surveys (for 2021, second quarter statistics).

[6] World Bank Statistics, https://data.worldbank.org/indicator/SL.UEM.1524.MA.ZS?locations=JO accessed 30 April 2022.

Figure 3: Unemployment Rate (Jordanian 15+ population) %, 2000–2021



Source: Jordanian Department of Statistics, Employment and Unemployment Surveys (for 2021, second quarter statistics).

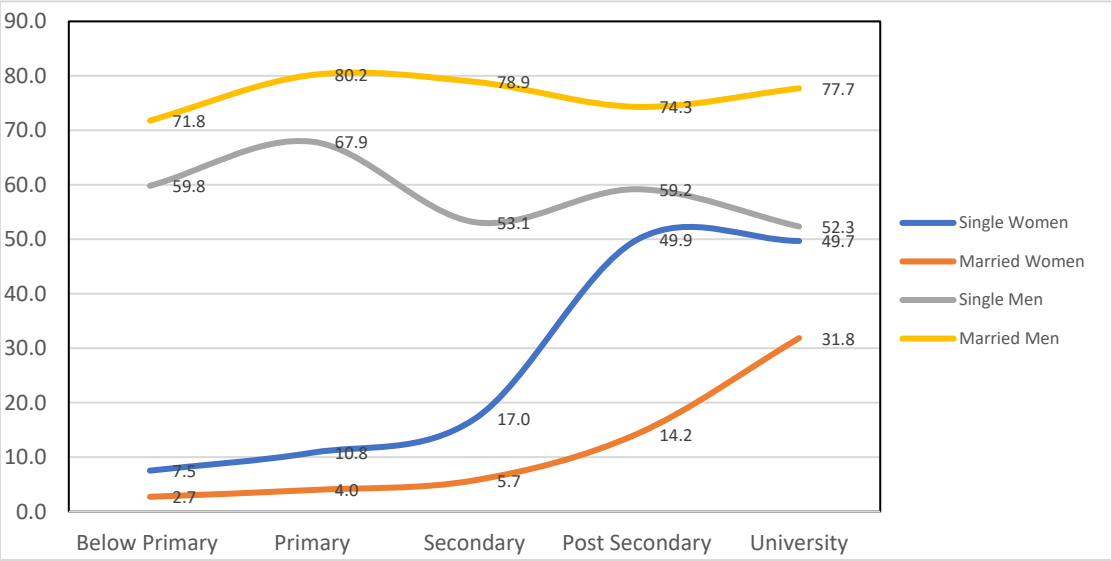
Jordan has one of the highest refugee and migrant populations globally; non-Jordanians constitute around one third (30 percent) of the total population (primarily Syrians and Palestinians). This puts further pressure on access to jobs as well as on healthcare and education systems, social protection schemes, and infrastructure. Non-Jordanian employment rates are higher than Jordanians both for women (12.8 percent) and men (63 percent), but the difference is pronounced particularly for men. Non-Jordanians are disproportionately represented in low-paid and informal jobs that native workers are less likely to engage in (ILO 2020).

Against this background, Jordan's NES 2011–20 and NEP 2022 underline that job creation remains a significant challenge for the Jordanian economy (MoP 2010). The 2022 Jordan Economic Modernization Vision states that one of the three objectives of the economic growth pillar will be to provide new job opportunities for more than one million young men and women who will enter the labor market by 2033 (Economic Modernization Vision 2022). An interesting assessment that NES makes pertains to the fact that Jordan's employment creation elasticity of growth is on the lower end, even under periods of relatively strong growth. The NES underlines investing in early childhood care and education services as a long-run strategy toward improving human capital and labor productivity, while at the same time alleviating the constraints on women's labor supply.

Research on the causes of low female employment levels in Jordan indicates that limited access to childcare services along with low wages constitute the most important bottlenecks to women's

labor force participation, along with added restrictions in access to safe and affordable transport and harmful social norms (UN Women Jordan 2019 and 2020; Qudah 2017). Domestic care responsibilities establish binding time constraints on women's labor supply and facilitate their weak attachment to the labor market. While many women enter the labor market at their young age while single, the majority (particularly those with lower education and labor market skills) drop out of the labor market upon marriage and childbirth. Employment rates for single women of prime working age (25–54) at all levels of education are higher than their married counterparts (Figure 4). Particularly single women with post-secondary and secondary education achieve employment rates almost at 50 percent with a very narrow gap with their single-male counterparts, but their employment rates decline to 14.2 and 31.8 percent respectively with marriage. Hence, beyond the problem of labor market entry, weak labor market attachment poses a significant problem for married women, particularly for those with higher education levels (UN Women 2019).

Figure 4: Employment Rate by Gender, Education, and Marital Status (prime-working-age 25–54 Jordanian population) (%)

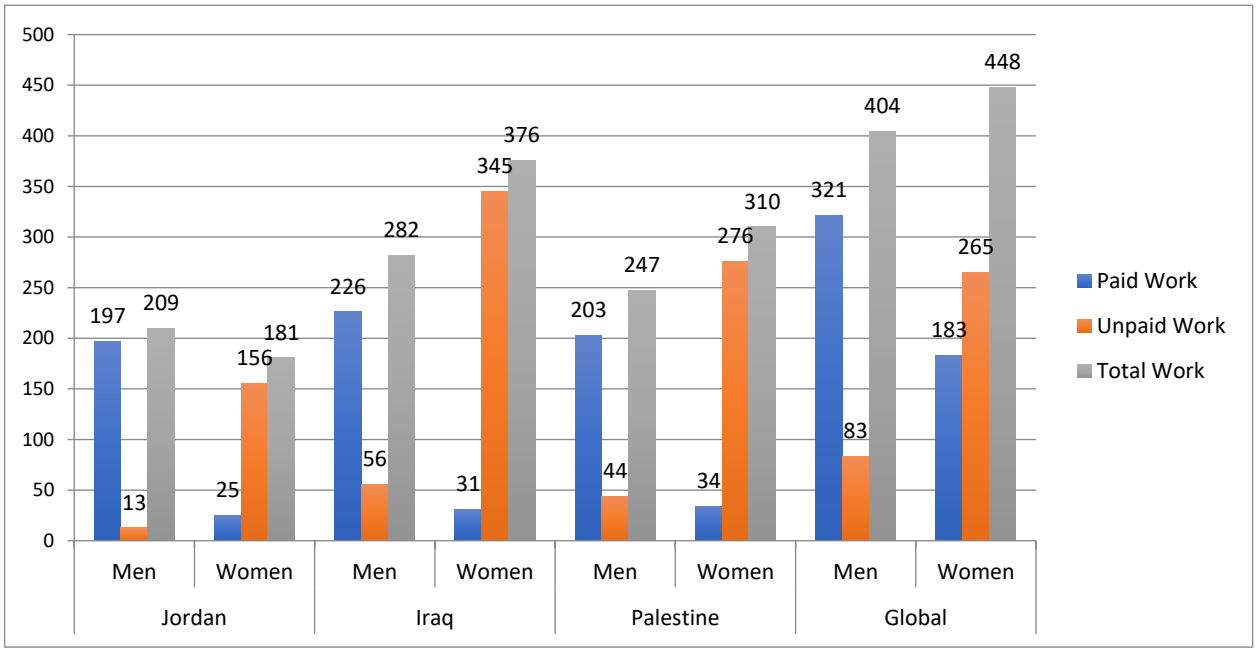


Source: UN Women 2019, based on Jordanian Labor Market Panel Survey 2016 by the Economics Research Forum.

Time allocation patterns show a wider gender gap in unpaid and paid work in Jordan than in other neighboring countries in the MENA region and the World. While the time-use data presented in Figure 5 indicates that, in terms of absolute numbers (hours per day), both women's and men's unpaid work time is lower in Jordan as compared to its neighbors Iraq and Palestine and globally, the data may not be directly comparable due to the differences in the survey method. Jordan's time-use data comes from the Jordanian Labor Market Panel Survey (JLMP) in 2016 which uses

the recall method, while Iraq, Palestine, and the world averages are derived from specific time-use surveys using the diary method, which has been assessed to provide more accurate results. Nevertheless, the disparity between men's and women's unpaid work time in Jordan with women spending 12 times as many hours on unpaid work than men is striking compared to Iraq and Palestine, where the gender disparity shows women working unpaid 6 times as much as men, and global where women's unpaid work time is triple that of men. Women's share in unpaid work is highest in Jordan at 92 percent compared to 86 percent in Iraq and Palestine and 76 percent globally (Figure 6).

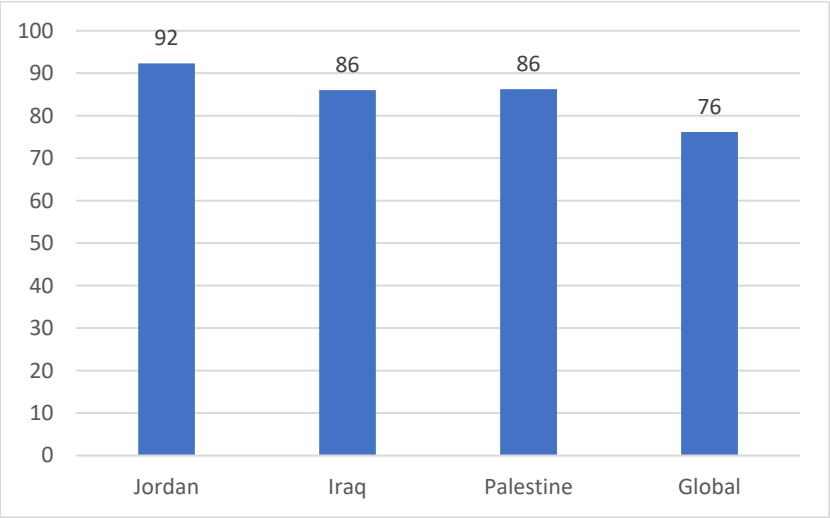
Figure 5: Time Allocation to Paid Versus Unpaid Work by Gender in Jordan vs. MENA vs. the World



Source: For Jordan, UN Women 2020, based on ERF Jordanian Labor Market Panel Survey 2016; for Iraq and Palestine, UNDP Human Development Report Office Background Paper by J. Charmes (2015)[7]*; for Global ILO (2018).*

[7] https://hdr.undp.org/system/files/documents/charmeshdr2015final.pdf

Figure 6: Women's Share in Total Unpaid Work (%), Jordan vs. Iraq, Palestine, and Global



Source: *Authors' Calculations, for Jordan UN Women 2020, based on ERF Jordanian Labor Market Panel Survey 2016; for Iraq and Palestine based on the UNDP Human Development Report Office, Background Paper by Charmes (2015); for Global based on ILO (2018).*

A field survey conducted in Jordan in February 2021 on the impact of the COVID-19 pandemic on labor market status, paid work and unpaid care work provides some insights into disaggregated effects by gender.[8] Accordingly, as of February 2020 immediately prior to the pandemic, 16.1 percent of women participating in the survey were employed.[9] Of the employed women, 16 percent reported experiencing a change in labor market status between February 2020 and February 2021 (when the survey was conducted), where they moved on to either being unemployed (12 percent) or labor-market inactive (4 percent who report their main activity as homemaking). On the other hand, men's employment rate in February 2020 was 60.1 percent. Eleven percent of employed men report experiencing a change in labor market status in the past year, where they moved on to either being unemployed (9 percent) or labor-market inactive (2 percent who report their main status as retired, student, or other).

In response to a separate question to those employed as wage workers (as of February 2021) on lay-offs and suspensions experienced in the two months prior to the survey, close to one fifth (19 percent) of male wage workers report having experienced a suspension of lay-off (8.9 percent

[8] The COVID-19 MENA Monitor Survey is a nationally representative panel survey led by the Economic Research Forum (ERF) to provide data for researchers and policy makers on the socio-economic and labor market impact of the global COVID-19 pandemic on households. The survey is constructed using a series of short-panel phone surveys conducted approximately every two months, covering topics such as demographic and household characteristics, education and children, labor market status, income, social safety net, employment and unemployment detection, employment characteristics, and social distancing. The baseline wave of this dataset was collected in February 2021, harmonized by the ERF, and is featured as wave 1 for household and individual data. The survey is in the process of further expansion to include other waves.

[9] The related survey question inquires the correspondent's main job or activity as of the end of February 2020.

temporary, 10.1 percent permanent). The share is slightly lower for women at 17 percent (5.5 percent temporary, 11.6 percent permanent). Nineteen (eighteen) percent of female (male) wage workers report having reduced paid work hours under the pandemic, while 9 (19) percent of female (male) wage workers report a decrease in their wage earnings. More than one in two employed women (53 percent) report that they are able to do their paid work from home; while this rate is only 14 percent for men.

Of non-employed women (85 percent of the total female sample), more than one third (35 percent) indicated that they were willing and available to work for pay, yet 39 percent of those available to work were not searching for a job (hence outside of official unemployment statistics). Close to half (41 percent) of the women available to work for pay but not searching for a job stated the reason being that they believed there are no jobs—either no jobs at all (19 percent) or no suitable job (22 percent); an additional 29 percent said they were unable to search for a job due to family responsibilities.

Of the non-employed men (43 percent of the total male sample), more than half (52 percent) indicate they are willing and available to work for pay, one fifth (20 percent) of men available to work were not searching for a job (hence outside of official unemployment statistics). About 40 percent of the men available to work for pay but not searching for a job state the reason being as they believe there are no jobs; 21 percent believe there are no jobs at all, and 19 percent believe there are no suitable jobs. Eighteen percent say they are unable to search for a job due to family responsibilities. These statistics, which are indicative of a substantial level of male discouraged worker effect, point to the inability of the macroeconomic growth patterns of the Jordanian economy to create job opportunities. While the government has identified agriculture, tourism, and information technology as the priority sectors to lead economic growth in 2021–23 (Jordanian Government's Economic Priorities Program 2021-23), this study aims to highlight the importance of the social care services sector as another target for jobs generation, given its high employment multiplier effects.

As lockdown measures necessitated online education, 52 percent of women and 22 percent of men living in households with school-age children reported that they were helping or teaching the children at home; 25 percent of women and 62 percent of men report others in their household were helping or teaching them.

Table 1 shows further results on unpaid work from a special module of the survey conducted only with female correspondents. Time spent taking care of children in households with children under 18 ranges from a minimum of 6.4 hrs/day for prime-working-age married and employed women to 8.1 hrs/day for their counterparts who are unemployed. On average, more than 40 percent of women state that their childcare time has increased under the pandemic. This share is much higher for prime-working-age married women who are unemployed at 83.6 percent. Women's housework

time averages at around 4 to 5 hrs/day, and around one third of the women report an increase in housework time under the pandemic. Committing unpaid work time to activities such as cooking, washing, and housecleaning seems a universal experience for all women (at more than 90 percent of the female correspondents) independent of age, marital, parental, or employment status. At least one in two women report engaging in childcare activities, higher for prime-working-age married women living in households with children under 18 (63 to 71 percent). On average, about one in five women (19 percent) report taking care of ill or dependent adults. The share of women who do not engage in any of these unpaid work activities is almost null.

The insights from the descriptive statistics of this field survey underline the importance of investing in the expansion of care services in Jordan from a dual perspective. Most importantly, the labor supply perspective emphasizes that access to care services helps to reduce the unpaid work constraints on women's time, improving the prospects of their labor force participation. The official statistics and findings of the COVID-19 field survey presented above underline women's heavy load of unpaid care work and those family responsibilities constitute an important reason for their departure from the labor market. In fact, this is the more common rationale in arguing for access to care for women's economic empowerment.

Going beyond the unpaid work and labor supply constraints, the findings of the field survey on COVID-19 also underline the importance of a labor demand perspective. As the findings section below will show, investing in care services has the potential to generate ample demand for labor. As the above discussion shows, there is a high share of women and men outside the labor market in Jordan, who are willing and able to work for pay, but who are not searching for a job because they believe there are no jobs. As such they are not captured in official unemployment statistics, yet constitute a potential labor force ready to be integrated into employment if suitable jobs are to be created. Investing in care services will also help their integration into the labor market through the generation of new labor demand.

Table 1: Unpaid Work for Women in Households with Children Under Age 18, COVID-19 Impact

Category of Women (sample size) **Unpaid Work Activity**	**All Women aged 15+** *(1201)*	**in households with children under the age of 18** *(846)*	**Prime Working Age (25-54), in Households with children under the age of 18** *(754)*	**Prime Working Age, Married, in Households with children under the age of 18** *(605)*	**Prime Working Age, Married, Employed, in Households with children under the age of 18** *(112)*	**Prime Working Age, Married, labor market inactive, in Households with children under the age of 18**

						(330)
Time spent taking care of children, February 2021 (*hrs/day)*	--	7.2	7.6	8.1	6.4	8.1
Childcare time higher past week compared to February 2020 (pre-Covid) *(%)*	--	41.5	43.5	44.5	29.5	83.6
Childcare time was higher past week compared to when schools were closed due to Covid-19 *(%)*	--	40.1	42.0	43.0	32.1	43.9
Housework time *hrs/day* (cooking, cleaning, washing, shopping for necessities) Feb 2021 (*hrs/day)*	4.4	4.6	4.7	5.0	4.5	5.0
Housework time higher past week compared to February 2020 (pre-Covid) *(%)*	32.5	33.5	33.8	32.6	27.7	34.2
Paid work time for employed women *(men),* February 2021 (*hrs/week)*	32.9 *(47.3)*				30.3	
Has performed following activity for her household in the past week *(%)***:**						
Cooking, serving meals, washing dishes	89.9	90.1	93.0	95.7	98.2	93.3
Cleaning, doing other housework	91.8	92.6	94.2	95.2	95.5	93.6
Doing house repairs	27.6	27.8	29.3	32.1	34.8	30.0
Shopping or transporting household members	41.1	40.1	41.5	40.1	48.2	61.5
Feeding, bathing, playing with, or putting to sleep children aged 5 or less17 in the household	41.6	52.4	55.6	62.8	64.3	63.0
Tutoring, playing with or another car for children aged 6-17 in the household	48.8	65.1	67.6	66.8	70.5	67.9
Caring for ill or dependent adults 17 in the household	19.1	16.6	16.3	15.0	11.6	17.6
None	2.0	2.5	1.2	0.7	0.9	0.9

Source: Compiled by the authors from microdata of the Covid-19 Economic Impact Survey, February 2021 by the Economics Research Forum (ERF).

II.B. Childcare and Preschool Education Services

Basic education is free in public schools in Jordan and compulsory from age 6 onward (completing the age of 6 by December in the school year in which the child enrolls). The educational institutions entail three stages under the Ministry of Education (MoE) plus higher education (MoE, Education System in Jordan; State University Education Encyclopedia):

i. Pre-school education (kindergarten): maximum 2-year duration (ages 4 to 5);
ii. Basic education: maximum 10-year duration (compulsory ages 6 to 15, consisting of primary school [grades 1-6] and preparatory school [grades 7-10]);

iii. Secondary education: 2-year duration.

ECEC services consist of three stages (UNICEF Jordan 2020):

i. Nursery services for children between the ages of 3 months and 4 years;
ii. Kindergarten 1 (KG1) for children aged 4;
iii. Kindergarten 2 (KG2) for children aged 5.

Nurseries and KG1 providers are private and regulated by the Ministry of Social Development (MoSD), while MoE is the provider and regulator of KG2. While it was announced by the Prime Ministry in 2019 that pre-primary education would become part of the compulsory education system, this has yet to be realized. UNICEF Jordan (2020) predicts that, given the commitment expressed by the Jordanian government to enable all children to attend KG2, provision is expected to expand rapidly through public and private provision; and that once an adequate supply is in place, KG2 is expected to become part of compulsory basic education.

The 2023 Economic Modernization Vision acknowledges that access to ECEC services plays a crucial role in child development, while—in its current state—the services offered by this sector are "not widely available, highly fragmented, insufficient, and vary in quality and sometimes are not commensurate with the household income." The EMV underlines the urgent need to enhance the sector's data/information, employ and train the workforce, enhance governance and licensing and raise awareness (EMV 2023).

The child population ages 5 and under (1.3 million children) constitutes 13.1 percent of the total (10.2 million). Official statistics report enrollment rates only for ages 4 and 5 (KG1 and 2) but not for younger children. Accordingly, for the 2019–20 school year, the enrollment rate for ages 4 and 5 are 16.2 and 68.0 percent, respectively.[10] There is a negligible difference between girls and boys, yet the disparities between Jordanian nationals and non-Jordanians are significant. Of the 4–5 age group, almost one fifth (19 percent) are non-Jordanian children. The enrollment rates for Jordanian children are 21.4 and 69.5 percent for ages 4 and 5 respectively, while they are lower at 2.6 and 53.6 percent for non-Jordanian children (JDoS). Beyond kindergarten, there are 31,090 children enrolled in nurseries (catering to children from 3 months to 4 years old).[11] This is a relatively small number, such that their inclusion makes little difference in enrollment rates.

[10] A private survey of parents of grade 1 students in 2017–18 regarding their children's KG2 experience in the previous year finds a higher enrollment rate (84 percent) than what is officially reported (59 percent). The study suggests that official statistics on KG2 maybe unable to capture unrecognized private and civil society provisions and that an unregulated supply of unknown quality may be meeting demand from parents, particularly in urban areas (Shukri, DeStefano, and Merseth 2018).

[11] Information on the number of children enrolled in nurseries in 2020 obtained through consultations on the World Bank Nurseries Survey.

On the basis of pre-primary (age five) enrollment rates, UNICEF Jordan (2020) reports that the disparities by region and economic status of the household (measured by a household-wealth score) are rather large. In Central Jordan, the pre-primary net-attendance rate is only 31 percent, while in the Southern region, more than half of the children (64 percent) attend preschool or primary school. The share of five-year-old children *not* in (pre-)school is highest in Zarqa (77 percent) and Madaba (72 percent), followed by Mafraq (68 percent) and Amman (67 percent).

Looking at the disparities by household economic status, UNICEF Jordan (2020) reports a non-linear (an inverted U-shape) relationship with pre-primary school attendance. Attendance rates are highest at the middle of the wealth distribution, and lowest at the bottom and top. Approximately 56 percent of children in the middle wealth quintile attend pre-primary school, while the corresponding rate is 22 percent in the poorest and 25 percent in the richest quintile (UNICEF Jordan 2020). The report points out that the reasons for lower pre-primary enrollment rates for children from highest and lowest wealth households are likely to be very different. For the latter, proximity (to a school) or cost considerations may be determining factors (Merseth, DeStefano, and Shukri 2018), while for the children from higher-income households, non-attendance may reflect choices by their families (UNICEF Jordan 2020).

Work-life balance measures complement access to care services in promoting labor market attachment of workers with care responsibilities, predominantly women. An assessment of work-life balance measures in Jordan shows that, despite limitations, there are a number of policy interventions. Efforts led by women's rights organizations were influential in advocating important legislative amendments in favor of redistributing the costs of childcare between households and the state.[12] As a result of these advocacy efforts, a number of policies were introduced. Women in the public (private) sector are granted 90 (70) days of paid maternity leave, while fathers have the right to only 3 days of paid paternity leave. The paid maternity leave in the private sector is financed by the Maternity Fund introduced by the Social Security Corporation (SSC) in 2010 and paid for by employer contributions at 0.75 percent of wages. Mothers benefit from a nursing leave of one hour per working day for nine months following the end of maternity leave both in the public and private sectors. Extended maternity leave is unpaid and up to two years for women in the public sector and one year for those in the private sector. Access to unpaid leave for other family care is limited to workers who need to accompany their spouse abroad, up to two years for private-sector workers, and of unidentified duration for public sector workers.

Through a revision of the Maternity Fund legislation, 25 percent of the fund's resources were earmarked for the financing of social protection programs on maternity. Under the Reeya program introduced in 2020, mothers of children under 60 months employed in the private sector can benefit from a childcare voucher for six months following maternity leave. The subsidy for nurseries

[12] See: These advocacy efforts were led by Sadaqa, Haq Coalition and Jordan Pay Equity https://www.ilo.org/beirut/media-centre/news/WCMS_468066/lang--en/index.htm

ranges from a maximum of 60 JD/month for lower-wage workers (less than 300 JD/month) to 50 JD/month for middle-wage earners (300–500 JD/month), and a minimum of 40 JD/month for higher wage earners (500–1000 JD/month). The voucher can also be used to pay for home-based care services but with a lower subsidy of 25 JD/month (provided that the mother's wage does not exceed 1000 JD). Under labor law (Article 72), private sector employers whose workers have 15 or more children under age 6 are also required to provide childcare services either at the workplace or by contributing to workers' payments to private facilities on a sliding scale.[13]

The flexible work regulation introduced in 2017 and the Flexible Working Instructions introduced in 2018 by the Jordanian Ministry of Labor are two other policy interventions aimed at improving labor force participation of different segments of workers, particularly women (Karak Castle and FES 2018). Those who benefit from the provisions of the law are those who have worked with the same employer for at least three consecutive years, workers with family responsibilities, including a pregnant woman, a worker caring for a child, caring for a family member, or caring for the elderly because of disability or illness; dully enrolled university student; or a worker with a disability. The flexible employment contract entails options for part-time work, flexi-time work, a compressed workweek, flexible year, or remote work, all subject to a common agreement between the worker and the employer. While the introduction of the flexible work regulation has been determined to promote positive results in terms of improving women's labor force participation (The World Bank, Karak Castle, and FES 2018), there have been also concerns that its focus on female workers may result in a widening of gender gaps in wage earnings, gender jobs segregation and social security pensions (UN Women 2019; Karak Castle and FES 2018).

II.C. Macroeconomic Context: Growth, Fiscal Policy, and Jobs Generation

Jordan's economy has been hit hard by the COVID-19 pandemic amid already low growth and high unemployment rates. The crisis has had particularly profound impacts on the service sector, particularly travel and tourism. Jordanian GDP has contracted by 1.6 percent in 2020, according to an issue of the Jordan Economic Monitor (JEM). JEM reports that this contraction, the first in three decades, was historic for Jordan; yet it was among the lowest economic contractions in the world in 2020. Part of this reduced impact can be attributed to the government's large fiscal and monetary stimulus packages and the sharp drop in the cost of oil imports also reduced losses to Jordan's economy.

The fiscal measures, first announced in March 2020, entailed the allocation of additional spending (JD 50 million—or, about $71 million) for purchases of health equipment and supplies, rental of hotels for quarantines, and sales tax exemption on select medical supplies; the allocation of 50

[13] The sliding scale for employer contributions to employees' childcare expenditures are slightly lower than that of the Reeya: 50 JD/month for workers who receives a wage less than 300 JD/month; 40 JD/month for workers with a wage between 300–500 JD/month; 30 JD/month for workers with a wage between 500–1000 JD (Abbadi 2021).

percent of maternity insurance revenues (JD 16 million—or, about $23 million) to material assistance for the elderly and the sick; a temporary cash transfer program for the unemployed and self-employed (JD 81 million—about $114 million); the introduction of price ceilings on essential products; the postponement of 70 percent of customs duty collections due from selected companies and the reduction of social security contributions from private sector establishments (from 21.75 percent to 5.25 percent). In June 2020, further measures were announced to support the tourism sector allowing firms to pay their 2019 tax liability in installments with no penalty; reducing the general sales tax from 16 to 8 percent and the service tax from 10 to 5 percent for hotels and restaurants. The cash transfer program was further expanded to cover 100,000 new families and daily workers, and funding to protect nearly 180,000 jobs in the hard-hit sectors. In March 2021, the government announced a COVID stimulus package with a total value of JD 448 million, amounting to14 a percent of GDP. The package includes measures to protect existing jobs (JD 113 million), employ youth in COVID-related programs (JD 10 million), and augment social welfare programs (JD 60 million, primarily via an expansion of the Takaful cash transfer program) (IMF COVID-19 Policy Responses).

There were also monetary policy measures whereby the Central Bank of Jordan (CBJ) reduced most policy rates and announced measures such as allowing banks to postpone loan repayments to clients in the impacted sectors. The CBJ injected additional liquidity of JD 550 million ($776 million) by reducing the compulsory reserve ratio on deposits and another JD 500 million ($705 million) by redeeming its CDs held by banks; expanded the sectoral coverage and reduced interest rates on its refinancing program. The Bank expanded support to the SMEs, including a JD 150 million ($211 million) credit facilities made available for tourism, increasing subsidized lending schemes for SMEs from JD 500 million to JD 700 million. It should be noted that there was no gender lens applied in the Bank supports to SMEs. CBJ also extended the bank loan service moratorium to negatively impacted borrowers until the end of 2021 (IMF COVID-19 Policy Responses). Moreover, these monetary policy measures did not entail any gender lens and failed to acknowledge women's economic empowerment as a potential target of monetary policy.

World Bank Jordan (WBJ) points out that continuing uncertainty about the COVID pandemic and uneven global recovery is likely to slow the return of most affected sectors, such as contact-intensive services and tourism. WBJ predicted Jordan's economy was expected to recover only gradually, with a growth rate of 1.4 percent in 2021.

As already mentioned above, Jordan has one of the world's lowest levels of female participation in the labor force and high levels of informal employment. The combination of low growth and high unemployment was exacerbated through a number of external shocks in the recent decades, such as the global economic crisis of 2008, the Arab Spring of 2013, and a regional turmoil entailing conflicts in Syria and Iraq which have negatively affected Jordanian commerce and trade. In addition, Jordan has been exposed to a large influx of refugees. In the post-global recession period (from 2010 onwards), the Jordanian economy experienced a notable downturn.

Employment rates deteriorated as access to jobs became increasingly limited, particularly for the least educated workers from low-income households. In a study of job creation in Jordan in the 2010-16 period, Assaad and Salemi (2018) find that one out of every two new jobs in the country went to a non-Jordanian; there was a shift of unskilled Jordanian men out of informal wage employment to irregular work as well as non-employment.

The stabilization program that the Jordanian government has implemented with the IMF has established macro-stability but job-poor growth. The low employment growth is reflected in high unemployment rates despite very low labor force participation. According to the ILO, the labor underutilization rate LU3 (combined rate of unemployment and potential labor force) is 32.6 percent for women and 19.6 percent for men. LU4 (composite rate of labor underutilization) is 32.7 percent for women and 19.7 percent for men.

The large fiscal and current account deficits (twin deficits) pose further challenges for macroeconomic policy. The government of Jordan launched the Jordan Economic Growth Plan for 2021–23 which identifies the key challenges of unemployment and low economic activity while maintaining fiscal and monetary stability. One of the three pillars of the program supports priority sectors to unlock the potential for increased growth and employment. As mentioned above, the three key sectors are tourism, information technologies, and agriculture (Government's Economic Priorities Program 2021–23).[14] The rest of this report aims to help identify social care services, in particular childcare services, as another priority sector.

III. Data and Methodology

There are multiple sources of data used at different stages of the analysis. For assessing the care coverage gap, we use the population and ECEC enrollment statistics disaggregated by age from the Jordanian Department of Statistics (DoS). For the costing of the care coverage gap, we used two sources of data. A comprehensive field survey of childcare centers in Jordan was conducted by the World Bank in 2020 with the objective of assessing the capacity of ECEC centers, the conditions of supply, and the quality of services. The World Bank Nurseries Survey (WBNS) survey covered nurseries operational under the Ministry of Social Development in three categories: public school nurseries (located in public primary schools), private nurseries, and institutional (workplace-based) nurseries. Private nurseries constitute the most developed and largest group. The survey had the participation of 188 private nurseries out of a total of 510 registered with the

[14] See: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://mop.gov.jo/EBV4.0/Root_Storage/EN/EB_Info_Page/GP_Presentation_En-donors.pdf

MoSD as of January 2021.[15] This is the data that was utilized in our assessment of childcare costs and the expenditure structures of ECEC centers. The survey comprises five sub-sections: service provider's background; accessibility and enrollment of children; pricing and costing information of the centers; the number and the categories of the employed staff in the centers; and lastly the daily routine and activities in the centers. The survey also included several questions to capture the impact of the COVID-19 pandemic on the supply of childcare services. Each childcare center was interviewed two times by the childcare provider representative.

Another important source was a number of childcare-costing exercises undertaken by the women's organization Sadaqa. The Sadaqa costing scenarios were initially developed in 2016–17 (Shomali 2016; Qudah 2017), with updates in 2020–21 (personal communication and consultations with Sadaqa). These scenarios profile the cost structure of a typical nursery at different operational scales (ranging from 26 to 78 children capacity per center) and in different regions (i.e., Amman, Irbid, and Aqaba).

Once the ECEC services coverage gap and the necessary expenditures to eliminate it are assessed, we move on to an estimation of the likely returns to such an increase in expenditures through demand-side channels. A primary demand-side outcome of increasing public expenditures on a particular sector is employment creation through an increase in labor demand. The total impact on employment creation as a consequence of the initial investment (increase in expenditures on a particular sector such as ECEC services) is composed of three effects. The direct effect corresponds to the jobs immediately created in the sector where the investment is made. The indirect effect captures the employment generated as a result of the increase of all the inputs produced and sold to the target sector as intermediate inputs. For example, if there is an investment in the accommodation and food services sector, there will be an increase in the use of agriculture inputs, which will then lead to an increase in the use of electricity and so on. The indirect effect on jobs adds all of the jobs created in other sectors of the economy (other than the sector which the increased public spending targets) as a consequence of these chained effects. Finally, the induced effect estimates the impact that the increase in wage incomes will have on employment. It covers all jobs created due to an increase in production that accommodates the expansion of household spending following the increase in household income.

Estimation of direct employment creation in the ECEC sector is straightforward. It is undertaken on the basis of the care coverage gaps (number of new children to be enrolled) and child-to-staff ratios. The ratios come from Jordanian legislation for the caregivers, and—for other staff—we formulate suggested ratios on the basis of currently observed ratios obtained from the WBNS and consultations with Sadaqa.

[15] There were also 58 public school nurseries and 15 institutional nurseries participating in the survey.

Estimation of employment creation through indirect and induced effects in the ECEC sector is undertaken through input-output analysis using the most recent (at time of writing) input-output data available for Jordan from 2016. The input-output matrix provides a detailed description of the economy, with all of its intersectoral transactions, which enables the estimation of the impact of one unit increase in the output of a particular sector on the output of other sectors. In order to assess the implications for sectoral employment, we use employment multipliers which are calculated on the basis of sectoral output in the input-output data and corresponding sectoral employment data from the household labor force surveys (called the Employment and Unemployment Survey [EUS] by the Jordanian DoS). Since the sectoral breakdown of employment is not available for 2016 in absolute numbers (and the percentage distribution yields inconsistencies due to rounding-up errors), we used employment data from the 2017 EUS, disaggregated by gender and by economic activity, to estimate the employment multipliers in the 2016 input-output table and to assess the total impact of investing in care on employment. Appendix I entails a detailed description of the data and the application of the input-output methodology.

One caveat here is that the ECEC sector does not exist as a stand-alone sector in most input-output tables, including Jordan's input-output data. Activities of nurseries and kindergartens are usually merged under the education sector and/or health and social services. Trying to estimate the impact of an increase in ECEC expenditures on the output and employment of other sectors by making an injection into the education and/or health and social services sectors results in what is called an aggregation bias (see Ilkkaracan, Kim, and Kaya [2015], Appendix II for a detailed discussion). One way to avoid such an aggregation bias and make a more accurate estimation on the basis of the cost structure unique to the ECEC sector (or any other sub-sector that does not stand alone in the input-output table) is to build a so-called "synthetic sector." This enables the integration of the ECEC sector into the input-output table as a stand-alone sector.

In our analysis, we implement such an approach in building the ECEC services sector into the Jordanian input-output Table 2016, using the expenditures structure of ECEC sectors obtained from the WBNS. The input-output table is built from the use table and the supply table which shows the use of commodities and services by industries and the final use and the production of commodities and services by industries respectively. The use and supply tables allow us to estimate the import, tax, retail, and transportation margins of all the commodities produced, as necessary inputs into the building of a synthetic sector. Details of the synthetic sector method are also presented in Appendix I. Consequently, we are able to estimate the number of jobs to be created in sectors other than ECEC from which the sector purchases its inputs (such as food and non-durable consumer items manufacturing, transport, financial services, etc.). This will enable an estimate of the total employment creation impact.

We also use the input-output analysis to estimate employment creation through increased spending on the construction sector as a comparison. Public investment in physical infrastructure and construction projects is a major item of public expenditures. Particularly in fiscal stimulus packages, spending on construction projects constitutes a common sectoral choice. Using such a framework, we compare the relative outcomes of alternative choices of public spending in terms of jobs and earnings generation and the consequent implications for policy objectives of gender equality.

In the final stage, we use microsimulation modeling to distribute the new jobs created in the ECEC or the construction sector to the various individuals who are not employed but are available for paid work. To this end, we use the Jordanian Labor Market Panel Survey (JLMPS) for 2016 conducted by the Economics Research Forum. This was the best accessible micro-data set we could obtain for our purposes.[16] It has good information about the labor market situation in Jordan in 2016, but it has some limitations. While it reports labor income, its capture of other income sources is limited.

Using the JLMPS 2016, we identify our potential pool of employable individuals observed in the microdata. These potential job recipients are those who are not currently working for pay in Jordan, are not retired or in school, and are not physically disabled.[17] Then we estimate their likelihood of employment in the various occupation-industry cells, using the results of a probit regression on the currently employed individuals. The new jobs created in the different sectors (as identified by the input-output analysis) are matched to the potential job recipients based on their estimated employment propensity, which, in turn, is derived from the recipients' demographic and household characteristics. Finally, we estimate the likely earnings and the consequent changes in household income for the job recipients to identify the income-distributional effects of different scenarios of public spending. The details of the microsimulation method and the JLMPS 2016 dataset are discussed in Appendix II.

IV. Assessment of Coverage Gaps in Childcare Services and the Cost of Eliminating the Coverage Gaps

In order to assess the coverage gaps in ECEC services and the cost of required expenditures to eliminate the gaps, we follow the criteria set by ILO and UN Women (2020) and ILO (2018).[18]

[16] The ideal dataset to use for the microsimulation would have been the Household Income and Expenditures Survey (HIES) 2017–18 by the DoS, however, the microdata is not accessible to researchers.

[17] The individuals identified as employed but with zero earnings are included in the potential employable pool.

[18] These enrollment targets are suggested by ILO (2018) on "Care Work and Care Jobs for the Future of Work," based on an interpretation of sustainable development goals (SDGs) on education, gender equality, employment and

These entail policy targets as preconditions for high-quality services and decent employment: e.g., universal coverage for children aged 3 to 5 (or up to the mandatory school age), a 50 percent enrollment rate for the younger children aged 0 to 2, child-to-staff ratios, and work conditions in the ECEC sector (jobs with social security coverage and decent wages).

- **Assessment of Care Coverage Gaps in ECEC**

The care deficit in ECEC services is assessed in terms of enrollment of children aged 0 to 5 including non-Jordanians, in nurseries and kindergartens. Table 2 shows current enrollment in nurseries, KG 1 and KG 2 versus desired enrollment by each age group to meet the policy targets mentioned above; namely 50 percent of children under 3, and universal coverage for children 3 to 5 (under the mandatory school age of 6 years old). The difference constitutes the care coverage gap. Accordingly, 346,921 children aged 0 to 2 and 445,690 children aged 3 to 5 for a total of 792,611 children need to enroll in ECEC centers in order for Jordan to meet the policy targets. This corresponds to 59.5 percent of the total child population under age 6 as of 2020.

Table 2: Coverage Gap in ECEC Services in Jordan, 2020

	a. Population	**b. No enrolled***	**c. Current enrollment rate***	**d. Target enrollment rate**	**e. No to be enrolled under target (a x d)**	**f. Coverage gap (e-b)**
Age 0	237,934	*n.a.*	*n.a.*	50%	363,893	363,893
Age 1	239,450					
Age 2	250,402					
Sub-total	727,786					
Age 3	252,336	416	0.2%	100%	252,336	251,920
Age 4	183,046	29,615	16.2%		183,046	154,018
Age 5	170,031	115,574	68.0%		170,031	55,034
Nurseries only		*(31,090)*				
Sub-total	605,413	288,321	29.2%		605,413	460,972
Total	*1,333,199*	*176,695*			*969,306*	*792,611*

*Source: Population and KG enrollment figures from Department of Statistics** Number enrolled and current enrollment rate disaggregated for ages 3, 4, and 5 entail official DoS statistics for KG1 and KG2. Nursery enrollment covers ages 0-5 but a breakdown by age group is not available.

- **Costing of Care Coverage Gaps**

The estimation of the total cost of closing the childcare services coverage gap depends on a range of references for per-child operational costs of ECEC centers as presented in Table 3. At a

inclusive growth; they are further adopted by UN Women and ILO (2020). While they may seem ambitious, given the starting levels of enrollment in Jordan, they should be read as medium-run targets.

minimum, it can be estimated using the childcare subsidy offered by the Social Security Cooperation (SSC) to employed parents for six months as part of a pilot initiative, which is 60 JD/month for the lowest wage income earners. On an annual basis, this amounted to 571 million JD for the gap of 792,611 children, corresponding to 1.8 percent of Jordanian GDP for 2020 (Table 3, column b.i).

Another set of references came from the World Bank Survey (WBS) of nurseries in terms of their average fees and costs. One of the important caveats here was that the survey was conducted under pandemic conditions, under-utilizing their capacity, and hence with altered and more fragile financial conditions. We took advantage of a question in the survey inquiring with the centers the share of costs recovered by revenues. The centers—which reported that their revenues covered at least 60 percent or more of their costs—constituted around 32.4 percent of the total sample (61 observations out of a total of 181), encompassing centers with generally higher enrollment levels. Based on the WBS, the average fee for a nursery is 84 JD/month for the entire sample, and 87 JD/month for centers that report to cover at least 60 percent of costs through revenue. The total annual cost on the basis of fees was 798 to 827 million JD, approximately 2.5 to 2.6 percent of GDP (Table 3, column b.ii).

On the basis of the WBS, the monthly expenditures (cost) of an ECEC center per child is 179 JD/month for the entire sample, and 120 JD/month for centers that report to cover at least 60 percent of their costs through revenues. This amounted to 1.7 billion JD annually at 5.4 percent of GDP and 1.1 billion JD annually at 3.6 percent of GDP (Table 3, column b.iii). The higher cost includes the caveat that, at the time the survey was conducted (at the end of 2020), many centers operated under their full capacity due to the pandemic, hence leading to an overestimation bias, particularly in fixed costs such as rent per child or management costs per child. Moreover, both the cost and fee estimates from the survey reflect the current employment conditions (formal vs. informal, part-time vs. full-time) and wage levels in the ECEC sector which are relatively poor, with informal employment and low wages.

In order to arrive at a costing that reflects a more accurate per-child cost under conditions of close to full-capacity utilization—plus improved working conditions for the employees in the ECEC sector as well as improved service quality—we used a method based on a disaggregation of the costs by different components (Table 3, column c): per-child labor costs, per-child rent costs and other per-child operational costs (i.e., other than wages and rent, such as utilities, cleaning, stationary, other intermediate goods, etc.). The per-child labor costs were driven on the basis of an expansion scenario entailing an estimate of child-to-caregiver ratios as prescribed in the Jordanian legislation and child-to-other staff ratios based on Sadaqa (2021). This is further explained in the next section on direct employment creation in the ECEC sector.

The improved wage levels were determined on the basis of prevailing wage levels by occupation in official DoS statistics for 2020 and the legal minimum wage on the one hand, and on the other hand, consultations with a number of stakeholders including Sadaqa, SSC, and the UN Women Jordan Country Office. Accordingly, we assumed the following wage rates in our ECEC services expansion scenario: 700 JD/month for managers, 420 JD/month for caregivers (an average for teachers and teacher assistants, slightly lower than the average wage for professionals), 260 JD/month (the legal minimum wage) for service workers, plus social security contributions (14.25 percent) on the basis of full-time, year-round employment. These wage rates reflect an improvement over current wage levels in the ECEC sector where no official data is available but consultations with stakeholders indicated that sectoral employment in ECEC services is characterized by low wages, informal and part-time employment, and an overall lack of decent jobs. Yet these wage rates are still lower than the average occupational wages in official statistics, which range—for the private and public sectors respectively—between 292 to 400 JD/month for elementary workers, 524 to 639 JD/month for associate professionals, 702 to 659 JD per month for professionals, 1,388 to 1,619 JD/month for legislators, senior officials, and managers. Even on the basis of such limited wage improvement (but including year-round formal employment), the per-child wage cost of 102.6 JD/month constituted 70.8 percent of total operational expenditures (Table 3, column c.i).

The per-child rent cost was derived from a costing exercise by Sadaqa (2021) but we further assumed that around one fifth of the centers (20 percent of children) would be accommodated in new ECEC centers established rent-free in available public buildings (Table 3, column c.ii). While the Sadaqa assessment of rent for centers was based on particular pilot governorates, it should be noted that there is a wide variation in rent costs across the various governorates. Other operational costs (other than rent and wages) are based on WBS, for a sample of centers that have at least 10 children enrolled at the time of the survey (Table 3, column c.iii). The total per-child cost on the basis of these assumptions amounted to 144.9 JD/month per child (Table 3, column c.iv). Converting this to annual costs per child and multiplying by the total number of children (column a), our estimate of total costs required to close the care-coverage gap stood at 1.4 billion JD, corresponding to 4.36 percent of GDP (Table 3, column c.iv). While this is a substantial amount, it reflects a close to ideal expansion scenario with improved employment conditions as well as high service quality with well-staffed, small-scale ECEC centers. The actual implementation could be spread over time with the children in lower-income households prioritized, toward the long-run target of universal coverage.

Table 3: Costing of Coverage Gap in ECEC Services in Jordan, *2020 prices*

	a. No of children	**b. Monthly cost per child by different measures*** (JD)	**c. Monthly cost per child under improved conditions**** (JD)

	to be enrolled							
		i. SSC subsidy	**ii. Fees (WBS)**	**iii. Costs (WBS)**	**i. Wage costs**	**ii. Rental costs**	**iii. Other operational costs**	**Total (i+ii+iii)**
	792,611	60	84 -87	120 -179	102.6	15.2	27.2	144.9
***Total Annual Costs** (JD) (a x b x 12 or a x c x 12)*		571 million	799-827 million	1.141-1.703 million				***1378 million***
***Share of GDP* (%)**		1.8	2.5-2.6	3.6–5.4				***4.36***

Notes: * The costs under 'b' reflect current conditions of ECEC services including child-to-staff ratios, wages and other employment conditions. SSC subsidy is the support payment offered by the Social Security Corporation to families to enroll young children in ECEC centers; Fess and Costs refer to the mean fees and costs of ECEC centers covered in the WBS World Bank Childcare Centers Survey 2020. ** The costs under 'c' reflect improved employment conditions as per decent wages and formal employment for ECEC workers as described in this section; rental costs come from Sadaqa (2021) plus the assumption that 80 percent of the ECEC centers will be accommodated rent-free in available public space; other operational costs reflect average operational costs other than wage and rent payments from WBS for centers with at least 10 children enrolled.

V. Employment Generation Outcomes

- **Direct Employment Creation**

The expansion of ECEC services, as per the defined enrollment targets in Part I, has the potential to create a substantial amount of new employment directly in the ECEC sector and indirectly in the other related sectors from which ECEC centers purchase inputs.

Our estimate of direct employment creation derives directly from the target enrollment rates and the number of new children to be enrolled in ECEC sectors as discussed in Part I, the child-to-staff ratios which, in turn, depend on legislative ratios for caregivers, and the average scale of ECEC centers. We made the following assumptions:

- The average size of nurseries is assumed to be small at 30 children per center, expected to reflect positively upon service quality;
- The child-to-teacher (caregiver) ratios were based on legislative ratios, which are as follows: ages 0-1, 6 children per caregiver, ages 1-2, 8 children per caregiver, ages 3-5, 10 children per caregiver;[19]

[19] In the WBS, the child-to-caregiver ratio, based on total enrollment and total employment of caregivers in nurseries is 4.3. We assume this to be a low ratio due to decreased enrollment during the pandemic.

- The management-to-administrative staff ratio was taken as 1 per center (30 children per management/admin staff), which is higher than the WB survey (18.4 children per management/administrative staff) following the Sadaqa scenario;
- The service staff ratio was taken as 2 per center (15 children per service staff member), which is lower than the WB survey (20.5 children per service staff) again following the Sadaqa scenario;

Table 4 shows the new ECEC jobs to be created in these different categories. Accordingly, we estimate that there will be 92,660 new caregivers (teacher and teacher assistant) jobs, 26,420 manager/administrative jobs, and 52,481 service staff jobs created in the ECEC sector. Adding up, we find a total direct employment creation of 172,000 new ECEC jobs. This corresponds to 12.8 percent of Jordanian employment and 9.8 percent of total employment including non-Jordanians as of 2020.

Table 4: Direct Employment Creation in the ECEC Sector

	Child-to-staff ratio	Total Staff
Care givers (teachers and teacher assistants)	Per caregiver, 6 children aged 0-1; 8 children aged 1-2, 10 children aged 3-5	92,660
Managers	30 children per manager	26,420
Service Staff	15 children per service worker	52,841
Total Employment		**171,921**

Source: Authors' calculation based on Jordanian Input-Output Table

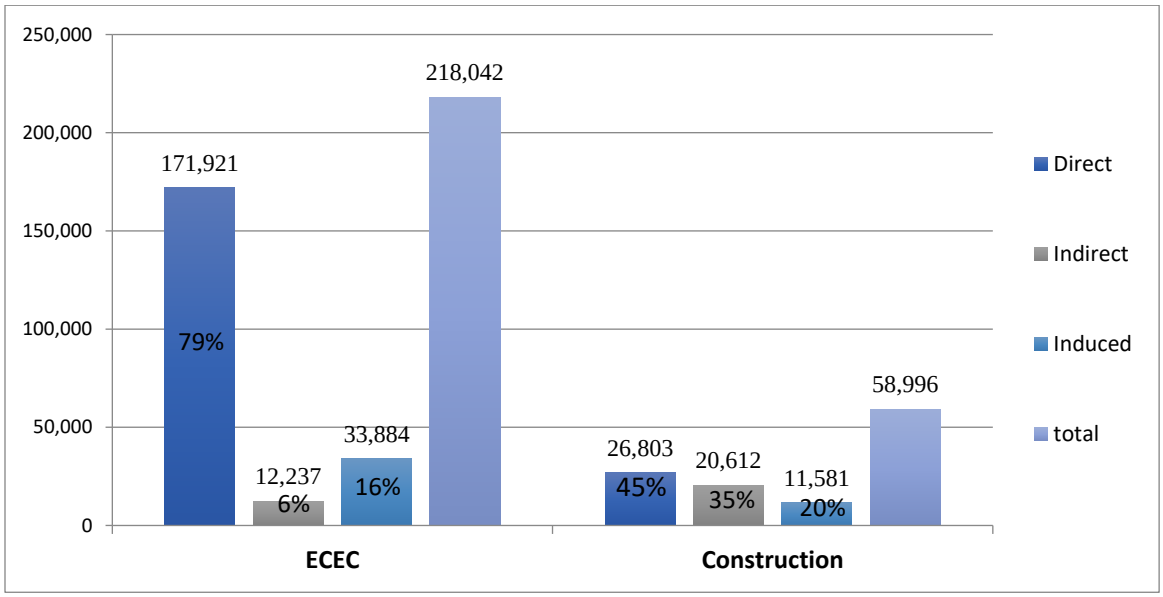
- **Indirect and Induced Employment Creation**

The results of the input-output analysis show that increased spending on the ECEC sector has the potential to create a substantial number of new jobs in sectors other than ECEC as well (Figure 7). An increase in public spending on ECEC expansion, equivalent to 4.36 percent of GDP is estimated to generate 46,000 new jobs in other sectors, with 12,000 jobs resulting from backward linkages (indirect employment) and almost 34,000 jobs from increased household spending (induced employment). Total employment creation, along with the direct employment created in the ECEC sector (171,921) is 218,000 jobs. This means the allocation of increased expenditures on the expansion of ECEC services has the potential to expand total employment by as much as 15 percent compared to its observed level in 2016.

Using input-output analysis, we are also able to estimate job creation in a comparative framework if the same magnitude of spending were to be directed instead of ECEC services to the construction sector—e.g., on physical infrastructure or construction projects. The total job creation through increased spending on the construction sector is estimated at almost 59,000 jobs, or about one third of the employment creation through ECEC spending. Of these, close to half of the jobs (26,803)

are direct employment in the sector itself, while approximately 22,000 jobs are created through indirect effects, and 12,000 jobs are created through induced effects (Figure 7). This means the allocation of increased expenditures on the construction sector has the potential to increase total employment by only 4 percent compared to its observed level in 2016.

Figure 7. Employment Creation Direct, Indirect, and Induced: ECEC vs. Construction



Source: Authors' Calculation based on Jordanian Input-Output Table 2012.

Table 5 shows the sectoral distribution of new jobs. In terms of indirect and induced effects, both types of public spending trigger the largest job creation in the manufacturing, wholesale and retail trade, and transportation sectors.

Table 5: The Distribution of New Jobs by Sector: ECEC vs. Construction

	ECEC	CONSTRUCTION
	Total	**Total**
ECEC (Synthetic Sector)	171,921	0
Agriculture, forestry, and fishing	768	644
Mining and quarrying	163	244
Manufacturing	5,059	7,980
Electricity, gas, steam, and air conditioning supply	1,276	281
Water supply, sewerage, waste management, and remediation activities	322	99
Construction	3,138	30,064
Wholesale and retail trade; repair of motor vehicles and motorcycles	12,192	7,651

Transportation and storage	3,762	3,551
Accommodation and food service activities	979	408
Information and communication	1,079	546
Financial and insurance activities	1,421	794
Real estate activities	395	165
Professional, scientific, and technical activities	1,983	1,597
Administrative and support service activities	2,784	566
Public Administration and Defence, Compulsory Social Security	1,356	1,171
Education	5,288	1,832
Human health and social work activities	1,655	548
Arts, entertainment, and recreation	51	4
Other service activities	2,162	751
Activities of extraterritorial organizations and bodies	100	36
Activities of households as employers	187	64
Total	**218,041**	**58,996**

Source: Authors' calculation based on Jordanian input-output Table

VI. Distributional Impact of Jobs and Income Generation

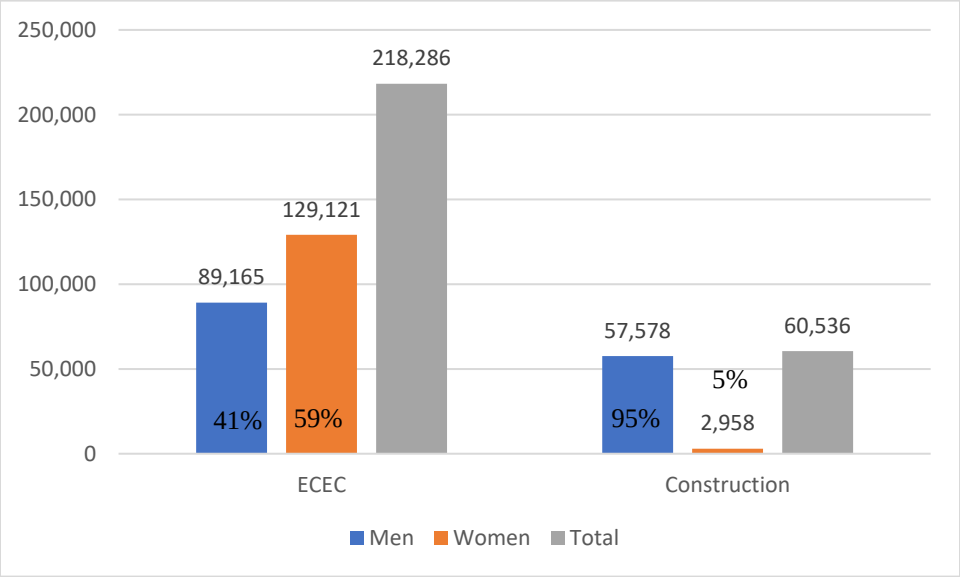
The results of the input-output analysis presented in Section V are at a macro level. They represent estimates of the total number of jobs to be generated in response to an increase in sectoral spending through direct, indirect, and induced effects. The next step, as described in the methodology discussion above, is to estimate the distributional impact of the employment increase obtained from the Input-Output model scenarios. To this end, we employ a microsimulation model using the Jordan Labor Market Survey for 2016 (see Section II and Appendix II). The microsimulation serves to answer the following questions: Who among non-employed workers may get the new jobs (i.e., the distribution of new job recipients by gender, marital status, presence of children in the household, age, and education level)? What will be the likely earnings of the new job recipients? How will these affect earnings by gender?

Looking, first and foremost, at the distribution of new job recipients by gender, we find that 59 percent of the jobs created through ECEC spending (129,000 jobs) are likely to employ women and the remaining 41 percent (89,000) go to men (Figure 8). This seems a rather gender-balanced distribution, favoring women with a relatively small margin. Table 6 shows the sectoral distribution of the jobs created by the sector. Approximately half (44 percent) of the male jobs created through increased ECEC spending derive from indirect or induced effects while the rest is direct job creation in the ECEC sector.

In the case of construction spending, the gender distribution of new employment is very imbalanced: women's share of new employment is only 5 percent. Despite men having the lion's share of new employment created by construction spending, however, we observe that construction spending still underperforms in terms of the absolute number of male jobs created. Increased ECEC spending is estimated to result in approximately 89,000 new employment opportunities for men as opposed to 54,000 through construction spending of the same magnitude.

This result is due to both the ECEC sector having a larger employment multiplier as well as demonstrating an improved gender balance as the sector expands. If the gender distribution of new employment creation were to be estimated in a static manner on the basis of the current gender distribution of jobs in each sector, women would get 82 percent of total jobs generated through increased ECEC spending. The higher female share would have been driven by the observation that, in the current ECEC sector which has a small size, only 2 percent of employment is held by men. However, our model shows that the types of employment created by the expansion may not be met solely by women who are not employed. There are indeed men too who fit the profile of the jobs (e.g., in terms of educational attainment) generated in the ECEC sector. Our results show that men may make up 29 percent of the employment in the ECEC sector (see Table 6) as a result of moving toward the policy target of universal access to services.

Figure 8. Employment Creation by Gender: ECEC vs. Construction



Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

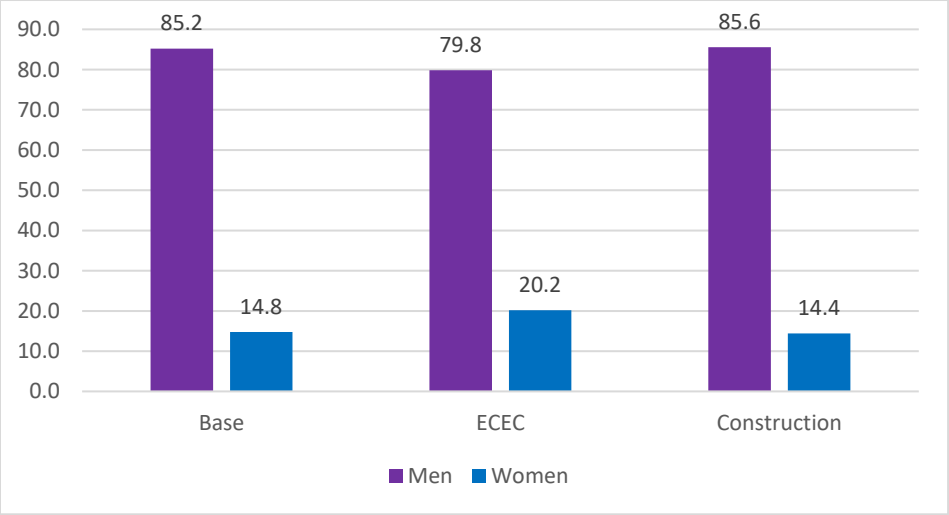
Table 6: Distribution of New Jobs by Gender, Direct vs. Indirect and Induced Employment

	ECEC			CONSTRUCTION		
	Men	**Women**	**Total**	**Men**	**Women**	**Total**
ECEC (Direct Employment)	49,702	120731	171,921	---	---	---
Construction (Direct Employment)	---	---	---	29,083	---	30,064
Indirect and induced employment	39,763	8,405	46,120	29,089	2,960	28,932
Total	**89,465**	**129,136**	**218,041**	**58,172**	**2,960**	**58,996**

Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Figure 9 shows the change in gender distribution of total employment under the two scenarios as compared to the baseline (current, as of writing) status. According to the gender distribution of employment observed in the JLMPS 2016, women's share in total employment in Jordan stands at 14.8 percent. Under the ECEC scenario, this improves by 5.4 percentage points to 20.2 percent. Under the construction scenario, by contrast, there is a slight decline in women's share in total employment to 14.4 percent.

Figure 9: Change in Distribution of Total Employment by Gender



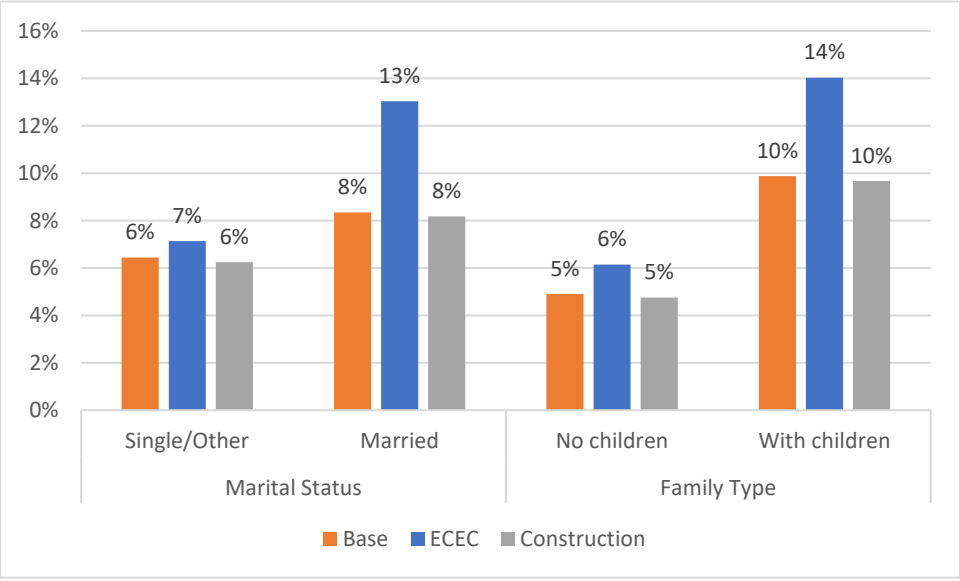
Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Figures 10 through 12 show the changes in the distribution of total employment not only by gender but by other demographic variables such as marital status, presence of children in the household, age, and educational attainment under the two simulation scenarios of increased sectoral spending against the baseline. We should note, however, the difference between the change in the share of a particular group in total employment versus the change in the absolute number of employed in

that group. While the share of a particular group in total employment may decline under the ECEC or construction scenarios, this need not reflect a decrease in their level of employment. On the contrary, under both scenarios the employment increases for most groups, albeit to a much larger extent under ECEC than in construction. The level of employment by gender and various demographic characteristics under the two simulation scenarios against the baseline are presented in Table 7. The interpretation of changing shares of different groups in total employment (Figures 10 to 12) should be viewed in light of the changes in the level of employment (Table 7).

Married women's share in total employment is improved from 8 to 13 percent (103,000 jobs), and the share of women living in households with small children increases from 10 to 14 percent (96,000 jobs) under the ECEC scenario (Figure 10 and Table 7). The increase in the shares of single women and women living in households with no children is relatively smaller from 6 to 7 percent (27,000 jobs) and 5 to 6 percent (33,000 jobs), respectively. Note that these results are purely due to employment demand for women created through ECEC spending. It would be expected that there would be additional positive labor supply-side effects through increasing access to childcare services and the consequent alleviation of time restrictions on women's labor supply. Under the construction scenario, we do not observe a change in women's share in total employment in any of the categories.

Figure 10: Change in Women's Share of Total Employment by Marital Status and Presence of Small Children in the Household

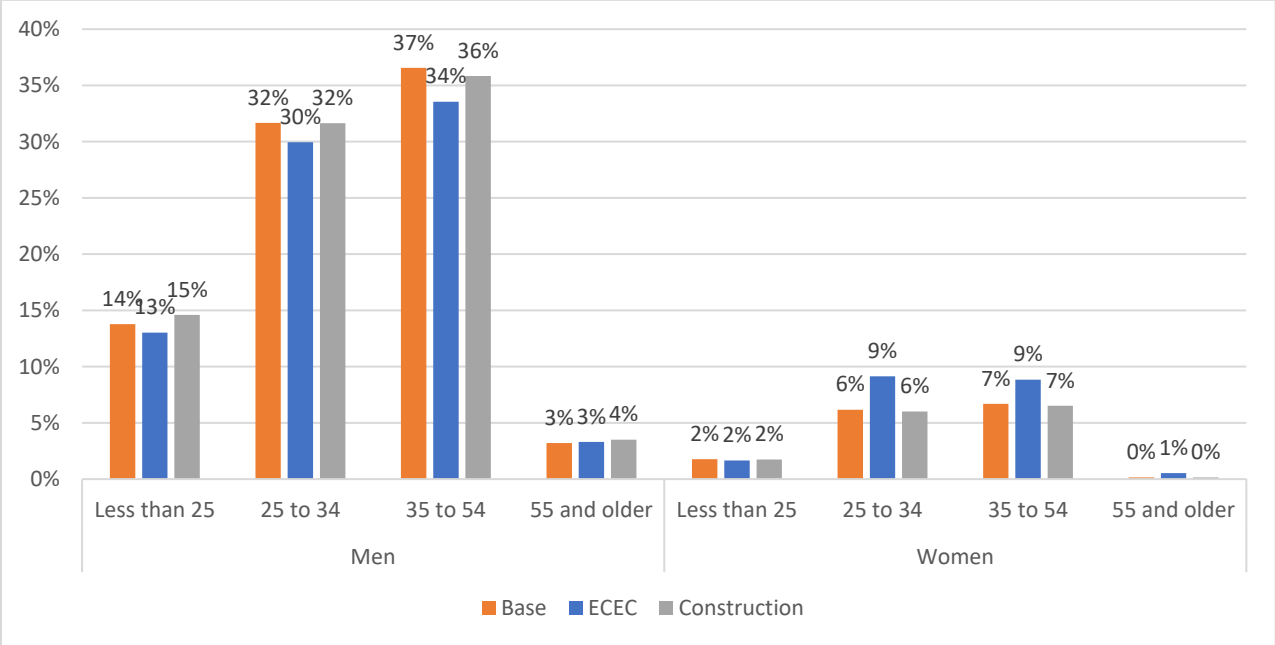


Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Looking at the changes in the distribution of total employment by gender and age (Figure 11), we observe that, under the ECEC scenario, the primary gains are for women of prime working age. For the 25–34 age group, women's share increases from 6 to 9 percent, and for the 35–54 age

group it increases from 7 to 9 percent. Under the construction scenario, women's share in total employment remains the same for all age groups, despite a small rise in the number of employed in all groups (Table 7). There is a small decrease in men's share for most age groups under the ECEC scenario as compared to the baseline, despite a relatively large rise in the number of employed. By contrast, under the construction scenario, men's share in total employment increases for the youngest and oldest age groups (i.e., less than 25 and 55 and older). For middle-age groups, men's share in total employment remains the same (25 to 34 age group) or declines by one percentage point (35 to 54 age group). It should also be noted that a dimension of distributional effects is by Jordanian versus non-Jordanian workers. The gains from employment expansion in construction are likely to benefit non-Jordanian men who constitute the majority of workers in this sector, but for the most part informally employed without social security coverage.

Figure 11: Change in the Distribution of Total Employment by Gender and Age Group

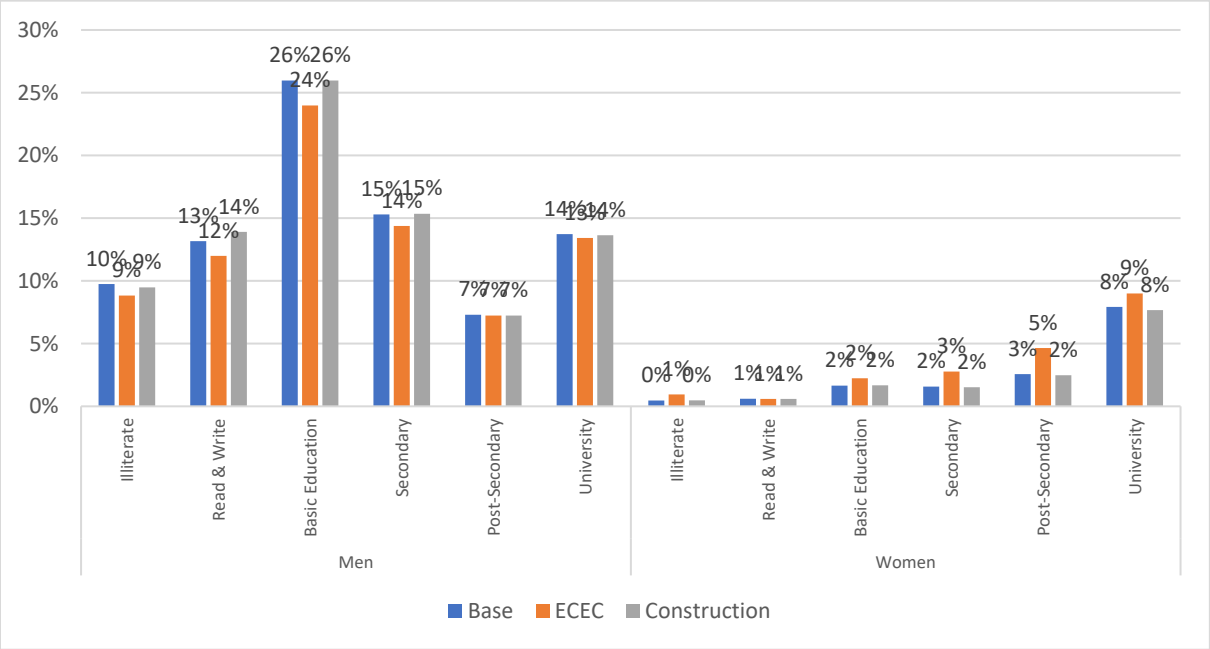


Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

As for changes in the distribution of employment by gender and education level, the largest relative gains under the ECEC scenario, are for women with post-secondary education (from 3 to 5 percent) corresponding to 43,000 job recipients in this category (Table 7). This is followed by a one percentage point increase in the share of illiterate women (from 0.3 to 0.5 percent, or 10,000 jobs), secondary education (from 2 to 3 percent, 14,000 jobs), and university education (from 8 to 9 percent, 37,000 jobs). Under the ECEC scenario, there is a small decline (one percentage point) in men's share for all education groups, except for post-secondary graduate men, whose share remains the same at 7 percent. The construction scenario exerts little impact on the distribution of

employment by education level, except for a small increase in the share of men in the "read&write" group, and a small decrease in the share of women with post-secondary education.

Figure 12: Change in the Distribution of Total Employment by Gender and Education Level



Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Table 7: Change in Number of Employed by Gender and Demographic Characteristics

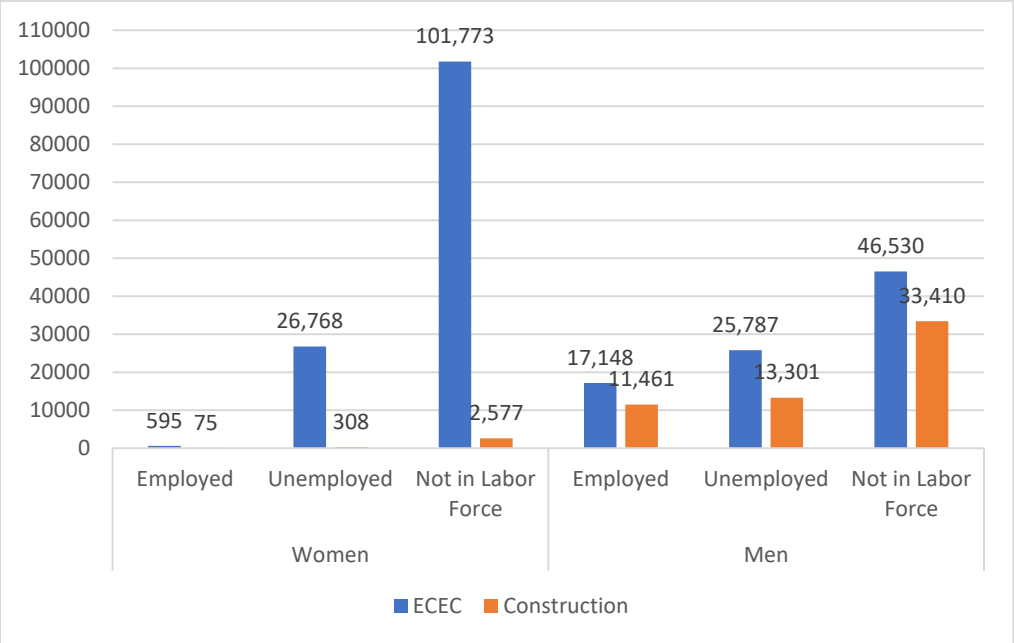
	Men			Women		
	Base	**ECEC**	**Construction**	**Base**	**ECEC**	**Construction**
Educational attainment						
Illiterate	154,007	158,648	155,504	7,270	16,979	7,859
Read & Write	207,944	215,497	228,045	9,597	10,508	9,597
Basic Education	410,191	431,177	425,922	26,052	40,123	27,493
Secondary	241,628	258,479	251,713	24,828	49,764	25,002
Post-Secondary	115,256	129,963	118,618	40,571	83,433	40,678
University	216,869	241,296	223,670	125,157	161,789	125,804
Age Groups						
Less than 25	217,680	234,110	239,483	27,995	29,875	28,605
25 to 34	500,078	538,381	518,866	97,420	164,216	98,491
35 to 54	577,371	603,016	587,646	105,648	158,862	106,846
55 and older	50,766	59,552	57,478	2,412	9,644	2,491
Marital Status						
Single/Other	420,865	462,886	448,805	101,666	128,225	102,389
Married	925,030	972,173	954,668	131,809	234,371	134,044

Family Type						
No children	496,758	527,252	513,968	77,464	110,484	77,934
With children	849,137	907,808	889,505	156,011	252,112	158,499
Total	**1,345,895**	**1,435,059**	**1,403,473**	**233,475**	**362,596**	**236,433**

Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Figure 13 shows the distribution of new employment by labor market status in the baseline, i.e., the labor market status of the job recipients prior to being assigned a new job. For the purposes of our simulation, we considered as potential job recipients those who are not currently working for pay, are not retired or in school, and are not physically disabled. We also included those who were employed but did not report any wages in the pool of potential recipients. In Figure 13, we divide the pool into three groups. The unemployed consists of those actively seeking a job and ready to start employment if offered a job. Not being in the labor force includes individuals who are not employed and not seeking a job but without a disability. The majority of the women in this category are full-time homemakers. Categories of men who are outside of the workforce include discouraged workers (those willing to work at a job but not seeking employment because they believe there are no opportunities in the labor market), students, or retirees. The increase in ECEC spending facilitates the entry of 102,000 women previously not in the labor force (presumably homemakers) into the labor market and yields wage employment for 27,000 unemployed women. For men, the numbers of new job recipients in these respective categories are 46,000 and 26,000. It is striking that increased allocation to ECEC spending creates more jobs for unemployed men than in the case of construction, where 13,000 of unemployed men transition into paid jobs.

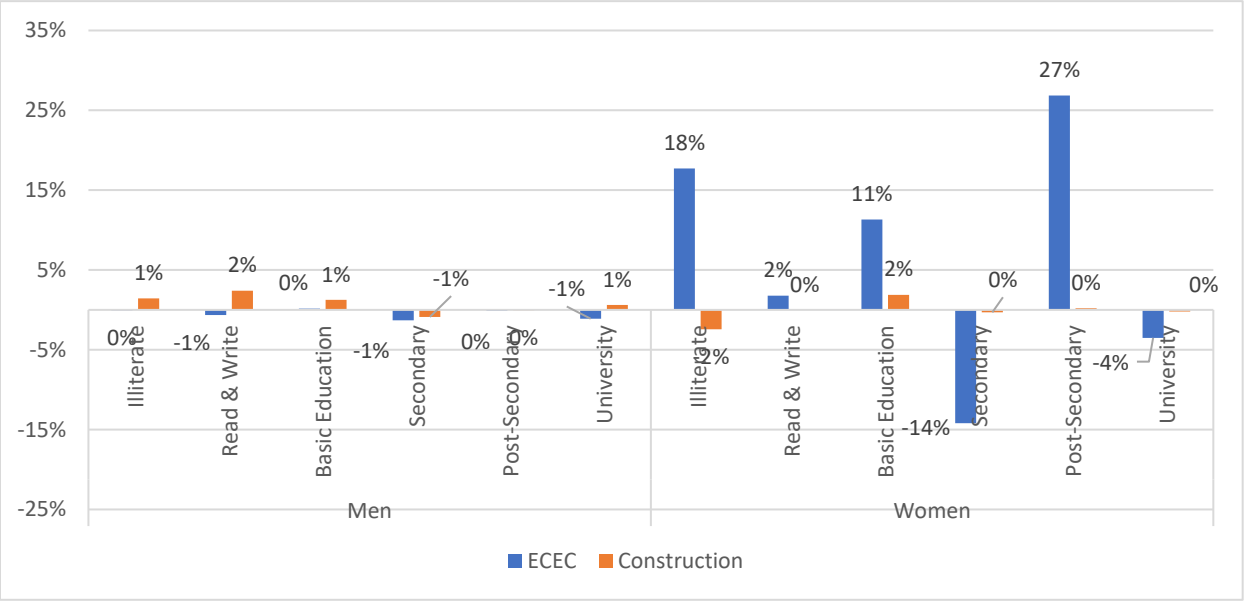
Figure 13: Distribution of New Jobs by Gender and Prior Labor Market Status



Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Turning to the impact on earnings, Figure 14 shows the percent change in the mean monthly earnings of employed women and men for each education level under the two simulation scenarios as compared to the baseline. The mean earnings of employed women and men show almost no change from the baseline under both the construction and ECEC scenarios. Under ECEC, there is a slight improvement in the average earnings of female workers vs. a decline for male workers. In the case of construction, men benefit from a slight improvement in earnings, and there is no change for female workers. The shift in overall mean female pay under ECEC seems to especially benefit female workers with post-secondary education with a 27 percent increase in average earnings (Figure 14) and their share in total employment went up from 3 to 5 percent (Figure 12). The increases in mean pay for illiterate female workers and those with basic education are also quite large at 21 and 9 percent respectively (Figure 14), but their share in total employment is quite small in size to have a big effect on median pay for women as a whole; only 1 percent for illiterate women and 2 percent for women with basic education under the ECEC scenario (Figure 12).

Figure 14: The Change in Monthly Mean Earnings by Gender and Education: ECEC Vs. Construction (Against the Baseline)

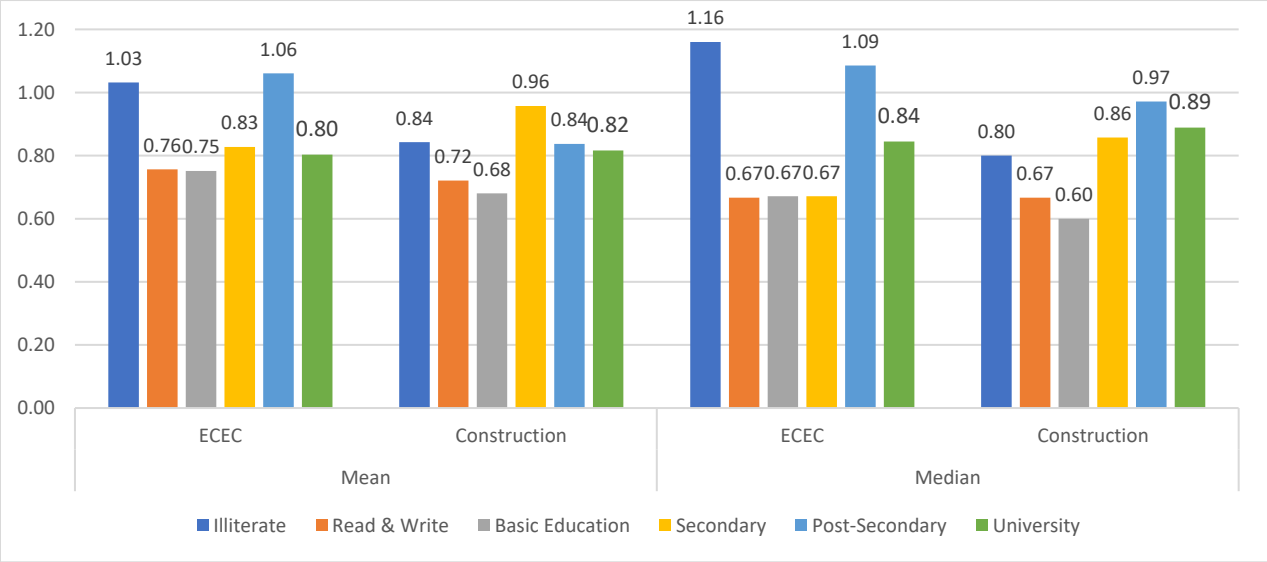


Source: Authors' calculation based on a microsimulation model using the JLMS for 2016

Figure 15 shows the gender earnings gap under the ECEC and construction scenarios as compared to the baseline by education level on the basis of mean earnings. The gender earnings gap improves for most education groups under the ECEC scenario. The gender earnings gap narrows from 88 to 103 percent for illiterate workers; from 74 to 76 percent for workers with the ability to read and write; from 68 to 75 percent for those with basic education; from 83 to 106 percent for post-

secondary graduates. For secondary and university graduates, there is a worsening of the gender earnings gap from 95 to 83 percent and 82 to 80 percent respectively. Overall, there is a slight improvement in the gender earnings gap from 99 to 100 percent on the basis of mean earnings (from 101 to 106 percent on the basis of median earnings). Under the construction scenario, by contrast, we observe a slight improvement in the gender earnings gap only for the secondary and post-secondary graduates from 95 to 96 percent and 83 to 84 percent respectively. For the other education groups, the earnings gap either worsens (illiterate, read & write) or remains the same (basic education and university). Overall, the gender earnings gap worsens from 99 to 98 percent on the basis of mean earnings under the construction scenario; it remains the same at 101 percent on the basis of median earnings.

Figure 15: The Gender Earnings Gap by Education Group: Baseline vs. ECEC vs. Construction Scenarios



Source: Authors' calculations based on a microsimulation model using the JLMS for 2016

We should note that the impact of the two public spending scenarios on the gender earnings gap alone is a conservative interpretation of the overall positive impact on women's income. The gender gaps shown in Figure 14, represent the mean earnings for those *in employment* under the baseline versus the two simulation scenarios. Yet, as the previous discussion has shown, increased ECEC spending has created new earnings for 129,121 women by providing them with new jobs. As such, the overall income gains for women are more substantial than the gender earnings analysis indicates. The total income creation under ECEC for a total of 218,286 new job recipients is approximately 81.1 million JD/month (average earnings under ECEC at 371 JD/month). Of this

new income creation, 59.8 percent accrues for women (average earnings under ECEC is 375 JD/month for women vs. 365 JD/month for men). On the other hand, the total income creation under construction for a total of 60,536 new job recipients is 27 million JD/month (average earnings under construction at 442 JD/month). Of this, a meager 3.1 percent accrues for women (average earnings under construction at 280 JD/month for women vs. 450 JD/month for men). Hence the increase in public spending of a given magnitude generates a substantially higher amount of labor earnings under ECEC both for women and men while narrowing the gender income gap by a substantial amount.

Table 8: Earnings Generation by Gender: ECEC vs. Construction

	ECEC	**Construction**
Average earnings (JD/month)	371	442
women	375	280
men	365	450
Total earnings JD/month	81.1 million	27.0 million
women	48.5 million	0.8 million
men	32.6 million	26.2 million
women's share in total	59.8%	3.1%
women's earnings as a share of men's earnings	148.8%	3.2%

VII. Conclusions and Policy Implications

Job creation remains a crucial challenge for the Jordanian economy in view of a declining trend in both the male and female employment rates, along with very high levels of youth unemployment. National policy documents assess creating jobs of adequate quantity and quality as a top priority for Jordan, emphasizing the need for improving particularly female and youth access to employment (NES 2011–20; NEPP 2021–23; FYRM 2019–24; EMV 2023). The crucial role of ECEC services expansion is acknowledged in this respect, with an emphasis on the labor supply side through two causal mechanisms: (1) improving human capital and labor productivity by investing in early education, and (2) alleviating the constraints on female labor supply. This study aimed to explore the labor demand-side outcomes of investing in ECEC services in terms of job and income creation and distributional outcomes.

As mentioned in the background section, the Government Economic Priorities Program 2021–23 identifies three priority sectors aimed at the objectives of unlocking the potential for increased

growth and employment—namely, tourism, information technologies, and agriculture. This study seeks to point attention toward another sector with a high potential for decent jobs generating growth: early childhood education care services. Given the labor-intensive nature of ECEC services, the sector entertains a very high employment multiplier such that a given magnitude of public funds has the potential to create a substantially higher number of jobs and generate more labor earnings than most other sectors.

Following an assessment of the deficit in ECEC services and the costs of eliminating this deficit, we estimated the magnitude of the new job creation in response to increased public expenditures on this sector: i.e., the number of new jobs to be created directly in the ECEC sector and indirectly in other related sectors through backward linkages and induced effects. The simulation also estimated the distributional outcomes of jobs creation in terms of the characteristics of the potential job recipients and the magnitude of their labor earnings. These employment and income returns to increased public expenditures on a hypothetical expansion of ECEC services were evaluated in a comparative framework with reference to those that would be expected if a similar magnitude of public expenditures were to be allocated instead to physical infrastructure and construction sector.

The deficit in access to ECEC services was assessed at almost 793,000 children with an estimated cost (under improved service and employment conditions) of 1.39 billion JD (2020 prices), equivalent of 4.36 percent of GDP. The simulation findings show that a sectoral allocation of public spending in ECEC services has the potential to create almost four times as many jobs compated to the allocation of spending in the construction sector, while also narrowing the gender gaps in employment. Increased expenditures of this magnitude on ECEC services has the potential to create 218,000 new jobs (21.2 percent in sectors other than ECEC) almost 60 percent of which would employ women. If the same amount of public expenditures is allocated to the construction sector instead, employment creation is limited to 60,500 new jobs, and only 5 percent of the jobs would employ women. Under the ECEC expansion scenario, women's share in total employment improves to 20.2 percent as compared to a baseline of 14.8 percent, while under the construction-boom scenario, women's share deteriorates further to 14.4 percent. While in relative terms, job creation through ECEC spending favors women as job recipients, in terms of absolute numbers, it has the potential to create more employment opportunities for men (89,000 male jobs) than construction pending (57,600 male jobs).

Job creation and earnings generation through ECEC spending tends to favor married women and women living in households with small children, improving their share in total employment and improving the mean monthly earnings of women with lower levels of education. The overall gender earnings gap narrows under the ECEC expansion scenario, while it further expands under the construction-spending scenario. The substantially higher number of jobs created via ECEC spending has the potential to generate labor earnings at 81.1 million JD per month with almost 60 percent accruing to female job recipients. The labor earnings generated via construction spending

of similar magnitude, is estimated at 27 million JD/month, where women's share is at a meagre 3.2 percent.

The cost of eliminating the care deficit in access to ECEC services constitutes a substantial amount at 4.36 percent of GDP. One of the reasons for the high costs is that the simulation scenario was designed on the basis of decent employment conditions for caregivers. An ECEC expansion which seeks to improve wages and social security coverage of workers is important both for women's labor market attachment as well as for ensuring high quality services. An expansion plan which simultaneously improves the quality of caregiving can be implemented over the medium run, prioritizing disadvantaged households and regions. These efforts in expanding ECEC services can be integrated into the active labor market programs by the Ministry of Labor, such as expansion of public or donor funded workfare programs (i.e., programs that pay beneficiaries for performing work that is in the public interest) and further development of regulatory support for homebased businesses including childcare. For example, a workfare program could target beneficiaries to perform supplementary tasks such as secretarial work in ECEC centers, tutoring in schools or providing home-based care for poor, elderly, and disabled persons. These types of programs are expected to have a positive impact on social protection services as well as on women's employment. Furthermore, the simulation findings on the substantial employment creation and equality-enhancing outcomes of ECEC spending point to a virtuous cycle of inclusive growth, whereby an initial outlay of public investment facilitates access to jobs and incomes by the disadvantaged groups while improving the welfare of women and children.

While beyond the scope of this study, it should be noted that integration of the ECEC services sector into Jordan's vision for economic growth creates further multiplier effects by meeting other important policy objectives: i.e., the narrowing of gender gaps in time use and consequently in access to employment and income not only through creating jobs for women but also relieving their time constraints; the narrowing of socioeconomic gaps among households through improving disadvantaged children's access to quality ECEC services; the promotion of dual-earner households with lower risks of poverty; and the enhancement of human capital and productivity over the long run through support to children's early-stage development.

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APPENDIX I: Input-Output Analysis of Jobs Generation under Different Scenarios

The first step to our estimation is to translate the costs reported by care centers surveyed by the World Bank into a cost structure of domestic products at basic prices compatible with the input-output data. To do so, we map each of their reported costs into commodities and services that exist in the input-output table. Next, we exclude the imported content, redistribute their transportation and retail margins as well as taxes and subsidies to the corresponding sectors, and assign them to activities following the industry technology assumption.[20] As a result, we have a vector that describes all inputs purchased by the ECEC sector from all other sectors of the economy. As can be seen in Table A1, this structure is very different from that of the education sector. Not only is the input composition distinct but the education sector has the participation of profits and higher participation in wages and imports, all of which would lead to an underestimation of the chained effects of an investment in early education if we were to assume that the injection goes into the existing education sector. Our method allows us to more precisely calculate in which sectors jobs are indirectly created as a result of an investment in the ECEC sector. The comparison is presented here to show the advantage of the synthetic sector method when compared to the alternative of simulating impacts on existing input-output sectors.

Table A1.1 Observed Composition of Inputs of the Education Sector vs. Estimated Composition of Inputs of the Synthetic Sector as a Share of Total Output

	Education	ECEC
Agriculture, forestry and fishing	0.02%	0.15%
Mining and quarrying	0.02%	0.05%
Manufacturing	2.70%	2.51%
Electricity, gas, steam, and air conditioning supply	1.07%	4.65%
Water supply, sewerage, waste management, and remediation activities	0.46%	1.38%
Construction	1.15%	9.24%
Wholesale and retail trade; repair of motor vehicles and motorcycles	0.43%	0.60%
Transportation and storage	1.59%	1.48%
Accommodation and food service activities	0.15%	0.12%
Information and communication	0.77%	0.09%
Financial and insurance activities	0.83%	1.54%
Real estate activities	1.56%	0.03%
Professional, scientific and technical activities	0.41%	0.12%
Administrative and support service activities	0.46%	3.44%

[20] For details, see Miller and Blair (2009), page 193.

Public Administration and Defense, Compulsory Social Security	0.00%	0.00%
Education	0.60%	0.00%
Human health and social work activities	0.19%	0.20%
Arts, entertainment and recreation	0.08%	0.06%
Other service activities	0.04%	0.07%
Activities of households as employers	0.00%	0.15%
Activities of extraterritorial organizations and bodies	0.05%	0.08%
Imports	3.36%	2.83%
Taxes on Products	0.52%	0.44%
Subsidies on Products	0.00%	0.00%
Total Use	16.49%	29.23%
Gross value added	83.51%	70.77%
Subsidies on production	0.00%	0.00%
Taxes on production	0.45%	0.00%
Compensation of employees	73.48%	70.77%
Gross operating surplus / mixed income	9.58%	0.00%
Total output	**100%**	**100%**

The resulting vector is ready to be inserted into the input-output matrix. This needs to be done by respecting the symmetry of the table—that is, the total output of each sector needs to be the same from the perspective of expenditure (column sum) and consumption (row sum). Ilkkaracan, Kim, and Kaya (2015) propose a method that circumvents the need to calculate how much other industries use the output of the ECEC sector as an input in their production. We follow their method and assume that the use of and supply of ECEC equal one another in each industry. For example, the value of electricity used by ECEC as inputs is assumed to be equal to the value of early childhood education services used by the electricity sector as inputs. Ilkkaracan, Kim, and Kaya (2015) normalize the values of inputs purchased by the synthetic sector to a very small total output, which allows for the technical coefficients to remain intact. At the same time, the values that need to be assigned to the row, to maintain the balance of table, are miniscule. This method allows us to calculate the backward linkages, direct and indirect effects and induced effects but it does not allow for the calculation of forward linkages, which are not necessary for our purposes.

Next, we follow standard input-output methods to calculate type I and type II output multipliers. Type I multipliers are calculated by taking the Leontief inverse of the technical coefficient matrix, and it allows us to calculate the direct and indirect effects. Type II multipliers are calculated by closing the model with respect to the households, i.e., making households endogenous[21] to the model, as if they are also a productive sector in the economy. Final demand by families and wages

[21] See Miller and Blair (2009), page 35.

are included in the coefficients table and the Leontief inverse is then calculated over the augmented matrix.[22]

The total number of jobs created as a result of the investment of an extra JD in a specific sector is calculated by performing an element-wise multiplication of the vector of labor coefficients, which reports the ratio of employment to the output of each sector, by the sector's column in the augmented Leontief inverse. The result is a vector that tells us the number of jobs created in each industry—directly, indirectly, and through the induced effect. Directly and indirectly created jobs are calculated similarly, by multiplying each element of the labor coefficients vector by each element of the sector's column of the original Leontief inverse matrix. The number of induced jobs by sector can be computed as a residual, by taking the difference between total employment created by sector and the direct and indirect employment by sector. Similarly, by deducting the number of direct jobs created by sector from direct and indirect jobs by sector we get the total number of indirect jobs created. By summing across sectors, we obtain the total number of direct, indirect, induced, and the total number of jobs created in the economy as a whole by the expansion of the sector.

For the purpose of comparison, we simulated the direct, indirect, and induced effects in each sector of the economy that the same investment would have in the education sector. The results are presented in Table A1.2. We use official employment data by sector and by gender to calculate how many jobs are created for men and women. We assume that the share of women in each sector is preserved after the investment. As a consequence, when jobs are created in a female intensive sector, the impact for women is larger than for men. As can be seen, if we simulated the impact of the investment in the education sector instead of using the synthetic-sector method we would be underestimating the overall impact while overestimating the number of jobs created for men. Furthermore, the synthetic sector method allows us to more precisely estimate in which sectors the jobs were created, which in turn provides us with better results for the microsimulation.

Table A1.2. Distribution of Jobs Created by 1.378 Billion JD (4.36% of Jordan's 2016 GDP) Injection on ECEC vs Education Sectors

	ECEC			EDUCATION		
	Men	Women	Total	Men	Women	Total
ECEC (Synthetic Sector)	2579	169342	171921	0	0	0
Agriculture, forestry and fishing	705	63	768	644	58	702
Mining and quarrying	157	6	163	132	5	137
Manufacturing	4377	682	5059	3813	594	4407

[22] Type I and type II multipliers are presented in Miller and Blair (2009), chapter 6. It is important to notice that, while type I multipliers underestimate the impact of a demand shock in a sector since households are absent, type II multipliers might overestimate since it assumes that labor coefficients and the propensity to consume out of wages are rigid.

Electricity, gas, steam, and air conditioning supply	1210	66	1276	610	33	643
Water supply, sewerage, waste management and remediation activities	316	6	322	184	3	187
Construction	3087	51	3138	703	11	714
Wholesale and retail trade; repair of motor vehicles and motorcycles	11259	933	12192	10663	883	11546
Transportation and storage	3654	108	3762	2954	87	3041
Accommodation and food service activities	937	42	979	892	40	932
Information and communication	797	282	1079	892	315	1207
Financial and insurance activities	978	443	1421	825	374	1199
Real estate activities	351	44	395	379	48	427
Professional, scientific and technical activities	1566	417	1983	1771	471	2242
Administrative and support service activities	2276	508	2784	823	183	1006
Public Administration and Defence, Compulsory Social Security	1232	124	1356	1132	114	1246
Education	2190	3098	5288	47299	66890	114189
Human health and social work activities	794	861	1655	784	849	1633
Arts, entertainment and recreation	40	11	51	42	11	53
Other service activities	1762	400	2162	1652	375	2027
Activities of extraterritorial organizations and bodies	64	36	100	49	27	76
Activities of households as employers	110	77	187	110	76	186
total	**40445**	**177596**	**218041**	**76351**	**71449**	**147800**

*Input-Output simulation of direct, indirect, and induced effects using 2017 employment data

APPENDIX II: Simulating the Distribution of Employment Produced by Policy Scenarios

To estimate the distributional impact of the employment changes in the Input-Output model scenarios, we employ a microsimulation model. Our base data set is the Jordanian Labor Market Panel Survey for 2016 (JLMPS 2016). It contains records for 33,450 individuals in 7,228 households representing 9,532,053 individuals in 1,941,773 households in Jordan. This is the best data set we could obtain for our purposes. It has good information about the labor market in Jordan in 2016, but it has some limitations. While it does report labor income, its capture of other income sources is limited. Monthly household per capita cash income for Jordan's governorates, as well as urban, rural, and refugee camps measured with the variables available in the JLMPS 2016 is displayed in Table below.

Table A2.9 Monthly Household per Capita Cash Income by Governorate and Location

Governorate	Urban	Rural	Camps	Total
Amman	1804.5	1111.1		1783.3
Balqa	1394.2	1318.7		1381.1
Zarqa	910.4	1051.7	87.7	883.0
Madaba	903.1	1461.9		1014.8
Irbid	1483.7	1419.9		1478.2
Mafraq	1047.8	1024.5	260.4	872.8
Jarash	1548.4	1432.7		1522.3
Ajloun	1642.3	1499.1		1618.2
Karak	1297.6	1370.3		1328.6
Tafileh	1248.3	1212.6		1240.9
Ma'an	1141.6	1175.3		1157.9
Aqaba	1215.5	1182.5		1211.8
Total	1500.6	1258.2	204.6	1454.7

To proceed with the simulation, we first distribute the employment numbers produced in the input-output model for each scenario among one-digit occupations. The existing occupational distribution for each industry is used. For the synthetic Early Childhood Education (ECE) sector, we use the four-digit occupational breakdown of the four-digit industry 8510 ("pre-primary and primary education") to identify workers in the ECEC sector. For those occupations in this sector that could be either primary school or pre-school, we divided the workers by the ratio of workers in the occupations 2340 ("Primary School and Early Childhood Teachers"), 2342 ("Early Childhood Educators"), and 5311 ("Child Care Workers") to the total number of teachers (two-digit codes 23 and 53) in the four-digit industry (this came out to roughly 2 percent). The results were aggregated up to the one-digit occupational codes. The result of applying these breakdowns for wage workers to the two scenarios is shown in Tables A2.10 and A2.11, below.

Table A2.10 Jobs Created in the ECEC Scenario by Industry and Occupation

	Managers	Professionals	Technicians and associate professionals	Clerical support workers	Service and sales workers	Skilled agricultural, forestry, and fish	Craft and related trades workers	Plant and machine operators	Elementary occupations	Total
Early childhood education	22053	85420	4861	30874	0	0	1260	12241	15302	172011
A: Agriculture, forestry, and fishing	0	12	1	4	49	638	1	8	55	768
B: Mining and quarrying	0	27	3	26	4	1	17	48	35	161
C: Manufacturing	32	477	319	231	204	0	2653	703	440	5059
D: Electricity, gas, steam and air conditioning	0	329	299	187	0	0	462	0	0	1277
E: Water supply; sewage, waste management	0	26	50	36	37	0	0	101	72	322
F: Construction	0	354	54	34	40	0	2513	63	80	3138
G: Wholesale and retail trade	135	924	660	414	6829	18	2290	172	750	12192
H: Transportation and storage	0	238	240	412	25	0	26	2716	106	3763
I: Accommodation and food service activities	26	57	15	21	692	0	37	32	99	979
J: Information and communication	0	884	118	9	0	0	63	5	0	1079
K: Financial and insurance activities	63	904	121	218	11	0	37	12	54	1420
L: Real estate activities	0	8	103	134	0	0	146	0	3	394

M: Professional, scientific and technical	0	1468	169	163	0	0	172	6	4	1982
N: Administrative and support service activities	0	181	154	184	1888	0	18	67	293	2785
O: Public administration and defense	1	169	56	151	696	3	64	125	90	1355
P: Education	131	4233	86	83	229	8	91	173	254	5288
Q: Human health and social work activities	1	821	417	184	86	2	22	59	62	1654
R: Arts, entertainment, and recreation	0	16	23	0	7	0	1	0	3	50
S: other service activities	0	207	139	1	993	0	232	9	582	2163
T: Activities of households as employers	0	0	0	0	96	0	0	0	4	100
U: Activities of extraterritorial organizations	10	101	8	11	5	0	8	25	21	189
Total	22452	96856	7896	33377	11891	670	10113	16565	18309	218129

Table A2.11 Jobs Created in the Construction Scenario by Industry and Occupation

	Managers	**Professionals**	**Technicians and associate professionals**	**Clerical support workers**	**Service and sales workers**	**Skilled agricultural, forestry, and fish**	**Craft and related trades workers**	**Plant and machine operators**	**Elementary occupations**	**Total**
Early childhood education	0	0	0	0	0	0	0	0	0	0

A: Agriculture, forestry, and fishing	0	10	1	4	41	535	0	7	46	644
B: Mining and quarrying	0	41	4	39	6	2	26	72	53	243
C: Manufacturing	51	752	503	364	322	0	4185	1108	693	7978
D: Electricity, gas, steam and air conditioning	0	72	66	41	0	0	102	0	0	281
E: Water supply; sewage, waste management	0	8	15	11	11	0	0	31	22	98
F: Construction	0	3388	521	322	380	0	24078	605	770	30064
G: Wholesale and retail trade	85	580	414	260	4286	11	1437	108	471	7652
H: Transportation and storage	0	224	227	389	24	0	24	2564	100	3552
I: Accommodation and food service activities	11	24	6	9	288	0	15	13	41	407
J: Information and communication	0	448	59	4	0	0	32	3	0	546
K: Financial and insurance activities	35	505	68	122	6	0	21	7	30	794
L: Real estate activities	0	3	43	56	0	0	61	0	1	164
M: Professional, scientific and technical	0	1183	136	132	0	0	139	5	3	1598
N: Administrative and support service activities	0	37	31	37	384	0	4	14	60	567
O: Public administration and defense	1	146	49	131	601	2	55	108	78	1171
P: Education	45	1466	30	29	79	3	31	60	88	1831
Q: Human health and social work activities	0	272	138	61	28	1	7	20	21	548

R: Arts, entertainment, and recreation	0	1	2	0	1	0	0	0	0	4
S: other service activities	0	72	48	0	345	0	80	3	202	750
T: Activities of households as employers	0	0	0	0	34	0	0	0	2	36
U: Activities of extraterritorial organizations	3	34	3	4	2	0	3	8	7	64
Total	231	9266	2364	2015	6838	554	30300	4736	2688	58992

To assign the jobs, we use a hot-decking statistical matching procedure. We will describe the procedure below, but first, we will outline the preparation for this matching procedure. We first identify potential job recipients. These potential recipients are those who are not currently working for pay in Jordan, are not retired or in school, and are not physically disabled.[23] Next, we identify donor records within the same data set. We will assign sets of job characteristics (industry, occupation, earnings, and hours) that exist to new job recipients. For each recipient, we rank industries by the likelihood of being employed within them by running a multinomial *probit* model on all employed individuals and then using the results to predict the likeliest industries among the recipients. We repeat this procedure for occupations. Finally, we predict the likelihood of being employed using a simple *probit* model.

We next use a three-stage Heckit procedure to impute wages and hours for each individual. The imputations for the earnings and usual weekly hours of paid work are performed using a three-stage Heckit procedure (Berndt 1996, 627) separately for each combination of four age categories,[24] sex, and area of residence. The first stage is a probit estimation of labor force participation:

$$\mathrm{lf_i} = \alpha_1 + \beta X + \varepsilon_i$$

The vector of explanatory variables, *X*, comprises the number of children younger than 5 and the number of children aged 6 to 17 in the household, the individual's education, and the individual's spouse's age, education, and labor force status. The regression is run on the universe of all eligible adults. The Mills ratio is calculated for all individuals using the results of the first stage regression:

$$\lambda = \frac{\mathrm{f}\left(\frac{\hat{\mathrm{lf}}}{\sigma_{\hat{\mathrm{lf}}}}\right)}{\left(1\text{-}\mathrm{F}\left(\frac{\hat{\mathrm{lf}}}{\sigma_{\hat{\mathrm{lf}}}}\right)\right)}$$

Where *f* is the normal density function, *F* is the normal distribution function, $\hat{\mathrm{lf}}$ is the estimated probability of labor force participation, and $\sigma_{\hat{\mathrm{lf}}}$ is the standard deviation of $\hat{\mathrm{lf}}$.

The second stage is an OLS estimate of the log of hourly wage:

$$\mathrm{lnw_i} = \alpha_2 + \gamma_2 Z + \theta_2 \lambda + \mu_i$$

This regression is run only on those who are actually employed for pay. The vector of explanatory variables, *Z*, in this stage includes the individual's education, age, industry, occupation, state, and, finally, λ, the Mills Ratio calculated in the first stage. Inclusion of the Mills Ratio corrects for the selection bias induced by limiting the regression to those in paid employment. The imputed log of wage is predicted for donors and recipients from the results of the regression, with industry and occupation replaced for the latter by the likeliest industries and occupations predicted in the previous step.

The third stage is a regression of the usual hours of paid work per week:

[23] Individuals identified as employed but with zero earnings are included in the potential employable pool.
[24] Less than 25 years old, 25 to 34 years old, 35 to 54 years old, and 55 and older.

$$h_i = \alpha_3 + \gamma_3 Z + \omega \ln\widehat{w_i} + \theta_3 \lambda + \eta_i$$

The regression is once again run only on those employed for pay. The vector of explanatory variables, *Z*, in this stage is the same as in the previous stage, with the addition of the number of children aged less than 7, the number of children aged 7 to 17 in the household, and the spouse's labor force status. Finally, the imputed wage predicted in the second stage and the Mills Ratio calculated in the first stage are included. Imputed hours per week are predicted for donors and recipients using the results of the regression, replacing the industry and occupation of the latter with their predicted values as for the wage equation.

With the variables generated in the previous steps, as well as other characteristics, we then proceed through the job assignment procedure. For each industry and occupation pair in turn, for those recipients for whom the industry and occupation were the likeliest, we identify a pool of individuals actually employed in that industry and occupation that most resemble each recipient. We randomly draw from this group of donors and assign a duplicate of their job to the recipient. We next check that the sum of the weights of the recipients does not exceed the number of new jobs available. If there are more recipients than jobs, we make the assignment only to those who are the likeliest to be employed (using the results of the probit estimation from the first step), using up all of the available jobs. If there are more jobs than recipients, each is assigned a job. The total jobs assigned are then subtracted from the total remaining to be assigned in that cell of the industry-occupation matrix. Records of those who were assigned jobs are removed from the remaining recipient pool and the process continues. If, after going through all the possible assignments for recipients' first most likely industry and occupation, there are still jobs remaining, we move on to the second most likely industry and occupation and repeat the above procedure. This process iterates until all jobs have been assigned. We then repeat the assignment procedure with the job matrix from the other scenario. For the ECEC scenario, we assign earnings to women based on a flat schedule.[25]

Once we have completed the assignment of all jobs, we move on to assess the quality of the simulation. Our options for such an assessment are limited by the fact that we are creating a counterfactual distribution of employment and earnings. Thus, our main quality check will be a comparison of the distributions of earnings and the hours of the job recipients in each scenario with those of the donor pool. Before that, we compare the distribution of characteristics used in the matching process between the recipient and donor pools. Note first that the composition of the recipient and donor pools by sex is very different, as must be the case, given the very low labor force participation rate of women in Jordan. In fact, 68 percent of the individuals in the recipient pool are female, while 84 percent of the donors are male. However, because of the way we do the matching, female recipients are only matched with female donors and vice versa. Figure 1, below, shows the distribution of the recipient and donor pools by sex, age, and educational attainment. Note that, for both women and men, donors are more likely to be prime-working-age individuals, while recipients are more likely to be under 25 or over 65. Among women, a greater share of recipients is aged 45 to 54 than among the donors. Looking at the distributions by educational attainment, it is clear that highly educated women are more likely to be working for pay: greater

[25] The monthly earning for managers is JD 633, for teachers it is JD 380, and for service staff it is JD 235.

shares of the women in the donor pool have secondary and higher education than in the recipient pool. Among men, the relationship is not as clear-cut. Although greater shares of the male donor pool have secondary or post-secondary education, there is little difference in the shares of donors and recipients with university or post-graduate education and male donors are likelier to be illiterate than recipients.

Figure A2.16 Distribution of Recipients and Donors by Sex, Age, and Education

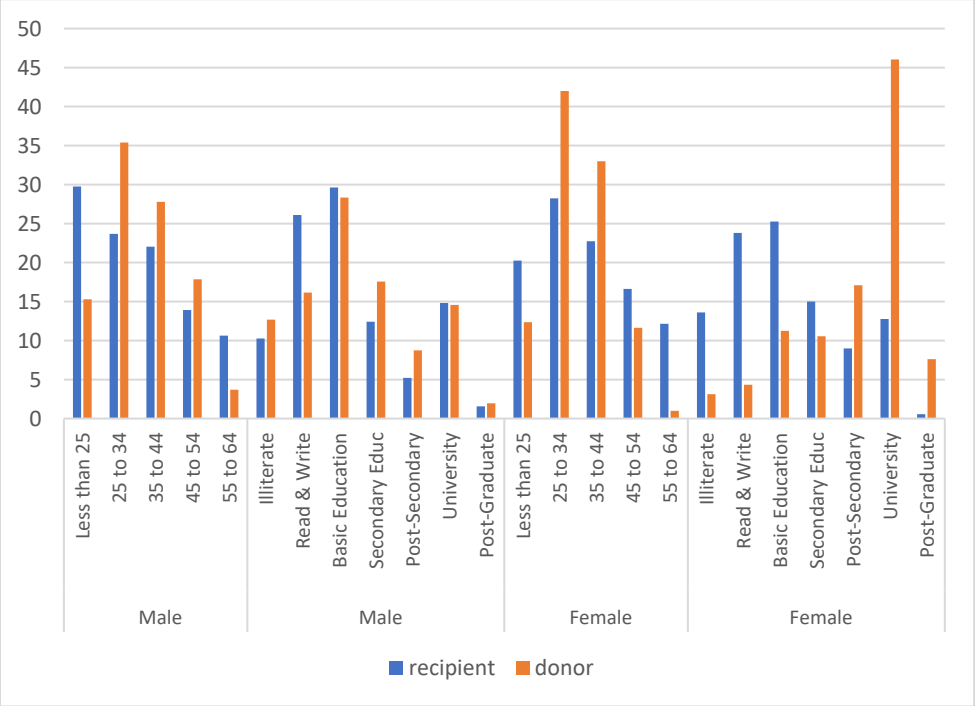
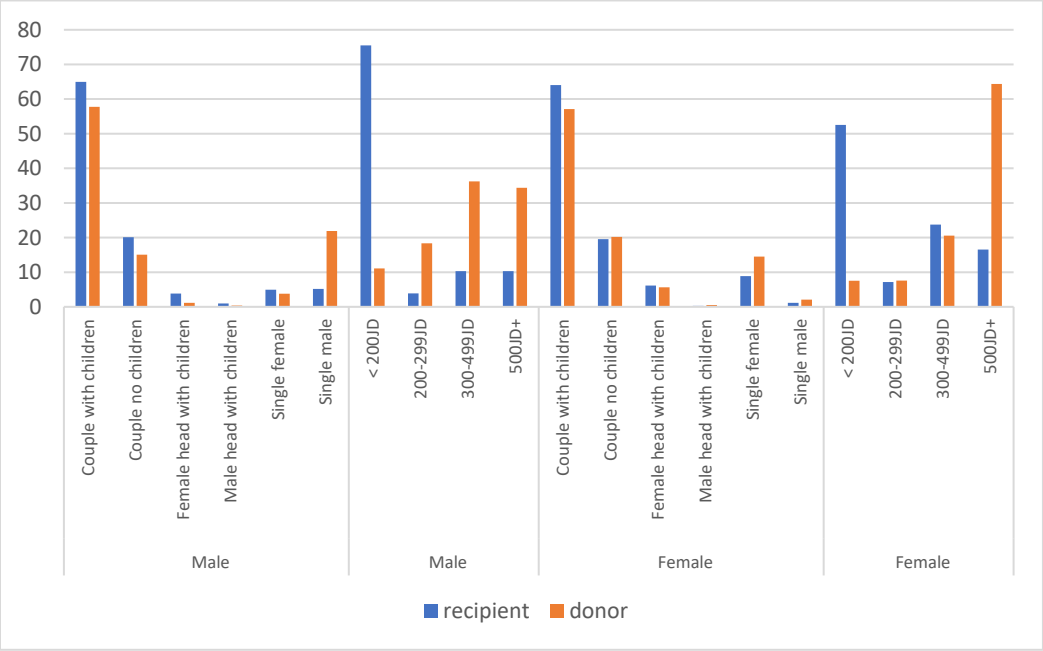


Figure A2.17, below, gives the distributions of the recipient and donor pools by sex, type of household, and household earnings category. Unsurprisingly, more donor records are in households with higher earnings. They are also more likely to be married couple households, rather than single-headed households without children.

Figure A2.17 Distribution of Recipients and Donors by Sex, Household Type, and Household Earnings Category



The sexual division of work in the two assignments is in stark contrast (see Table A2.12, below). Almost all of the jobs in the construction scenario went to men, while over half of the jobs in the ECEC scenario went to women. We next check the rate at which individuals are assigned to their most likely industry and occupation by tabulating the assigned industry with the likeliest industry and then the assigned occupation with the likeliest occupation. These tabulations are shown for both scenarios in Tables A2.13–A2.16, below. The results are influenced by the structure of the jobs created, of course. For the construction employment simulation, 87 percent of job recipients received jobs in their likeliest industries (see the bolded entries in Table A2.12, below). The ECEC sector was no recipient's likeliest industry, yet most of the jobs in that scenario were in the ECEC sector. Thus, in that simulation, only 15 percent of recipients received jobs in their likeliest industry. Of those who were not assigned jobs in the ECEC sector, however, 69 percent were in their likeliest industry. As far as the assignment by occupation is concerned, no recipient's likeliest occupation was manager. In the construction employment simulation, 69 percent of recipients got their likeliest occupation, corresponding to only 30 percent in the ECEC simulation. This is, in part, a reflection of the characteristics of the recipient pool and the existing occupational structure of the labor market in Jordan.

Table A2.12 Jobs assigned by Sex and Employment Scenario

	Male	**Female**	**Total**
Construction	58,172	2,960	61,132
ECE	89,465	129,136	218,601

Table A2.13 Assigned Industry by Likeliest Industry of Job Recipients in the Construction Employment Simulation

Construction Scenario		**Likeliest Industry**												
Assigned Industry		1	2	3	4	6	7	9	13	14	15	16	17	Total
1	**A: Agriculture, forestry, and fishing**	**165**	0	0	0	0	0	0	0	0	0	0	0	165
2	**B: Mining and quarrying**	0	**161**	0	0	0	0	0	0	0	0	0	0	161
3	**C: Manufacturing**	0	0	**6,154**	0	0	0	0	0	0	0	0	0	6,154
4	**D: Electricity, gas, steam and air conditioning**	0	65	0	**159**	0	0	0	0	0	0	0	0	224
5	**E: Water supply; sewage, waste management**	0	0	0	0	0	0	0	0	0	0	0	0	0
6	**F: Construction**	0	0	0	0	**29,083**	0	0	0	0	0	0	0	29,083
7	**G: Wholesale and retail trade**	0	0	0	0	0	**11,407**	0	0	0	0	0	0	11,407
8	**H: Transportation and storage**	0	69	0	0	0	3,838	0	0	0	920	0	0	4,827
9	**I: Accommodation and food service activities**	0	0	0	0	0	0	**287**	0	0	0	0	0	287
10	**J: Information and communication**	0	0	0	0	0	0	0	0	0	0	571	0	571
11	**K: Financial and insurance activities**	0	0	0	0	0	0	0	0	0	0	1,213	0	1,213
12	**L: Real estate activities**	0	0	0	0	0	0	20	0	0	285	0	0	305
13	**M: Professional, scientific and technical**	0	0	0	0	0	0	0	**2,293**	0	0	0	0	2,293
14	**N: Administrative and support service activities**	0	0	0	0	0	0	0	0	**242**	0	0	0	242
15	**O: Public administration and defense**	0	0	0	0	0	0	0	0	0	**1,144**	0	0	1,144
16	**P: Education**	0	0	0	0	0	0	0	0	0	0	**1,639**	0	1,639
17	**Q: Human health and social work activities**	0	0	0	0	0	0	0	0	0	0	0	**589**	589
18	**R: Arts, entertainment, and recreation**	0	0	828	0	0	0	0	0	0	0	0	0	828

19	**S: other service activities**	0	0	0	0	0	0	0	0	0	0	0	0	0
20	**T: Activities of households as employers**	0	0	0	0	0	0	0	0	0	0	0	0	0
21	**U: Activities of extraterritorial organizations**	0	0	0	0	0	0	0	0	0	0	0	0	0
22	**Early childhood education**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	165	295	6,982	159	29,083	15,245	307	2,293	242	2,349	3,423	589	61,132

Table A2.14 Assigned Industry by Likeliest Industry of Job Recipients in the Early Childhood Education Employment Simulation

ECE Scenario		**Likeliest Industry**													
Assigned Industry		1	2	3	4	6	7	9	13	14	15	16	17	20	Total
1	**A: Agriculture, forestry, and fishing**	**588**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**588**
2	**B: Mining and quarrying**	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0
3	**C: Manufacturing**	0	0	**4,214**	0	0	0	0	0	0	0	0	0	0	4,214
4	**D: Electricity, gas, steam and air conditioning**	79	455	0	**159**	0	0	0	0	0	663	474	0	0	1,830
5	**E: Water supply; sewage, waste management**	0	0	0	0	0	0	0	0	0	639	0	0	0	639
6	**F: Construction**	0	0	0	0	**2,969**	0	0	0	0	0	0	0	0	2,969
7	**G: Wholesale and retail trade**	0	0	0	0	0	**10,566**	0	0	0	0	0	0	0	10,566
8	**H: Transportation and storage**	0	69	0	0	0	3,832	0	0	0	845	0	0	0	4,746
9	**I: Accommodation and food service activities**	0	0	0	0	0	0	**1,315**	0	0	0	0	0	0	1,315
10	**J: Information and communication**	0	0	0	0	0	0	0	0	0	382	944	0	0	1,326
11	**K: Financial and insurance activities**	0	0	0	0	0	0	0	0	0	0	2,551	0	0	2,551

12	**L: Real estate activities**	0	0	0	0	0	0	100	0	0	594	0	0	0	694
13	**M: Professional, scientific and technical**	0	0	0	0	0	0	0	**2,618**	0	0	0	0	0	2,618
14	**N: Administrative and support service activities**	0	0	0	0	0	0	0	0	**2,591**	662	0	0	0	3,253
15	**O: Public administration and defense**	0	0	0	0	0	0	0	0	0	**1,444**	0	0	0	1,444
16	**P: Education**	0	0	0	0	0	0	0	0	0	0	**5,161**	0	0	5,161
17	**Q: Human health and social work activities**	0	0	0	0	0	0	0	0	0	0	0	**1,362**	0	1,362
18	**R: Arts, entertainment, and recreation**	0	1	2	3	4	5	6	7	8	9	10	11	12	13
19	**S: other service activities**	0	0	2,544	0	0	0	0	0	0	0	0	0	0	2,544
20	**T: Activities of households as employers**	0	0	0	0	0	0	0	0	0	0	0	0	**251**	251
21	**U: Activities of extraterritorial organizations**	0	0	0	0	0	0	0	0	0	0	97	0	0	97
22	**Early childhood education**	2,574	175	28,558	0	3,402	8,932	440	0	3,298	34,103	69,038	19,247	666	170,433
	Total	3,241	699	35,316	159	6,371	23,330	1,855	2,618	5,889	39,332	78,265	20,609	917	218,601

TableA2.15 Assigned Occupation by Likeliest Occupation of Job Recipients in the Construction Employment Simulation

Construction Scenario	**Likeliest Occupation**								
Assigned Occupation	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
1 Managers	421	0	0	0	0	127	0	0	548
2 Professionals	**5,372**	143	65	1,772	0	1,816	69	190	9,427
3 Technicians and associate professionals	381	**966**	551	0	0	496	75	0	2,469
4 Clerical support workers	994	36	**473**	2,747	0	258	285	0	4,793
5 Service and sales workers	0	0	0	**3,740**	0	0	0	409	4,149

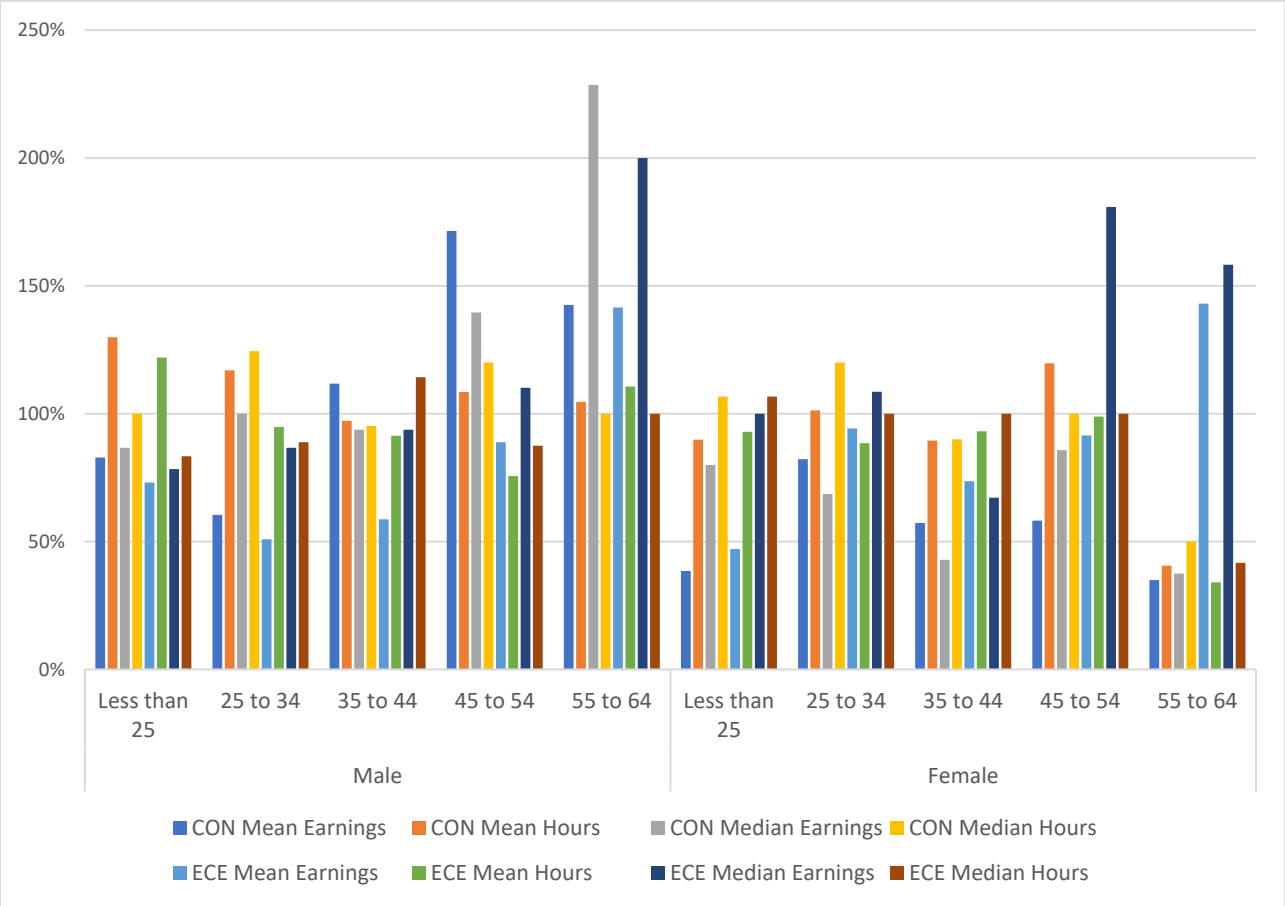
6	**Skilled agricultural, forestry and fishing**	0	0	0	0	**165**	0	0	0	165
7	**Craft and related trades workers**	103	80	0	5,824	0	**27,875**	0	161	34,043
8	**Plant and machine operators**	118	0	0	1,528	0	575	**871**	0	3,092
9	**Elementary occupations**	0	0	0	1,129	0	702	0	**615**	2,446
	Total	7,389	1,225	1,089	16,740	165	31,849	1,300	1,375	61,132

Table A2.16 Assigned Occupation by Likeliest Occupation of Job Recipients in the Early Childhood Education Employment Simulation

ECE Scenario	**Likeliest Occupation**								
Assigned Occupation	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
1 Managers	15,996	6,820	0	0	0	0	0	0	22,816
2 Professionals	**50,575**	28,408	218	826	2	0	174	15,382	95,585
3 Technicians and associate professionals	4,348	**1,374**	267	522	0	0	0	1,068	7,579
4 Clerical support workers	21,833	1,407	**714**	3,038	0	2,569	594	5,365	35,520
5 Service and sales workers	110	120	0	**4,208**	0	0	0	2,694	7,132
6 Skilled agricultural, forestry and fishing	0	0	0	0	**551**	0	0	0	551
7 Craft and related trades workers	1,673	0	0	7,188	214	**5,181**	132	357	14,745
8 Plant and machine operators	894	653	0	6,735	0	5,665	**1,744**	0	15,691
9 Elementary occupations	1,779	294	1,899	6,381	2,932	4,106	146	**1,445**	18,982
Total	97,208	39,076	3,098	28,898	3,699	17,521	2,790	26,311	218,601

Turning to the simulated distributions of earnings and hours, we first compare the earnings and hours by sex and age (Figure A2.18). For the most part, the recipients' mean and median earnings are between 50 and 100 percent that of the donors. For men, the ratios are higher for the construction than in the ECEC scenario. For women, the scenarios are more comparable in terms of hours and earnings. For women aged 55 to 64, simulated earnings are significantly higher than typical for this group in the ECEC scenario, though less than half for the construction scenario.

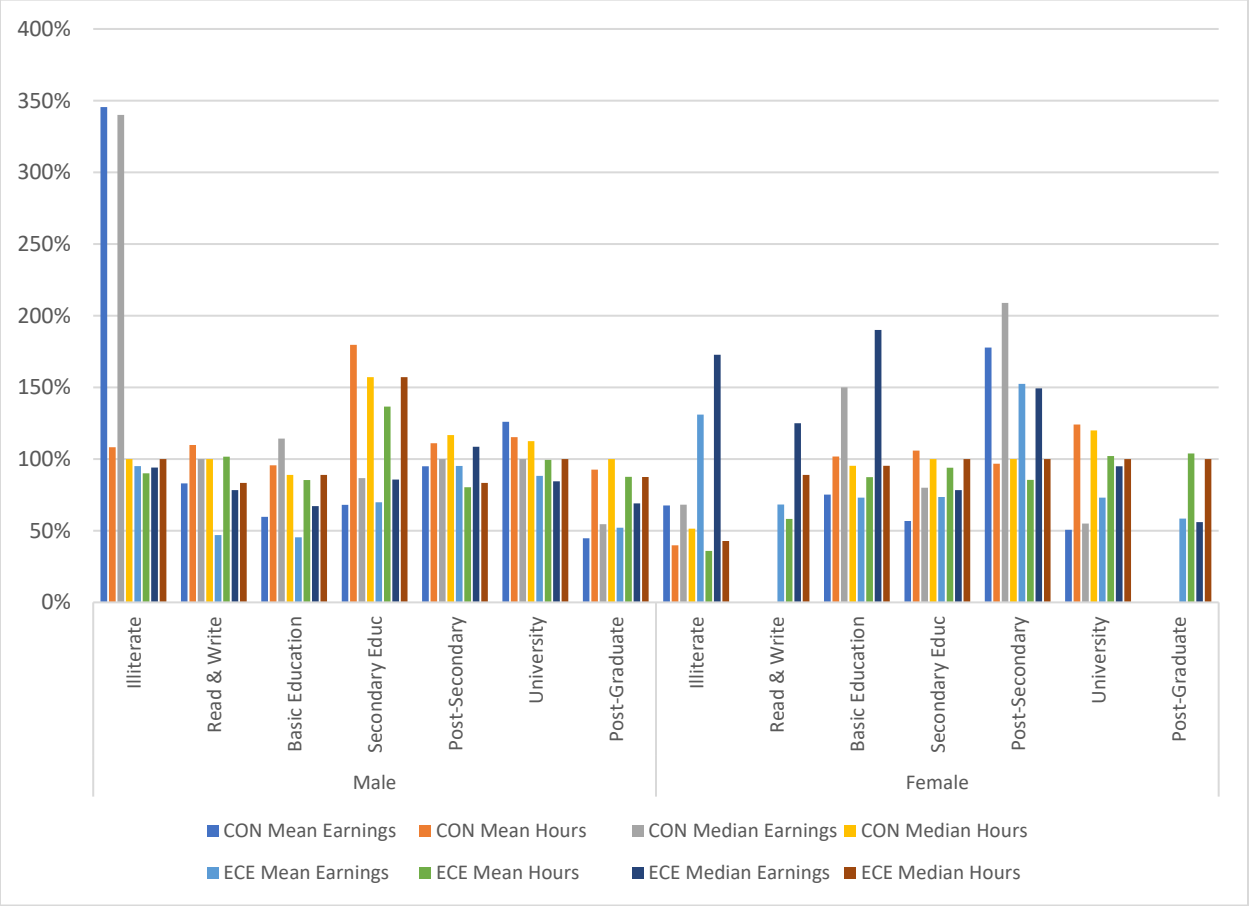
Figure A2.18 Ratio of Simulated to Donor Mean and Median Earnings and Hours, by Sex and Age



Turning to the distribution of hours and earnings by sex and educational attainment (Figure A2.19), it is first worth noting that in the construction scenario—less than 3,000 of the 62,000 jobs assigned—went to women. Half of the latter had attained basic education. For men, the illiterate made up the second smallest segment of job recipients by education (with 1,700 jobs going to illiterate men, only the post-graduates received fewer jobs with 900). The illiterate job recipients did get job assignments that were higher-paying than they might otherwise receive in the Jordanian job market, but the statistics here are for a small number of observations (just 15 records in the JLMPS). Almost all of the jobs in the construction scenario went to men with education levels from reading and writing to secondary education. In the ECEC scenario, the job recipients were more likely to have higher education. Among women, the bulk of the jobs went to those with secondary to university educations. Among male job recipients, the gains were more spread out,

also including those with basic education. Overall, the recipients received jobs with earnings and hours in line with those that their age–sex category currently receives in Jordan.

Figure A2.19 Ratio of Simulated to Donor Mean and Median Earnings and Hours, by Sex and Education



Overall, the simulation appears to be a good one, despite the limitations in the data (relatively small sample size and lack of information about non-labor incomes). The job assignments adequately reflect the job market situation in Jordan in 2016. Earnings and hours are not out of line for the Jordanian labor market.