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THE EVOLUTION OF WAGE FORMATION AND  
INEQUALITY IN JORDAN IN 2010-2016

Rami Galal and Mona Said

Working Paper No. 1209

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## Abstract

This paper investigates wage formation and inequality in Jordan over the period 2010 to 2016 using the Jordan Labor Market Panel Surveys. We take stock of the main distributional features of Jordanian wage structure in 2016 compared to 2010 focusing on population subgroups including by gender, sector, occupational skill-level, industry, geographic location, and level of education as well as low-wage earners. We utilize the panel aspects of the data to shed light on mobility within the distribution. To provide some explanation for the evolution of inequality, we estimate the returns to education, as well as sector-based and gender-based wage differentials that correct for differences in worker characteristics. The results show a rise in real wages and a decline in inequality over the period from 2010 to 2016. Wages across different subgroups display compression from both ends of the distribution, with fewer Jordanians falling below the low-wage earnings line, and wages for the highest-paid groups declining. Rises in median wages hold across the population, even among more disadvantaged groups, for example the illiterate. Declining incremental returns to education and narrowing sector-based and gender-based wage differentials are consistent with the overall decline in wage inequality.

**JEL Classifications:** D31, E24, J31, O15

**Keywords:** Income Inequality, Wage Structure, Jordan.

## ملخص

تبحث هذه الورقة في تكوين الأجور وعدم المساواة في الأردن خلال الفترة من 2010 إلى 2016 باستخدام استطلاعات فريق سوق العمل الأردنية. نحن نقيم السمات الرئيسية لتوزيع هيكل الأجور الأردني في عام 2016 مقارنة بعام 2010 مع التركيز على المجموعات الفرعية للسكان حسب الجنس والقطاع ومستوى المهارة المهنية والصناعة والموقع الجغرافي ومستوى التعليم بالإضافة إلى العاملين ذوي الأجور المنخفضة. كما نقوم بتقييم جوانب البيانات المتعلقة بالبحث كبحت فريق لإلقاء الضوء على التنقل داخل هيكل توزيع الأجور. ولتقديم بعض التفسير لتطور عدم المساواة، فإننا نقدر عوائد التعليم، فضلاً عن الفروق في الأجور القائمة على القطاعات والنوع الاجتماعي التي تصحح الاختلافات في خصائص العامل. تبين النتائج ارتفاعاً في الأجور الحقيقية وانخفاضاً في عدم المساواة خلال الفترة من 2010 إلى 2016. وتظهر الأجور عبر مجموعات فرعية مختلفة ضغطاً من طرفي التوزيع، مع انخفاض عدد الأردنيين دون خط إيرادات الأجور المنخفضة، وأجور الفئات الأعلى دخلاً التي تسجل انخفاضاً، في حين تصاعدت الأجور المتوسطة بين السكان كافة، حتى بين الفئات الأكثر حرماناً، مثل الأميين على سبيل المثال. إن انخفاض العوائد المتصاعدة على التعليم وتضييق الفوارق القائمة على الأجور والقائمة على أساس النوع الاجتماعي تتسق مع الانخفاض العام في عدم المساواة في الأجور.

## **1. Introduction**

This paper explores the issues of wage formation and inequality in the Jordanian labor market between 2010 and 2016. It seeks to answer three main questions. First, what are the main distributional features of the Jordanian wage structure in 2016 compared to 2010? Second, what are the characteristics of the individuals whose wages have improved or declined? Third, to what extent do the returns to education, and sector- and gender-based wage differentials explain changes in wage inequality?

To answer these questions, the paper makes use of an extensive and new data set on the Jordanian labor market, which was collected in 2010 and 2016. The Jordan Labor Market Panel Survey (JLMPS) contains a wealth of information well-suited to investigating wage distribution. This data set allows us to provide a descriptive analysis of the levels of wages and their distributions for various subgroups within the population, as well as those at the lower end of the earnings distribution. It also allows us to utilize the panel aspects of the data to find out the characteristics of those individuals who witnessed relative gains or losses in their real wages over the two waves. Finally, it allows us to estimate the returns to education over the two waves, as well as sector- and gender-based wage differentials. Here we run regressions to estimate the determinants of wages, which we use to estimate the returns on education. We also estimate gender- and sector-based wage gaps.

The paper fills a gap in knowledge about the Jordanian labor market, as much of the existing analysis has not focused on inequality in Jordan. For example, international institutions like the World Bank have focused on the effect of external shocks at the macroeconomic level (Hakim et al., 2016, 2017) and constraints to poverty reduction (World Bank, 2016). Alhawarin and Kreishan (2017) looked at the extent to which minimum wage legislation has been adhered to in the formal and informal private sector, concluding that there is an alarming spread of violations ranging from 6% in formal activities to 27% in informal occupations. In general, women, less-educated workers, and those in micro-enterprises are more likely to earn below the applicable minimum wage. One exception to these studies is Said (2014), who, drawing on the first labor market survey of 2010, found that wage inequality is higher in the private than the public sector, but gender wage gaps remain compressed by international standards. This current paper builds on Said (2014), comparing her findings with those based on estimates from the JLMPS 2016, with the added advantage of utilizing the panel aspect of the data.

Our main findings are that real wages increased and inequality declined over the period from 2010 to 2016. Wages across different subgroups displayed compression from both ends of the distribution, with fewer Jordanians falling below the low-wage earnings line and wages for the highest-paid groups declining. Rises in median wages held across the entire population, even among the more disadvantaged groups, for example, the illiterate. Declining incremental returns to education and narrowing sector-based and gender-based wage differentials are consistent with the overall decline in inequality.

The paper is organized as follows. Section 2 presents trends in the evolving structure of wages in the labor market from the cross-sectional data in the two waves of the JLMPS. Section 3 explores the issue of mobility within the distribution by utilizing the panel data. Section 4 presents estimates of the returns to education as well as sector-based and gender-based wage differentials that correct for differences in worker characteristics. Section 5 concludes.

## **2. Wage levels and distributions over time**

This section first describes the data used in the analysis. It then reviews the evolution of levels and distributions of wages, paying attention to gender, sector of employment, occupational skill-level, industry, geographic location, level of education, as well as low-wage earners. It then looks at the characteristics of those individuals who fared best over the 2010 to 2016 period.

In terms of the data, this paper utilizes wage data from the Jordan Labor Market Panel Survey for 2010 and 2016 (Krafft and Assaad, 2018). The latest wave of the data was collected by the Economic Research Forum (ERF) and the Jordanian Department of Statistics (DOS).<sup>2</sup> The completion of the second wave represents the first time there exists detailed information about the labor market experiences of workers in Jordan in a panel format. The survey contains a wealth of information on household composition and socioeconomic characteristics such as income, parental background, measures of access to the labor market, detailed education history, ownership of assets, migration histories and activity status. The survey is nationally representative, covering 25,953 observations in 2010 and 33,450 in observations in 2016.

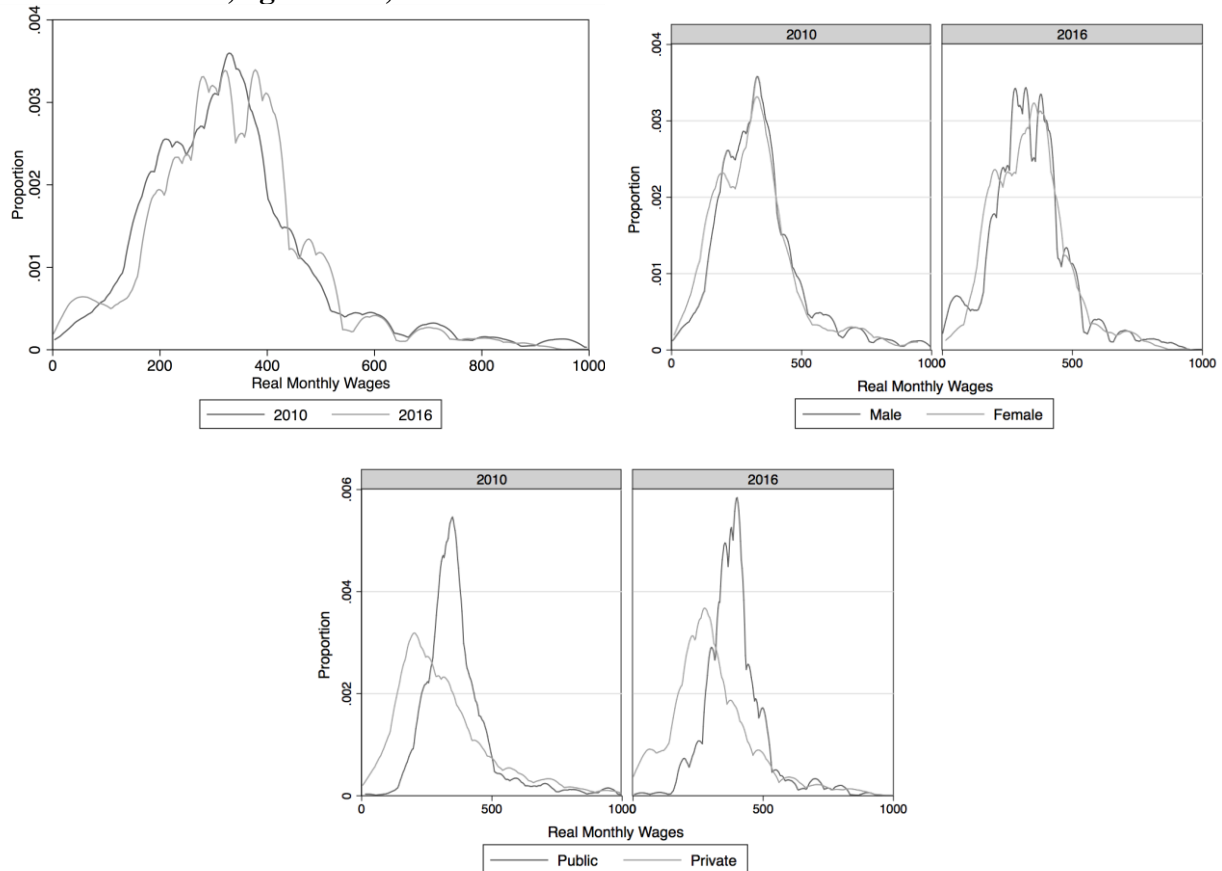
In all calculations, we excluded the top percentile of observations due to the presence of outliers that greatly skewed the results. The variable used for wages is real monthly wages in 2017 prices. We restricted our sample to wage-workers aged 15-64 with positive earnings. This leaves 4,824 and 5,309 observations in 2010 and 2016 respectively in the cross-sectional analysis and 1,611 in the panel analysis.

Turning to the descriptive analysis, the distributions of real monthly wages across the two waves, as displayed in Figure 1, shows that the mean of wages has slightly increased, and that the mode of the 2016 distribution is lower than of 2010, suggesting a more equal distribution. The wage distributions for men and women do not reveal drastically different findings by gender, though the male distributions are at a slightly higher mean. A major difference in the distributions is apparent when we compare public and private wages, where wages in government and public enterprises are much higher than in the private sector. Over time, private sector wages have caught up to some degree with public sector wages.

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<sup>2</sup> Public use microdata from the 2016 wave of the JLMPS, as well as all previous waves of ERF LMPSs, are available through ERF's Open Access Microdata Initiative (OAMDI). Researchers can access the microdata free of charge from the ERF Data Portal ([www.erfdataportal.com](http://www.erfdataportal.com)) after completing the required registration procedures.

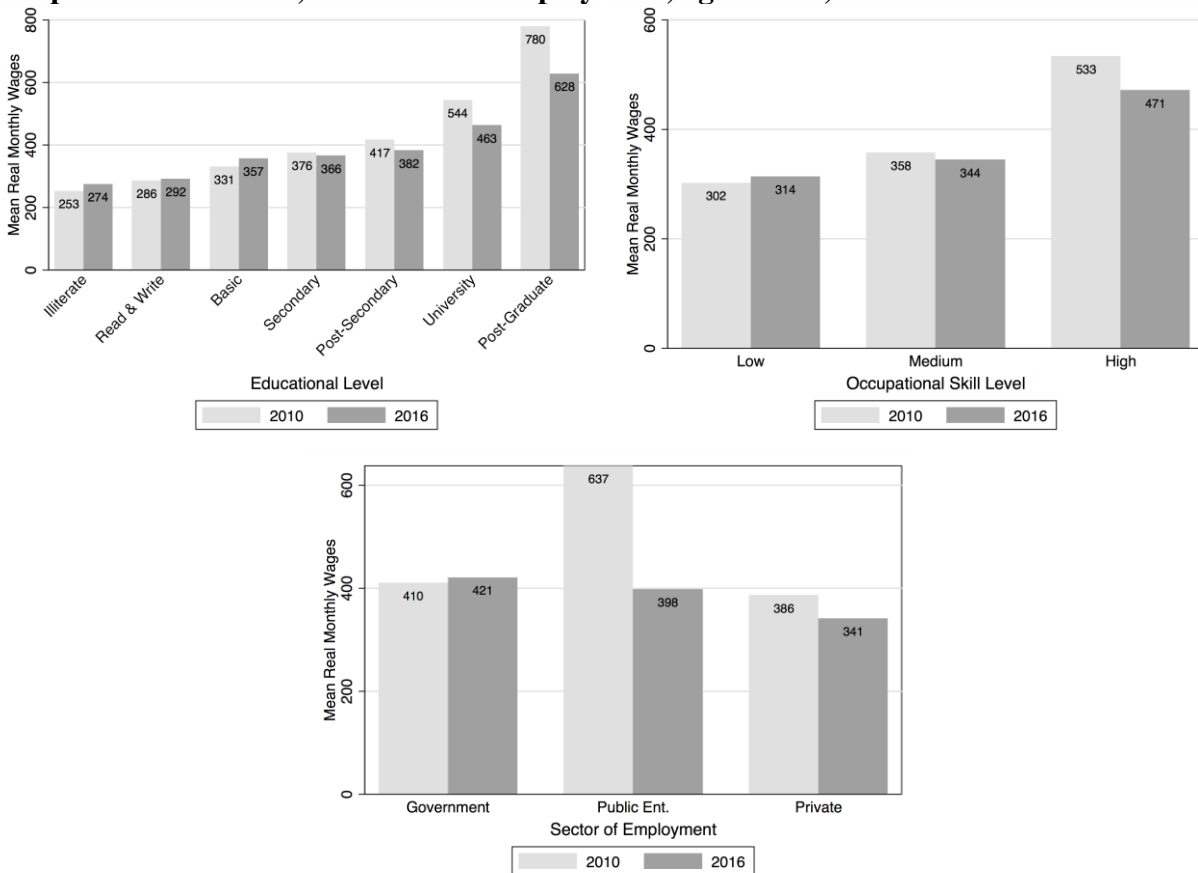
**Figure 1. Real monthly wage distributions, 2017 Jordanian dinars, full sample and by gender and sector, ages 15-64, 2010 and 2016**



Source: Authors' calculations on JLMPS 2010 and 2016.  
 Note: Observations above 1,000 have been cut to better display the distribution.

Real wages over the period between 2010 and 2016 have also exhibited compression. Figure 2 displays the real wages across education subgroups, occupational skill-levels, and sectors of employment respectively. Among the groups that witnessed the largest rises in real wages were those with no education and those in the lower-skilled and predominantly agricultural sector compared to manufacturing and services. Meanwhile, the largest declines in real wages were among the highest earnings subgroups including those working in public enterprises. A fuller detailing of median and mean wages over the two waves is available in the Appendix Table A.1, but the numbers depict a narrowing of the gap over time. Sectors that witnessed declines in real wages included construction, which is consistent with the macroeconomic slowdown of economic growth and declining oil prices. The largest wage rises were in agriculture, and the government and public administration sectors.

**Figure 2. Mean real monthly wages by educational level, 2017 Jordanian dinars, occupational skill level, and sector of employment, ages 15-64, 2010 and 2016**



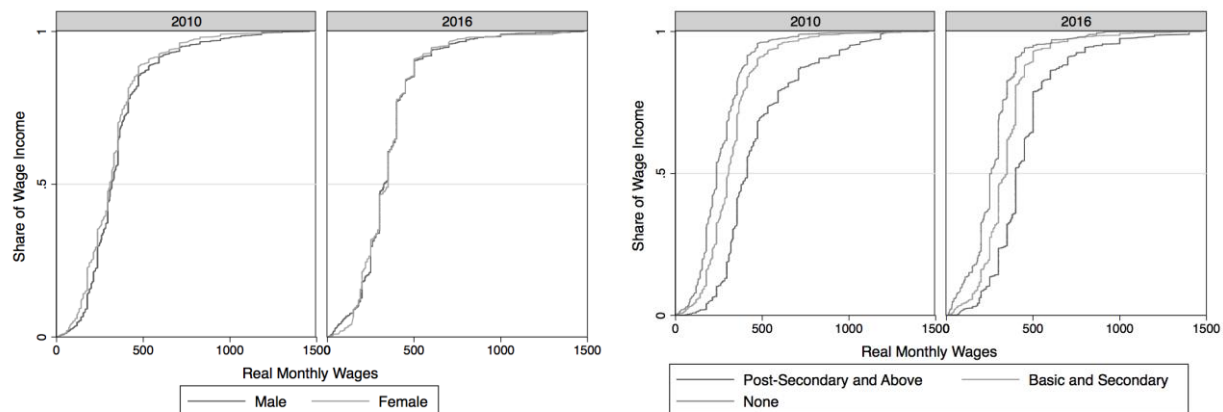
Source: Authors' calculations on JLMPS 2010 and 2016.

Note: Occupational Skills levels has been arranged as follows: High – managers, technicians, and associate professionals; Medium – clerical support, service and sales, and craft and trade workers; Low – agricultural, plant and machinery, and other elementary occupations. “Other” and “International” categories suppressed in sector of employment due to lower than 50 observations in either wave.

Another way of looking at how inequality has evolved over the two waves is to compare the cumulative distributions functions, which is done in Figure 3 by gender and level of education. The distributions between men and women in the two waves are almost identical. In the second panel showing distributions by education, the higher educated groups are ahead of those with lower levels of education, however the gaps are narrowing between the two waves. It is also worth noting that many observations in 2016 have identical wages, as displayed in the vertical portions of the curves. While median wages may be close to identical for some subgroups, the mean wages for these groups are also presented in Appendix Table A1 where a more expected ranking between subgroups is clearer.



**Figure 3. Distribution of real monthly wages by gender and level of education, 2017  
Jordanian dinars, ages 15-64, 2010 and 2016**



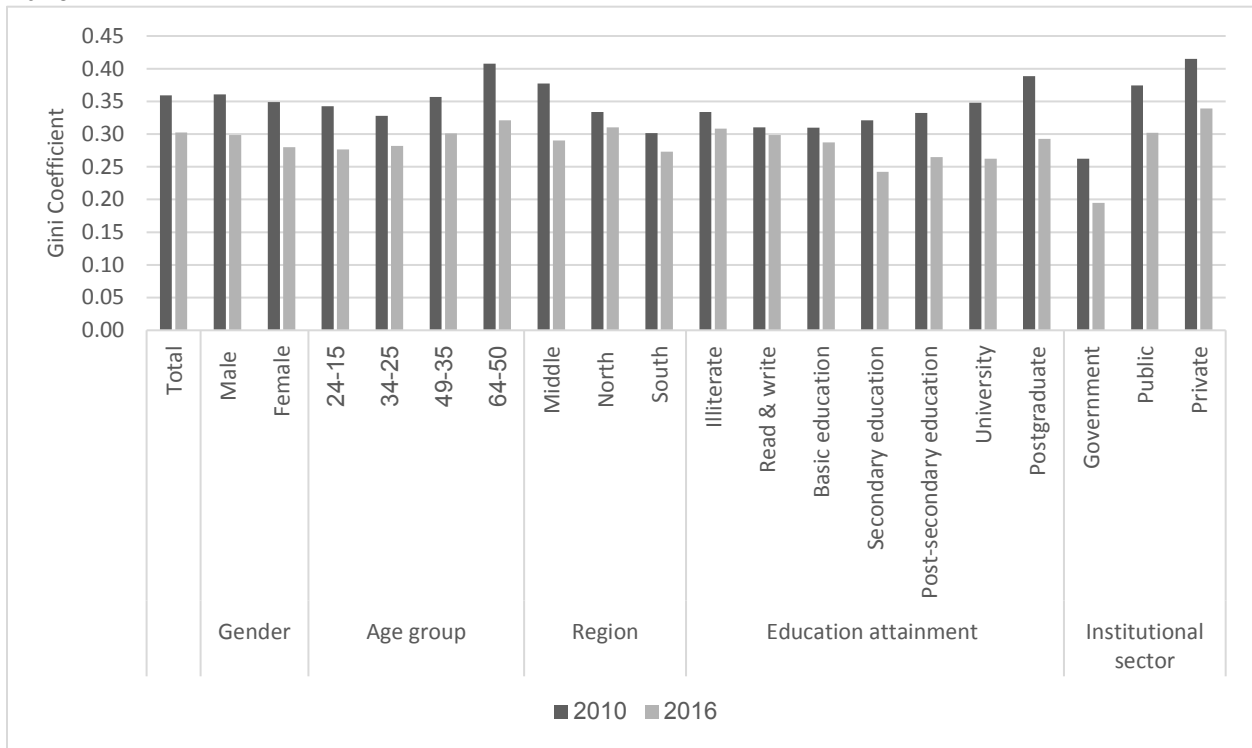
Source: Authors' calculations on JLMPS 2010 and 2016.

Note: Observations above 1,500 dinars have been cut to better display the distribution.

The presence of wage compression in the Jordanian labor market is further corroborated by inequality measures. Figure 4 displays trends in Gini coefficients over the 2010 to 2016 period, indicating that total inequality has declined from 36% to 30%, matched by similar declines across all subgroups by gender, age, region, educational attainment, and institutional sector. A more detailed enumeration of Gini coefficients for population subgroups is presented in Table A2 of the Appendix. The largest declines in inequality were among those groups displaying higher inequality in 2010. These included older age-groups, the Middle region of Jordan geographically, the relatively higher educated, agricultural, administrative, and service activities, and high-skill occupations. Perhaps the most important institutional change that took place in Jordan over this period was the change in maximum wage legislation, which set limits for maximum wages in government in accordance with the civil service law number 82 for 2013, and its amendments through 2017. It is important that those limits affected higher-grade jobs, particularly those on temporary contracts. Wage inequality fell by 26% in government, and by 19% in public enterprises.

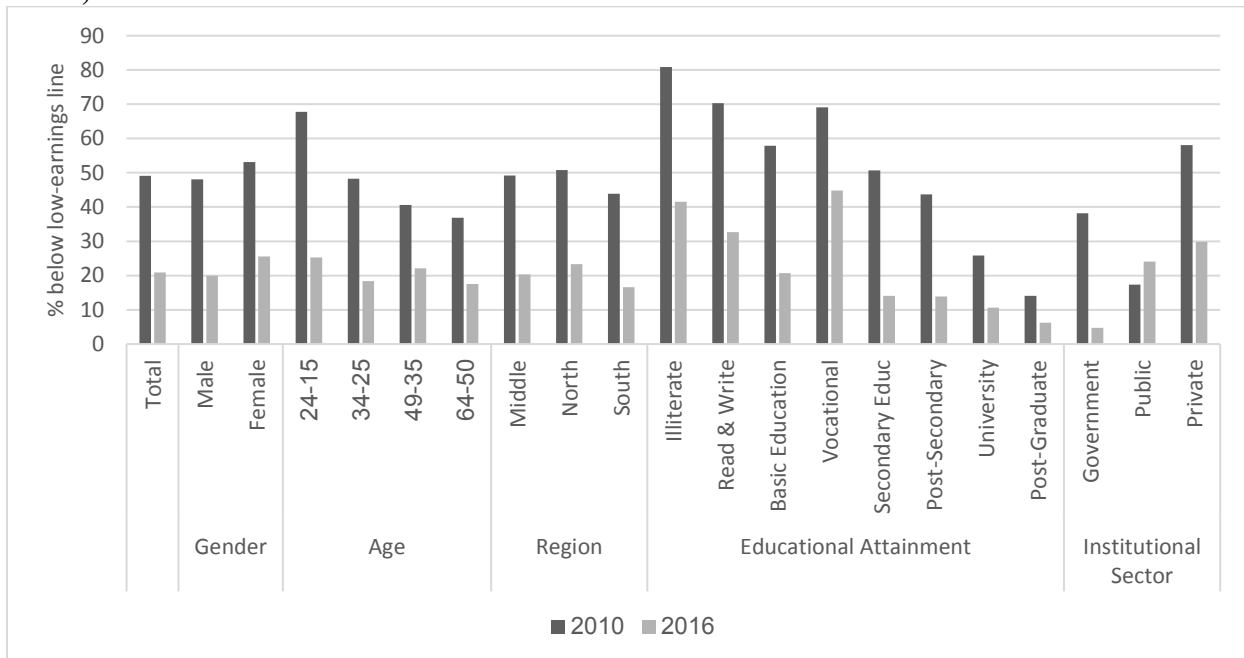
There is further evidence to suggest that the declines in inequality can also be traced to improvements in real wages at the lower end of the distribution. Figure 5 presents the percentage of workers that can be classified as low wage earners, i.e. their monthly wages are below a low earnings line which is derived from the monthly poverty lines for Jordan. The methodology for deriving the low earnings line is similar to Said (2015) and is described in Appendix B. As a result of the increase in real wages for all groups as discussed earlier, the share of those falling under the low earnings line has also substantially declined from 49% of all wage workers in 2010 to 21% in 2016. The decline was similar for men and women, more substantial for young workers up to age 34 in comparison to older workers, similar across regions, slightly greater among the higher educated, and larger for government employees relative to the private sector and public enterprises. Figures for the share of the population below the low earnings line for all subgroups is presented in Appendix Table B2. In 2016, the highest incidence of low waged workers remains for the illiterate and those who can only read and write i.e. workers with no education, and those working in agriculture and construction activities. There is also a slightly higher incidence of low wage workers in the private rather than the government and public sector. This profile of the low waged workers is actually quite similar to 2010 in Jordan, except the percentages in each case are much lower.

**Figure 4. Trends in wage inequality (Gini coefficients) by groups, ages 15-64, 2010 and 2016**



Source: Authors' calculations based JLMPS 2010-2016.

**Figure 5. Percentage of workers below the low-earnings line by population subgroup, ages 15-64, 2010 and 2016**



Source: Authors' calculations based JLMPS 2010-2016

### 3. Exploring mobility within the distribution using the panel data

This section focuses on the individuals present in both waves of the survey. After describing changes in real wages for different subgroups, we divide the sample by quintiles to see the overall level of mobility within the distribution. We then look at the characteristics of those who saw improvements, declines, or no change in their relative rank in the distribution.

Much like the findings in the cross-sectional analysis, the group of individuals in the panel also witnessed improvements in real wages over the two waves. The evolution of real median wages is presented in Table 1. The first striking feature is that the total rise in wages for the panel group was 23%, more than triple the increase apparent in the cross-sectional analysis. The second observation is that those with lower wages experienced relatively larger gains than those with higher wages. Also, the higher educated group in the panel displayed a greater rise in wages relative to the stagnation apparent in the cross-sectional analysis. There is also a substantial swing in the wages of public enterprise workers where instead of a decline, wages rose by 35%. A noteworthy commonality between the two sets of observations is that females still witnessed greater rises in wages than men by 7% to 9% in both instances.

**Table 1. Median real monthly wages for panel group, 2017 Jordanian dinars, 2010 and 2016**

|                                       | 2010 | 2016 | Change (%) | Number of Obs. |
|---------------------------------------|------|------|------------|----------------|
| <i>Level of Education (in 2010)</i>   |      |      |            |                |
| Read & Write                          | 236  | 300  | 27         | 179            |
| Basic Education                       | 306  | 350  | 14         | 588            |
| Secondary Educ.                       | 331  | 400  | 21         | 280            |
| Post-Secondary                        | 349  | 400  | 15         | 193            |
| University                            | 369  | 450  | 22         | 303            |
| Post-Graduate                         | 413  | 500  | 21         | 52             |
| <i>Gender</i>                         |      |      |            |                |
| Male                                  | 331  | 400  | 21         | 1,335          |
| Female                                | 307  | 400  | 30         | 276            |
| <i>Sector of Employment (in 2010)</i> |      |      |            |                |
| Government                            | 331  | 400  | 21         | 1,019          |
| Public Enterprise                     | 371  | 500  | 35         | 31             |
| Private                               | 296  | 350  | 18         | 524            |
| Total                                 | 325  | 400  | 23         | 1,611          |

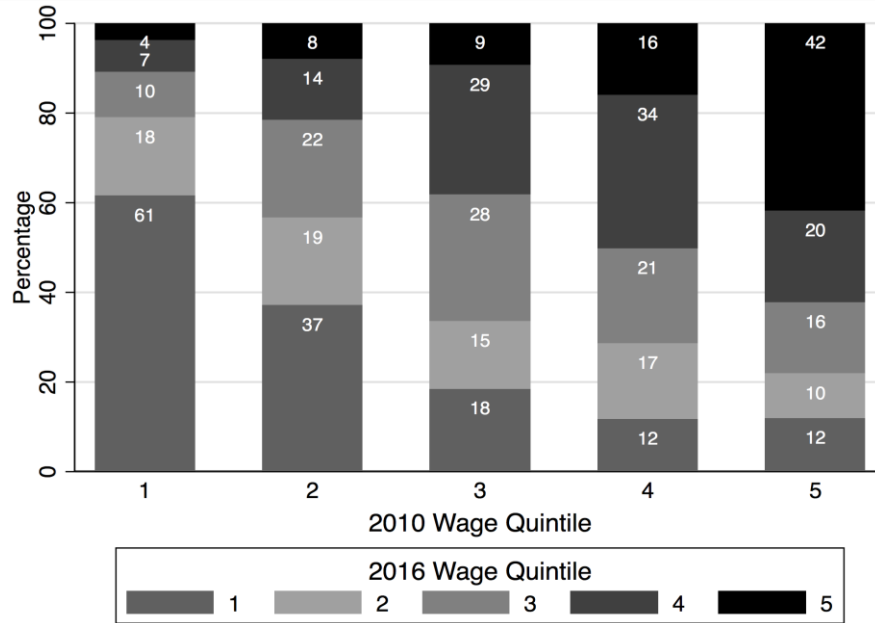
Source: Authors' calculations based JLMPS 2010-2016

Note: Sample limited to individuals present in both waves; panel weights used. "Illiterate" education category and "Foreign and International" employment sector categories suppressed due to lower than 30 observations.

One reason for the differences across the cross-sectional and panel groups is that the observations included in the panel are those with positive earnings in both waves. Therefore, by design, it does not include individuals who have just entered the labor market, lost their job, retired, or switched to self-employment from one wave to the other, even if present in both waves of the survey. While this may compromise the overall representativeness of the panel sample, comparing how the individuals in these different groups have fared compared to each other is telling of who saw the greatest improvements.

The panel aspect of the data also enables us to look at what are the characteristics of those individuals who did relatively better, worse, or stayed the same over time. The first step to doing so is to compare wage quintile ranks across the two waves to show whether individuals moved up, stayed where they were, or moved down in rank. This is displayed in Figure 6, which overall reveals a fair degree of mobility. 39% of those in the lowest wage quintile in 2010, and 44% of those in the second wage quintile improved their relative rank between 2010 and 2016. In all but the lowest quintile, more individuals shifted rather than maintained their rank.

**Figure 6. Shares (percentage) in 2016 wage quintile by 2010 wage quintile, ages 15-64**



Source: Authors' calculations based JLMPS 2010-2016  
 Note: Sample limited to individuals present in both waves; panel weights used.

Looking at the characteristics of those who moved up, down, or stayed at the same wage quintile also reveals a picture where even those individuals from more disadvantaged groups felt improvements. As shown in Table 2, 24% of those with no education, 27% of those with low-skilled occupations, 35% of females, 39% of the youngest age cohort, and 27% of private wage-workers all reached a higher wage quintile.

**Table 2. Shares moved down, stayed, and moved up by 2010 characteristics, percentage**

|                             | Moved down | Stayed | Moved up | Number of Obs. |
|-----------------------------|------------|--------|----------|----------------|
| <i>Education</i>            |            |        |          |                |
| Higher Education            | 29         | 41     | 30       | 374            |
| Basic and Secondary         | 37         | 33     | 29       | 992            |
| None                        | 30         | 46     | 24       | 191            |
| <i>Occupation Skill</i>     |            |        |          |                |
| High                        | 32         | 41     | 28       | 511            |
| Medium                      | 36         | 34     | 30       | 794            |
| Low                         | 36         | 37     | 27       | 571            |
| <i>Gender</i>               |            |        |          |                |
| Male                        | 35         | 37     | 28       | 1,290          |
| Female                      | 31         | 34     | 35       | 266            |
| <i>Age</i>                  |            |        |          |                |
| 15-24                       | 28         | 33     | 39       | 319            |
| 25-34                       | 38         | 35     | 27       | 692            |
| 35-49                       | 34         | 40     | 27       | 493            |
| 50-64                       | 36         | 55     | 8        | 52             |
| <i>Sector of Employment</i> |            |        |          |                |
| Public                      | 36         | 34     | 30       | 801            |
| Private                     | 33         | 40     | 27       | 755            |
| Total                       | 35         | 35     | 30       |                |

Source: Authors' calculations based JLMPS 2010-2016

Note: Rows add up to 100

Taken together, the findings from the panel group tell a story consistent with the cross-sectional analysis. Firstly, real wages increased across all groups, but with a greater magnitude across the more disadvantaged groups. Secondly, more individuals changed wage quintile ranks than remained in the same rank. And thirdly, those with less privileged characteristics shared in the upward mobility in the wage structure.

#### **4. Estimating returns to education and wage differentials by sector and gender**

The previous two sections have shown that real wages have increased and wage inequality has declined. This section seeks to provide some answers as to why these changes have taken place. In particular, it explores the extent to which these outcomes can be explained by changes in the returns to education, as well as gender- and sector-based wage differentials.

The first step to doing so requires an empirical analysis of wages that measures sector and gender wage differentials correcting for individual differences in characteristics as well as in returns to these characteristics. Using the same estimation strategy as Said (2015), ordinary least squares regressions (weighted by sampling weights, described below) are used to estimate separate wage equations for workers in the public (p), and private (r) sectors as follows:

$$(1) \quad \ln(w_{is}) = x_{is}\beta_s + u_s$$

$$(s = p, r)$$

where  $\ln(w_{is})$  is log hourly wages of individual  $i$  in sector  $s$  and  $X$  is the set of individual and job related characteristics known to be of relevance in determining wages. This is estimated twice, once for males ( $m$ ) and once for females ( $f$ ), yielding four equations.

Given the parameter estimates from (1), public-private wage differentials can be evaluated at the mean of the sample, using the following decomposition formula:

$$(2) \quad D_s = \ln(\bar{w}_s) - \ln(\bar{w}_r) = \frac{(\beta_s + \beta_r)(\bar{X}_s - \bar{X}_i)}{2} + \frac{(\beta_s - \beta_r)(\bar{X}_s + \bar{X}_i)}{2} \quad (s = p)$$

$D_s$  refers to the wage differential between the public and the private sector.  $\ln(w)$  refers to the mean of Ln wages.

The formula decomposes the wage differential into two main components. The first term, which is “explained,” is the part of the differential attributable to differences in observed characteristics of workers. The second term, which is “unexplained,” is the part of the differential resulting from differences in the pay structure, or in returns to the characteristics. Note that the unexplained component also includes the differential in base wage (the constant term) that can be interpreted as a premium or pure rent from attachment to a particular sector. Similarly the same formula can be used to decompose the male-female wage gap as follows:

$$(3) \quad D_f = \ln(\bar{w}_m) - \ln(\bar{w}_f) = \frac{(\beta_m + \beta_f)(\bar{X}_m - \bar{X}_f)}{2} + \frac{(\beta_m - \beta_f)(\bar{X}_m + \bar{X}_f)}{2}$$

Here the unexplained component (second term on the right hand side) is broadly taken to refer to a rough estimate of gender-based discrimination.

Tables 3 presents the OLS estimates for equation (1) for all workers, and for males and females in the public sector and private sector in 2010 and 2016 respectively (10 equations in total). Descriptive statistics for the variables used in the regressions are presented in Appendix Tables C1 and C2. Parameter estimates from OLS regressions were used to calculate annualized incremental returns to education for the males and females in the public and private sector, as presented in Table 4. The level of the coefficients provides a measure of the effect each additional level of education has on wages. The effect of being able to read and write is quite strong relative to going from basic education to secondary education for instance. For females, there is a larger leap in returns to education when moving from secondary to post-secondary education in both the public and private sector. This same phenomenon exists for males, but only in the public sector. The returns to university education are higher than post-secondary for men in the private sector, while for men in the public sector and for women, returns to university education are lower than post-secondary. Over the two waves, in most cases returns to education have declined or remained the same with the notable exception of post-secondary educated men and women in the public sector.

**Table 3. Ordinary least squares wage equation estimates, wage-workers using the market definition, ages 15-64, 2010 and 2016**

|                                   | Total                |                      | Male Private         |                      | Male Public          |                      | Female Private       |                      | Female Public       |                      |
|-----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|
|                                   | 2010                 | 2016                 | 2010                 | 2016                 | 2010                 | 2016                 | 2010                 | 2016                 | 2010                | 2016                 |
| Experience                        | 0.030***<br>(0.004)  | 0.034***<br>(0.004)  | 0.039***<br>(0.006)  | 0.031***<br>(0.006)  | 0.022***<br>(0.005)  | 0.031***<br>(0.005)  | 0.029*<br>(0.016)    | 0.041**<br>(0.016)   | 0.016<br>(0.010)    | 0.047***<br>(0.012)  |
| Experience Squared                | -0.000***<br>(0.000) | -0.001***<br>(0.000) | -0.001***<br>(0.000) | -0.001***<br>(0.000) | -0.000***<br>(0.000) | -0.001***<br>(0.000) | 0.000<br>(0.000)     | 0.000<br>(0.001)     | 0.000<br>(0.000)    | -0.001**<br>(0.000)  |
| <i>Education: ref. Illiterate</i> |                      |                      |                      |                      |                      |                      |                      |                      |                     |                      |
| Read & Write                      | 0.180**<br>(0.086)   | 0.164**<br>(0.064)   | 0.261**<br>(0.127)   | 0.170*<br>(0.091)    | 0.219<br>(0.149)     | 0.202*<br>(0.115)    | -0.091<br>(0.303)    | 0.115<br>(0.282)     | 0.188<br>(0.303)    | -0.236<br>(0.369)    |
| Basic Education                   | 0.354***<br>(0.084)  | 0.250***<br>(0.059)  | 0.392***<br>(0.124)  | 0.248***<br>(0.086)  | 0.414***<br>(0.147)  | 0.162<br>(0.107)     | -0.260<br>(0.291)    | 0.582**<br>(0.249)   | 0.345<br>(0.293)    | -0.053<br>(0.353)    |
| Vocational                        | 0.242*<br>(0.137)    | 0.207<br>(0.131)     | 0.302<br>(0.189)     | 0.059<br>(0.180)     | 0.386<br>(0.245)     | 0.510**<br>(0.220)   | -0.581<br>(0.755)    |                      | 0.269<br>(0.663)    |                      |
| Secondary Educ.                   | 0.455***<br>(0.086)  | 0.258***<br>(0.063)  | 0.514***<br>(0.130)  | 0.271***<br>(0.097)  | 0.464***<br>(0.149)  | 0.161<br>(0.110)     | 0.165<br>(0.299)     | 0.552**<br>(0.255)   | 0.38<br>(0.287)     | 0.034<br>(0.358)     |
| Post-Secondary                    | 0.667***<br>(0.088)  | 0.398***<br>(0.068)  | 0.784***<br>(0.141)  | 0.444***<br>(0.111)  | 0.616***<br>(0.151)  | 0.287**<br>(0.119)   | 0.356<br>(0.277)     | 0.534**<br>(0.247)   | 0.723***<br>(0.277) | 0.127<br>(0.346)     |
| University                        | 1.067***<br>(0.086)  | 0.740***<br>(0.062)  | 1.316***<br>(0.135)  | 0.943***<br>(0.098)  | 0.880***<br>(0.149)  | 0.531***<br>(0.110)  | 0.947***<br>(0.272)  | 0.929***<br>(0.231)  | 1.024***<br>(0.276) | 0.445<br>(0.342)     |
| Post-Graduate                     | 1.336***<br>(0.104)  | 0.841***<br>(0.087)  | 1.561***<br>(0.184)  | 1.021***<br>(0.224)  | 1.238***<br>(0.165)  | 0.750***<br>(0.134)  | 1.399***<br>(0.363)  | 1.076***<br>(0.314)  | 1.173***<br>(0.289) | 0.471<br>(0.350)     |
| <i>Region: ref. Middle</i>        |                      |                      |                      |                      |                      |                      |                      |                      |                     |                      |
| North                             | -0.013<br>(0.028)    | -0.144***<br>(0.028) | -0.109**<br>(0.052)  | -0.214***<br>(0.052) | 0.111***<br>(0.035)  | -0.034<br>(0.036)    | -0.438***<br>(0.124) | -0.309***<br>(0.102) | -0.003<br>(0.064)   | -0.263***<br>(0.074) |
| South                             | 0.132***<br>(0.035)  | -0.125***<br>(0.035) | 0.329***<br>(0.074)  | 0.043<br>(0.077)     | 0.066<br>(0.041)     | -0.134***<br>(0.043) | 0.094<br>(0.186)     | -0.224<br>(0.140)    | 0.108<br>(0.069)    | -0.223***<br>(0.081) |
| Female                            | -0.126***<br>(0.034) | -0.149***<br>(0.034) |                      |                      |                      |                      |                      |                      |                     |                      |
| Public                            | 0.228***<br>(0.026)  | 0.178***<br>(0.026)  |                      |                      |                      |                      |                      |                      |                     |                      |
| Constant                          | -0.341***<br>(0.086) | 0.177***<br>(0.059)  | -0.516***<br>(0.129) | 0.166*<br>(0.086)    | -0.043<br>(0.150)    | 0.437***<br>(0.110)  | -0.176<br>(0.281)    | -0.216<br>(0.237)    | -0.107<br>(0.284)   | 0.534<br>(0.353)     |
| Observations                      | 4,794                | 5,088                | 2,015                | 1,942                | 1,889                | 2,224                | 391                  | 419                  | 499                 | 503                  |
| R-squared                         | 0.170                | 0.102                | 0.152                | 0.090                | 0.132                | 0.075                | 0.252                | 0.172                | 0.192               | 0.174                |

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Source: Authors' calculations based JLMPS 2010-2016

**Table 4. Annualized incremental returns to education in Jordan, ages 15-64, 2010 and 2016**

|                 | Total |      | Male Private |      | Male Public |       | Female Private |       | Female Public |      |
|-----------------|-------|------|--------------|------|-------------|-------|----------------|-------|---------------|------|
|                 | 2010  | 2016 | 2010         | 2016 | 2010        | 2016  | 2010           | 2016  | 2010          | 2016 |
| Read & Write    | 0.04  | 0.03 | 0.05         | 0.03 | 0.04        | 0.04  | -0.02          | 0.02  |               |      |
| Basic Education | 0.04  | 0.02 | 0.03         | 0.02 | 0.05        | -0.01 | -0.04          | 0.12  | 0.04          | 0.05 |
| Secondary Educ. | 0.07  | 0.00 | 0.08         | 0.01 | 0.03        | 0.00  | 0.28           | -0.02 | 0.02          | 0.05 |
| Post-Secondary  | 0.11  | 0.07 | 0.14         | 0.09 | 0.70        | 0.91  | 1.13           | 0.50  | 1.00          | 1.91 |
| University      | 0.19  | 0.15 | 0.25         | 0.22 | 0.13        | 0.11  | 0.28           | 0.18  | 0.14          | 0.14 |
| Post-Graduate   | 0.10  | 0.04 | 0.09         |      | 0.13        | 0.08  |                |       | 0.05          | 0.01 |

Source: Authors' calculations based JLMPS 2010-2016

Note: Incremental returns calculated using the weighted average of years of education by level of educational attainment in each round. The "Read & Write" category is relative to "illiterate". The vocational education category has been suppressed as a whole due to systematically low sample sizes. Elsewhere cells with below 30 observations are suppressed.

The OLS estimates for the total workers equation has two dummy variables for working in the public sector and for being female. As such, the coefficient estimates on those two variables are indicative of the change in male-female and public-private differentials. They suggest a decline in the public sector wage premium and slight increase in the gender wage gap. These estimates however capture differences at the intercept. To estimate differentials that also take into account the impact of differences in the characteristics, we calculate the decompositions in equations 2 and 3 above. The results presented in Table 5 confirm the decline in public sector premia for males (from 23% to 14%), alongside an increase for females (from 19% to 25%). The corrected gender gap has declined in the public sector from 12% to 7%, and has remained at a higher level in the private sector at 15% to 17%.

**Table 5. Gender and sector wage differentials in Jordan, ages 15-64, 2010-2016**

|  | 2010  |           | 2016  |           |
|--|-------|-----------|-------|-----------|
|  | Crude | Corrected | Crude | Corrected |
| <i>Sector Wage Differentials</i>               |       |           |       |           |
| Male Public-private                            | 0.31  | 0.23      | 0.19  | 0.14      |
| Female Public-private                          | 0.48  | 0.19      | 0.40  | 0.25      |
| <i>Gender Wage Differentials (Female-Male)</i> |       |           |       |           |
| Public sector                                  | 0.15  | -0.12     | 0.41  | -0.074    |
| Private Sector                                 | -0.02 | -0.17     | -0.08 | -0.15     |

Source: Source: Authors' calculations based JLMPS 2010-2016

Note: Crude sector and gender wage differentials are simply differences in the means of log hourly wages. Corrected sector wage differentials are calculated as the difference between predicted log hourly wages for public sector employees using the public sector wage equation and their predicted log hourly wages using the private sector equation (expressed as a proportion of the former). Similarly, corrected Gender wage differentials are the difference between predicted female wages using the female equation and their predicted wages using the male equation.

In sum, this section has pointed to some reasons behind the overall decline in wage inequality between 2010 and 2016. First, returns to education have declined, especially among graduates. Second, the public wage premium has declined for men, and that the gender wage gap narrowed in the public sector.



## 5. Conclusion

This paper explored the evolution of wage levels and wage inequality in Jordan between 2010 and 2016. It asked what the main distributional features of the Jordanian labor market were in the two periods, what were the characteristics of the groups that saw either gains or declines over the period, and to what extent can these changes be explained by changes in returns to education and gender- or sector-based wage gaps. To answer these questions, the paper provided a descriptive analysis of the levels of wages and the distributions of wage inequality over the two waves focusing on subgroups within the population as well as those at the lower end of the earnings distribution. Then using the panel aspects of the data, it reviewed the characteristics of those individuals who witnessed relative gains or losses in their real wages over the two waves. It then estimated the returns to education over the two waves, as well as sector- and gender-based wage differentials.

The results of the analysis show that the Jordanian labor market has demonstrated rising real wages and declining inequality over the 2010 and 2016 period. The groups that witnessed the largest improvements in real wages were the relatively worse-off, including the youth, women, lower-educated, lower-skilled, and private sector workers. Improvements for individuals at the lower end of the wage distribution are consistent with the overall decline in inequality, as evidenced by the drop in the Gini coefficient from 36% to 30%. As a result of the increase in real wages for all groups, the share of those falling under the low-earnings line has also substantially declined from 49% of all wage workers in 2010 to 21% in 2016. This improvement in the lower part of the wage distribution is consistent with the finding that the characteristics of those that moved up in their wage quintile rank show that the most disadvantaged groups participated in these overall gains. While this is true in part by design, since lower groups have more to gain than those already at the top of the distribution, it does provide evidence for a fair degree of mobility within the wage-distribution where many of the worse-off shared in the improvements.

Consistent with the decline in inequality in overall wages, returns to education in Jordan also declined over this period. Decompositions of gender and sector wage differentials reveal that the public sector wage premium declined for men and that the unexplained gender gap in favor of men declined in the public sector, but remained higher and unchanged in the private sector.

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## Appendix A

**Table A1. Median and mean real wages in Jordan, ages 15-64, 2010 and 2016**

|   | Median |       | Mean  |       |
|---|--------|-------|-------|-------|
|   | 2010   | 2016  | 2010  | 2016  |
| Total                                   | 319    | 340   | 402   | 370   |
| <i>Gender</i>                           |        |       |       |       |
| Male                                    | 325    | 340   | 410   | 371   |
| Female                                  | 313    | 350   | 365   | 364   |
| <i>Age group</i>                        |        |       |       |       |
| 15-24                                   | 247    | 300   | 302   | 322   |
| 25-34                                   | 327    | 350   | 391   | 380   |
| 35-49                                   | 355    | 325   | 450   | 369   |
| 50-64                                   | 369    | 350   | 532   | 433   |
| <i>Region</i>                           |        |       |       |       |
| Middle                                  | 319    | 300   | 418   | 357   |
| North                                   | 319    | 350   | 370   | 391   |
| South                                   | 335    | 350   | 393   | 392   |
| <i>Educational attainment</i>           |        |       |       |       |
| Illiterate                              | 213    | 250   | 253   | 274   |
| Read & Write                            | 236    | 290   | 286   | 292   |
| Basic Education                         | 296    | 331   | 331   | 357   |
| Secondary Educ.                         | 315    | 350   | 376   | 366   |
| Post-Secondary                          | 355    | 350   | 417   | 382   |
| University                              | 414    | 400   | 544   | 463   |
| Post-Graduate                           | 512    | 500   | 780   | 628   |
| <i>Sector of activity</i>               |        |       |       |       |
| Agriculture, forestry and fishing       | 177    | 250   | 276   | 271   |
| Manufacturing                           | 296    | 315   | 362   | 367   |
| Construction                            | 296    | 260   | 359   | 336   |
| Retail trade; motor vehicle repair      | 251    | 300   | 330   | 344   |
| Transportation and storage              | 355    | 350   | 400   | 405   |
| Accommodation and food service          | 296    | 280   | 380   | 364   |
| Financial and insurance activities      | 414    | 400   | 724   | 460   |
| Professional, scientific, technical     | 473    | 450   | 703   | 504   |
| Admin. and support service              | 473    | 400   | 648   | 527   |
| Public admin., defense; social security | 213    | 300   | 327   | 333   |
| Education                               | 348    | 380   | 407   | 411   |
| Human health and social work            | 331    | 380   | 391   | 398   |
| Other service activities                | 365    | 400   | 506   | 466   |
| Activities of households as employers   | 284    | 250   | 354   | 268   |
| <i>Institutional sector</i>             |        |       |       |       |
| Government                              | 355    | 400   | 410   | 421   |
| Public                                  | 473    | 350   | 637   | 398   |
| Private                                 | 296    | 300   | 386   | 341   |
| Other                                   | 296    | 235   | 394   | 226   |
| International                           | 532    | 400   | 633   | 439   |
| <i>Occupational Level</i>               |        |       |       |       |
| High                                    | 248    | 300   | 302   | 314   |
| Medium                                  | 306    | 300   | 358   | 344   |
| Low                                     | 378    | 400   | 533   | 471   |
| Total observations                      | 4,824  | 5,309 | 4,824 | 5,309 |

Note: Categories with below 50 observations suppressed. Occupational Skills levels has been arranged as follows: High – managers, technicians, and associate professionals; Medium – clerical support, service and sales, and craft and trade workers; Low – agricultural, plant and machinery, and other elementary occupations.

**Table A2. Inequality across subgroups, ages 15-64, 2010 and 2016**

|   | Gini Coefficient |      | Change (%)<br>2010-2016 |
|---|------------------|------|-------------------------|
|   | 2010             | 2016 |                         |
| Total                                   | 0.36             | 0.30 | -16                     |
| <i>Gender</i>                           |                  |      |                         |
| Male                                    | 0.36             | 0.30 | -17                     |
| Female                                  | 0.35             | 0.28 | -20                     |
| <i>Age group</i>                        |                  |      |                         |
| 15-24                                   | 0.34             | 0.28 | -19                     |
| 25-34                                   | 0.33             | 0.28 | -14                     |
| 35-49                                   | 0.36             | 0.30 | -16                     |
| 50-64                                   | 0.41             | 0.32 | -21                     |
| <i>Region</i>                           |                  |      |                         |
| Middle                                  | 0.38             | 0.29 | -23                     |
| North                                   | 0.33             | 0.31 | -7                      |
| South                                   | 0.30             | 0.27 | -9                      |
| <i>Education attainment</i>             |                  |      |                         |
| Illiterate                              | 0.33             | 0.31 | -8                      |
| Read & write                            | 0.31             | 0.30 | -4                      |
| Basic education                         | 0.31             | 0.29 | -7                      |
| Secondary education                     | 0.32             | 0.24 | -25                     |
| Post-secondary education                | 0.33             | 0.26 | -20                     |
| University                              | 0.35             | 0.26 | -25                     |
| Postgraduate                            | 0.39             | 0.29 | -25                     |
| <i>Sector of activity</i>               |                  |      |                         |
| Agriculture, forestry and fishing       | 0.50             | 0.32 | -36                     |
| Manufacturing                           | 0.37             | 0.29 | -22                     |
| Construction                            | 0.38             | 0.47 | 26                      |
| Retail trade; motor vehicle repair      | 0.38             | 0.33 | -14                     |
| Transportation and storage              | 0.30             | 0.34 | 11                      |
| Accommodation and food service          | 0.32             | 0.32 | 0                       |
| Financial and insurance activities      | 0.39             | 0.28 | -27                     |
| Professional, scientific, technical     | 0.39             | 0.32 | -17                     |
| Admin. and support service              | 0.41             | 0.27 | -34                     |
| Public admin., defense; social security | 0.27             | 0.18 | -33                     |
| Education                               | 0.29             | 0.24 | -18                     |
| Human health and social work            | 0.39             | 0.27 | -30                     |
| Other service activities                | 0.42             | 0.29 | -30                     |
| Activities of households as employers   | 0.22             | 0.17 | -19                     |
| <i>Institutional sector</i>             |                  |      |                         |
| Government                              | 0.26             | 0.19 | -26                     |
| Public                                  | 0.37             | 0.30 | -19                     |
| Private                                 | 0.41             | 0.34 | -18                     |
| Other                                   | 0.42             | 0.28 | -33                     |
| International                           | 0.30             | 0.29 | -4                      |
| <i>Occupational Level</i>               |                  |      |                         |
| High                                    | 0.36             | 0.27 | -26                     |
| Medium                                  | 0.32             | 0.29 | -10                     |
| Low                                     | 0.33             | 0.30 | -8                      |

Source: Authors' calculations based JLMPS 2010-2016

Note: Categories with below 50 observations suppressed.

## Appendix B: Calculation of Low Earnings Line

The low earnings line was computed by using the official national poverty lines listed in Table B1. The poverty lines were converted to real terms using the consumer price index taking 2017 as the base year. The poverty line for 2010 was inflated by the CPI of 2017 to get an estimate of poverty line in 2016. To account for the fact that each worker's earnings are used to support not only him or herself but also other non-working members of their household, per-capita poverty lines were then scaled up by the real median ratio of household members to working-age employed household members. Table B1 shows the low earning lines that emanated for each year a result of this exercise. These are used to examine the portion of earners that can be classified as low-earners.

**Table B1. Real monthly per-capita poverty line and low-earnings line (2017 Jordanian Dinars)**

|      | Monthly poverty line | Dependency ratio | Low-earnings line |
|------|----------------------|------------------|-------------------|
| 2010 | 80.2                 | 4.0              | 320.7             |
| 2016 | 80.2                 | 3.0              | 240.5             |

Source: Author's calculations based on JLMPS 2010-2016 and poverty line from Dawass (2015) prepared by the Jordanian Department of Statistics based on the 2010 Household Expenditure and Income Survey.

Note: The decline in the dependency ratio from 4 to 3 signifies decreasing financial stress on the working class to support the dependent population. This may owe to a declining fertility rate from 3.9 to 3.3 from 2010 to 2016 (Sieverding et al., 2018).

**Table B2. Share of population below the low-earnings line, ages 15-64, 2010 and 2016**

|   | Level (%) |      | Change (%) |
|---|-----------|------|------------|
|   | 2010      | 2016 | 2010-2016  |
| Total                                       | 49        | 21   | -57        |
| <i>Gender</i>                               |           |      |            |
| Male  | 48        | 20   | -58        |
| Female                                      | 53        | 26   | -52        |
| <i>Age</i>                                  |           |      |            |
| 15-24                                       | 68        | 25   | -63        |
| 25-34                                       | 48        | 18   | -62        |
| 35-49                                       | 41        | 22   | -46        |
| 50-64                                       | 37        | 18   | -53        |
| <i>Region</i>                               |           |      |            |
| Middle                                      | 49        | 20   | -59        |
| North                                       | 51        | 23   | -54        |
| South                                       | 44        | 17   | -62        |
| <i>Educational Attainment</i>               |           |      |            |
| Illiterate                                  | 81        | 42   | -49        |
| Read & Write                                | 70        | 33   | -53        |
| Basic Education                             | 58        | 21   | -64        |
| Vocational                                  | 69        | 45   | -35        |
| Secondary Educ                              | 51        | 14   | -72        |
| Post-Secondary                              | 44        | 14   | -68        |
| University                                  | 26        | 11   | -59        |
| Post-Graduate                               | 14        | 6    | -56        |
| <i>Sector of activity</i>                   |           |      |            |
| A:Agriculture, forestry and fishing         | 83        | 36   | -56        |
| C:Manufacturing                             | 58        | 22   | -63        |
| F:Construction                              | 59        | 39   | -34        |
| G:Wholesale and retail trade; repair of     | 66        | 30   | -55        |
| H:Transportation and storage                | 43        | 24   | -45        |
| I:Accommodation and food service activities | 51        | 21   | -60        |
| K:Financial and insurance activities        | 22        | 3    | -84        |
| M:Professional, scientific and technical    | 23        | 5    | -77        |
| N:Administrative and support service act    | 83        | 32   | -62        |
| O:Public administration and defense; com    | 40        | 5    | -88        |
| P:Education                                 | 44        | 16   | -64        |
| Q:Human health and social work activities   | 38        | 10   | -74        |
| S:other service activities                  | 69        | 39   | -43        |
| T:Activities of households as employers     | 83        | 23   | -73        |
| <i>Institutional sector</i>                 |           |      |            |
| Government                                  | 38        | 5    | -87        |
| Public                                      | 17        | 24   | 39         |
| Private                                     | 58        | 30   | -49        |

Source: Authors' calculations based JLMPS 2010-2016

Note: Categories with below 50 observations suppressed.

## Appendix C

**Table C1. Means and Standard Deviations of Variables by Sector and Gender, ages 15-64, 2010**

| Variable              | Male   |        |         |          | Female |        |         |         | Total  |          |
|-----------------------|--------|--------|---------|----------|--------|--------|---------|---------|--------|----------|
|                       | Public |        | Private |          | Public |        | Private |         | Mean   | S.D.     |
|                       | Mean   | S.D.   | Mean    | S.D.     | Mean   | S.D.   | Mean    | S.D.    |        |          |
| Log Real Hourly Wage  | 0.73   | 0.70   | 0.42    | 1.06     | 0.88   | 0.66   | 0.40    | 1.14    | 0.59   | 0.92     |
| Real Hourly Wage      | 2.86   | 3.96   | 3.34    | 10.93    | 3.09   | 3.52   | 3.71    | 12.16   | 3.16   | 8.36     |
| Real Monthly Earnings | 442.56 | 554.42 | 636.69  | 2,642.90 | 369.47 | 288.94 | 478.16  | 1376.70 | 519.43 | 1,796.90 |
| Experience            | 13.98  | 9.78   | 15.71   | 11.37    | 10.67  | 8.02   | 9.37    | 8.76    | 13.99  | 10.45    |
| Experience2           | 291.20 | 361.61 | 375.96  | 478.29   | 177.87 | 237.77 | 164.34  | 294.76  | 304.72 | 407.53   |
| <i>Education</i>      |        |        |         |          |        |        |         |         |        |          |
| Illiterate            |        |        | 0.04    | 0.19     |        |        |         |         | 0.02   | 0.15     |
| Read & Write          | 0.10   | 0.30   | 0.20    | 0.40     |        |        | 0.10    | 0.30    | 0.13   | 0.34     |
| Basic Education       | 0.37   | 0.48   | 0.36    | 0.48     | 0.07   | 0.26   | 0.15    | 0.36    | 0.32   | 0.47     |
| Vocational            |        |        | 0.02    | 0.15     |        |        |         |         | 0.01   | 0.11     |
| Secondary Educ        | 0.20   | 0.40   | 0.16    | 0.37     | 0.09   | 0.28   | 0.11    | 0.31    | 0.16   | 0.37     |
| Post-Secondary        | 0.11   | 0.31   | 0.08    | 0.28     | 0.24   | 0.43   | 0.22    | 0.42    | 0.12   | 0.32     |
| University            | 0.17   | 0.38   | 0.12    | 0.32     | 0.48   | 0.50   | 0.33    | 0.47    | 0.19   | 0.40     |
| Post-Graduate         | 0.03   | 0.18   | 0.02    | 0.15     | 0.08   | 0.27   |         |         | 0.03   | 0.18     |
| <i>Region</i>         |        |        |         |          |        |        |         |         |        |          |
| Middle                | 0.33   | 0.47   | 0.65    | 0.48     | 0.38   | 0.48   | 0.69    | 0.46    | 0.50   | 0.50     |
| North                 | 0.43   | 0.50   | 0.25    | 0.43     | 0.35   | 0.48   | 0.23    | 0.42    | 0.33   | 0.47     |
| South                 | 0.24   | 0.42   | 0.10    | 0.30     | 0.28   | 0.45   | 0.08    | 0.28    | 0.17   | 0.38     |
| Sample Size           | 1,896  |        | 2,022   |          | 500    |        | 396     |         | 4,814  |          |

Source: Authors' calculations based JLMPS 2010-2016

Note: Categories with below 30 observations suppressed.

**Table C2. Means and Standard Deviations of Variables by Sector and Gender, ages 15-64, 2016**

| Variable              | Male   |        |         |         | Female |        |         |        | Total  |         |
|-----------------------|--------|--------|---------|---------|--------|--------|---------|--------|--------|---------|
|                       | Public |        | Private |         | Public |        | Private |        | mean   | S.D.    |
|                       | mean   | S.D.   | mean    | S.D.    | mean   | S.D.   | Mean    | S.D.   | mean   | S.D.    |
| Log Real Hourly Wage  | 0.84   | 0.75   | 0.65    | 1.07    | 0.95   | 0.74   | 0.55    | 0.97   | 0.76   | 0.91    |
| Real Hourly Wage      | 4.31   | 13.69  | 6.67    | 47.55   | 4.93   | 14.98  | 4.45    | 14.65  | 5.29   | 31.40   |
| Real Monthly Earnings | 434.99 | 310.02 | 685.47  | 7734.60 | 435.22 | 517.71 | 416.30  | 844.80 | 528.97 | 4789.50 |
| Experience            | 11.00  | 8.44   | 12.09   | 10.83   | 9.55   | 7.39   | 5.60    | 6.92   | 10.84  | 9.41    |
| Experience2           | 192.20 | 279.10 | 263.26  | 394.49  | 145.83 | 192.74 | 79.12   | 173.09 | 206.05 | 321.23  |
| <i>Education</i>      |        |        |         |         |        |        |         |        |        |         |
| Illiterate            | 0.02   | 0.14   | 0.09    | 0.29    |        |        |         |        | 0.05   | 0.22    |
| Read & Write          | 0.10   | 0.30   | 0.21    | 0.41    |        |        | 0.06    | 0.25   | 0.13   | 0.34    |
| Basic Education       | 0.41   | 0.49   | 0.31    | 0.46    | 0.09   | 0.28   | 0.14    | 0.34   | 0.32   | 0.47    |
| Vocational            |        |        | 0.02    | 0.14    |        |        |         |        | 0.01   | 0.10    |
| Secondary Educ        | 0.17   | 0.38   | 0.14    | 0.34    | 0.07   | 0.26   | 0.12    | 0.33   | 0.15   | 0.35    |
| Post-Secondary        | 0.07   | 0.26   | 0.08    | 0.27    | 0.18   | 0.39   | 0.15    | 0.36   | 0.09   | 0.29    |
| University            | 0.18   | 0.39   | 0.14    | 0.35    | 0.50   | 0.50   | 0.44    | 0.50   | 0.22   | 0.41    |
| Post-Graduate         | 0.03   | 0.18   |         |         | 0.11   | 0.32   |         |        | 0.03   | 0.18    |
| <i>Region</i>         |        |        |         |         |        |        |         |        |        |         |
| Middle                | 0.33   | 0.47   | 0.60    | 0.49    | 0.31   | 0.46   | 0.58    | 0.49   | 0.45   | 0.50    |
| North                 | 0.45   | 0.50   | 0.29    | 0.45    | 0.40   | 0.49   | 0.29    | 0.45   | 0.37   | 0.48    |
| South                 | 0.23   | 0.42   | 0.11    | 0.31    | 0.29   | 0.45   | 0.13    | 0.34   | 0.18   | 0.38    |
| Sample Size           | 2,322  |        | 2,095   |         | 436    |        | 525     |        | 5,378  |         |

Source: Authors' calculations based JLMPS 2010-2016

Note: Categories with below 30 observations suppressed.