ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية
2018

working paper series

INTRODUCING THE JORDAN LABOR MARKET PANEL SURVEY 2016

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Working Paper No. 1186

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April 2018

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First published in 2018 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

This paper introduces the 2016 wave of the Jordan Labor Market Panel Survey (JLMPS). The 2016 wave is a follow up on the initial 2010 wave. There has been substantial turmoil in the region since 2010, including the onset of the Syrian conflict and influx of refugees into Jordan. The 2016 wave over-sampled areas with a high proportion of non-Jordanians to be able to represent and examine this important population. The paper describes this sampling strategy, attrition from 2010 to 2016, and weighting that corrects for attrition and accounts for the sampling strategy. We compare key demographic measures and labor market statistics with other sources of data on Jordan to demonstrate the sample's representativeness. The data provides an important opportunity for detailed analysis of Jordan's changing labor market and society.

JEL Classifications: J00, C81, C83

Keywords: Survey data, Public use data, Sample weights, Labor, Refugees, Jordan.

ملخص

تقدم هذه الورقة موجة 2016 من مسح سوق العمل الأردنية وهي متابعة للموجة الأولى في عام 2010. فقد شهدت المنطقة اضطرابا كبيرا منذ موجة 2010، شمل بداية الصراع السوري وتدفق اللاجئين إلى الأردن. وغطت موجات غام 2016 نسبة عالية من غير الأردنيين بما لا يسمح باعتبارها عينة ممثلة لهذا الجزء المهم من السكان أو لفحصه. تصف الورقة استراتيجية أخذ العينات هذه وخفة حدتها من عام 2010 إلى عام 2016، والترجيح الذي يصحح هذا الانخفاض ويبرر استراتيجية أخذ العينات. نحن نقارن التدابير الديموجرافية الرئيسية وإحصاءات سوق العمل مع مصادر البيانات الأخرى في الأردن لإثبات تمثيل العينة. توفر البيانات فرصة مهمة لتحليل مفصل لسوق العمل والمجتمع الأردني المتغير.

1. Introduction

In the 2010 to 2016 period, Jordan was buffeted by large external shocks resulting from the eruption of the Arab Spring uprisings in late 2010 and 2011 and the subsequent conflicts in two of Jordan's neighbors, Syria and Iraq. These shocks have undoubtedly resulted in major changes in the Jordanian society and economy, changes that until now have not been fully investigated due to the limited availability of nationally-representative survey data. As part of its series of comprehensive labor market panel surveys, the Economic Research Forum had conducted a survey in Jordan in 2010, the Jordan Labor Market Panel Survey of 2010 (JLMPS 2010) and had planned to conduct a new wave after six years. The JLMPS 2016, which is the subject of this paper, thus comes at an opportune time to allow for an in-depth assessment of critical social and economic developments in Jordan's recent history.

The JLMPS is part of a series of labor market panel surveys carried out by the Economic Research Forum (ERF) in several Arab countries since 1998 and whose microdata are available for public use through the ERF data portal (www.erfdataportal.com). These surveys have, so far, been carried out in Egypt (1998, 2006, 2012), Jordan (2010, 2016) and Tunisia (2014) and a 2018 wave is currently underway in Egypt.[4] The ERF Labor Market Panel Surveys (LMPSs) are carried out in cooperation with the national statistical office of each country. Accordingly, the JLMPS 2016 was carried out in cooperation with the Jordanian Department of Statistics (DoS), which had preserved the personally identifiable information (PII) of the sample from the previous wave, supplied a refresher sample based on the design provided by ERF researchers, and implemented all data collection activities using tablet computers.[5]

As part of a longitudinal survey, the 2016 wave of JLMPS was designed to follow an existing population over time. However, the 2016 wave was also designed to capture the implications of the large influx of new populations, both refugee and migrant worker flows, into Jordan during the intervening period. To this end, the survey design team decided to add a large refresher sample of 3,000 households that over-sampled neighborhoods in Jordan that had high proportions of non-Jordanian households, including refugee camps, as ascertained by the 2015 Population Census. New modules were also added to the questionnaire to inquire about the in-migration of non-Jordanians, food security, and household exposure to shocks and coping strategies. We assume in this paper that the 2015 Census population counts of various nationality groups are appropriate for our sample and reproduce these counts by means of the appropriate ex-post weights.

1.1 Sample overview

As the second wave of the JLMPS longitudinal study, the JLMPS 2016 both followed the 2010 panel and added a refresher sample. For the panel component of the data, we attempted to recontact all households that were included in the 2010 wave. Among the households that were found, we also followed any split households. Split households occur when one or more individuals from 2010 leave their 2010 household to form a new household. For example, an individual who was the son of the household head in 2010 might marry and form a new household. The entire new household is included in our sample, including members who were not part of the 2010 sample. The refresher sample over-sampled neighborhoods in Jordan that, as of the 2015 Census, had a

[4] See Assaad, Ghazouani, Krafft, & Rolando (2016) for more information on TLMPS 2014, Assaad & Krafft (2013) for more information on ELMPS 2012, Assaad (2014) for more information on JLMPS 2010, Assaad & Roushdy (2009) for more information on ELMPS 2006, and Assaad & Barsoum (2000) for more information on ELMPS 1998.

[5] The questionnaire was programmed using the Askia CAPI software by programmers from Forcier Consulting (www.forcierconsulting.com).

high proportion of non-Jordanians. The final JLMPS 2016 sample is made up of 7,229 households, including 3,058 that were part of the original 2010 sample, 1,221 split households and 2,950 refresher households. The JLMPS 2016 sample captured a total of 33,450 individuals. We discuss the sampling strategy and the creation of the sampling and attrition weights in detail below.

1.2 The questionnaires

The questionnaires for JLMPS 2016 build on those used in 2010 as indicated in Table 1. The questionnaires include a household questionnaire, an individual questionnaire, and a questionnaire that elicits information about household enterprises and current migrants and remittances. The *household questionnaire* includes the identifying information for the household, a household roster and information on housing conditions, access to public services, ownership of durable goods and use of household help. The *individual questionnaire* includes: (i) a personal biography, which elicits information about marriage history, entry and exit from school, start and end of jobs, and residential mobility, (ii) modules on father's, mother's and siblings characteristics, (iii) self-reported health, health insurance, and health-seeking behavior (iv) educational status and detailed educational history, (v) employment in a short (one week) and long (three months) reference periods, (vi) unemployment and job search, (vii) subsistence and domestic work, (viii) detailed characteristics of the primary job, (ix) characteristics of the secondary job, (x) labor market history, (xi) fertility, (xii) women's status, (xiii) costs and characteristics of marriage, (xiv) women's employment, (xv) wage earnings in primary and secondary jobs, (xvi) return migration, (xvii) in-migration for non-Jordanians, (xviii) use of information technology, (xix) savings and borrowing behavior, and (xx) gender attitudes. The *current migration and household enterprise questionnaire* elicits information about (i) current migrants abroad, (ii) remittances, (iii) sources of non-labor income, (iv) household non-farm enterprises, including sections on hired labor, expenditures, assets and revenues,[6] (v) agricultural landholding, livestock, capital assets, revenue from crop production, and other sources of agricultural income. Note that additional questions on food security were added to the health module to ascertain household vulnerability to shocks. We also substantially revised the labor market history modules in light of lessons learned from a research that compared the reliability of retrospective data from the LMPSs to that of panel data (Assaad, Krafft, and Yassin 2017). The revisions consisted primarily of asking explicitly about employment and non-employment states rather than simply asking about past labor market statuses.

[6] Due to problems in the implementation of appropriate screening questions and skip patterns, a non-representative sub-sample of the self-employed and employers was captured; the resulting data will not be publicly released.

Table 1. Modules of the questionnaire in 2010 and 2016

Modules present in 2010	Modules added in 2016
Household questionnaire • Household identifying information • Household roster • Housing and durable goods	
Individual questionnaire • Father's characteristics • Mother's characteristics • Siblings' characteristics • Education • Employment • Unemployment • Subsistence and domestic work • Job characteristics • Secondary job • Women's employment • Fertility • Women's status • Cost and characteristics of marriage • Labor market history • Return migration • Wage earnings	*Individual questionnaire* • Personal biography (life history) • Health • In-migration (non-Jordanians) • Information technology • Savings & borrowing • Gender attitudes
Enterprise questionnaire • Remittances/Transfers • Other income sources • Household non-farm enterprises • Household non-farm enterprise employment • Agricultural assets • Access to credit	*Migration/Enterprise questionnaire* • Current migrants • Household non-farm enterprise expenditures • Household non-farm enterprise assets • Household non-farm enterprise revenues • Agricultural land • Livestock • Other agricultural income

1.3 Public use microdata access

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) after completing the required registration procedures. The data from individual country surveys can be obtained either as repeated cross section or as panel datasets. Harmonized data across all countries and waves can also be obtained by requesting the Integrated Labor Market Panel Survey (ILMPS) data set.

2. Data collection and sample attrition

2.1 Data collection and fielding

Data collection for the 2016 wave proceeded in two phases. First, enumeration was undertaken to track and, if possible, locate the 5,102 households included in the 2010 wave, including any households formed by individuals splitting from 2010 households. Second, fielding was undertaken with located households from 2010 as well as a refresher sample of 3,000 households that over-sampled neighborhoods with a high proportion of non-Jordanian household heads, as ascertained by the 2015 Population Census. The enumeration phase lasted from June 5, 2016 until November 14, 2016 and the main data collection phase lasted from December 10, 2016 until April 27, 2017.[7]

[7] Additional data collection to capture individuals or households missed in initial fielding continued until September 27, 2017.

2.2 2010 sample

The 2010 sample was a nationally-representative sample designed to represent urban and rural areas in the three regions of Jordan: North, Middle, and South. For sampling purposes, the sample was stratified into 30 strata based on a combination of the 12 governorates of Jordan and five different location classifications within them: (1) basic urban (2) rural (3) large central city urban in Amman, Zarqa, and Irbid governorates (4) suburban Amman and Zarqa and (5) exurban Amman. The 2010 sample captured 5,102 households and 25,953 individuals.[8]

2.3 Refresher sample

The refresher sample in 2016 was designed to over-sample neighborhoods with high proportions of non-Jordanians. The prior, 2010 wave, was implemented just prior to the Arab Spring and subsequent conflicts in the region. Although Jordan itself did not have internal conflict, its neighbors, Iraq and Syria, did, resulting in a large flow of refugees into Jordan. Based on the Jordanian Population Census of 2015, there were 9.5 million individuals in Jordan, of whom 6.6 million were Jordanian and 1.3 million were Syrian (Department of Statistics (Jordan) 2015a; b). UNHCR's estimate of the number of registered Syrian refugees in Jordan as of September 2017 was 654,000 (UNHCR 2017). Jordan hosts a large population of migrant workers, including 636,000 Egyptians as of 2015 (Department of Statistics (Jordan) 2015b). Jordan also hosts a number of Palestinians, with substantial waves of arrivals around 1948 and 1967 (Turner 2016). Individuals of Palestinian origin originating from the West Bank are Jordanian citizens and therefore counted in the Jordanian population. However, non-nationalized Palestinians were the third largest group after Syrians and Egyptians in Jordan, at around 634,000 individuals in 2015 (Department of Statistics (Jordan) 2015b). They are made up of Palestinians from Gaza as well as recent arrivals who had previously been Palestinian refugees in Syria. There were also around 131,000 Iraqis and smaller numbers from numerous other countries. Altogether, these non-Jordanians play a large and increasing role in the Jordanian economy. The refresher sample was designed to over-sample these groups in order to ensure national representativeness in the JLMPS 2016, as well as sufficient observations for analysis of key groups, such as Syrian refugees.

The sampling frame for the refresher sample was Jordan's 2015 Population and Housing Census. The census was fielded in late November of 2015. Table 2 shows the number of households and individuals in the 2015 Census, by nationality.[9] In total, there were 1.9 million households and 9.5 million individuals. These census data (geographically disaggregated, as discussed below) are also the source of our expansion factors for the JLMPS weights.

Table 2. Number of households and individuals in 2015 Census, by nationality

	Jordanian	Syrian	Egyptian	Other Arabs	Other Nationalities	Total
Households	1,412,157	243,972	96,640	159,534	29,600	1,941,903
Individuals	6,613,587	1,265,514	636,270	818,956	197,385	9,531,712

Source: Correspondence with DOS

Note: Households are private households (as per Department of Statistics (Jordan) 2015c). Individuals are not restricted to private households as this set of data was not available.

[8] A few individuals, during 2016 fielding, were determined to have been incorrectly included in the 2010 sample, for example, guests visiting were included but should not have been. These individuals were removed from the revised 2010 data.

[9] Based on spreadsheets provided by the Department of Statistics.

In order to over-sample areas with high proportions of non-Jordanians, we examined the prevalence of households with non-Jordanian heads (hereafter referred to as non-Jordanian households). Our goal was to create two strata, one with a high proportion of non-Jordanian households and one with a low proportion of non-Jordanian households in order to oversample the former. The prevalence of non-Jordanian households was assessed at the lowest administrative level possible, namely the neighborhood (*hayy*). This is the cluster or primary sampling unit (PSU) level we used for drawing our refresher sample. Our "high" non-Jordanian stratum consisted of neighborhoods in the top decile of the prevalence of non-Jordanian households. These were neighborhoods with 45.7% non-Jordanian households and higher. All other neighborhoods in Jordan constitute our "low" non-Jordanian stratum. We further stratified our refresher sample along two dimensions: governorate and location (urban, rural, or refugee camps). The camps were the two official camps in Jordan: Za'atari refugee camp, in the Mafraq governorate, and Azraq refugee camp, in the Zarqa governorate.

The high non-Jordanian and camps strata were both over-sampled in order to provide a sufficient number of observations for research and analysis. This over-sampling strategy is accounted for in our weights, discussed below. Across the strata, a total of 200 PSUs (neighborhoods) were selected, of which 150 fell in the "high" non-Jordanian and 50 in the "low" non-Jordanian. The distribution of PSUs by governorate and urban/rural/camps is shown in Table 3 below. Within each PSU, the plan was to sample 15 households.[10]

Table 3. Planned refresher PSUs by strata

	Strata											
	Low non-Jordanian households				**High non-Jordanian households**				**Total**			
Governorate	Urb.	Rur.	Camp	Tot.	Urb.	Rur.	Camp	Tot.	Urb.	Rur.	Cap	Tot.
Amman	9	1	0	10	39	2	0	41	48	3	0	51
Balqa	3	1	0	4	4	3	0	7	7	4	0	11
Zarqa	5	1	0	6	16	3	10	29	21	4	10	35
Madaba	2	1	0	3	3	2	0	5	5	3	0	8
Irbid	6	2	0	8	15	1	0	16	21	3	0	24
Mafraq	2	2	0	4	10	3	15	28	12	5	15	32
Jarash	2	1	0	3	9	2	0	11	11	3	0	14
Ajloun	1	1	0	2	0	1	0	1	1	2	0	3
Karak	2	1	0	3	0	1	0	1	2	2	0	4
Tafileh	1	1	0	2	0	1	0	1	1	2	0	3
Ma'an	1	1	0	2	0	1	0	1	1	2	0	3
Aqaba	2	1	0	3	7	2	0	9	9	3	0	12
Total PSUs	36	14	0	50	103	22	25	150	139	36	25	200
Total households	540	210	0	750	1545	330	375	2250	2085	540	375	3,000

Source: Correspondence with DoS

[10] Two extra households were drawn from each cluster as back-ups if a planned household was not found.

There were a few deviations from planned sampling during implementation. First, in the "high" strata an additional PSU in urban Amman and an additional PSU in rural Amman were added. Ajloun and Tafileh "high" strata rural areas were not sampled. One less PSU was drawn from the "high" stratum rural area in Mafraq.[11] In total, 199 PSUs were sampled. There were also some deviations from the planned number of households in each PSU. The goal was to sample 15 households per PSU, and for 93.5% of PSUs, this was achieved. Most other PSUs (3.5%) sampled 14 households. Two PSUs sampled only 13 households, one PSU only 12 households, two PSUs 11 households, and one PSU only 2 households. Overall, the mean response rate was 98.8%. Within the different dimensions of the strata, missing households were slightly more common in rural areas: a 97.8% response rate in rural areas, a 98.9% response rate in urban areas, and a 100% response rate in the camps. These response rates on the PSU level are factored in to our sample weights, as discussed below. Ultimately, of a planned 3,000 households, our refresher sample contained 2,950 households with 13,423 individuals.

2.4 Sample attrition

For the panel data, tracking households from 2010 to 2016, a key issue is sample attrition. There are two points in time when attrition can occur: between the 2010 wave and 2016 enumeration and between 2016 enumeration and 2016 fielding. There are also two types of attrition that can occur: Type I attrition occurs when we cannot locate a 2010 household at all, while Type II attrition occurs when we can locate a 2010 household, it has a split, and we cannot locate the split household.[12] This section discusses the patterns of the two different types of attrition and then presents the models predicting attrition that are used as inputs into generating the sample weights.

2.4.1 Attrition of entire households (Type I attrition)

In undertaking the enumeration and fieldwork, a key goal was to locate as many of the 2010 households as possible. From the original 2010 sample of 5,102 households, 3,427 were successfully found at the enumeration stage (Table 4). In the cases when households were not located, data were collected, where possible, on the status of the household or the reason they were not present. During enumeration, there were 81 households that had left the country entirely (all members departed) and 44 households that had all their members die. We refer to these cases of all the members leaving or dying as "natural attrition." We do not include cases of natural attrition in our calculation of attrition rates or in our attrition models since they are no longer part of the relevant universe for our survey.

At the enumeration stage, we were unable to locate 1,481 households and 69 households refused (both these results are forms of attrition). Thus, our Type I attrition rate was 31.1% at the enumeration stage. After updates during fielding, from the 3,427 households found during enumeration, 26 households left the country, 8 died out, 178 could not be found, and 157 refused. Of the 5,102 households from 2010, 3,058 remained in the sample. Thus, accounting for natural attrition, our final Type I attrition rate was 38.1%. This compares to a Type I attrition rate of 23.5% in the ELMPS from 1998 to 2006 and 17.3% from 2006 to 2012.[13] This relatively high attrition

[11] The reason for these deviations was that the identified high-non-Jordanian rural areas could not be found.

[12] Since attrition could occur at two points in time, there were some cases where the original household and a split were both found during enumeration, but only the split was found in fielding. In these cases, we reclassified the split to be the original household and the original household, not found in fielding, to be the split so that attrition could be modeled and the households reclassified from splits to original included in the data.

[13] See Assaad & Roushdy (2009) for an analysis of attrition in the 2006 wave of the ELMPS and Assaad & Krafft (2013) for the 2012 wave.

rate is presumably due to the larger proportion of more mobile non-citizens living in Jordan compared to Egypt and the relatively higher residential mobility of the population in the Jordanian setting.

Table 4. Status of households at enumeration and fielding

	Enumeration	Updates between enumeration and fielding	Final status
Initial households	5,102	3,427	5,102
Located	3,427	3,058	3,058
Could not be found	1,481	178	1,659
Refused	69	157	226
All left the country	81	26	107
All died	44	8	52
Type I attrition rate	31.1	9.9	38.1

Source: Authors' calculations based on JLMPS 2010 and JLMPS 2016

2.4.2 Attrition of split households (Type II attrition)

One of the lessons we learned from ELMPS 2012 was that we need to account for attrition between enumeration and fielding on the individual level as well as the household level. We therefore included essentially the same questions as from enumeration in order to update the disposition of different individuals who were in the 2010 wave and present at enumeration. This also allowed us to track additional split households that occurred between enumeration and fielding. Unfortunately, the additional split households were not followed up in the field. However, we can use the data on individuals who died, left the country, or moved to group housing, thus leaving the survey universe, between enumeration and fielding to assess natural attrition as distinct from Type II attrition. Split households between enumeration and fielding thus contribute to Type II attrition.

Table 5 shows the status of individuals at enumeration and fielding. The status of individuals is only shown for those whose 2010 household was found. The households found in enumeration originally contained 18,227 individuals in 2010. Of these, 15,617 were still present in their original households at the enumeration stage. Among those no longer present, four had moved to group housing, 234 emigrated, and 382 died, totaling 620 individuals who left the sample due to natural attrition. The remaining 1,990 individuals formed split households. Since individuals can split together, we identify individuals who form a new household together as one "split household." There were 1,911 split households at enumeration, of which 1,536 were found, for a Type II attrition rate of 19.6%.

Since additional households were lost between enumeration and fielding, there were only 15,357 individuals from 2010 who could potentially be in their original (or split) household at the fielding stage. We successfully located 14,502 of these individuals from 2010 during fielding. Of the 855 individuals lost, 208 were lost to natural attrition, and 647 were lost into 616 split households. When looking at the final status of individuals, there were 16,631 individuals who were present in 2010 in the households that were successfully found at fielding. Of these, 13,235 individuals were found in their original households. Of the remaining 3,396, in total 757 were lost to natural attrition. There were 2,639 individuals who split, into 2,465 split households. Multiple split

households may have split from a 2010 household. For example, a family with two teenaged daughters in 2010 may have had both daughters marry and leave home to form two separate split households. The proportion of households that were located in fielding in 2016 who experienced a split was 41% (1,257 households had one or more splits from the 3,058 found from 2010). Of the 2,465 split households, 1,221 were found, implying a Type II attrition rate of 50.5%

Again, this is relatively high, when compared to the Type II attrition rates in the ELMPS, which were 15.4% from 1998 to 2006 and 30.3% from 2006 to 2012, and when compared to the Type II attrition rate from the enumeration stage. This high rate is due to the additional 616 split households identified during the fielding stage, none of which were successfully located, and another 315 split households found during enumeration and not successfully located during fielding. This was due some problems that arose during the fielding stage related to tracking these individuals.[14] In what follows we develop models to predict both Type I and Type II attrition in order to be able to construct the appropriate attrition weights.

Table 5. Status of individuals at enumeration and fielding

	Enumeration	Updates between enumeration and fielding	Final status
Individuals present in 2010 in a household found in 2016/17	18,227	15,357	16,631
Individuals still in original households in 2016/17	15,617	14,502	13,235
Individuals no longer in original households in 2016/17	2,610	855	3,396
Natural attrition through death, migration, or group housing	620	208	757
Individual known to have died	382	59	406
Individual known to have emigrated	234	64	264
Individual known to have moved to group housing	4	85	87
Individual splits to form households	1,990	647	2,639
Potential split households (accounting for individuals who split together)	1,911	616	2,465
Split households found	1,536	0	1,221
Split households not found (attrited)	375	616	1,244
Type II attrition rate	19.6	100.0	50.5

Source: Authors' calculations based on JLMPS 2010 and JLMPS 2016

3. Sample weights

3.1 Models of sample attrition

We model sample attrition for two reasons; first, we wish to examine whether attrition is random or related to household characteristics. Second, if there are differences in attrition related to observable characteristics, we account for these differences by creating appropriate weights. Table 6 presents odds ratio estimates from a logit model, on the household level, for Type I attrition. Households that naturally attrited are excluded from the model, resulting in a universe of

[14] Given the repeated problems with losing individuals from enumeration to fielding in ELMPS 2012 and JLMPS 2016, we will no longer be implementing a separate enumeration round in ELMPS 2018, but rather field immediately upon finding a household and collect data on any splits to subsequently track.

4,943 households from 2010 at risk of Type I attrition. Characteristics are, necessarily, those measured in 2010.

There are some significant predictors of Type I attrition. In terms of household composition, households with more working age and especially more elderly (65+) females were significantly less likely to attrite. Households composed of all males, compared to mixed sex households, were significantly more likely to attrite. There were not significant differences by the geographic strata that were used in 2010 for stratifying the sample, which is encouraging for sample representativeness. Households in the top wealth decile were significantly more likely to attrite than the poorest, but there were not significant odds ratios for other deciles. The higher attrition in the top decile was driven by urban areas.[15]

In terms of governorates, there are significantly lower odds of Type I attrition for (the reference, urban) Karak, Tafileh, and Ma'an, but higher odds of attrition in urban Aqaba (all in the South region), compared to Amman. Karak and Ma'an's interactions with rural are near one and insignificant, so the lower odds of Type I attrition pertain for rural areas of these regions as well. There are significant interactions with rural, lower odds of attrition, for Zarqa, Irbid, and Aqaba, compared to their urban counterparts, and significantly higher odds in rural Tafileh, compared to urban Tafileh. Homeownership as opposed to renting predicts significantly lower attrition. There were not significant differences by head age group or sex, although households headed by females 25-34 were significantly more likely to attrite. There were not significant differences by marital status, but there was a significantly higher probability of attrition for households with divorced, female heads.

Households with more educated heads were more likely to attrite, significantly so for secondary and higher education, as compared to less than basic. There were few significant head labor market characteristics, which bodes well for the labor market representativeness of our panel. Households with unemployed household heads were significantly less likely to attrite, while those out of the manpower basis (disabled or elderly) were more likely to attrite than the reference household head who was employed in the public sector. There were no significant labor market status interactions with the rural dummy. Overall, the model had a pseudo R-squared of 14.7%, meaning that only a limited portion of the probability of attrition can be explained by this long list of observable characteristics and that much of the rest is presumably random.

[15] Although the tenth decile rural interaction is insignificant, it shows lower odds of attrition, cancelling the higher odds of tenth decile main effect. The higher Type I attrition in the top decile of urban areas is presumably due to a higher rate of refusals among this category of respondents, which are generally known to be less cooperative in face-to-face household surveys (Hlasny and Verme 2014).

Table 6. Type I attrition logit model: Probability household attrited

Cells are odds ratios, standard errors in parentheses

Household composition (no. of)	
Mean No. of Children 0 to 5 in Household	1.002
	(0.042)
Mean No. of Children 6 to 14 in Household	0.977
	(0.029)
Mean No. of WA Males in Household	0.938
	(0.036)
Mean No. of WA Females in Household	0.891**
	(0.035)
Mean No. of Elderly Males in Household	0.713
	(0.144)
Mean No. of Elderly Females in Household	0.548***
	(0.084)
Single sex households (mixed sex omit.)	
All male	2.022*
	(0.566)
All female	1.112
	(0.233)
Strata (urban not large city omit.)	
Rural	0.846
	(0.284)
Central large city	1.200
	(0.128)
Suburban large city	0.854
	(0.111)
Exurbs	1.510
	(0.333)
Wealth decile (poorest omit.)	
Deciles of household wealth=2	0.887
	(0.166)
Deciles of household wealth=3	0.765
	(0.142)
Deciles of household wealth=4	0.995
	(0.184)
Deciles of household wealth=5	0.891
	(0.166)
Deciles of household wealth=6	0.931
	(0.173)
Deciles of household wealth=7	0.990

	(0.187)
Deciles of household wealth=8	1.001
	(0.191)
Deciles of household wealth=9	1.275
	(0.252)
Deciles of household wealth=10	2.332***
	(0.492)
Wealth decile and location ints.	
Deciles of household wealth=2 # rural	1.158
	(0.355)
Deciles of household wealth=3 # rural	1.254
	(0.395)
Deciles of household wealth=4 # rural	0.617
	(0.204)
Deciles of household wealth=5 # rural	1.007
	(0.329)
Deciles of household wealth=6 # rural	0.884
	(0.308)
Deciles of household wealth=7 # rural	0.846
	(0.297)
Deciles of household wealth=8 # rural	1.042
	(0.399)
Deciles of household wealth=9 # rural	0.711
	(0.316)
Deciles of household wealth=10 # rural	0.417
	(0.247)
Governorate (Amman omit.)	
Balqa	0.904
	(0.157)
Zarqa	1.029
	(0.117)
Madaba	0.679
	(0.153)
Irbid	1.038
	(0.121)
Mafraq	1.379
	(0.285)
Jarash	0.715
	(0.147)
Ajloun	0.898
	(0.215)
Karak	0.378***

	(0.094)
Tafileh	0.225***
	(0.072)
Ma'an	0.513*
	(0.140)
Aqaba	2.531***
	(0.656)
Governorate and location ints.	
Balqa # rural	0.576
	(0.185)
Zarqa # rural	0.375*
	(0.153)
Madaba # rural	1.403
	(0.564)
Irbid # rural	0.465**
	(0.137)
Mafraq # rural	0.653
	(0.207)
Jarash # rural	0.695
	(0.250)
Ajloun # rural	0.575
	(0.268)
Karak # rural	1.060
	(0.387)
Tafileh # rural	3.221*
	(1.559)
Ma'an # rural	1.055
	(0.472)
Aqaba # rural	0.071***
	(0.049)
Homeownership (not owned omit.)	
Owned	0.252***
	(0.019)
Head age group (<25 omit.)	
25-34	0.772
	(0.209)
35-44	0.829
	(0.229)
45+	0.729
	(0.208)
Head sex (male omit.)	
Female	0.412
	(0.308)

Head age and sex ints.	
25-34 # female	3.763*
	(2.509)
35-44 # female	0.878
	(0.560)
45+ # female	1.919
	(1.207)
Head marital status (single omit.)	
Married	0.661
	(0.197)
Divorced	0.381
	(0.209)
Widowed	0.897
	(0.412)
Head marital status and sex ints.	
Married # female	2.697
	(1.398)
Divorced # female	5.188*
	(3.849)
Widowed # female	1.581
	(0.967)
Head ed. (less than basic omit.)	
Basic	1.018
	(0.096)
Secondary	1.253*
	(0.137)
Higher ed.	1.366**
	(0.149)
Head labor market status (Public sector omit.)	
Formal private wage	1.162
	(0.150)
Informal private wage	1.180
	(0.166)
Nonwage	1.202
	(0.152)
OLF	0.867
	(0.122)
Unemployed	0.563*
	(0.131)
Out of manpower	1.626*
	(0.380)
Head labor market status and location ints.	

Formal private wage # rural	1.349
	(0.377)
Informal private wage # rural	1.310
	(0.398)
Nonwage # rural	1.243
	(0.322)
OLF # rural	1.507
	(0.349)
Unemployed # rural	1.645
	(0.764)
Out of manpower # rural	1.186
	(0.335)
Pseudo R-squared	0.147
N (households)	4,943

Notes: *p<0.05; **p<0.01; ***p<0.001
Source: Authors' calculations based on JLMPS 2010 (characteristics) and JLMPS 2016 (outcome)

For the Type II attrition model (Table 7), the sample is restricted to those 2,386 splits with heads age 6+ (who have individual characteristics from 2010).[16] Since most split households are made up of just one member who split off from his or her original household alone, we only model composition in terms of additional working age males and females. In fact, there are significantly lower odds of Type II attrition for split households with additional working age males, meaning when two or more individuals split together they are easier to trace. There are significantly higher odds of Type II attrition for strata other than the reference urban (not large city). Splits from rural areas and the exurbs of Amman in particular have significantly higher odds or attrition. There are significantly higher odds of attrition for a number of wealth quintiles compared to the poorest, although the differences essentially imply that splits from the poorest quintile are less likely to attrite. There are some significantly lower odds of attrition for wealth rural interactions. As was the case for Type I attrition, it appears to be primarily urban and wealthier households that are driving differences in attrition. Only splits from Madaba have a significantly different (higher) odds of attrition that those of other governorates. There are no significant rural and governorate interactions. Splits from households that owned their home are significantly less likely to attrite. Compared to split household heads younger than 25, only those 45+ are significantly more likely to attrite. The odds ratio here is high; one possible reason is that these are splits where the split was due to natural attrition, but that this was not captured in the field.

Female-headed splits are significantly less likely to attrite, although the female and 25-34 interaction indicates significantly higher odds of attrition for females in that age group. Compared to those splits with less than basic educated heads, other categories are less likely to attrite, all but higher education significantly so. This may be related to the ability of remaining household members to accurately communicate the new location. Compared to splits with household heads who were public sector workers in 2010, splits with formal private wage, informal wage, and out of labor force heads are more likely to attrite. Overall, the pseudo R-squared of the Type II attrition

[16] Essentially, we are assuming that split households with heads less than age 6 are unlikely to be "real" split households, but rather that we are simply missing information about these individuals (for instance, that they died). For those few splits with "heads" aged 0-5, we use the mean predicted probability of attrition while weighting.

model is 10.0%, again indicating that most of the Type II attrition is not systematically related to observable characteristics.

Table 7. Type II attrition logit model: Probability household attrited
Cells are odds ratios,
standard errors in parentheses

Split household composition (no. of)	
Mean No. of WA Males in Household	0.529*
	(0.147)
Mean No. of WA Females in Household	0.898
	(0.138)
Strata (urban not large city omit.)	
Rural	2.918**
	(1.164)
Central large city	1.683**
	(0.310)
Suburban large city	1.123
	(0.235)
Exurbs	3.361*
	(1.885)
Wealth decile (poorest omit.)	
Deciles of household wealth=2	1.517
	(0.410)
Deciles of household wealth=3	2.169**
	(0.588)
Deciles of household wealth=4	1.807*
	(0.502)
Deciles of household wealth=5	1.546
	(0.439)
Deciles of household wealth=6	2.118**
	(0.570)
Deciles of household wealth=7	1.647
	(0.459)
Deciles of household wealth=8	2.157**
	(0.606)
Deciles of household wealth=9	2.159**
	(0.605)
Deciles of household wealth=10	2.551**
	(0.802)
Wealth decile and location ints.	
Deciles of household wealth=2 # rural	0.657
	(0.252)

Deciles of household wealth=3 # rural	0.377*
	(0.150)
Deciles of household wealth=4 # rural	0.418*
	(0.171)
Deciles of household wealth=5 # rural	0.734
	(0.297)
Deciles of household wealth=6 # rural	0.523
	(0.224)
Deciles of household wealth=7 # rural	0.501
	(0.213)
Deciles of household wealth=8 # rural	0.417*
	(0.185)
Deciles of household wealth=9 # rural	0.324*
	(0.163)
Deciles of household wealth=10 # rural	1.327
	(0.949)
Governorate (Amman omit.)	
Balqa	1.371
	(0.373)
Zarqa	1.010
	(0.192)
Madaba	3.045**
	(1.130)
Irbid	1.213
	(0.234)
Mafraq	1.261
	(0.374)
Jarash	1.223
	(0.328)
Ajloun	0.947
	(0.286)
Karak	0.667
	(0.213)
Tafileh	0.738
	(0.256)
Ma'an	0.834
	(0.272)
Aqaba	1.935
	(0.951)
Governorate and location ints.	
Balqa # rural	0.534
	(0.220)

Zarqa # rural	1.052
	(0.462)
Madaba # rural	0.862
	(0.488)
Irbid # rural	0.798
	(0.294)
Mafraq # rural	0.637
	(0.261)
Jarash # rural	1.168
	(0.468)
Ajloun # rural	0.574
	(0.292)
Karak # rural	0.881
	(0.382)
Tafileh # rural	0.698
	(0.395)
Ma'an # rural	0.523
	(0.277)
Aqaba # rural	0.417
	(0.275)
Homeownership (not owned omit.)	
Owned	0.683*
	(0.114)
Head age group (<25 omit.)	
25-34	0.958
	(0.146)
35-44	1.595
	(0.746)
45+	9.472***
	(4.944)
Head sex (male omit.)	
Female	0.484*
	(0.148)
Head age and sex ints.	
25-34 # female	2.767***
	(0.636)
35-44 # female	1.830
	(1.077)
45+ # female	0.789
	(0.536)
Head ed. (less than basic omit.)	
Basic	0.698**

	(0.094)
Secondary	0.593***
	(0.086)
Higher ed.	0.825
	(0.150)
Head labor market status (Public sector omit.)	
Formal private wage	2.179***
	(0.438)
Informal private wage	1.889**
	(0.425)
Nonwage	1.589
	(0.483)
OLF	3.221***
	(0.545)
Unemployed	1.670*
	(0.333)
Out of manpower	1.238
	(0.986)
Pseudo R-squared	0.100
N (split households)	2,386

Notes: *p<0.05; **p<0.01; ***p<0.001
Source: Authors' calculations based on JLMPS 2010 (characteristics) and JLMPS 2016 (outcome)

3.2 Calculation of sample weights: Panel sample

Weights are initially constructed at the household level. Two essential inputs are the results of the Type I and Type II attrition models. For an original (2010) household, denote the household as *h*.[17] Denote a household that split (whether found or not) as *s*. We use our Type I attrition model to calculate the probability of attrition of the entire household, which we denote Pr(A_h). Further, for split households, we calculate the probability of attrition as Pr(A_{hs}):

$$\Pr(A_{hs}) = \Pr(h \text{ found } \& \ s \text{ not found}) + \Pr(h \text{ not found}) \quad (1)$$
$$= \Pr(s \text{ not found} \mid h \text{ found})*[1- \Pr(\text{h not found}) + \Pr(h \text{ not found})$$

Or, alternatively and equivalently:

$$\Pr(A_{hs}) = 1-\Pr(h \text{ found } \& \ s \text{ found})$$
$$= 1-\Pr(h \text{ found})*\Pr(s \text{ found} \mid h \text{ found})$$

We then can compute a response adjustment factor, r_h for original households as:

[17] The start of this section draws on the concepts and notation used for the ELMPS 2012 (Assaad and Krafft 2013).

$$r_h = \frac{1}{1 - \Pr(A_h)} \tag{2}$$

For the split sample the response adjustment factor is:

$$r_{hs} = \frac{1}{[1 - \Pr(A_{hs})] * c_s} \tag{3}$$

Here the adjustment includes c_s, the number of component households. Essentially, component households are the number of different originating households in the population (not the sample) that contribute to a split household. If the split contains only individuals from a 2010 household, there is only one component household. If the split contains individuals not from a 2010 household, there are two component households. Accounting for component households in this manner maintains population representativeness.[18]

The calculation of our panel sample weights also brings in the weights from 2010. Denote as *e* the expansion weight from 2010.[19] We generate our panel weights, *w*, initially as $w=e*r_{h(s)}$. We then normalize the weights (dividing by the mean to have a mean of one), which enables subsequent combination with the refresher sample on a one-to-one basis. Before we discuss the combined, full sample weights, we discuss the refresher weights.

3.3 Calculation of sample weights: Refresher sample

The refresher sample weights both stand alone, should someone want to analyze the refresher sample only (for instance, as an additional validation check), and act as inputs into the combined sample weights. As with the panel sample, weights are calculated on a household level. We first account for non-response at the PSU level, *p*, with a weight, w_p, based on the number of observed households, m_p as:

$$w_p = \frac{15}{m_p} \tag{4}$$

Essentially, the observed households in clusters with non-response are weighted up to represent the planned 15 households. Otherwise this weight is one.

Recall that the refresher sample was stratified along governorate, urban/rural/camps and high/low non-Jordanian lines. Denote governorate as *g*, urban/rural/camps (location) as *l*, and high/low non-Jordanian strata as *s*. We undertake ex-post weighting along nationality, *n*, lines. We therefore identify the response-corrected number of households of each nationality *n* in each governorate *g* in location *l* and high-low stratum *s* as:

$$h_{g,l,s,n} = \sum_{p=1}^{P} w_{p,g,l,s,n} \tag{5}$$

[18] For panel analyses using only observations present in both 2010 and 2016, the specific panel weight does not include the division by component households.

[19] There was some individual variation in weights within households in 2010 for some households, which was averaged out in the revised data for JLMPS 2010 and to enable generation of weights for 2016.

We then draw on the census data for the nationality-specific number of households in the same governorate, location, and strata, $c_{g,l,s,n}$. This implies an expansion weight of:

$$w_{p,g,l,s,n} = w_p \frac{c_{g,l,s,n}}{h_{g,l,s,n}} \quad (6)$$

Although at this point the weight is conceptually correct, two empirical problems arise. First, there are some extreme outliers within the weight distribution, which are particularly problematic when analyzing subgroups. These are primarily driven by instances where we observed only a few households of a particular non-Jordanian nationality in a combination of governorate, location, and strata. We therefore winsorized the high end of our weight, at the 95th percentile. We denote the winsorized weight as $w'_{p,g,l,s,n}$.

The other empirical problem is that we do not always have, in our sample, individuals from all nationalities in each combination of governorate, location, and strata. For Jordanians, we are very close to the national population. However, we under-represent other nationalities to an increasing extent as their numbers diminish. Additionally, the winsorizing reduces numbers somewhat. Therefore, to ensure our statistics represent nationalities appropriately within the country, we revise the weights, multiplying up to represent higher levels of aggregation. Specifically, we use from the Census the number of households of a nationality within a region, *r*, (there are three regions), and area, specifically inside or outside of camps, which we denote *a*. We use the census number of households relative to the weighted, winsorized, observed households as a multiplier on our weights, aggregating over governorates (from 1 to G) within a region, locations (from 1 to L within a governorate and area), and strata, to generate an adjusted weight:

$$w_{p,g,r,l,a,s,n} = w'_{p,g,l,s,n} * \frac{c_{r,a,n}}{\sum_{g=1}^{G} \sum_{l=1}^{L_{g,a}} \sum_{s=1}^{2} w'_{p,g,l,s,n}} \quad (7)$$

Here the denominator includes only those governorates within the region and only the locations within the area.

This approach generates mathematically identical numbers of households at the national level. On the individual level, it does very well for representing Jordanians (expanding to around 6,603,000, very close to the census) and Syrians (expanding to around 1,268,000, also very close to the census). Other groups have fewer individuals, likely due to the fact that many of these individuals are immigrants who may live in collective housing, rather than private households. We expand to around 546,000 other Arabs (underestimated by around 272,000), 185,000 Egyptians (underestimated by around 451,000) and around 58,000 other nationalities (underestimated by around 139,000). Ultimately our sample expands to 8,661,000 individuals, whereas there were 9,293,000 individuals in private households according to the 2015 Census. Given the sizes of households we observe and those implied in the census data, it is likely that the sampling frame was more stringent in identifying private households, and thus under-represents those other nationalities living collectively.

An additional problem on the individual level arises in that, as well as household level consent, we collected individual level consent and had some refusals (69 in the refresher sample, 172 in the panel sample) as well as some individual questionnaires that were only partially completed (12 in the refresher sample, 58 in the panel). We removed the partial individual data and treat both cases

as individual non-response. The only characteristics we have for these individuals are the basic characteristics from the roster. Upon examination, we determined that there were sex and age-specific patterns of individual non-response. To address both the under-representation of certain types of individuals and individual non-response we created individual level weights. The starting point for these individual level weights was the household level weight. We adjusted this household level weight by the age, *e*, and sex-specific, *x*, interacted non-response rate, $r_{e,x}$:

$$w_{p,g,r,l,a,s,n,x,e} = \frac{w_{p,g,r,l,a,s,n}}{1 - r_{e,x}} \tag{8}$$

We then summed the household-weighted number of individuals with valid responses and multiplied up by the ratio of that number to the number in the population on the region, areas and nationality levels from the 2015 census, which we denote as $j_{a,r,n.}$ Essentially, we calculated an individual expansion weight, *i*, of:

$$i_{p,g,r,l,a,s,n,x,e} = w_{p,g,r,l,a,s,n,x,e} * \frac{j_{r,a,n}}{\sum_{r,a} w_{p,g,r,l,a,s,n,x,e}} \tag{9}$$

These individual weights (mathematically) generate expanded numbers of individuals that are identical to the census on the region, area, and nationality level.

3.4 Calculation of sample weights: Combined sample cross-sectional weights

The calculation of weights for the combined sample starts with the normalized panel and refresher sample weights (meaning weights that average to one in each sample). As with the refresher sample weights, we do ex-post weighting on a nationality, governorate, and location basis. Since the initial sample was not stratified by high/low non-Jordanian that dimension is not incorporated explicitly into the combined sample weights, but is built in implicitly through the refresher sample weights. Denote the normalized weights for a household in governorate g , location *l*, and nationality *n* as $\widetilde{w}_{g,l,n}$. We calculated the initial combined sample weights as:

$$w_{g,l,n} = \widetilde{w}_{g,l,n} * \frac{c_{g,l,n}}{\sum \widetilde{w}_{g,l,n}} \tag{10}$$

where $c_{g,l,n}$ are the number of households from the 2015 census at the governorate, location and nationality levels. As with the refresher weights, we winsorize at the 95th percentile to address outliers. We denote the winsorized weight as $w'_{g,l,n}$. We then need to account for the absence of some nationalities in combinations of governorate and location. Again, we use the number of households of a nationality within a region, *r*, and area (inside or outside of camps), *a* from the 2015 census. We use the census number of households relative to the weighted, winsorized, observed households as a multiplier on our weights, aggregating over governorates (from 1 to G) within a region and location (from 1 to L) within governorates, to generate an adjusted weight:

$$w_{g,r,l,a,n} = \frac{c_{r,a,n}}{\sum_{g=1}^{G} \sum_{l=1}^{L_{g,a}} w'_{g,l,n}} \tag{11}$$

As was the case with the refresher weights, we find that this under-represents individuals, particularly non-Jordanians, and also we again have an issue of non-response on the individual level, so for the combined sample we also generate individual weights that account for age and sex-specific individual non-response, $r_{e,x}$, as:

$$w_{g,r,l,a,n,x,e} = \frac{w_{g,r,l,a,n}}{1 - r_{e,x}} \tag{12}$$

We then adjust this by the census number of individuals in a specific area and region of the same nationality to generate an individual weight, *i*:

$$i_{g,r,l,a,n,x,e} = w_{g,r,l,a,n,x,e} * \frac{j_{r,a,n}}{\sum_{r,a} w_{g,r,l,a,n,x,e}} \tag{13}$$

The individual weights should be used when trying to generate individual-level statistics, particularly those incorporating any data from the individual questionnaire.

4. Comparison of JLMPS data to other Jordanian Data

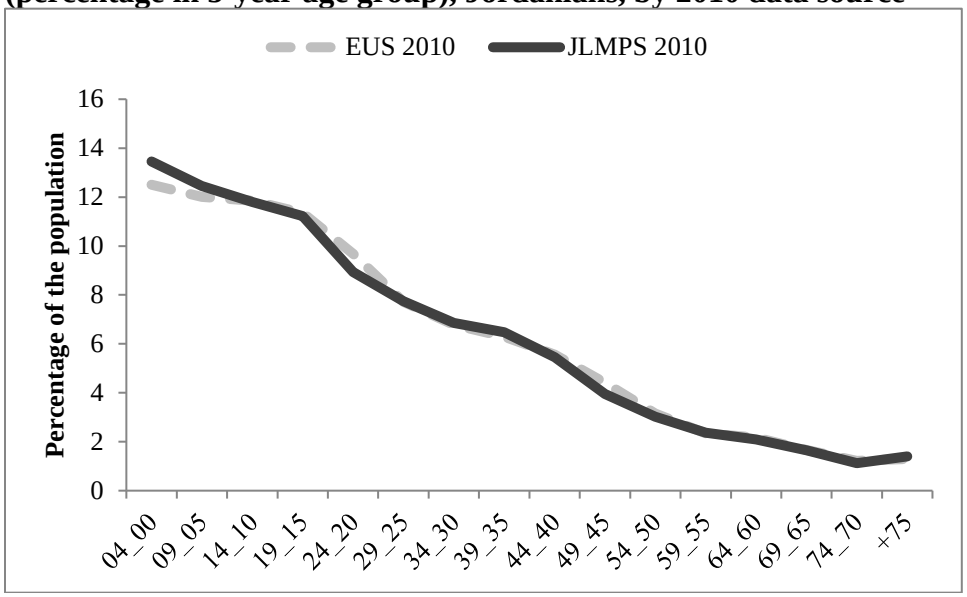
In order to assess the representativeness of the JLMPS 2010 and especially JLMPS 2016 data after attrition modeling and weighting, we compare in this section key basic labor market and demographic statistics to other contemporaneous Jordanian data sources. We specifically compare our results to the Jordanian Employment and Unemployment Survey (EUS). Microdata are available from the EUS through 2016, so we focus our demographic comparisons on this period. We also compare labor market trends and statistics to the Q1 2017 results from published reports, as the majority of JLMPS 2016 fieldwork was carried out in Q1 of 2017. When possible, we also compare our results to the 2015 Population Census. We focus solely on comparisons for Jordanians (data permitting), as the sampling frame for the EUS did not include non-Jordanians until 2017 (Azzeh 2017).

4.1 Comparison of demographic characteristics

The distribution of (five-year) age groups is quite comparable between the JLMPS surveys and other data sources. Figure 1 compares the JLMPS 2010 and EUS 2010. The JLMPS sampled slightly more children in the 0-9 age group than the EUS in 2010. The JLMPS also sampled slightly fewer individuals in the 20-24 age group. The few differences are small and quite plausibly the result of sampling variability. Figure 2 compares the 2015 Population Census and EUS 2016 to the JLMPS 2016. The JLMPS 2016 results are quite close to the 2015 Census, closer even than the EUS 2016 (which has a larger sample). The EUS in particular appears to have fewer young children, while the JLMPS 2016 and 2015 Census both show a more modest inflection of the population pyramid.[20]

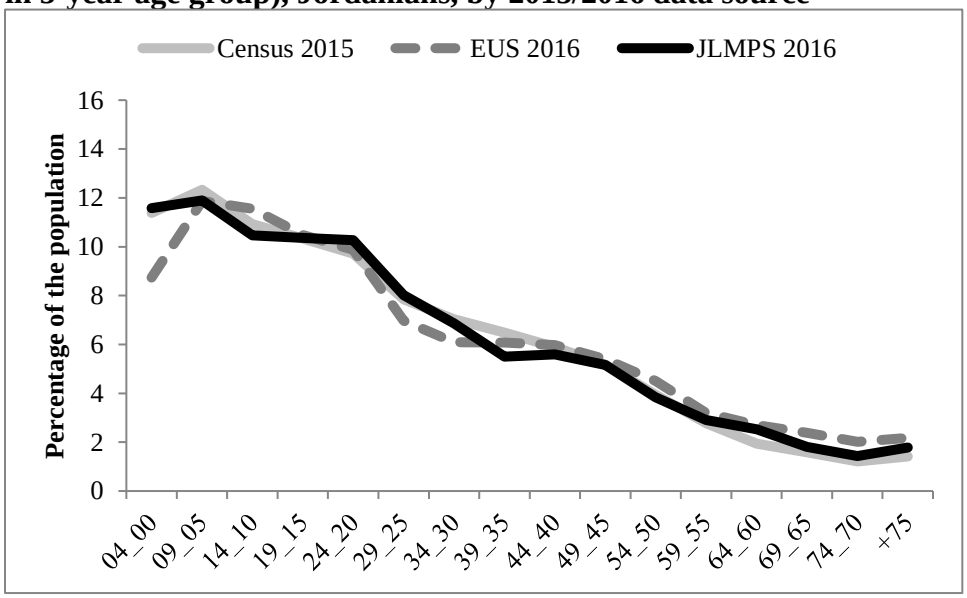
[20] The changing population structure of Jordan and particularly the resumption of fertility decline after a decade of stall is explored further in Krafft & Sieverding (2018).

Figure 1. Comparison of population structure (percentage in 5-year age group), Jordanians, by 2010 data source



Source: Authors' calculations from EUS 2010 and JLMPS 2010

Figure 2. Comparison of population structure (percentage in 5-year age group), Jordanians, by 2015/2016 data source

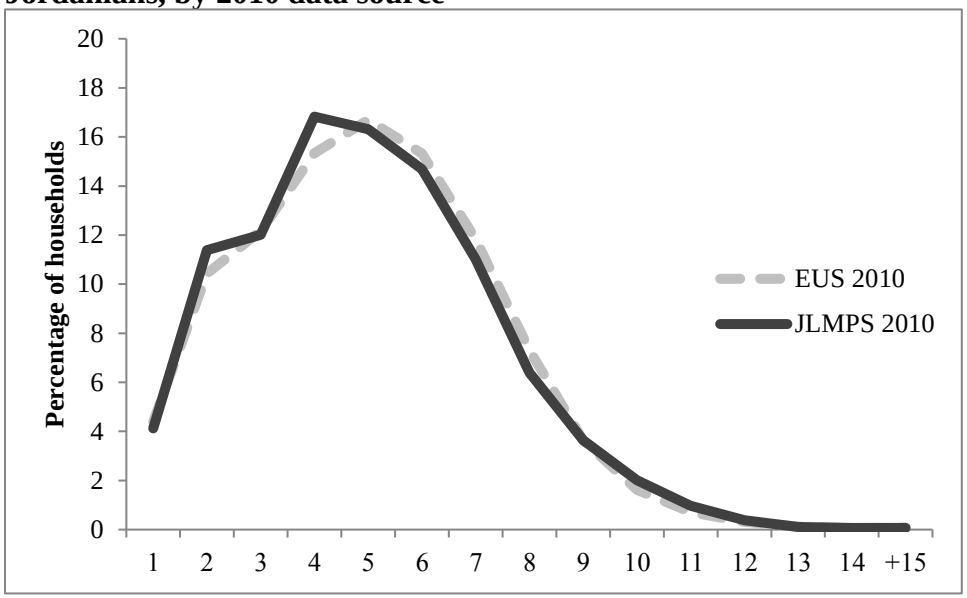


Source: Authors' calculations from EUS 2016 and JLMPS 2016, Census: Department of Statistics (Jordan) (2015a).

Correctly defining and identifying households is a challenging part of household-based survey fieldwork. The JLMPS 2010 shows a comparable distribution of household sizes among Jordanians to the EUS 2010 survey (Figure 3). JLMPS 2010 finds slightly more households with just two people by a percentage point or so, as well as slightly more households with four people compared to the EUS, and slightly fewer households of larger sizes. There are more substantial differences comparing the 2015/2016 data (Figure 4). Here, the Census data are all nationalities

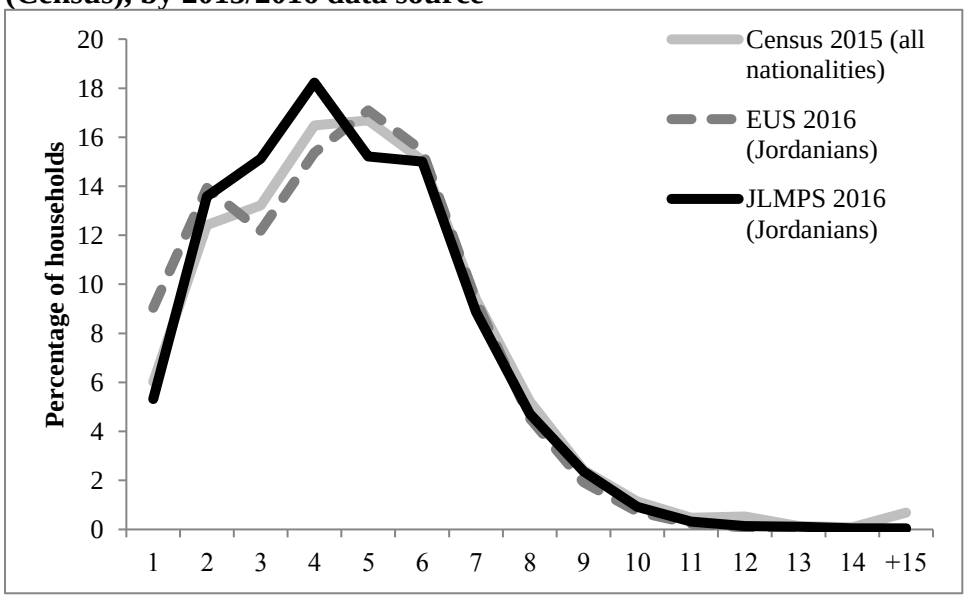
living in private households, as household size split by nationality was not available. The JLMPS 2016 and Census find a similar share of one person households, but the EUS captures more one person households. The JLMPS generally finds more small households than the other two data sources, but the difference with the Census is likely to be driven by Syrian refugees having larger households (Krafft et al. 2018). All three data sources align for households of six and more.

Figure 3. Comparison of household size (percentage of households), Jordanians, by 2010 data source



Source: Authors' calculations from EUS 2010 and JLMPS 2010

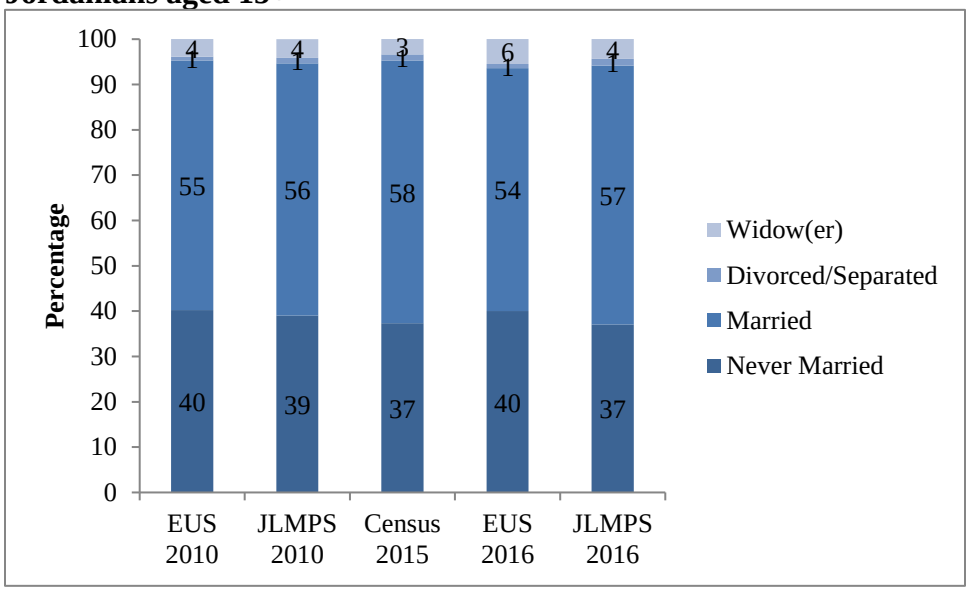
Figure 4. Comparison of household size (percentage of households), Jordanians (EUS and JLMPS), all nationalities in private households (Census), by 2015/2016 data source



Source: Authors' calculations from EUS 2016 and JLMPS 2016, Census: Department of Statistics (Jordan) (Department of Statistics (Jordan) 2015d).

In terms of the marital status of respondents aged 15 and up, the data sources are quite consistent (Figure 5). The JLMPS 2010 finds one percentage point fewer never married individuals and one percentage point more married individuals than the EUS 2010. They identify similar shares of divorced or separated (1%) and widowed (4%) individuals. The results over 2015/2016 are slightly more varied, with the Census and JLMPS 2016 both identifying 37% of individuals as never married, but the EUS 40% and correspondingly fewer married. While all three sources still find around 1% of individuals are divorced or separated, fewer are widowed in the Census (3%) than JLMPS 2016 (4%) or EUS 2016 (6%).

Figure 5. Marital status (percentage) by data source, Jordanians aged 15+

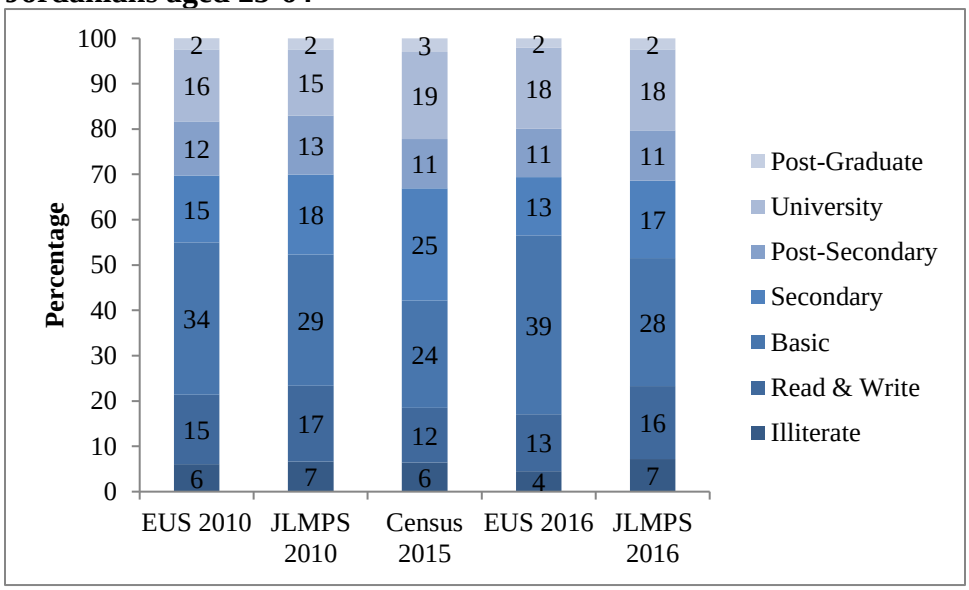


Source: Authors' calculations from EUS 2010 and 2016, JLMPS 2010 and 2016, and Census: Department of Statistics (Jordan) (2015e).

While most demographic indicators are quite close across data sources, there are more substantial differences in terms of educational attainment (Figure 6). The share of the population 25-64, of an age to have finished all education, classified as having a post-graduate education is comparable (2-3%) across time and data sources. The share with a university degree is 16% in EUS 2010 and 15% in JLMPS 2010, quite comparable, and rises to 18-19% across 2015/2016 sources. Similar alignment occurs for two-year post secondary degrees, 12-13% in 2010 across surveys and 11% across 2015/2016 data sources. Where the differences occur are at the secondary and lower levels of education. While the JLMPS 2010 identifies 15% of Jordanians as secondary educated, the EUS 2010 finds 18%. The Census in 2015 finds 25% of Jordanians have a secondary education, compared to 13% in the EUS 2016 and 17% in the JLMPS 2016. Some of these differences may be driven by difficulties actually classifying attainment, the degree or level completed. The 2015 Census asked attainment categorically (Department of Statistics (Jordan) 2015f), which may have been interpreted as the highest level attended, whereas the JLMPS specifically asks for the highest level successfully completed. Since the secondary examination (*tawjihi*) pass rate is only 50% (Ministry of Labor and Ministry of Planning and International Cooperation 2012), this definitional difference could explain much of the disparity around secondary. Definitional differences, particularly with the change in the structure of basic from six-year primary and three-year

preparatory to ten-year basic, may also be contributing to disparate definitions and differences in classifying individuals as basic educated or read and write (which is higher in the JLMPS 2016). Estimates of illiteracy are fairly comparable across JLMPS 2010 (7%) and EUS 2010 (6%) as well as the 2015 Census (6%) and JLMPS 2016 (7%), with the EUS rates in 2016 being lower (4%). Notably, there is substantial consistency across JLMPS 2010 to JLMPS 2016, after accounting for expected rises in higher education, bolstering classification and definitional differences as the cause for disparities in educational attainment.

Figure 6. Educational attainment (percentage) by data source, Jordanians aged 25-64



Source: Authors' calculations from EUS 2010 and 2016, JLMPS 2010 and 2016, and Census: Department of Statistics (Jordan) (2015e).

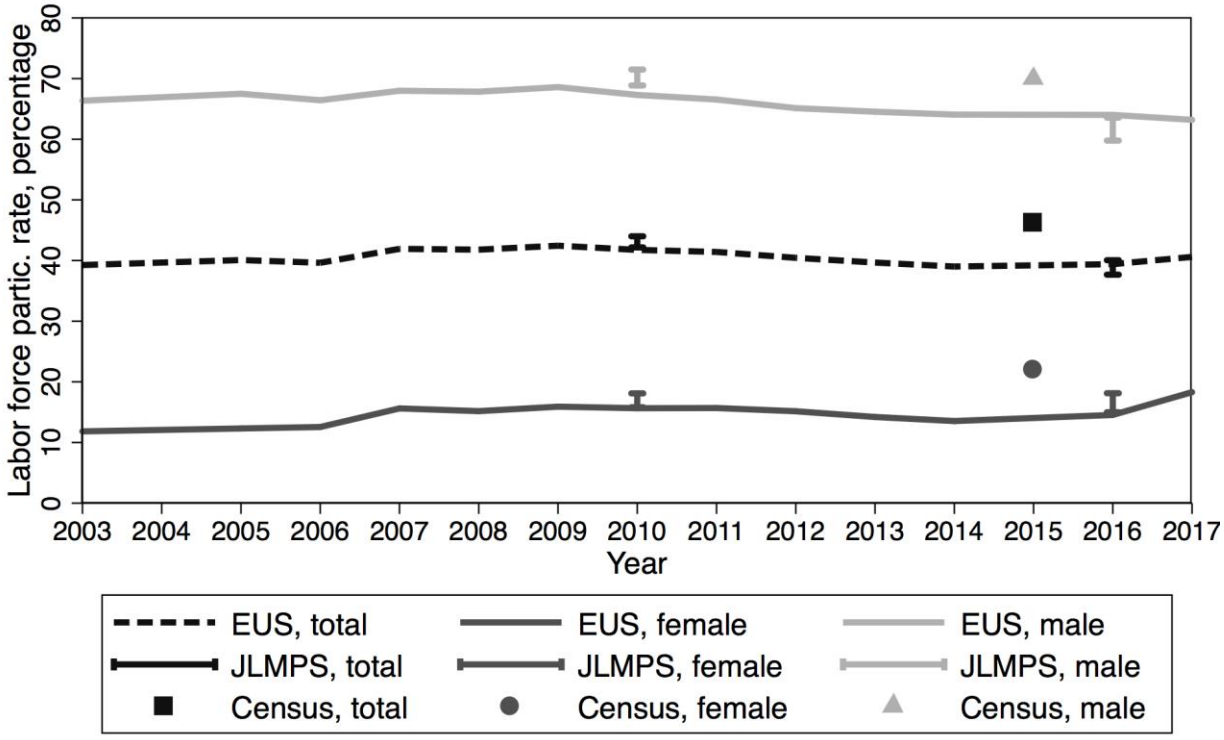
4.2 Comparison of labor market statistics

Having established the consistency of the JLMPS data with other Jordanian sources in terms of demographic representation, in this section we turn to analyzing labor market statistics, trends over time, and their alignment. We include 95% confidence intervals from JLMPS estimates in order to assess whether differences in statistics exceed what we might expect due to sampling variability. We add to our comparisons Q1 of 2017 from the EUS (noted as 2017) since JLMPS 2016 was fielded primarily in 2017 and there appear to be substantial differences in the EUS results between 2016 and Q1 2017.

Figure 7 examines the labor force participation rate by sex. In 2010, the JLMPS detected slightly higher labor force participation than the EUS. The estimates from the EUS for the total rate and females fall within the JLMPS 2010 confidence interval, but the male rate is higher—70%--in the JLMPS than the 2010 EUS rate (67%) although not far from the 2009 rate (69%). Estimates in 2015 from the census appear to be substantially different (much higher) than EUS or JLMPS 2016 rates, which may be due to different definitions or applications of the criteria for participation. The JLMPS 2016 data is in line with the EUS, particularly Q1 of 2017. The total is exactly in line, and while the confidence intervals for 2016 by sex fall slightly below (for men) and above (for women) the EUS estimates for 2016, they include the EUS estimates for Q1 of 2017. Overall, an important

and concerning trend, discussed further in Assaad, Krafft, and Keo (2018) is the very low and declining rate of participation in Jordan.

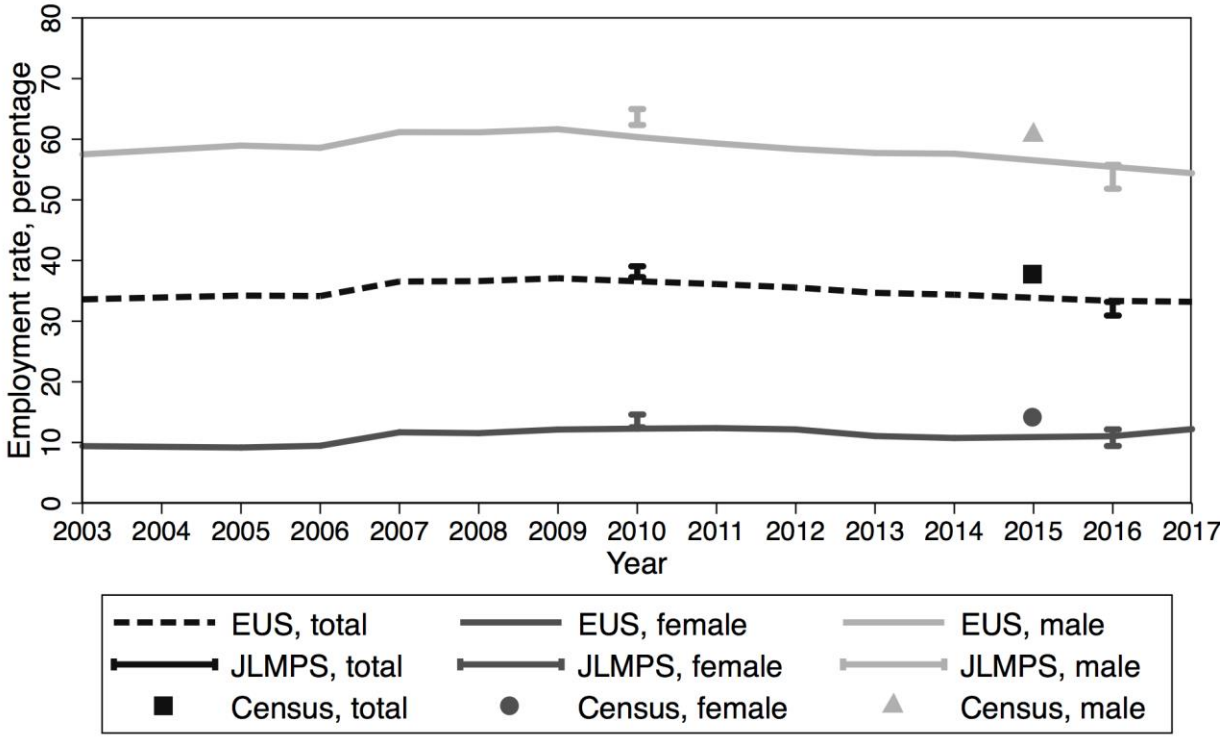
Figure 7. Labor force participation rates (percentage) by sex and data source, Jordanians, 2003-2017



Source: Authors' calculations from EUS 2000-2016, JLMPS 2010 and 2016, and Census: Department of Statistics (Jordan) (2015g), EUS Q1: Department of Statistics (Jordan) (2017)
Notes: Ages 15-64 except EUS 2017 Q1 is ages 15+. Bars indicate 95% confidence intervals from JLMPS, accounting for strata and PSUs under which household was initially sampled.

Turning to employment rates (Figure 8), we see similar patterns as with labor force participation. JLMPS 2010 has a higher estimate of employment for men than EUS 2010, and the total as well as the male rate have confidence intervals that do not include the EUS 2010 estimate. The census again has higher employment rates than the EUS 2016 or JLMPS 2016. JLMPS 2016 confidence intervals for men and women include the EUS 2016 estimates, although the total is a little low, and the JLMPS 2016 estimates are slightly closer to the EUS Q1 2017 estimates.

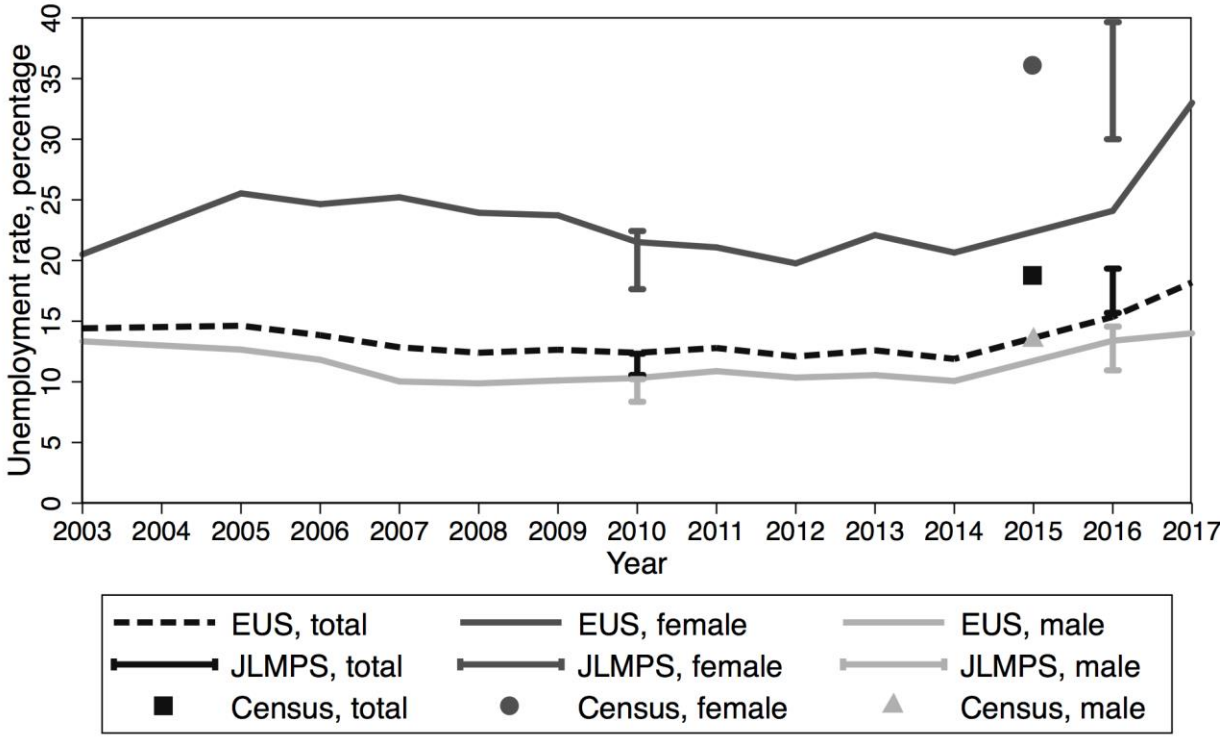
Figure 8. Employment rates (percentage) by sex and data source, Jordanians, 2003-2017



Source: Authors' calculations from EUS 2000-2016, JLMPS 2010 and 2016, and Census: Department of Statistics (Jordan) (2015g), EUS Q1: Department of Statistics (Jordan) (2017)
Notes: Ages 15-64 except EUS 2017 Q1 is ages 15+. Bars indicate 95% confidence intervals from JLMPS, accounting for strata and PSUs under which household was initially sampled.

Since the unemployment rate is calculated as a share of the labor force, necessarily the JLMPS estimates have larger standard errors and confidence intervals for unemployment than employment or labor force participation (Figure 9). Comparing 2010 data, the JLMPS 2010 estimates of unemployment are slightly lower and just marginally have confidence intervals that exclude the EUS estimates for men and the total, but include the EUS for women. The EUS 2016 estimates of unemployment are not included in the JLMPS 2016 confidence intervals for women or the total, however, the JLMPS 2016 confidence intervals include the 2015 Census estimate and the 2017 Q1 estimate for all groups, a high rate of unemployment for women at around 35% in the JLMPS 2016. Overall, the JLMPS results appear to be very close to other estimates when considering key labor market indicators.

Figure 9. Unemployment rates (percentage) by sex and data source, Jordanians, 2003-2017



Source: Authors' calculations from EUS 2000-2016, JLMPS 2010 and 2016, and Census: Department of Statistics (Jordan) (2015g), EUS Q1: Department of Statistics (Jordan) (2017)
Notes: Ages 15-64 except EUS 2017 Q1 is ages 15+. Bars indicate 95% confidence intervals from JLMPS, accounting for strata and PSUs under which household was initially sampled.

5. Conclusions

We discussed in this paper the design and implementation of the second wave of the Jordan Labor Market Panel Survey, which was implemented in late 2016 and early 2017 and which we refer to as JLMPS 2016. The period between the first and second waves – 2010 to 2016 – was a period of substantial turbulence in Jordan, as the country was buffeted by the powerful forces unleashed by the Arab Spring, not least of which was the large influx of Syrian refugees and a major slowdown in economic activity. In order to capture the effects of the large migrant and refugee flows, the survey design team added a sizable refresher sample, which oversampled neighborhoods (including refugee camps) with large proportions of non-Jordanian households. This sampling strategy was particularly successful in achieving a good representation of the Syrian population, something that was never previously achieved in nationally-representative household surveys in Jordan. The representation of other nationality groups, such as Egyptians, also was a substantial improvement over previous household surveys, but because many Egyptian migrants live in group quarters or on job sites, they probably remain somewhat under-represented.

As with any longitudinal survey, attrition from one wave to another is an issue. We consider in this paper two types of attrition. Type I is when a household interviewed in the previous wave is not found in its entirety and Type II is when individuals who are no longer in the household due to splits cannot be found. The probability of both types of attrition were relatively high in the JLMPS 2016 at 38.1% (Type I) and 50.5% (Type II). Factors that contributed to higher Type I attrition presumably include the relatively high proportion of non-national households living in

Jordan and the generally higher residential mobility of households in Jordan. The relatively high Type II attrition resulted from fieldwork-related issues at the fielding stage which prevented individuals newly identified to be splits from being tracked. In any case, modeling of the two types of attrition reveals that both were for the most part random, although some observables systematically affected attrition. For instance, being in the highest urban decline of wealth increased attrition of both types, a pattern that can be linked to the higher refusal rate among wealthy households. Other correlates of Type I attrition were also fairly predictable, such as the higher attrition of all male households, which tend to be temporary in nature, and the higher attrition among households that rent as opposed to own their dwelling. Households with more educated household heads also had higher attrition rates, presumably because of their higher residential mobility. Type II attrition was driven in part by location, with splits from smaller urban areas being easiest to locate. Females were easier to locate in general when they split, but this does not apply to young females (25-34) who presumably move from their natal households when they marry. Finally, private sector workers appear to be more difficult to locate if they split than public sector workers. We created both panel and cross-sectional weights to account for these differential rates of attrition and maintain the representativeness of our sample, but it should be kept in mind that attrition based on unobservables can continue to be a source of bias.

Comparing the JLMPS with the EUS and Census confirmed that (after the application of weights) we have a comparable sample to other data sources. The demographics of the samples in 2010 and 2016 were quite similar to other sources in terms of age distribution, household size, and marital status. Definitional differences likely led to disparate classifications of mid-level educational attainment, but higher education and illiteracy were consistent. In terms of key labor market indicators, the JLMPS was generally quite close to other contemporaneous statistics, with differences often in the range of sampling variability. The JLMPS results in 2016 were particularly close to those of EUS 2017 Q1, when the JLMPS was fielded. The results captured the worsening labor market conditions in Jordan, and particularly the rise in female unemployment, quite consistently.

The comparability of the JLMPS data to other statistics on Jordanians makes clear that the results of the survey are generalizable, and the rich, detailed data on a variety of subjects represents the Jordanian population well. Additionally, the over-sampling of non-Jordanians in the refresher sample of 2016 provides a unique opportunity to study both refugees and other migrant groups in Jordan. Already, the data are providing important insights into issues as diverse as the well-being of refugees (Krafft et al. 2018), the impact of the refugee influx on Jordan's labor and housing markets (Al-Hawarin, Assaad, and Elsayed 2018; Fallah, Krafft, and Wahba 2018), social insurance reforms (Alhawarin and Selwaness 2018), and marriage and fertility trends (Krafft and Sieverding 2018; Sieverding, Berri, and Abdulrahim 2018). We look forward to seeing additional research with the JLMPS as it is now publicly available, and comparing Jordan to the other countries with LMPSs.

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