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Abstract

This paper investigates the impact of migration shocks on housing conditions and rental prices for locals. The identification comes from the regional variation in the large influx of Syrian refugees to Jordan in the wake of the Syrian conflict starting in 2011. We employ a difference in difference approach to evaluate the change in housing conditions and rental prices in areas with relatively higher flows of Syrian refugees compared to areas with relatively lower flows of Syrian refugees. The paper shows that the share of Syrian refugees seems to have a negative, yet small, impact on housing conditions of locals. Heterogeneity analyses shows that while poorer household are affected more negatively, richer household experience an improvement in their housing outcomes in response to the share of refugees. The paper further shows that housing rents significantly increased in the regions closer to Syrian borders. However, housing quality was more responsive to the crisis in regions that are relatively more distant.

JEL Classifications: O18, R21, R23

Keywords: migration shocks, Syrian refugees, housing, Jordan

ملخص

مستخدمة ببانات ممثلة على المستوى الوطني في الجزائر و الاردن، اظهرت هذه الدراسة ان للشبكات و العلاقات الاجتماعية اهمية واضحة في الموائمة في سوق العمل. تم استخدام تحليل الانحدار الثنائي الترتيبي، مصححا بإستخدام نموذج هكمان، لدراسة محددات كثافة البحث عن العمل ، ومحددات احتمالية العثور عليه من خلال العلاقات الاجتماعية. بعد التعامل مع مشكلة التحيز المحتمل في العينة، اشارت النتائج التي توصلنا اليها الى ان استخدام الكثافة السكانية كمؤشر لحجم الشبكات الاجتماعية قد يكون مناسبا فقط في حالة دراسة الإقليات و المهاجرين. الذا نقتر ح ان العلاقات الاجتماعية قد يكون مناسبا فقط في حالة دراسة الإقليات و المهاجرين. الذا نقتر ح ان العلاقات الاجتماعية المراسبة فقد يكون مناسبا فقط في حالة دراسة الإقليات و المهاجرين. الذا نقتر ح ان العلاقات الاجتماعية المكثلية المحنول على وظائف الذا نقتر ح ان العلاقات الاجتماعية الوثيقة (مع الاصدقاء المقربين و الإقارب) قد تكون اكثر اهمية في زيادة احتمالية الحصول على وظائف مقارنة مع العلاقات الاجتماعية المنعية المعرفين و المامرين و الإقارب) قد تكون اكثر اهمية في زيادة احتمالية الحصول على وظائف مقارنة مع العرفات الاجتماعية قد يكون مناسبا فقط في حالة دراسة الإقليات و المهاجرين. والذا نقتر ح ان العلاقات الاجتماعية الوثيقة (مع الاصدقاء المقربين و الإقارب) قد تكون اكثر اهمية في زيادة احتمالية الحصول على وظائف ومعدل البطالة المحلي، منطقة السكن، ووجود خبرات وظيفية سابقة، و الى حد ما التعليم، تؤدي دورا هاما في تحديد كثافة البحث عن ومعدل البطالة المحلي، منطقة السكن، ووجود خبرات وظيفية سابقة، و الى حد ما التعليم، تؤدي دورا هاما في تحديد كثافة البحث عن ومعدل الوظائف و بشكل مهم، وجدت الدراسة ان استخدام الشبكات و العلاقات الاجتماعية يؤدي الى حصول الباحثين عن عمل على وظائف ولكن الوظائف و بشكل مهم، وجدت الدراسة ان استخدام الشبكات و العلاقات الاجتماعية يؤدي الى حصول الباحثين عن عمل على وظائف ولكن الوظائف و بشكل مهم، وجدت الدراسة ان استخدام الشبكامي و مؤلفو ولكن و بعبودة الو و تنظلب مهار ات متدنية و معظمها في القطاع غير المنظم. و اخبرا، بينت الدراسة انه بالرغم من اهمية مؤسسات القطاع العام في تسهيل عملية البحث عن عمل، فإن اقل من 5% في الجزائر و 9% في الاردن من الشباب العاملين افادوا بأن هذه المؤسسات ساعدتهم في النتبال

1. Introduction

The Syrian conflict that started in 2011 between the government and several other groups and forces has caused a massive domestic as well as regional displacement of Syrian refugees. The situation has escalated to a humanitarian crisis that required the assistance of the international community (Ostrand 2015). According to Ostrand (2015), by 2014 the number of displaced Syrians within the country was 7.6 million, , and another 3.7 million had fled the country. Most of those who have left the country, have looked for shelter in neighbor countries like Turkey, Lebanon and Jordan. Jordan, for instance with 660,000 registered refugees by 2017 was the country with the third largest population of Syrian refugees after Turkey and Lebanon (UNHCR, 2018). The number of Syrians in Jordan as reported by the 2015 Population Census is even higher at 1.3 million (DoS, 2016).

The Syrian refugee influx occurred at a time when the country was already suffering a chronic shortage of low-income housing (Francis 2015). With nearly four fifths of refugees living outside refugee camps, the housing requirements of refugees have undoubtedly stressed local housing markets, particularly in the Northern regions of Jordan, where most refugees have located (Salemi, Bowman, & Compton, 2018). However, there has been no serious evaluation of the impact of the Syrian refugee influx on the housing outcomes of Jordanians.

We exploit the JLMPS 2010 and 2016 data to study the causal impact of the migration shock of Syrian refugees on housing outcomes in Jordan. While the JLMPS data does not have information on actual rent across the two waves, we complement the analyses using the Jordan Household Expenditure and Income Survey (HEIS) in 2006 and 2013. We employ a difference-in-difference methodology to evaluate the change in housing conditions and rental prices in areas with relatively higher flows of Syrian refugees compared to areas with relatively lower flows of Syrian refugees before and after the onset of the refugee influx. The share of Syrian refugees across localities is estimated from the 2015 Jordan Population Census data. We find evidence that housing conditions for Jordanians have been adversely affected by the incoming flow of Syrian refugees, but the average effect is relatively modest. However, the impact is not homogenous across different groups in Jordan. In fact, poor households that directly compete for housing with refugees were more negatively affected in terms of housing quality, whereas richer households with greater exposure to refugees seem to have improved their housing outcomes, a result we attribute to their attempt to upgrade away from the kind of housing demanded by refugees. We also find that rent prices increased in response to the share of Syrian refugees, but only in regions closer to the Syrian border. However, other housing outcomes (e.g., average area per HH member, house quality index, etc.) are more negatively affected by the Syrian refugee influx in regions that are relatively distant from borders.

The rest of the paper is structured as follows. Section 2 reviews the previous related literature. Section 3 describes the datasets used, the outcome variables, and descriptive statistics. Section 4 explains the identification strategy. Section 5 focuses on the data analyses, and Section 6 summarizes the main findings.

2. Literature Review

As a small country located in the heart of the Middle East, Jordan faces several challenges including limited natural and economic resources and political vulnerability (Francis 2015). One of the major issues that the country is facing is the challenge of providing adequate shelter and public services to a population growing at a rate of 3.2% per annum.² The challenge is compounded by the fact that more than 80% of the population is in urban areas (Al Betawi 2013).

² https://data.worldbank.org/indicator/SP.POP.GROW

Jordan housing markets appear to perform relatively well compared to other countries in the region. The house price to income ratio, at 3, is relatively low compared to 5 in Tunisia, 7 in Egypt, 9 Morocco, and 12 in Algeria (Beidas-Strom, Lian, & Maseeh, 2009; Erbaş & Nothaft, 2005). Jordan also appears to have more flexible rental markets than either Egypt and Tunisia (Assaad, Krafft, & Rolando, 2016). Mortgage finance is also relatively well developed, with a ratio of total mortgage loans to total loans in commercial and government financial institutions at 19%, relative to 7-8% in Egypt, Morocco and Tunisia, and nearly nil in Algeria (Erbaş & Nothaft, 2005). Compare to these comparator countries, Jordan has a high ratio of owner-occupancy at 75% compared to 45% in Algeria, 32% in Egypt, 46% in Morocco and 67% in Tunisia (Erbaş & Nothaft, 2005).

Despite its limited resources, the country has a long history as an asylum location. For example, as a product of the Arab-Israeli war of 1948 that caused 85% of Palestinians to leave their home, Jordan received a significant influx of refugees and built camps to accommodate them. Over the decades, camps have evolved from tents and marquees, to brick houses (Alnsour and Meaton 2014). The initial waves of Palestinian refugees were followed by further refugee waves resulting from the 1967 war and the occupation of the West bank, the first gulf War of 1990-91, the US invasion of Iraq in 2003. Thus, the response of the Jordanian government to the arrival of large inflows of Syrian refugees after 2011 should be viewed in the context of its historical role toward people in need of refuge (Francis 2015).Notwithstanding Jordan's experience in accommodating large refugee inflows, the sheer number in this most recent influx are bound to stretch Jordan's ability to provide services and shelter, and are bound to have strained its housing markets, especially for groups that would be in direct competition for the kind of low-cost housing sought by refugees.

A few donor-funded programs have attempted to respond to the shortages of housing caused by the Syrian refugee influx in host communities. The largest such program was run by the Norwegian Refugee Council (NRC), which attempted to increase housing supply in the Northern governorates of Ajloun, Irbid and Jerash by providing landlords with financial incentives and technical support to complete partially constructed units and build new units (Salemi, Bowman, & Compton, 2018). Other programs support Syrian refugees in acquiring housing by providing temporary rent subsidies (Ibid.).

There is not much evidence to date on the impact of the Syrian crisis on housing outcomes in neighboring countries. With the exception of the work of Tumen (2016) and Balkan and Tumen (2016), which showed a negative impact of the influx of refugees on housing rental prices in Turkey, there have been no other rigorous, nationally-representative studies that investigate the impact of the Syrian refugees on housing markets in receiving countries. UNDP (2014) examined the impact of the Syrian crisis on local communities in two of the northern governorates of Jordan, namely Mafraq and Irbid, utilizing data obtained from (HIES) 2010 and 2013 and a supplemental survey to cover additional socioeconomic aspects. Carrying out a comparative analysis between 2010 and 2013, the study showed that the quality of life of hosting communities was negatively affected by the influx of refugees. Among others, it reported that overall inflation and unemployment rates were higher than the averages economy-wide, more strain on public services, such as garbage collection and water. Additionally, the study pointed out to the deterioration of several aspects related to housing and the local environment in the northern region. These included higher levels of rent, pollution, and dust. However, the study employed only descriptive analysis and did not take into account the effects of refugees on other areas in the country.

3. Data, descriptive statistics and outcome variables

We use data from the Jordan Labor Market Panel Survey (JLMPS) 2010 and 2016 waves, and the Jordan Household Expenditure and Income Survey (HEIS) for 2006 and 2013. The JLMPS survey was designed and administered by the Economic Research Forum (ERF) in cooperation with the

Department of Statistics in Jordan (DoS). The JLMPS contains detailed information on demographic characteristics (e.g. employment status, household composition, income, parental education, education history, etc.). More importantly, for the purpose of the current study, it contains detailed data on household housing and living conditions including information on the areas of the dwelling, access to infrastructure (e.g., public water, public sewerage networks, etc.) and quality of the dwelling (e.g., type of building materials, etc.) We limit the analyses in JLMPS to 2,128 households for whom we have complete information on housing outcomes across the two waves in order to conduct panel data analysis and thus control for all time-invariant household characteristics. To deal with the issue that the JLMPS does not have consistent measure of actual rent across the two waves, we also use the Jordan Household Expenditure and Income Survey (HEIS) for 2006 and 2013 which is a repeated cross-section data that includes detailed data on consumption and income of households in Jordan.

The share of Syrian refugees for each region (locality) is calculated using data from the Jordan census in 2015. The share of Syrians is the treatment variable in this exercise. The outcome variables include housing quality measures, dwelling area of households and the rent. Specifically, when talking about housing quality measures we refer to a housing quality index constructed using factor analysis by combining various dwelling characteristics (i.e., apartment or house, floor type, source of drinking water, heating type, garbage disposal, sewage and area per household members). In addition, JLMPS contains information on actual rent only in 2016. We use this information to construct a predicted rent measure by estimating a hedonic model of quality by regressing the 2016 log rent on the quality indicators indicated above. The predicted scores of this regression for both 2010 and 2016 are used as another measure of housing quality. The predicted rent measure is basically produces an alternative set of weights to the one produced by factor analysis, so it reflects housing quality changes weighted by 2016 prices, but not changes in rents over time. We standardize the two scales for ease of interpretation. We also consider the dwelling area and dwelling area per household member as outcomes potentially affected by the inflow of refugees, in order to analyze the overpopulation that some regions might have experienced with the inflow of refugees. In the case of HEIS data, we use the number of rooms in the household as a proxy of dwelling area, and we use the reported actual rent as an additional outcome.

Table 1 shows the descriptive statistics from JLMPS in 2010, prior to the crisis, for households in regions that experienced relatively higher inflows of refugees (above median) and regions that experienced lower share of Syrian refugees (below median), and evaluates the significance of the difference. According to the table, there are significant differences between regions with high share of refugees and regions with low share of refugees. In most aspects of housing quality, regions that present higher share of refugees are doing much better than regions with lower share of refugees. The same also applies to other aspects including household wealth, years of education, and household size. This reflects the fact that the Northern part of Jordan, which was more exposed to the Syrian influx, is generally more developed that then southern region of the country, underscoring the need to correct for initial conditions.

4. Identification strategy

The identification comes from the variation across localities in the large influx of Syrian refugees to Jordan in the wake of the Syrian conflict starting in 2011 and it is captured by the share of Syrian refugees reported in the census data of 2015 at the locality level. We employ a difference in difference approach to evaluate the change in housing conditions and rental prices in areas with relatively higher flows of Syrian refugees compared to areas with relatively lower flows of Syrian refugees.

The share of Syrian refugees by locality serves as the treatment variable, helping us to separate high-Syrian and low-Syrian areas, and its effect can be estimated using the following empirical model:

$$O_{it} = \beta_0 + \beta_1 R_i + \beta_1 T_t + \beta_3 [R_i * T_t] + \beta_4 D_{it} + U_i + \varepsilon_{it}$$

where O_{it} are housing outcome variables such as the standardized house quality index, standardized predicted rent, dwelling area and dwelling area per household member; R_i is the share of Syrian refugees; T_t is a time dummy that takes the value 1 if the observation is after the crisis, and 0 otherwise; D_{it} is regional dummies, which capture any potential geographic moving; U_i is an household fixed effect (FE); and ε_{it} is the time-varying error term. Thus, β_3 is the coefficient of interest that captures the effect of the share of Syrian refugees.

5. Results

5.1 Overall Sample

Table 2 shows the impact of the share of Syrian refugees using the overall sample of households who appeared in the two waves of JLMPS. According to the table, the proportion of Syrian refugees seems to negatively affect the housing outcomes of locals. However, the impact is statistically and economically insignificant with only the standardized house quality index being affected: one percent increase in the share of Syrian refugees reduces the household quality index by 0.013 of a standard deviation (SD). Log house area (even per hh member), and the standardized predicted rent seem not to be affected by the share of Syrians.

The difference in difference technique was implemented on the HEIS dataset as a robustness check. Similarly, the share of Syrian refugees is used as the treatment variable. The results are presented in Table A1 in the Appendix. The standardized household quality index decreases by 0.005 SD points as a response to one percent increase in the share of Syrians between 2006 and 2013. The table further shows that predicted rent is also affected negatively and decreases by about 0.002 SD points. Number of household members per room and actual rents appear to be unaffected by the refugee influx.

5.2 Heterogeneity Analysis

The small to zero impact of the crisis on housing outcomes could mask heterogeneity across different aspects. Table 3 shows the impact of higher flows of Syrian refugees across different household characteristics using the JLMPS panel data namely, household size, wealth of the household, education, and type of job of the head of the household. The table shows that households with lower levels of wealth (below median), and families with low-educated and low-skilled heads are affected more negatively in terms of housing quality. The table, however, shows that households with higher wealth experience statistically significant, yet economically small, improvement in their housing outcomes.

5.3 The effect of geographic distance

As stated above, regions that are closer to Syrian borders are more likely to be affected by the crisis due to the large number of refugees who settled there. Table 4 shows the analysis of the JLMPS data for the regions in Jordan that are close to borders. This includes the governorates of Irbid, Ajloun, Jerash, Mafraq and Zarqa. For households in these governorates, an increase in the share of Syrian refugees by one percent reduces the house quality index by 0.012 SD points. Table 5 shows the analysis for the remaining regions (i.e., distant regions), namely Balqa, Amman, Madaba, Karak, Tafilah, Ma'an and Aqaba. Within these governorates, the effect of the Syrian refugee crisis is higher: an increase in the share of Syrian refugees by one percent reduces the house quality index by 0.020 SD points. These results suggest that regions that are distant from the Syrian borders are relatively

more sensitive to changes in the proportion of Syrian refugees than governorates closer to boarders.³ This could be due to the inability of local municipalities, in areas with low populations particularly in the South (mainly, Karak, Tafilah, Ma'an) to cope with the increased pressures on services. Another possible reason could be the concentration of several international donors for refugees in the regions closer to borders. Those donors are more likely to provide support for locals to help them cope with the crisis. They could also offer help to municipalities so they could enhance their services.

Table A3 in the Appendix shows the impact of the Syrian refugees' inflow on housing outcomes for closer and distant regions using the HEIS data. The results show that in the closer regions, the actual rental prices increased significantly in response to the share of Syrian refugees: 0.011 percentage points increase in response to one percent increase in the share of Syrians. In the south, both house quality index and the predicted rent appear to be negatively affected by the inflow of refugees. One percent increase in the share of Syrians decreased the quality index by 0.021 SD points and decreased the predicted rent by 0.011 SD points.

We also run the heterogeneity analyses separately for closer and distant regions (Tables A4 and A5, respectively). Low wealth households and households with low-educated heads seem to be affected more by the influx of refugees. The sensitivity in distant governorates to the crisis was higher generating a bigger effect on the house quality index.

6. Parallel Trends

The negative impact of the share of Syrians on housing outcomes could be a result of some other endogenous differences in the housing markets of regions with high share of Syrians vs. regions with low share of Syrians. To investigate this possibility, we estimate the parallel trends in housing outcomes for regions that received high share of Syrians (treatment) and regions that did not (control) using data from the 2002, 2006, 2010 and 2013 waves of the HEIS data. Figure 1 show the parallel trends of the outcome variables for the two types of regions.

The figure clearly shows no evidence of different trends between the treated and control regions prior to the crisis. After the crisis (i.e., in wave 2013), the figure shows a decline in some aspects for the treated group relative to the control group (mainly, house quality index, and average number of rooms per household member). This suggests that the findings are not driven by endogenous factors in the housing markets of treated and control regions, and could be traced to the Syrian refugee crisis.⁴

7. Conclusion

We use a difference in difference approach to evaluate the change in housing conditions and rental prices in response to the high flows of Syrian refugees in the wake of the Arab Spring Revolution. We show that housing conditions of Jordanians are slightly negatively affected on average by the crisis and that this negative impact is more pronounced for poorer households who, arguably, compete with refugees in the housing market. Heterogeneity analyses shows that while poorer household are affected more negatively, richer household experience an improvement in their housing outcomes in response to the share of refugees. The paper further shows that rent significantly increased in the regions closer to Syrian borders in response to the crisis. However, housing quality was more responsive to the crisis in regions that are relatively more distant. One potential reason for this could be the inability of local municipalities, in areas with low populations particularly in the south to cope with the increased pressures on services. Another possible reason could be the concentration of several international

³ As a robustness check, we ran the analysis separately for Amman and the remaining distant governorates (Table A2). The table shows no evidence that the bigger effect experienced in the distant governorates is driven exclusively by the size and importance of Amman.

⁴ The HEIS data is missing information about district level in earlier waves. That's why, Figure 1 uses the rather broad definition of governorate for regions.

donors for refugees in the regions closer to borders. Those donors are more likely to provide support for locals to help them cope with the crisis. They could also offer help to municipalities so they could enhance their services. We finally show that the impact of the Syrian refugee crisis is not driven by different patterns of trend in the housing markets in treated and control regions.

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Table 1. Descriptive analysis

	(1)	(2)	(3)	(4)	(5)
	Share of refugees b	Share of refugees below median		bove median	D Vales
VARIABLES	Mean	SD	Mean	SD	P value
Outcome variables					
House area	128.99	46.60	131.49	48.58	0.18
House area per person	28.98	20.72	32.40	27.75	0.00
House quality index (std)	-0.318	1.036	0.102	1.025	0.00
House quality: floor	0.906	0.291	0.960	0.194	0.00
House quality: water	0.964	0.184	0.975	0.154	0.10
House quality: heating	0.474	0.499	0.562	0.496	0.00
House quality: sewage	0.352	0.477	0.567	0.495	0.00
House quality: garbage	0.851	0.355	0.810	0.392	0.00
Predicted rent (std)	-0.286	1.093	0.146	0.947	0.00
Urban	1.463	0.498	1.213	0.409	0.00
Household size	5.653	2.499	5.307	2.367	0.00
Years of school	8.996	4.667	9.842	4.641	0.00
Wealth index	4.651	2.541	5.425	2.557	0.00

Source: Author's calculations based on JLMPS 2010

Table 2. Impact of Syrian refugees' inflow on housing outcomes. Overall ample, JLPMS

	(1)	(2)	(3)	(4)
VARIABLES	Log house area	Log house area per hh member	House quality index (std.)	Predicted rent (std.)
Share of refugees	0.000	0.000	-0.013***	-0.000
* 2016 round	(0.001)	(0.001)	(0.002)	(0.002)
2016 round	0.022	0.042**	0.289***	0.062**
	(0.014)	(0.017)	(0.033)	(0.026)
Share of refugees	-0.002	-0.015	-0.719*	0.185
-	(0.166)	(0.209)	(0.397)	(0.315)
Observations	5,140	5,140	5,140	5,078
R-squared	0.005	0.010	0.046	0.034
Number of HH	2,570	2,570	2,570	2,564
Control Urban/Rural	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Household FE	YES	YES	YES	YES

Note: Source JLMPS data, waves 2010 and 2016. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3. Impact of Syrian refugees' inflow on housing outcomes by heterogeneity <u>dimensions, JLPMS</u>

VARIABLES	(1) Log house area	(2) Log house area per hh member	(3) House quality index (std.)	(4) Predicted rent (std.)
Household Size				
Small hh (below	0.002	0.002	-0.014***	-0.004
median=5)	(0.003)	(0.003)	(0.005)	(0.004)
Big hh (above median=5)	-0.000	-0.001	-0.016***	-0.000
	(0.001)	(0.001)	(0.003)	(0.003)
Wealth				
Low-wealth $(5^{th} decile$	-0.002	-0.003*	-0.020***	-0.007**
and below)	(0.001)	(0.002)	(0.004)	(0.003)
High-wealth (above 5 th	0.004**	0.006***	-0.001	0.011***
decile)	(0.002)	(0.002)	(0.003)	(0.003)
Education of head of III				
Low Educe (below sec.)	0.001	-0.000	-0.015***	-0.000
Low Luce. (below see.)	(0.001)	(0.002)	(0.003)	(0.002)
	(0.001)	(0.002)	(0.005)	(0.002)
High Educ. (sec. or above)	-0.001	0.003	-0.005	0.000
	(0.002)	(0.002)	(0.004)	(0.003)
Labor skills (head)				
Unskilled workers	-0.002	-0.001	-0.018***	-0.002
	(0.002)	(0.002)	(0.004)	(0.003)
Skilled workers	0.002	0.002	-0.005	0.007
	(0.003)	(0.004)	(0.006)	(0.006)
Age of head of UU				
Young (below median=50)	-0.000	-0.001	-0.017***	0.000
roung (below median=50)	(0.001)	(0.002)	(0.004)	(0.003)
	(0.001)	(0.002)	(0.001)	(0.005)
Old (above median=50)	0.001	0.002	-0.008**	-0.001
	(0.002)	(0.002)	(0.003)	(0.003)
Control Urban/Rural	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Household FE	YES	YES	YES	YES

Note: Source JLMPS data, waves 2010 and 2016. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

/	(1)	(2)	(3)	(4)
VARIABLES	Log house area	Log house area per hh member	House quality index (std.)	Predicted rent (std.)
Share of refugees	0.001	-0.000	-0.012***	0.001
* 2016 round	(0.001)	(0.002)	(0.003)	(0.003)
2016 round	0.018	0.067**	0 334***	0.085*
2010 Iound	(0.023)	(0.028)	(0.055)	(0.045)
Share of refugees	-0.026	-0.104	0.349	0.139
C	(0.186)	(0.230)	(0.445)	(0.362)
Observations	2.154	2.154	2.154	2.138
R-squared	0.011	0.017	0.039	0.044
Number of HH	1,077	1,077	1,077	1,077
Control Urban/Rural	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Household FE	YES	YES	YES	YES

Table 4. Impact of Syrian refugees' inflow on housing outcomes. Regions closer to Syrian borders, JLMPS

Note: Source JLMPS data, waves 2010 and 2016. Regions: Irbid, Ajloun, Jerash, Mafraq and Zarqa. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5. Impact of Syrian refugees' inflow on housing outcomes. Regions distant from Syrian borders, JLMPS

,	(1)	(2)	(3)	(4)
VARIABLES	Log house area	Log house area per hh member	House quality index (std.)	Predicted rent (std.)
Share of refugees	-0.004*	-0.000	-0.020***	-0.012***
* 2016 round	(0.002)	(0.003)	(0.005)	(0.004)
2016 round	0.050**	0.039	0 306***	0 120***
2010 Iouna	(0.020)	(0.026)	(0.048)	(0.038)
Share of refugees	0.008	-0.017	-0.646	0.227
C	(0.168)	(0.213)	(0.400)	(0.311)
Observations	2.986	2.986	2.986	2.940
R-squared	0.006	0.007	0.055	0.035
Number of HH	1,493	1,493	1,493	1,487
Control Urban/Rural	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Household FE	YES	YES	YES	YES

Note: Source JLMPS data, waves 2010 and 2016. Regions: Balqa, Amman, Madaba, Karak, Tafilah, Ma'an and Aqaba. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1



Figure 1. Parallel trends (2002-2013)

Source: Author's calculations based on HEIS data 2002, 2006, 2010 and 2013.

Note: Treatment is defined by governorates with share of Syrian refugees greater than or equal to the median, Control is defined by governorates with share of Syrian refugees below the median.

		8		
	(1)	(2)	(3)	(4)
VARIABLES	Average No. of HH members	House quality index	Predicted log rent	Actual log
	per room	(std.)	(std.)	rent
Share of refugees	-0.002	-0.005***	-0.002	0.002
* 2013 round	(0.001)	(0.002)	(0.001)	(0.004)
Share of refugees	0.041***	0.239***	0.075***	0.059*
	(0.015)	(0.015)	(0.009)	(0.034)
2013 round	0 175***	0.368***	0.217***	0 423***
2013 Iound	(0.022)	(0.028)	(0.016)	(0.063)
	(010-2)	((0.000)	(0.000)
Observations	7,420	7,420	7,420	1,383
R-squared	0.058	0.456	0.810	0.461
Controls				
District	YES	YES	YES	YES
Urban/Rural	YES	YES	YES	YES
			0.1	

Appendix Table A1. Impact of Syrian refugees' inflow on housing outcomes, overall sample, HEIS

Note: Source HEIS, waves 2006 and 2013. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A2. Impact of Syrian refugees' inflow on housing outcomes. Amman vs other distant from border regions, JLMPS

	(1)	(2)	(3)	(4)
VARIABLES	Log house	Log house area per hh	House quality index	Predicted rent
	area	member	(std.)	(std.)
Amman Only				
Share of refugees	-0.002	-0.000	-0.031***	-0.013
* 2013 round	(0.005)	(0.006)	(0.010)	(0.008)
2013 round	0.027	0.037	0.464***	0.181*
	(0.059)	(0.071)	(0.114)	(0.096)
Share of refugees	-0.026	0.120	-0.039	-0.080
-	(0.078)	(0.094)	(0.152)	(0.125)
Observations	1,078	1,078	1,078	1,057
R-squared	0.001	0.006	0.086	0.021
Number of hh	539	539	539	536
Other distant from border regions				
Share of refugees	-0.002	-0.000	-0.030***	-0.018***
* 2013 round	(0.003)	(0.004)	(0.009)	(0.007)
round	0.040*	0.029	0.317***	0.140***
	(0.022)	(0.029)	(0.058)	(0.046)
Share of refugees	-0.002	-0.013	-0.631	0.244
-	(0.154)	(0.202)	(0.399)	(0.316)
Observations	1,604	1,604	1,604	1,586
R-squared	0.008	0.006	0.056	0.044
Number of hhid	802	802	802	800
Control Urban/Rural	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Household FE	YES	YES	YES	YES

Note: Source JLMPS data, waves 2010 and 2016. Other distant regions: Balqa, Madaba, Karak, Tafilah, Ma'an and Aqaba. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Average No. of HH members per	(2) House quality index	(3) Predicted log rent	(4) Actual log
	room	(sta.)	(sta.)	rent
Closer Regions				
Share of refugees * 2013 round	-0.002 (0.002)	-0.003 (0.002)	0.000 (0.001)	0.011*** (0.004)
Share of refugees	0.014**	0.020**	0.015***	-0.002
2013 round	0.173*** (0.038)	0.313*** (0.049)	0.169*** (0.028)	0.260*** (0.080)
Observations R-squared	2,878 0.031	2,878 0.348	2,878 0.661	414 0.359
Distant Regions				
Share of refugees	-0.003	-0.021***	-0.011***	-0.018
* 2013 round	(0.006)	(0.007)	(0.004)	(0.014)
Share of refugees	0.041***	0.250***	0.082***	0.069*
2013 round	(0.015)	(0.016) 0.505***	(0.009) 0.303***	(0.037)
2013 10010	(0.046)	(0.061)	(0.035)	(0.143)
Observations	4,589	4,589	4,589	994
R-squared	0.066	0.490	0.843	0.479
Controls				
District	YES	YES	YES	YES
Urban/Rural	YES	YES	YES	YES

Table A3. Impact of Syrian refugees' inflow on housing outcomes. Regions close to Syrian borders vs regions distant from Syrian borders, HEIS

Note: Source HEIS, waves 2006 and 2013. Northern governorates: Irbid, Ajloun, Jerash, Mafraq and Zarqa. Southern governorates: Balqa, Amman, Madaba, Karak, Tafilah, Ma'an and Aqaba. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)
VARIABLES	Log house area	Log house area per hh	House quality index	Predicted rent
		member	(std.)	(std.)
			(314)	(2121)
Household Size				
Small hh (below	-0.001	-0.001	-0.005	-0.005
median=5)	(0.003)	(0.003)	(0.005)	(0.005)
median_3)	(0.005)	(0.005)	(0.000)	(0.005)
Big hh (above median=5)	-0.001	-0.002	-0.016***	-0.001
	(0.002)	(0.002)	(0.004)	(0.003)
	(1111)			(/
Wealth				
Low-wealth (5 th decile	-0.002	-0.005**	-0.017***	-0.005
and below)	(0.002)	(0.002)	(0.004)	(0.003)
· · · · · · · · · · · · · · · · · · ·	()			()
High-wealth (above 5 th	0.002	0.004*	-0.003	0.006
decile)	(0.002)	(0.002)	(0.004)	(0.003)
	· · · · ·			
Education of head of HH				
Low Educ. (below sec.)	0.001	-0.001	-0.015***	0.001
	(0.002)	(0.002)	(0.004)	(0.003)
High Educ. (sec. or above)	-0.002	-0.000	-0.003	-0.001
	(0.002)	(0.002)	(0.005)	(0.004)
Labor skills (head)				
Unskilled workers	-0.001	-0.004	-0.016***	-0.001
	(0.002)	(0.002)	(0.005)	(0.004)
Skilled workers	-0.001	-0.005	-0.011*	-0.005
	(0.003)	(0.003)	(0.006)	(0.006)
Age of head of HH	0.000			0.000
Young (below median=50)	-0.000	-0.003*	-0.018***	0.000
	(0.002)	(0.002)	(0.004)	(0.003)
011 (-1	0.000	0.002	0.004	0.000
Old (above median=50)	0.000	0.002	-0.004	-0.000
	(0.002)	(0.002)	(0.004)	(0.003)
Control Urban/Bural	VES	VES	VES	VES
Region FF	VES	VFS	VFS	VES
Household FE	YES	YES	YES	YES

Table A4. Impact of Syrian refugees' inflow on housing outcomes by heterogeneitydimensions. Regions close to Syrian borders, JLMPS

Note: Source JLMPS data, waves 2010 and 2016. Northern governorates: Irbid, Ajloun, Jerash, Mafraq and Zarqa. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)
VARIABLES	Log house area	Log house area per hh	House quality index	Predicted rent
		member	(std.)	(std.)
Household Size				
Small hh (below	-0.001	-0.001	-0.044***	-0.026***
median=5)	(0.006)	(0.007)	(0.012)	(0.010)
Big hh (above median=5)	-0.000	0.001	-0.016**	-0.004
	(0.003)	(0.003)	(0.007)	(0.006)
Wealth				
Low-wealth (5 th decile	0.001	-0.001	-0.024***	-0.009
and below)	(0.003)	(0.004)	(0.008)	(0.006)
High-wealth (above 5 th	-0.004	0.003	-0.008	-0.006
decile)	(0.003)	(0.004)	(0.007)	(0.007)
Education of head of HH	0.000	0.001		0.000
Low Educ. (below sec.)	-0.003	-0.001	-0.024***	-0.009
	(0.003)	(0.004)	(0.007)	(0.006)
Uich Educ (coo, or shous)	0.004	0.002	0.014*	0.019**
High Educ. (sec. of above)	-0.004	0.002	-0.014	-0.018
	(0.004)	(0.003)	(0.008)	(0.007)
I abor skills (head)				
Unskilled workers	-0.006	0.000	-0.028***	-0.011
Chiskined workers	(0.000)	(0.005)	(0.009)	(0.007)
	(0.001)	(0.000)	(0.00))	(0.007)
Skilled workers	-0.003	0.004	0.004	0.000
	(0.009)	(0.011)	(0.015)	(0.015)
Age of head of HH				
Young (below median=50)	-0.003	-0.003	-0.019**	-0.005
Č ((0.003)	(0.004)	(0.008)	(0.006)
Old (above median=50)	-0.002	0.001	-0.023***	-0.016***
	(0.003)	(0.004)	(0.008)	(0.006)
Control Urban/Rural	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
Household FE	YES	YES	YES	YES

Table A5. Impact of Syrian refugees' inflow on housing outcomes by heterogeneity dimensions. Regions distant from Syrian borders, JLMPS

Note: Source JLMPS data, waves 2010 and 2016. Southern governorates: Balqa, Amman, Madaba, Karak, Tafilah, Ma'an and Aqaba. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1