Appendix
The Impact of Refugees on Employment and Wages in Jordan

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**SUPPLEMENTAL APPENDICES FILE**

**Appendix A: Outcomes comparing 2010 and 2016**

Comparing labor outcomes for Jordanians in 2010 to 2016 can illustrate national trends, which may be linked to perceptions of the impact of refugees, as well as potential mechanisms for impact. Figure 1, for outcomes in percentages or hours, and Figure 2, for log wages, present how national outcomes have changed over time, by sex. The unemployment ratio (percentage of the population unemployed, distinct from the unemployment rate) rose (from 5% to 7%) while the employment rate fell even further (from 39% to 33%), such that labor force participation (not shown) dropped as well. Among the employed, there are important changes over time that suggest possible mechanisms for the effects of the Syrian influx. Formality increased from 65% to 66%, the share of workers in managerial or professional activities rose from 29% to 33%, the share of workers in competitive activities fell from 29% to 27%, while the share of workers in health and human service activities rose from 17% to 19% . The private sector shrank from 61% to 57% of employment (such that public sector employment rose from 39% to 43% of employment). Hours per week fell slightly, from a mean of 46 to 43, but since hourly wages rose 10%, monthly wages still rose by 5%. These patterns generally held for both men and women.

Figure 1. Outcomes in percentages or mean hours in 2010 and 2016, by sex, Jordanians ages 15-64
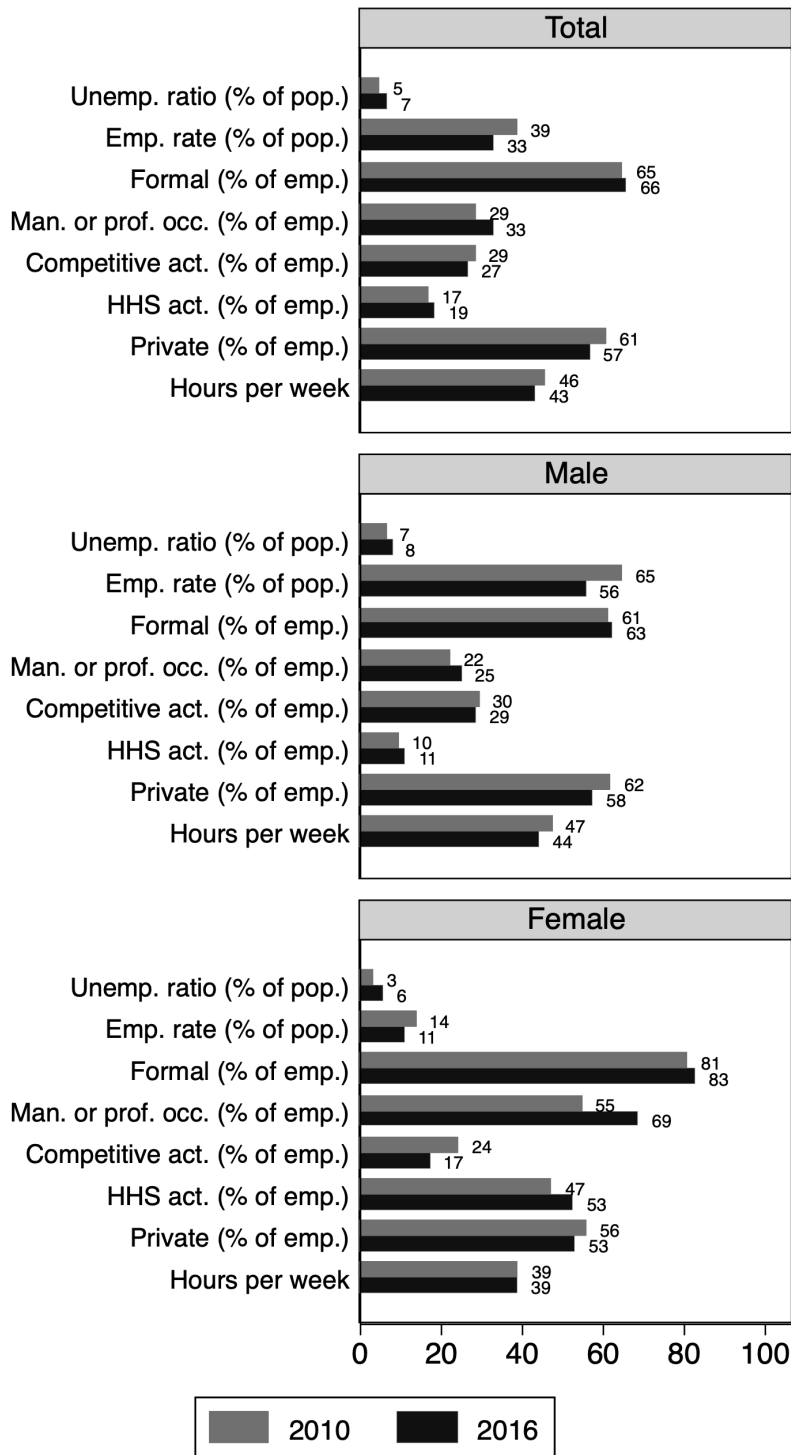
Source: Authors' calculations based on JLMPS 2010 and 2016

Figure 2. Log hourly and monthly real wages in 2010 and 2016, by sex, Jordanians ages 15-64
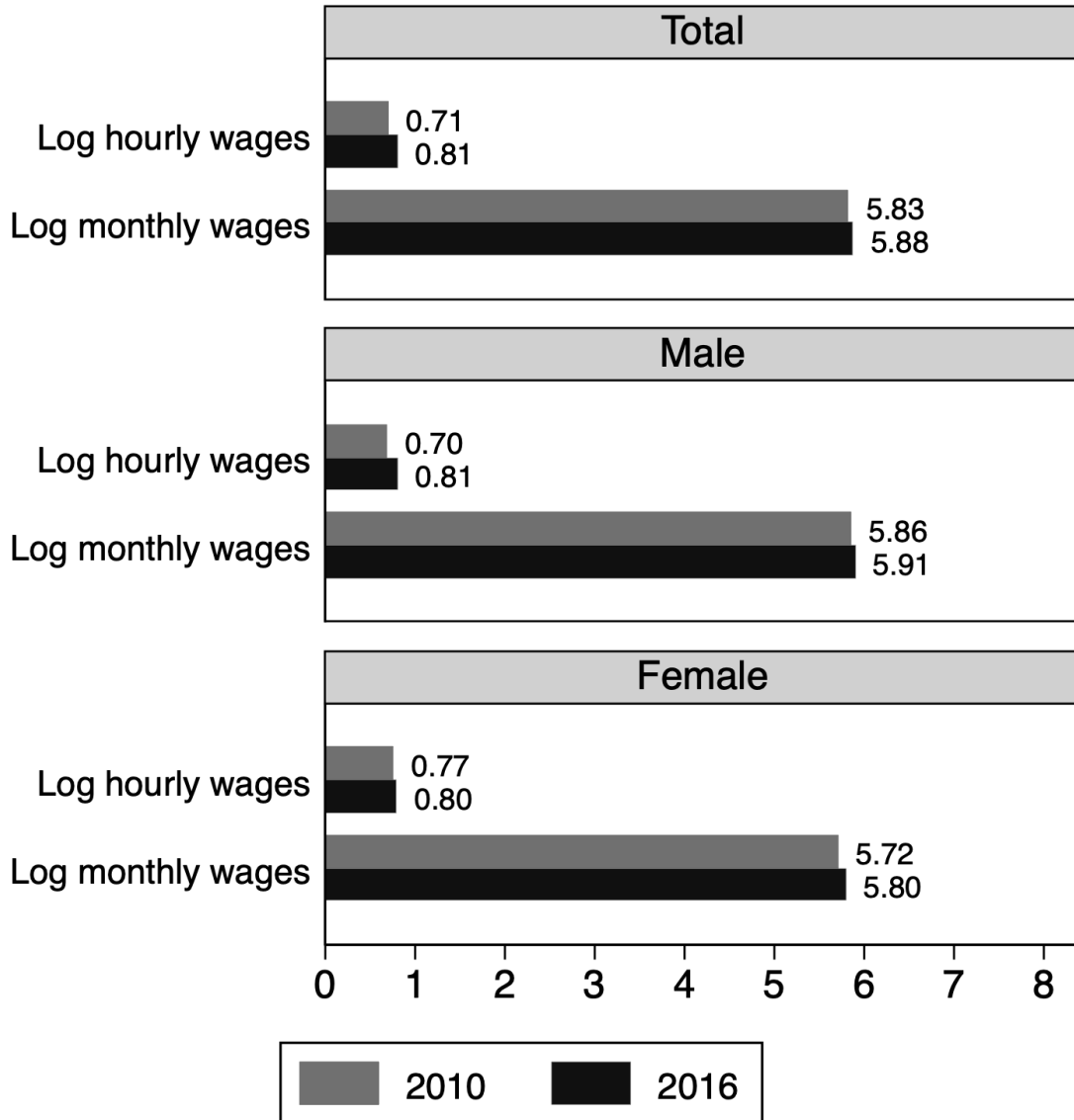
Source: Authors' calculations based on JLMPS 2010 and 2016

Appendix B: Pooling retrospective data

In the retrospective models, we estimate separately the interaction between the Syrian influx and each year, in part because the Syrians arrived over a number of years, and in part because the effects might vary over time. However, this estimation approach may underpower our results. Therefore, in this appendix, we pool "pre-2011" and "2011+" in estimating the central interaction term. The results are presented in Table 1, Table 2, and Table 3. In our preferred specification with individual fixed effects there is only one significant result; a negative effect on the probability of formality in areas that experienced a great influx. However, looking at the year-disaggregated results, this appears to be driven by higher formality in these areas in 2004-2008 (not 2009 or 2010). We therefore prefer our non-pooled results that allow separation of effects and comparison with 2010, immediately pre-influx.

Table 1. Pooling 2011+: Labor market status (linear probability model), men, retrospective data, 2004-2017

	Unemployed				Employed			
Percentage HH Syrian								
Percentage of HH Syr.	0.000	0.000			-0.001	-0.001		
	(0.001)	(0.001)			(0.001)	(0.001)		
Year (2010 omit.)								
2004	0.007	0.005	0.005	0.014	-0.007	-0.017	-0.018	-0.606***
	(0.007)	(0.007)	(0.007)	(0.016)	(0.012)	(0.010)	(0.010)	(0.021)
2005	0.009	0.008	0.008	0.014	-0.007	-0.016	-0.018	-0.509***
	(0.006)	(0.006)	(0.006)	(0.014)	(0.011)	(0.009)	(0.009)	(0.017)
2006	0.006	0.004	0.004	0.009	-0.007	-0.013	-0.013	-0.409***
	(0.005)	(0.005)	(0.005)	(0.012)	(0.009)	(0.008)	(0.008)	(0.013)
2007	0.003	0.001	0.001	0.005	0.001	-0.004	-0.004	-0.302***
	(0.004)	(0.004)	(0.004)	(0.009)	(0.007)	(0.006)	(0.007)	(0.011)
2008	0.006	0.005	0.005	0.007	-0.003	-0.007	-0.007	-0.206***
	(0.004)	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.008)
2009	0.007*	0.006*	0.006	0.008	-0.008	-0.010*	-0.010*	-0.110***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)
2011	0.011	0.010	0.012	0.009	-0.013	-0.013	-0.013	0.092***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.016)	(0.013)	(0.013)	(0.013)
2012	0.011	0.010	0.011	0.008	-0.018	-0.015	-0.015	0.188***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.017)	(0.014)	(0.014)	(0.016)
2013	0.016	0.016	0.017	0.015	-0.011	-0.010	-0.009	0.293***
	(0.010)	(0.010)	(0.010)	(0.012)	(0.018)	(0.014)	(0.014)	(0.018)
2014	0.019*	0.020*	0.021*	0.021	-0.008	-0.009	-0.009	0.394***
	(0.010)	(0.010)	(0.010)	(0.013)	(0.018)	(0.014)	(0.014)	(0.019)
2015	0.019	0.020	0.022*	0.024	-0.002	-0.004	-0.003	0.498***
	(0.010)	(0.010)	(0.010)	(0.015)	(0.019)	(0.014)	(0.014)	(0.022)
2016	0.013	0.015	0.017	0.021	0.007	0.003	0.004	0.603***
	(0.010)	(0.010)	(0.010)	(0.017)	(0.019)	(0.015)	(0.015)	(0.025)
2017	0.012	0.015	0.017	0.022	0.007	-0.012	-0.011	0.684***
	(0.010)	(0.010)	(0.010)	(0.019)	(0.019)	(0.015)	(0.015)	(0.027)
Int. 2011+ and % HH Syr.								

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Int. 2011+ and % HH Syr.	-0.001	-0.001	-0.001	-0.001	0.002	0.002	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls		X	X	X		X	X	X
Locality FE			X				X	
Individual FE				X				X
N (Person-Year Obs.)	96543	94889	94889	96543	96543	94889	94889	96543
R-sq.	0.000	0.022	0.065	0.002	0.001	0.256	0.286	0.192

Source: Authors' calculations based on JLMPS 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the locality level

Table 2. Pooling 2011+: Job formality and occupation (linear probability model), employed men, retrospective data, 2004-2017

	Formal				Managerial/Professional Occupation.			
Percentage HH Syrian								
Percentage of HH Syr.	-0.002	-0.003			0.003*	0.001		
	(0.002)	(0.002)			(0.001)	(0.001)		
Year (2010 omit.)								
2004	-0.038***	-0.036***	-0.025*	-0.039***	-0.022*	-0.002	-0.001	-0.004
	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)	(0.006)	(0.006)	(0.006)
2005	-0.033***	-0.031***	-0.023**	-0.033***	-0.018*	-0.001	0.000	-0.004
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.005)	(0.005)	(0.005)
2006	-0.028***	-0.024**	-0.019*	-0.027***	-0.019*	0.001	0.003	-0.003
	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)	(0.004)	(0.004)	(0.005)
2007	-0.018*	-0.015*	-0.013*	-0.023***	-0.012*	0.004	0.004	-0.001
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.003)	(0.003)	(0.004)
2008	-0.010	-0.005	-0.004	-0.015**	-0.012*	0.002	0.001	-0.001
	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.003)	(0.004)	(0.003)
2009	-0.006	-0.002	-0.004	-0.007	-0.007	-0.000	-0.001	-0.001
	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.003)	(0.003)	(0.001)
2011	0.007	-0.001	-0.003	0.015**	0.026**	0.002	0.006	0.002
	(0.010)	(0.010)	(0.009)	(0.005)	(0.009)	(0.008)	(0.008)	(0.002)
2012	0.016	0.009	0.003	0.022***	0.027**	0.001	0.006	0.003
	(0.010)	(0.010)	(0.009)	(0.006)	(0.010)	(0.009)	(0.009)	(0.003)
2013	0.015	0.009	0.004	0.029***	0.029**	0.005	0.009	0.004
	(0.010)	(0.010)	(0.010)	(0.007)	(0.011)	(0.009)	(0.009)	(0.004)
2014	0.021*	0.016	0.010	0.040***	0.031**	0.006	0.011	0.006
	(0.010)	(0.011)	(0.010)	(0.009)	(0.011)	(0.009)	(0.009)	(0.004)
2015	0.018	0.013	0.006	0.047***	0.031**	0.001	0.007	0.007
	(0.011)	(0.012)	(0.011)	(0.010)	(0.012)	(0.011)	(0.011)	(0.005)
2016	0.020	0.016	0.009	0.054***	0.032**	-0.000	0.005	0.008
	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)	(0.011)	(0.010)	(0.006)
2017	0.021	0.022	0.014	0.060***	0.029*	-0.003	0.003	0.008
	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)	(0.011)	(0.011)	(0.007)
Int. 2011+ and % HH Syr.								
Int. 2011+ and % HH Syr.	-0.001	0.000	0.000	-0.001*	-0.002*	0.000	-0.000	-0.000

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Controls		X	X	X		X	X	X
Locality FE			X				X	
Individual FE				X				X
N (Person-Year Obs.)	51123	50449	50449	51123	50732	50065	50065	50732
R-sq.	0.002	0.099	0.209	0.006	0.003	0.555	0.588	0.001

Source: Authors' calculations based on JLMPS 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the locality level

Table 3. Pooling 2011+: Job sector (linear probability model), employed men, retrospective data 2004-2017

	Open Sector				Health and Human Services				Private Sector			
Percentage HH Syrian												
Percentage of HH Syr.	-0.001	-0.001			0.002	0.001			0.001	0.001		
	(0.002)	(0.002)			(0.001)	(0.001)			(0.003)	(0.003)		
Year (2010 omit.)												
2004	0.009	0.010	0.005	0.027**	-0.007	0.001	0.006	-0.004	0.009	0.024*	0.004	0.023**
	(0.006)	(0.007)	(0.006)	(0.010)	(0.005)	(0.005)	(0.006)	(0.005)	(0.010)	(0.009)	(0.009)	(0.007)
2005	0.009	0.010	0.006	0.023*	-0.006	-0.001	0.004	-0.004	0.011	0.022*	0.008	0.021***
	(0.006)	(0.006)	(0.005)	(0.009)	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)	(0.009)	(0.006)
2006	0.003	0.003	0.002	0.019*	-0.009*	-0.003	0.000	-0.003	0.005	0.014	0.006	0.017***
	(0.006)	(0.006)	(0.005)	(0.008)	(0.004)	(0.004)	(0.005)	(0.005)	(0.009)	(0.008)	(0.007)	(0.005)
2007	-0.001	-0.002	-0.001	0.010*	-0.009*	-0.003	-0.002	-0.001	-0.002	0.005	0.001	0.013***
	(0.005)	(0.006)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.003)
2008	-0.005	-0.008	-0.007	0.004	-0.007	-0.002	-0.001	0.000	-0.001	0.000	-0.001	0.007**
	(0.006)	(0.006)	(0.006)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.006)	(0.006)	(0.006)	(0.002)
2009	-0.004	-0.006	-0.004	0.000	-0.007*	-0.005	-0.004	-0.000	-0.004	-0.005	-0.002	0.001
	(0.005)	(0.005)	(0.004)	(0.002)	(0.003)	(0.003)	(0.003)	(0.001)	(0.005)	(0.004)	(0.004)	(0.001)
2011	-0.011	-0.004	-0.009	-0.005	0.010	0.002	-0.002	-0.000	0.006	0.006	0.009	-0.007
	(0.009)	(0.009)	(0.009)	(0.004)	(0.005)	(0.006)	(0.006)	(0.002)	(0.010)	(0.010)	(0.007)	(0.005)
2012	-0.017	-0.011	-0.013	-0.011*	0.007	-0.000	-0.006	0.001	0.002	-0.002	0.007	-0.011
	(0.010)	(0.009)	(0.009)	(0.005)	(0.006)	(0.006)	(0.007)	(0.003)	(0.011)	(0.010)	(0.007)	(0.006)
2013	-0.014	-0.010	-0.012	-0.015*	0.006	-0.001	-0.008	0.002	0.003	-0.006	0.006	-0.016*
	(0.011)	(0.010)	(0.010)	(0.006)	(0.006)	(0.006)	(0.006)	(0.004)	(0.012)	(0.010)	(0.008)	(0.006)
2014	-0.016	-0.013	-0.015	-0.019*	0.007	0.001	-0.006	0.003	0.007	-0.007	0.008	-0.017*
	(0.011)	(0.011)	(0.011)	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.012)	(0.011)	(0.008)	(0.008)
2015	-0.015	-0.011	-0.011	-0.022**	0.005	-0.002	-0.010	0.004	0.012	-0.004	0.014	-0.021*
	(0.011)	(0.011)	(0.011)	(0.009)	(0.007)	(0.007)	(0.008)	(0.007)	(0.012)	(0.012)	(0.009)	(0.009)
2016	-0.002	-0.000	-0.002	-0.025*	0.003	-0.004	-0.012	0.005	0.024	0.001	0.020*	-0.025*
	(0.012)	(0.013)	(0.012)	(0.010)	(0.007)	(0.007)	(0.008)	(0.008)	(0.013)	(0.013)	(0.010)	(0.010)
2017	-0.000	-0.001	-0.001	-0.029*	0.003	-0.004	-0.013	0.006	0.023	-0.007	0.017	-0.030**
	(0.012)	(0.014)	(0.013)	(0.011)	(0.007)	(0.007)	(0.008)	(0.009)	(0.013)	(0.014)	(0.010)	(0.011)
Int. 2011+ and % HH Syr.												

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Int. 2011+ and % HH Syr.	0.001	0.000	0.001	0.000	-0.001	-0.000	0.000	0.000	-0.000	-0.001	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Controls		X	X	X		X	X	X		X	X	X
Locality FE			X				X				X	
Individual FE				X				X				X
N (Person-Year Obs.)	50813	50144	50144	50813	50813	50144	50144	50813	51126	50452	50452	51126
R-sq.	0.000	0.068	0.189	0.003	0.001	0.141	0.225	0.001	0.000	0.092	0.337	0.006

Source: Authors' calculations based on JLMPS 2016

Notes: *p<0.05; **p<0.01; ***p<0.001

Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared

Standard errors (in parentheses) clustered at the locality level

Appendix C: Results (retrospective and panel) for women

In this appendix, we present the retrospective (Table 4, Table 5, and Table 6) and panel (Table 7) models for women. In the fourth (our preferred) specification with individual fixed effects, the parallel trend assumption always holds in the retrospective models for women and none of the refugee influx effects are significant. The panel results show a small but significant increase in formality for women (as for men) in localities that experienced a greater influx.

Table 4. Labor market status (linear probability model), women, retrospective data, 2004-2017

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			<u>Unemployed</u>				<u>Employed</u>	
Percentage HH Syrian								
Percentage of HH Syr.	-0.000	-0.001			-0.000	-0.000		
	(0.001)	(0.001)			(0.001)	(0.001)		
Year (2010 omit.)								
2004	-0.016*	-0.012	-0.011	-0.105***	-0.010	-0.010	-0.011	-0.162***
	(0.007)	(0.007)	(0.007)	(0.014)	(0.007)	(0.007)	(0.007)	(0.013)
2005	-0.012	-0.009	-0.008	-0.087***	-0.005	-0.007	-0.008	-0.133***
	(0.007)	(0.007)	(0.007)	(0.013)	(0.006)	(0.006)	(0.006)	(0.011)
2006	-0.012	-0.010	-0.009	-0.071***	-0.004	-0.007	-0.007	-0.107***
	(0.006)	(0.006)	(0.006)	(0.011)	(0.005)	(0.005)	(0.005)	(0.008)
2007	-0.010	-0.007	-0.007	-0.054***	-0.004	-0.007	-0.007	-0.082***
	(0.006)	(0.005)	(0.005)	(0.009)	(0.005)	(0.005)	(0.005)	(0.007)
2008	-0.003	-0.001	-0.002	-0.034***	-0.007	-0.008	-0.008	-0.058***
	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.006)
2009	-0.002	-0.001	-0.002	-0.018***	-0.003	-0.004	-0.004	-0.030***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
2011	0.004	0.005	0.005	0.021***	-0.000	0.002	0.002	0.025***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.003)
2012	0.003	0.006	0.006	0.036***	0.004	0.010**	0.010**	0.055***
	(0.004)	(0.004)	(0.004)	(0.006)	(0.003)	(0.003)	(0.003)	(0.005)
2013	0.006	0.009*	0.008	0.055***	0.008*	0.015***	0.016***	0.084***
	(0.004)	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)	(0.004)	(0.008)
2014	0.009	0.014*	0.013*	0.075***	0.008	0.019***	0.020***	0.110***
	(0.006)	(0.006)	(0.006)	(0.010)	(0.005)	(0.005)	(0.005)	(0.010)
2015	0.011	0.016*	0.016*	0.093***	0.015*	0.026***	0.027***	0.140***
	(0.007)	(0.007)	(0.007)	(0.013)	(0.006)	(0.006)	(0.006)	(0.013)
2016	0.010	0.016*	0.016*	0.108***	0.021**	0.035***	0.036***	0.171***
	(0.007)	(0.008)	(0.008)	(0.014)	(0.007)	(0.007)	(0.007)	(0.015)
2017	0.010	0.016*	0.015*	0.121***	0.023**	0.035***	0.036***	0.193***
	(0.007)	(0.007)	(0.008)	(0.015)	(0.008)	(0.008)	(0.007)	(0.017)
Int. year and % HH Syr.								
Int. 2004 and % HH Syr.	0.000	0.000	0.000	0.001	-0.001	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Int. 2005 and % HH Syr.	0.000	-0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.000

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Unemployed				**Employed**			
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Int. 2006 and % HH Syr.	0.000	0.000	0.000	0.000	-0.001	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2007 and % HH Syr.	0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Int. 2008 and % HH Syr.	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2009 and % HH Syr.	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2011 and % HH Syr.	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2012 and % HH Syr.	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2013 and % HH Syr.	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2014 and % HH Syr.	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2015 and % HH Syr.	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2016 and % HH Syr.	0.001	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Int. 2017 and % HH Syr.	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls		X	X	X		X	X	X
Locality FE			X				X	
Individual FE				X				X
N (Person-Year Obs.)	97581	96367	96367	97581	97581	96367	96367	97581
R-sq.	0.002	0.066	0.117	0.027	0.002	0.127	0.171	0.054

Source: Authors' calculations based on JLMPS 2016

Notes: *p<0.05; **p<0.01; ***p<0.001

Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared

Standard errors (in parentheses) clustered at the locality level

Table 5. Job formality and occupation (linear probability model), employed women, retrospective data, 2004-2017

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Formal				**Managerial/Professional Occupation**			
Percentage HH Syrian								
Percentage of HH Syr.	0.006*	0.003			0.012***	0.001		
	(0.002)	(0.002)			(0.003)	(0.001)		
Year (2010 omit.)								
2004	-0.019	-0.004	-0.010	-0.002	-0.073	-0.023	-0.016	-0.013
	(0.027)	(0.029)	(0.025)	(0.002)	(0.045)	(0.023)	(0.020)	(0.012)
2005	-0.035	-0.010	-0.011	-0.002	-0.077	-0.023	-0.026	-0.009
	(0.020)	(0.024)	(0.019)	(0.002)	(0.045)	(0.019)	(0.017)	(0.008)
2006	-0.009	-0.005	-0.007	-0.002	-0.006	-0.013	-0.017	-0.007
	(0.024)	(0.025)	(0.025)	(0.002)	(0.034)	(0.017)	(0.014)	(0.007)
2007	-0.017	-0.010	-0.015	-0.003	0.003	0.002	-0.009	-0.005
	(0.024)	(0.023)	(0.021)	(0.002)	(0.030)	(0.015)	(0.011)	(0.005)
2008	0.001	0.012	0.003	0.001	-0.008	0.013	-0.003	-0.004
	(0.021)	(0.019)	(0.016)	(0.001)	(0.023)	(0.011)	(0.009)	(0.003)
2009	0.023	0.035*	0.023*	0.000	-0.007	0.009	0.004	-0.002
	(0.018)	(0.015)	(0.011)	(0.000)	(0.018)	(0.010)	(0.005)	(0.002)
2011	0.002	0.001	-0.001	-0.000	0.004	-0.004	-0.005*	0.001
	(0.005)	(0.004)	(0.004)	(0.000)	(0.008)	(0.003)	(0.003)	(0.002)
2012	0.014	0.015	-0.000	-0.002	0.008	-0.005	-0.004	0.002
	(0.012)	(0.012)	(0.008)	(0.002)	(0.018)	(0.011)	(0.007)	(0.003)
2013	0.039**	0.038**	0.016	-0.002	0.036	0.011	0.006	0.004
	(0.014)	(0.013)	(0.011)	(0.002)	(0.020)	(0.012)	(0.011)	(0.005)
2014	0.052***	0.049***	0.032*	-0.002	0.061**	0.018	0.015	0.001
	(0.015)	(0.015)	(0.013)	(0.002)	(0.022)	(0.013)	(0.012)	(0.003)
2015	0.062***	0.062***	0.037*	-0.002	0.060**	0.013	0.006	0.003
	(0.018)	(0.017)	(0.015)	(0.002)	(0.022)	(0.013)	(0.012)	(0.004)
2016	0.044*	0.041*	0.028	-0.002	0.074*	0.021	0.014	0.004
	(0.019)	(0.019)	(0.017)	(0.003)	(0.029)	(0.020)	(0.017)	(0.006)
2017	0.023	0.017	0.004	-0.003	0.080*	0.016	0.011	0.006
	(0.023)	(0.023)	(0.021)	(0.003)	(0.031)	(0.021)	(0.018)	(0.007)
Int. year and % HH Syr.								
Int. 2004 and % HH Syr.	0.002	0.002	0.003*	0.001	-0.001	0.002	0.002	0.000
	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.000)
Int. 2005 and % HH Syr.	0.003*	0.002	0.002*	0.001	0.002	0.003*	0.003**	0.000

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Formal			**Managerial/Professional Occupation**		
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.000)
Int. 2006 and % HH Syr.	0.002	0.002	0.002	0.001	-0.003	0.001	0.002	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2007 and % HH Syr.	0.002	0.002	0.002	0.000	-0.002	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2008 and % HH Syr.	0.001	0.000	0.000	0.000	-0.001	-0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2009 and % HH Syr.	-0.001	-0.001	-0.001	0.000	-0.001	-0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Int. 2011 and % HH Syr.	-0.000	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Int. 2012 and % HH Syr.	-0.001	-0.001	0.000	0.000	-0.001	-0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Int. 2013 and % HH Syr.	-0.004*	-0.003*	-0.001	0.000	-0.003	-0.002*	-0.001	0.000
	(0.002)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2014 and % HH Syr.	-0.004*	-0.003*	-0.001	0.000	-0.005**	-0.003**	-0.002**	-0.000
	(0.002)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2015 and % HH Syr.	-0.005**	-0.004**	-0.001	-0.000	-0.005**	-0.003**	-0.002**	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2016 and % HH Syr.	-0.005***	-0.004**	-0.001	-0.000	-0.006***	-0.004***	-0.003***	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Int. 2017 and % HH Syr.	-0.003*	-0.002	-0.000	-0.000	-0.006**	-0.004**	-0.003**	-0.000
	(0.002)	(0.002)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)
Controls		X	X	X		X	X	X
Locality FE			X				X	
Individual FE				X				X
N (Person-Year Obs.)	9241	9146	9146	9241	9150	9059	9059	9150
R-sq.	0.010	0.173	0.434	0.012	0.025	0.690	0.769	0.010

Source: Authors' calculations based on JLMPS 2016

Notes: *p<0.05; **p<0.01; ***p<0.001

Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared

Standard errors (in parentheses) clustered at the locality level

Table 6. Job sector (linear probability model), employed women, retrospective data 2004-2017

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Open Sector				Health and Human Services				Private Sector			
Percentage HH Syrian												
Percentage of HH Syr.	-0.003	0.001			-0.001	-0.007*			-0.003	0.001		
	(0.002)	(0.002)			(0.003)	(0.003)			(0.005)	(0.004)		
Year (2010 omit.)												
2004	0.077*	0.056	0.035	0.029	-0.110*	-0.073	-0.027	0.006	0.000	-0.007	-0.025	0.005
	(0.038)	(0.033)	(0.032)	(0.031)	(0.046)	(0.042)	(0.040)	(0.010)	(0.054)	(0.048)	(0.047)	(0.006)
2005	0.068*	0.048	0.025	0.027	-0.098*	-0.057	-0.019	0.005	0.015	-0.005	-0.034	0.006
	(0.031)	(0.026)	(0.025)	(0.027)	(0.045)	(0.041)	(0.038)	(0.010)	(0.048)	(0.042)	(0.041)	(0.005)
2006	0.027	0.031	0.016	0.023	-0.021	-0.017	-0.002	0.003	-0.031	-0.032	-0.050	0.005
	(0.030)	(0.028)	(0.026)	(0.023)	(0.038)	(0.036)	(0.033)	(0.007)	(0.044)	(0.038)	(0.037)	(0.004)
2007	0.013	0.014	0.005	0.009	0.011	0.018	0.018	0.004	-0.037	-0.044	-0.048	0.004
	(0.021)	(0.018)	(0.018)	(0.010)	(0.033)	(0.028)	(0.024)	(0.005)	(0.036)	(0.032)	(0.030)	(0.003)
2008	0.004	-0.001	-0.004	0.005	0.002	0.015	0.012	0.003	-0.050	-0.058*	-0.050*	0.002
	(0.019)	(0.016)	(0.015)	(0.006)	(0.026)	(0.024)	(0.020)	(0.004)	(0.028)	(0.024)	(0.019)	(0.002)
2009	0.002	-0.005	-0.005	0.002	0.004	0.016	0.017	0.001	-0.041	-0.050*	-0.042*	0.001
	(0.014)	(0.013)	(0.013)	(0.003)	(0.021)	(0.020)	(0.016)	(0.002)	(0.024)	(0.022)	(0.018)	(0.001)
2011	0.003	0.007	0.009*	-0.003	0.001	-0.003	-0.012	0.003	0.008	0.010	0.019	-0.000
	(0.005)	(0.004)	(0.004)	(0.003)	(0.010)	(0.009)	(0.009)	(0.005)	(0.010)	(0.011)	(0.010)	(0.001)
2012	0.001	0.010	0.013	-0.007	-0.013	-0.018	-0.026*	-0.000	0.023	0.028	0.044**	-0.001
	(0.012)	(0.010)	(0.007)	(0.006)	(0.020)	(0.015)	(0.012)	(0.004)	(0.018)	(0.019)	(0.014)	(0.002)
2013	-0.009	0.004	0.010	-0.007	0.007	-0.011	-0.033*	-0.002	0.021	0.034	0.059**	0.001
	(0.014)	(0.012)	(0.011)	(0.009)	(0.024)	(0.019)	(0.017)	(0.005)	(0.023)	(0.025)	(0.021)	(0.003)
2014	-0.019	0.004	0.013	-0.008	0.012	-0.016	-0.044	-0.004	0.032	0.049*	0.077***	-0.001
	(0.016)	(0.013)	(0.011)	(0.013)	(0.028)	(0.023)	(0.023)	(0.008)	(0.024)	(0.024)	(0.022)	(0.003)
2015	-0.008	0.020	0.031	-0.011	0.018	-0.012	-0.045*	-0.005	0.055	0.076**	0.113***	-0.002
	(0.023)	(0.020)	(0.018)	(0.016)	(0.033)	(0.024)	(0.022)	(0.009)	(0.032)	(0.029)	(0.028)	(0.004)
2016	0.002	0.035	0.029	-0.013	-0.012	-0.047	-0.068*	-0.006	0.043	0.064*	0.113***	-0.006
	(0.025)	(0.023)	(0.020)	(0.019)	(0.039)	(0.031)	(0.028)	(0.011)	(0.033)	(0.031)	(0.030)	(0.005)
2017	0.001	0.041	0.033	-0.015	-0.001	-0.050	-0.076**	-0.007	0.049	0.085*	0.132***	-0.007
	(0.026)	(0.024)	(0.023)	(0.021)	(0.041)	(0.032)	(0.029)	(0.012)	(0.038)	(0.036)	(0.034)	(0.006)
Int. year and % HH Syr.												
Int. 2004 and % HH Syr.	-0.003	-0.004	-0.002	-0.001	0.007*	0.007*	0.004	-0.000	-0.002	-0.002	-0.002	-0.000
	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.003)	(0.003)	(0.000)	(0.004)	(0.004)	(0.003)	(0.000)
Int. 2005 and % HH Syr.	-0.003	-0.004*	-0.002	-0.001	0.009*	0.008**	0.005	-0.000	-0.002	-0.001	-0.000	-0.000

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			Open Sector				Health and Human Services				Private Sector	
	(0.002)	(0.002)	(0.002)	(0.001)	(0.004)	(0.003)	(0.003)	(0.000)	(0.003)	(0.003)	(0.002)	(0.000)
Int. 2006 and % HH Syr.	-0.002	-0.003	-0.001	-0.001	0.002	0.004	0.002	0.000	-0.001	-0.001	0.000	-0.000
	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.003)	(0.003)	(0.000)	(0.003)	(0.003)	(0.002)	(0.000)
Int. 2007 and % HH Syr.	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000	0.001	0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)	(0.003)	(0.003)	(0.002)	(0.000)
Int. 2008 and % HH Syr.	0.000	0.000	0.001	-0.000	-0.000	-0.001	-0.001	-0.000	0.001	0.003	0.003	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)	(0.002)	(0.003)	(0.002)	(0.000)
Int. 2009 and % HH Syr.	-0.000	-0.000	0.000	0.000	-0.001	-0.002	-0.002	-0.000	0.001	0.003	0.002	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)
Int. 2011 and % HH Syr.	0.000	0.000	0.000	0.000	0.000	0.000	0.001	-0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Int. 2012 and % HH Syr.	0.001	0.000	-0.000	0.000	0.002	0.001	0.002*	0.000	0.000	0.000	-0.001	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Int. 2013 and % HH Syr.	0.001	0.001	-0.000	-0.000	0.000	0.001	0.002	0.000	0.001	0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)	(0.001)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)
Int. 2014 and % HH Syr.	0.001	0.001	-0.001	-0.000	-0.000	0.001	0.002	0.000	0.002	0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)
Int. 2015 and % HH Syr.	0.001	-0.000	-0.001	-0.000	-0.002	-0.000	0.001	0.000	0.002	0.001	-0.001	-0.000
	(0.002)	(0.001)	(0.001)	(0.000)	(0.003)	(0.002)	(0.002)	(0.000)	(0.003)	(0.002)	(0.002)	(0.000)
Int. 2016 and % HH Syr.	0.001	0.000	-0.001	-0.000	-0.002	-0.000	0.001	0.000	0.004	0.003	0.001	0.000
	(0.002)	(0.002)	(0.001)	(0.000)	(0.003)	(0.002)	(0.002)	(0.000)	(0.003)	(0.002)	(0.003)	(0.000)
Int. 2017 and % HH Syr.	0.001	-0.000	-0.000	-0.000	-0.002	-0.000	0.001	0.000	0.004	0.002	0.000	0.000
	(0.002)	(0.002)	(0.001)	(0.000)	(0.003)	(0.003)	(0.002)	(0.000)	(0.004)	(0.003)	(0.003)	(0.000)
Controls		X	X	X		X	X	X		X	X	X
Locality FE			X				X				X	
Individual FE				X				X				X
N (Person-Year Obs.)	9155	9064	9064	9155	9155	9064	9064	9155	9241	9146	9146	9241
R-sq.	0.005	0.195	0.399	0.010	0.002	0.199	0.424	0.005	0.010	0.193	0.546	0.003

Source: Authors' calculations based on JLMPS 2016

Notes: *p<0.05; **p<0.01; ***p<0.001

Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared

Standard errors (in parentheses) clustered at the locality level

Table 7. Labor market outcomes (fixed effects linear probability and OLS models), women, panel data

	Unemployed	Employed	Formal	Ln (hourly wage)	Hours per week	Ln (monthly wage)	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
Year (2010 omit.)										
2016	0.038*	-0.008	-0.344	0.117	15.274*	1.401*	-0.076	0.182	0.215	0.223
	(0.019)	(0.028)	(0.192)	(0.780)	(7.580)	(0.708)	(0.184)	(0.175)	(0.130)	(0.166)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	-0.001	0.000	0.004*	0.010	-0.138	0.000	0.002	-0.001	-0.000	-0.004
	(0.001)	(0.001)	(0.002)	(0.016)	(0.143)	(0.006)	(0.002)	(0.002)	(0.003)	(0.004)
N	7411	7412	1071	979	1056	994	1193	1194	1194	1201

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Appendix D: Cross-sectional model results

In this appendix, we present the results treating the JLMPS 2010 and JLMPS 2016 waves as two cross sections. Essentially, pooled cross-sectional difference-in-difference models are estimated. We present the models across three specifications. The first has no controls, the second has controls, and the third adds sub-district (geographic) fixed effects (our preferred specification). Since we lack locality identifiers for 2010, we use the share of Syrians at the sub-district level and therefore cluster standard errors at this level as well. This also allows testing for a different definition of a local labor market. The coefficient of interest here is the interaction between the 2016 round and the share of households in the sub-district that are Syrian. There are no significant employment or unemployment effects for men (Table 8) or women (Table 9). Table 10 reports the results of examining the impact of Syrian refugees on men's job characteristics (and Table 11 does likewise for women). For formality, the estimate on the interaction is positive and statistically significant (in the models with controls and sub-district fixed effects); employed Jordanians are more likely to be engaged in formal work and therefore less likely to be in informal work. However, from our results on employment, we know that they are not less likely to be employed overall, so on the net this represents a shift in the types of jobs Jordanians are doing rather than the net loss of employment. The estimates are statistically significant for women in the model with fixed effects and of a similar magnitude. The tables also show that the effects on occupation and sector are insignificant. Table 12 documents the results for the wage and weekly hours worked models for men (both for waged and non-waged workers). The estimated effect of refugees in 2016 for the wage model is statistically insignificant. This finding holds for both hourly wage and monthly wage. Likewise, for hours worked per week, the estimates are statistically insignificant across all specifications. As for women (Table 13), the estimates are also statistically insignificant.

Table 8. Labor market status (linear probability model), men, cross-sectional data

	Unemployed			Employed		
Percentage HH Syrian						
Percentage of HH Syr.	-0.000	-0.000		-0.001	-0.001	
	(0.000)	(0.000)		(0.001)	(0.001)	
Year (2010 omit.)						
2016	0.014	0.008	0.008	-0.102***	-0.095***	-0.092***
	(0.008)	(0.010)	(0.009)	(0.022)	(0.020)	(0.018)
Int. 2016 and % HH Syr.						
Int. 2016 and % HH Syr.	-0.000	0.000	0.000	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Controls		X	X		X	X
Sub-district FE			X			X
N	15253	15070	15070	15253	15070	15070
R-squared	0.001	0.020	0.031	0.008	0.324	0.336

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 9. Labor market status (linear probability model), women, cross-sectional data

	Unemployed			Employed		
Percentage HH Syrian						
Percentage of HH Syr.	-0.001	-0.000		-0.001	-0.001	
	(0.000)	(0.000)		(0.001)	(0.001)	
Year (2010 omit.)						
2016	0.024**	0.018*	0.020*	-0.027*	-0.045***	-0.043***
	(0.008)	(0.008)	(0.008)	(0.012)	(0.009)	(0.009)
Int. 2016 and % HH Syr.						
Int. 2016 and % HH Syr.	0.000	0.000	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Controls		X	X		X	X
Sub-district FE			X			X
N	15553	15421	15421	15553	15421	15421
R-squared	0.004	0.098	0.115	0.002	0.197	0.205

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 10. Job characteristics (linear probability model), employed men, cross-sectional data

	Formal			Managerial/Professional Occupation			Open Sector			Health and Human Serv.			Private		
Percentage HH Syrian															
Percentage of HH Syr.		-0.001	-0.002		0.001	0.000		-0.001	-0.000		0.000	-0.000		-0.000	0.000
		(0.002)	(0.002)		(0.001)	(0.000)		(0.001)	(0.001)		(0.001)	(0.001)		(0.003)	(0.002)
Year (2010 omit.)															
2016	-0.009	-0.019	-0.019	0.029	0.018	0.019	-0.001	0.005	0.003	0.024*	0.021	0.015	-0.035	-0.037	-0.027
	(0.021)	(0.020)	(0.018)	(0.019)	(0.015)	(0.014)	(0.017)	(0.016)	(0.013)	(0.011)	(0.011)	(0.011)	(0.027)	(0.027)	(0.020)
Int. 2016 and % HH Syr.															
Int. 2016 and % HH Syr.	0.002	0.003*	0.002*	-0.001	0.001	0.001	-0.000	-0.001	-0.000	-0.001	-0.000	-0.000	-0.001	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls		X	X		X	X		X	X		X	X		X	X
Sub-district FE			X			X			X			X			X
N	9013	8930	8930	9004	8924	8924	9004	8924	8924	9004	8924	8924	9053	8970	8970
R-squared	0.000	0.116	0.175	0.001	0.516	0.524	0.000	0.050	0.109	0.001	0.143	0.162	0.003	0.088	0.255

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 11. Job characteristics (linear probability model), employed women, cross-sectional data

	Formal			Managerial/Professional Occupation			Open Sector			Health and Human Serv.			Private		
Percentage HH Syrian															
Percentage of HH Syr.	0.003	0.000		0.003	0.000		-0.003	-0.001		0.002	0.001		-0.001	-0.000	
	(0.002)	(0.001)		(0.002)	(0.001)		(0.002)	(0.001)		(0.002)	(0.001)		(0.002)	(0.002)	
Year (2010 omit.)															
2016	0.013	-0.027	-0.051*	0.145**	0.073*	0.068*	-0.089*	-0.031	-0.024	0.080*	0.029	0.010	-0.058	-0.017	0.032
	(0.033)	(0.025)	(0.022)	(0.049)	(0.028)	(0.030)	(0.037)	(0.026)	(0.025)	(0.033)	(0.034)	(0.032)	(0.037)	(0.030)	(0.029)
Int. 2016 and % HH Syr.															
Int. 2016 and % HH Syr.	0.001	0.001	0.002*	-0.001	-0.000	0.000	0.002	0.002	0.001	-0.003	-0.004	-0.003	0.002	0.003	0.002
	(0.002)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Controls		X	X		X	X		X	X		X	X		X	X
Sub-district FE			X			X			X			X			X
N	1932	1919	1919	2121	2110	2110	2122	2111	2111	2122	2111	2111	2131	2118	2118
R-squared	0.005	0.240	0.297	0.021	0.633	0.648	0.009	0.291	0.335	0.003	0.210	0.261	0.002	0.228	0.344

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 12. Hours and wages (OLS model), employed (or wage-working) men, cross-sectional data

	Ln (hourly wage)			Hours per week			Ln (monthly wage)		
Percentage HH Syrian									
Percentage of HH Syr.	-0.001	-0.002		-0.030	-0.025		-0.002	-0.003	
	(0.002)	(0.002)		(0.053)	(0.051)		(0.002)	(0.003)	
Year (2010 omit.)									
2016	0.267***	0.170***	0.202***	-2.443*	-1.641	-1.895	0.188***	0.148***	0.165***
	(0.056)	(0.047)	(0.049)	(1.183)	(1.107)	(1.044)	(0.036)	(0.038)	(0.040)
Int. 2016 and % HH Syr.									
Int. 2016 and % HH Syr.	0.001	0.002	0.001	-0.065	-0.076	-0.052	0.002	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.074)	(0.072)	(0.065)	(0.002)	(0.002)	(0.002)
Controls		X	X		X	X		X	X
Sub-district FE			X			X			X
N	7351	7278	7278	8834	8757	8757	7458	7383	7383
R-squared	0.025	0.144	0.163	0.009	0.035	0.060	0.020	0.154	0.175

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 13. Hours and wages (OLS model), employed (or wage-working) women, cross-sectional data

	Ln (hourly wage)			Hours per week			Ln (monthly wage)		
Percentage HH Syrian									
Percentage of HH Syr.	0.002	-0.002		0.008	0.049		0.003	0.000	
	(0.003)	(0.002)		(0.031)	(0.031)		(0.004)	(0.003)	
Year (2010 omit.)									
2016	0.172	0.057	0.083	-0.219	0.239	0.390	0.214***	0.143**	0.145**
	(0.092)	(0.055)	(0.062)	(1.116)	(0.895)	(1.054)	(0.060)	(0.046)	(0.047)
Int. 2016 and % HH Syr.									
Int. 2016 and % HH Syr.	0.003	0.004	0.003	0.009	-0.005	0.005	0.003	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.052)	(0.046)	(0.046)	(0.003)	(0.003)	(0.003)
Controls		X	X		X	X		X	X
Sub-district FE			X			X			X
N	1772	1762	1762	1911	1899	1899	1792	1782	1782
R-squared	0.014	0.227	0.276	0.000	0.119	0.170	0.038	0.207	0.281

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Appendix E: Education: Sub-group analyses

We distinguish individuals based on level of education in Table 14 and Table 15. Most Syrian labor force participants have low levels of education themselves (Assaad, Krafft, and Keo 2018) and are competing for informal and irregular jobs, which are likely to be held by less educated Jordanians (if any). Given the few females who work, we analyze only males for sub-group analyses. We present the panel results throughout our sub-group analyses, since some of the analyses that follow (for instance, by sector) depend on the 2010 year status, and the panel data, unlike the retrospective data, has wage and hours outcomes. We divide our sample into those with a basic education or less and those with secondary or more (as of 2010). There are not significant results for either the less or more educated in terms of employment or unemployment. The formality result becomes insignificant, but is larger for the less educated than the educated, suggesting they are particularly likely to shift out of informal work and into formal work. The significant hourly wage effect persists (and is larger) for the less educated, and is positive but insignificant for the more educated. The decrease in private sector (and increase in public sector work) is significant only for the more educated, unsurprising given the requirements of most public sector jobs. Overall, our results do not suggest unique negative effects of the refugee influx for the less educated.

Table 14. Labor market outcomes, hours, and wages (fixed effects linear probability and OLS models), by education (in 2010), men, panel data

	Unemployed		Employed		Ln (hourly wage)		Hours per week		Ln (monthly wage)	
	Less ed.	More ed.	Less ed.	More ed.	Less ed.	More ed.	Less ed.	More ed.	Less ed.	More ed.
Year (2010 omit.)										
2016	0.044	-0.002	-0.106	-0.046	0.181	0.469**	-0.211	-6.705	-0.088	0.371
	(0.054)	(0.039)	(0.065)	(0.055)	(0.164)	(0.166)	(2.009)	(3.705)	(0.216)	(0.365)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	-0.000	0.002	0.001	-0.001	0.013*	0.005	-0.207	-0.074	0.007	-0.001
	(0.001)	(0.001)	(0.002)	(0.003)	(0.006)	(0.005)	(0.144)	(0.136)	(0.005)	(0.004)
N	4755	2608	4776	2618	2301	1562	2840	1837	2337	1587

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Table 15. Job characteristics (fixed effects linear probability models), by education (in 2010), employed men, panel data

	Formal		Managerial/Professional Occupation		Open sector		Health and Human Serv.		Private sector	
	Less ed.	More ed.	Less ed.	More ed.	Less ed.	More ed.	Less ed.	More ed.	Less ed.	More ed.
Year (2010 omit.)										
2016	0.144**	0.159**	0.004	-0.013	0.008	0.064	0.003	-0.005	0.010	-0.137**
	(0.045)	(0.052)	(0.016)	(0.089)	(0.035)	(0.098)	(0.020)	(0.024)	(0.031)	(0.053)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	0.004	0.001	0.000	0.001	0.000	0.002	-0.000	-0.001	-0.002	-0.004*
	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
N	2910	1876	2916	1872	2917	1872	2917	1872	2927	1881

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Appendix F: Sector: Sub-group analyses

We examine the effects of employment by the sector of work in 2010 in Table 16 and Table 17. Those in the private sector in 2010 would be particularly likely to experience competition from incoming Syrians. Again, we present results only for men, since few women work. We use the panel data analyses for the best coverage of outcomes as well as being able to condition on 2010 status. Keeping in mind the selected nature of the sample—we are comparing those employed in the private sector and those employed in the public sector, so setting aside those not employed in 2010—there are interesting unemployment and employment effects. Those who were in the private sector and experienced a greater local labor market shock are significantly less likely to be unemployed. Those who had a greater shock and were in the public sector are significantly more likely to be employed (the coefficient for those in the private sector is of similar magnitude, albeit insignificant). The formality effects are insignificant, but of greater magnitude in the private sector. The increase in hourly wages is of a similar magnitude across sectors, but only significant in the public sector, where there was also a small (0.2) but significant reduction in hours per week. There was a significant effect on the probability of being a manager or professional only in the public sector. Curiously, there was a significant increase in being in the open sector for those in the private sector in 2010. It may be that the Jordan Compact is creating greater employment opportunities for Jordanians in these activities, as well as the Syrians who can acquire work permits in this sector. No other results were significant, but the number of significant results by sector, particularly given the further division of the sample, suggests that the Syrian refugee influx has had different effects, largely slight positive ones, across sectors.

Table 16. Labor market outcomes, hours, and wages (fixed effects linear probability and OLS models), by sector (in 2010), men, panel data

	Unemployed		Employed		Ln (hourly wage)		Hours per week		Ln (monthly wage)	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Year (2010 omit.)										
2016	0.043**	0.056***	-0.303***	-0.245***	0.330**	0.503**	2.740	-6.712*	0.266**	0.021
	(0.016)	(0.011)	(0.045)	(0.032)	(0.121)	(0.158)	(2.281)	(2.805)	(0.090)	(0.250)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	-0.001	-0.002**	0.003*	0.003	0.008*	0.009	-0.207*	0.037	0.003	0.005
	(0.001)	(0.001)	(0.002)	(0.002)	(0.004)	(0.010)	(0.085)	(0.207)	(0.002)	(0.012)
N	2356	2364	2357	2384	2012	1313	2054	2008	2036	1332

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Table 17. Job characteristics (fixed effects linear probability models), by sector (in 2010), employed men, panel data

	Formal		Managerial/Professional Occupation		Open sector		Health and Human Serv.		Private sector	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Year (2010 omit.)										
2016	0.063	0.187***	0.051	0.041	-0.016	-0.065	-0.017	0.013	-0.040	-0.055**
	(0.074)	(0.047)	(0.028)	(0.031)	(0.093)	(0.044)	(0.023)	(0.024)	(0.073)	(0.020)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	0.001	0.004	0.003*	-0.002	0.000	0.005*	-0.000	-0.002	-0.001	-0.002
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
N	2081	2063	2080	2063	2082	2063	2082	2063	2089	2070

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Appendix G: Amman versus elsewhere: Sub-group analyses

Amman is the capital of Jordan – the seat of government – and also home to 39% of Jordan's population. Given these characteristics, Amman may also have a somewhat different labor market and labor market response to the influx than elsewhere. We therefore undertook sub-group analyses splitting the sample into Amman and "not Amman" (everywhere else). We present the results for men in our main panel estimation, comparing Amman and "not Amman" in Table 18 and Table 19. In neither Amman or outside Amman is there a negative effect of the influx on employment or unemployment. Among the employed, shifts into more formal work and reductions in private sector/increases in public sector work occur in both areas but are larger and significant in Amman.

Table 18. Labor market outcomes, hours, and wages (fixed effects linear probability and OLS models), by Amman (in 2010), men, panel data

	Unemployed		Employed		Ln (hourly wage)		Hours per week		Ln (monthly wage)	
	Not Amman	Amman	Not Amman	Amman	Not Amman	Amman	Not Amman	Amman	Not Amman	Amman
Year (2010 omit.)										
2016	0.087	-0.012	0.010	-0.026	0.353**	0.237	-1.208	-5.425	0.128	0.326
	(0.081)	(0.037)	(0.106)	(0.064)	(0.110)	(0.241)	(2.504)	(4.461)	(0.154)	(0.391)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	0.000	0.004	0.001	-0.007	0.007	0.034	-0.131	-0.077	0.004	0.006
	(0.001)	(0.003)	(0.002)	(0.006)	(0.003)	(0.027)	(0.090)	(0.366)	(0.003)	(0.028)
N	5966	1397	5992	1402	3158	705	3769	908	3193	731

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Table 19. Job characteristics (fixed effects linear probability models), by Amman (in 2010), employed men, panel data

	Formal		Managerial/Professional Occupation		Open sector		Health and Human Serv.		Private sector	
	Not Amman	Amman	Not Amman	Amman	Not Amman	Amman	Not Amman	Amman	Not Amman	Amman
Year (2010 omit.)										
2016	0.053	0.111*	0.121***	-0.039	-0.080	-0.084	-0.068	0.029	-0.068	0.078
	(0.070)	(0.044)	(0.035)	(0.098)	(0.109)	(0.105)	(0.068)	(0.046)	(0.129)	(0.054)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	0.002	0.011*	0.000	0.005	0.001	0.007	-0.000	-0.003	-0.001	-0.010*
	(0.001)	(0.004)	(0.001)	(0.010)	(0.001)	(0.008)	(0.001)	(0.004)	(0.001)	(0.004)
N	3832	954	3835	953	3838	951	3838	951	3852	956

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the locality level

Appendix H: Entrants: Sub-Group Analyses

One further model is used to consider the potentially disproportionate impact of Syrian refugees specifically on labor market entrants in Jordan. Unemployment is primarily a new entrant phenomenon in Jordan. Labor markets are rigid, such that initial entry is highly deterministic of subsequent labor market outcomes (Amer 2014; Assaad and Krafft 2016; Mryyan 2014). Therefore, one of the sub-groups we examine as potentially disproportionately impacted by the Syrian refugee influx are new entrants. In this section, we examine only labor market entrants, those who left school or turned age 15 in the preceding five years, whichever was later, using the repeated cross-section data. We use the repeated cross-section rather than our preferred panel because we cannot observe any employment characteristics for those who were in school in 2010 and therefore could not estimate our models. The entrants are therefore those who left school or turned 15 in 2005-2009 or 2012-2016. As elsewhere, we focus our results on men. Table 20, Table 21, and Table 22 present the results of these models. In our preferred specification (including controls and sub-district fixed effects) there are no significant effects.

Table 20. Entrants: Labor market status (linear probability model), men, cross-sectional data

	Unemployed			Employed		
Percentage HH Syrian						
Percentage of HH Syr.	-0.000	-0.001		0.000	0.000	
	(0.001)	(0.001)		(0.002)	(0.001)	
Year (2010 omit.)						
2016	0.029	0.025	0.026	-0.225***	-0.193***	-0.194***
	(0.030)	(0.036)	(0.035)	(0.033)	(0.039)	(0.042)
Int. 2016 and % HH Syr.						
Int. 2016 and % HH Syr.	-0.002	-0.001	-0.001	0.002	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Controls		X	X		X	X
Sub-district FE			X			X
N	2138	2096	2096	2138	2096	2096
R-squared	0.001	0.044	0.089	0.043	0.142	0.192

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 21. Entrants: Job characteristics (linear probability model), employed men, cross-sectional data

	Formal			Managerial/Professional Occupation			Open Sector			Health and Human Serv.			Private		
Percentage HH Syrian															
Percentage of HH Syr.	-0.004	-0.004		0.005**	0.002*		0.000	0.000		0.003*	0.002		0.003	0.003	
	(0.003)	(0.003)		(0.001)	(0.001)		(0.003)	(0.002)		(0.001)	(0.001)		(0.005)	(0.003)	
Year (2010 omit.)															
2016	-0.013	-0.064	-0.006	0.099*	0.012	0.006	-0.015	0.011	-0.006	0.047	0.011	0.012	0.019	0.048	-0.012
	(0.062)	(0.050)	(0.046)	(0.049)	(0.025)	(0.027)	(0.062)	(0.056)	(0.060)	(0.033)	(0.024)	(0.025)	(0.050)	(0.048)	(0.036)
Int. 2016 and % HH Syr.															
Int. 2016 and % HH Syr.	0.004	0.006	0.003	-0.008***	-0.002	-0.001	-0.002	-0.003	-0.002	-0.004**	-0.003	-0.003	-0.005*	-0.005*	-0.001
	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Controls		X	X		X	X		X	X		X	X		X	X
Sub-district FE			X			X			X			X			X
N	1188	1172	1172	1184	1169	1169	1184	1169	1169	1184	1169	1169	1191	1175	1175
R-squared	0.003	0.171	0.296	0.008	0.579	0.627	0.003	0.139	0.241	0.005	0.224	0.306	0.004	0.161	0.400

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Table 22. Entrants: Hours and wages (OLS model), employed (or wage-working) men, cross-sectional data

	Ln (hourly wage)			Hours per week			Ln (monthly wage)		
Percentage HH Syrian									
Percentage of HH Syr.	0.001	-0.001		-0.103	-0.100		-0.004	-0.006	
	(0.003)	(0.003)		(0.069)	(0.061)		(0.004)	(0.004)	
Year (2010 omit.)									
2016	0.358*	0.201*	0.332***	-2.593	-1.177	-2.677	0.242*	0.170	0.290***
	(0.159)	(0.098)	(0.097)	(2.331)	(1.806)	(2.072)	(0.109)	(0.091)	(0.080)
Int. 2016 and % HH Syr.									
Int. 2016 and % HH Syr.	-0.003	0.002	-0.002	0.042	0.013	0.056	0.002	0.006	0.001
	(0.004)	(0.004)	(0.006)	(0.089)	(0.090)	(0.100)	(0.003)	(0.003)	(0.003)
Controls		X	X		X	X		X	X
Sub-district FE			X			X			X
N	1079	1066	1066	1150	1136	1136	1110	1095	1095
R-squared	0.026	0.184	0.301	0.006	0.079	0.145	0.029	0.209	0.347

Source: Authors' calculations based on JLMPS 2010 and 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the sub-district level

Appendix I: Entrants: School-to-work transitions

Since unemployment is a primarily new entrant phenomenon in Jordan and early outcomes are highly deterministic of subsequent trajectory, the school to work transition of Jordanian youth is of great concern. In this appendix we analyze school-to-work transitions over the 2004-2016 period,[2] similar to the retrospective analyses, but with the outcome here being the probability of obtaining a first job.

We specifically examine the duration of the school-to-work transitions using a complementary log-log discrete-time hazard model. The underlying event. *T*, we are interested in modeling (in this case, obtaining a first job) occurs at some point in time *d*. In this case, time is duration from school exit or age 15, whichever is later.[3] Duration-time, *d*, is distinct from calendar time, *t*. However, some individuals are censored and have not yet obtained a first job. Thus, we must use survival analysis, based on the idea of a hazard, h_{id}, namely:

$$h_{id} = \Pr\left(T_d = d \mid T_d \geq d\right) \qquad (1)$$

The hazard is the probability of individual *i* obtaining a first job at a particular duration, given that an individual has not yet done so. In a multivariate context, this gets modeled as the complementary log-log difference-in-difference model:

$$h_{id} = 1 - \exp\left[-\exp(\mu_d d + \alpha_j X_{ij} + \delta_t t + \gamma S_l + \theta_t t * S_l)\right] \qquad (2)$$

Here the coefficients, once exponentiated, are hazard ratios, proportionately multiplying the baseline hazards, μ_d.

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[2] Here we omit 2017 since we do not observe school exit in 2017 in our sample, since primary fielding finished in April.
[3] We restrict our analyses to those who exited in 2004-2016, parallel to the time frame for our retrospective analyses.

We estimate the effect of Syrians in each year, which allows us to test for parallel trends in this model, as in the retrospective data, as well as estimate the effect itself. Table 23 shows the results in terms of hazard ratios; a hazard ratio less than one means a slower transition from school to work (specifically, a lower probability of obtaining a first job in each year if one has not yet done so) while a hazard ratio greater than one is a faster transition (or higher probability). The models are presented first without and then with controls. All specifications include the baseline hazard, the probability of obtaining a job each year out from age 15 or school exit.

There are no significant refugee impacts for men, although after adding controls, there is some evidence that areas that had a larger refugee influx did, back in 2005/2006, have slower school to work transitions, non-parallel trends, with joint significance for the 2004-2009 interactions. Overall, there does not appear to have been a negative impact of the refugee influx on school-to-work transitions.

Table 23. School-to-work transition (hazard ratios from a complementary log-log discrete time hazard model), men, retrospective data for 2004-2016

Year (2010 omit.)		
2004	1.189	1.280
	(0.430)	(0.470)
2005	1.051	1.258
	(0.252)	(0.299)
2006	1.070	1.256
	(0.321)	(0.377)
2007	0.820	0.870
	(0.226)	(0.243)
2008	0.451**	0.478*
	(0.133)	(0.141)
2009	0.540*	0.537*
	(0.155)	(0.161)
2011	0.737	0.745
	(0.143)	(0.145)
2012	0.609	0.700
	(0.245)	(0.257)
2013	0.851	0.930
	(0.238)	(0.251)
2014	0.545*	0.609*
	(0.137)	(0.145)
2015	0.777	0.855
	(0.230)	(0.244)
2016	0.753	0.759
	(0.163)	(0.169)
Percentage HH Syrian		
Percentage of HH Syr.	1.000	1.004
	(0.013)	(0.013)
Int. year and % HH Syr.		
Int. 2004 and % HH Syr.	0.969	0.970
	(0.036)	(0.034)
Int. 2005 and % HH Syr.	0.975	0.965*
	(0.017)	(0.017)
Int. 2006 and % HH Syr.	0.966	0.957*
	(0.022)	(0.021)
Int. 2007 and % HH Syr.	1.011	1.005
	(0.021)	(0.020)
Int. 2008 and % HH Syr.	1.030	1.028
	(0.024)	(0.024)
Int. 2009 and % HH Syr.	1.014	1.013
	(0.019)	(0.018)
Int. 2011 and % HH Syr.	1.009	1.009
	(0.014)	(0.014)
Int. 2012 and % HH Syr.	1.008	0.995
	(0.029)	(0.023)
Int. 2013 and % HH Syr.	0.980	0.973
	(0.023)	(0.022)
Int. 2014 and % HH Syr.	1.020	1.007
	(0.018)	(0.016)

Int. 2015 and % HH Syr.	1.008	0.993
	(0.021)	(0.019)
Int. 2016 and % HH Syr.	1.021	1.014
	(0.013)	(0.013)
Controls		X
N (Person-year obs.)	10594	10300

Source: Authors' calculations based on JLMPS 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the locality level

Appendix J: Instrumenting for potential endogenous placement of refugees

As an additional robustness check for the potentially endogenous location decisions of refugees, we estimate two-stage least squares (2SLS) models, instrumenting for the locality share of Syrians, based on two different instruments. The first instrument uses the 2004 population census to calculate the percentage of households that are Syrian and Egyptian in a locality in 2004.[4] This is essentially an "ethnic enclave" approach, using historical shares of ethnic groups to instrument for new arrivals, since new immigrants tend to migrate towards existing communities (Bagir 2017; Card 2009). Although this instrument is common in the literature, one potential threat to its exogeneity is that Syrians and Egyptians in 2004 were primarily migrant workers, who may have been migrating to economically prosperous areas. Should these areas remain more prosperous at the time of the refugee influx, the exclusion condition may not hold.

The second instrument is the distance, in kilometers, to the locality from Za'atari refugee camp, Jordan's largest camp.[5] While most Syrians are living in host communities, around a fifth pass through refugee camps before arriving in host communities (Krafft et al. 2018). Za'atari refugee camp was opened in July 2012 in response to the rising refugee influx, and located in the desert near the Syrian border. Its placement was unrelated to local labor market conditions, making it a plausibly exogenous instrument, although the proximity to the border, and thus conflict may make areas closer to Za'atari predisposed to worse outcomes regardless of the local share of refugees, such that the exclusion condition may not hold. Although there are potential threats to the exclusion of each instrument, they are likely to be biased in opposite directions,

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[4] The share of non-Jordanians increased between 2004 and 2010, driven primarily by economic migrants. We tested using the 2004 share of Syrians only, but found it to be a weak instrument. Since both Syrians and Egyptians pre-2011 would have been relatively substitutable economic migrants, we use the combination as our instrument.

[5] Distance based on Google Maps. Distance to rural localities was not available, so for such missing cases, the average sub-district distance was used. There are very few Syrians—and not many Jordanians either—living in rural areas (Assaad, Krafft, and Keo 2018; Krafft et al. 2018).

with the 2004 census Syrians and Egyptians linked to economic opportunity and the distance to the border linked to economic downturn. Thus, we present both instruments separately. We consider the instrumental variable estimates primarily as an additional robustness check, identifying off of alternative assumptions to the difference-in-difference model. Since our instruments are at the locality level, we cannot include locality fixed effects, but do include district fixed effects.

Figure 3 shows the number of households underlying the instrument and the instrument itself for the first instrument, the percentage of households that are Syrian or Egyptian, by sub-district (the instrument is used on the locality level, which has even more variation). There is clear geographic variation to identify off of, and while visibly correlated with the 2015 share of households Syrian, this instrument also has a distinct pattern, concentrated in the center of the country, relative to identifying off of distance from the Za'atari refugee camp, near the border.

Figure 3. Number and percentage of households that are Syrian or Egyptian, by sub-district, 2004 Census
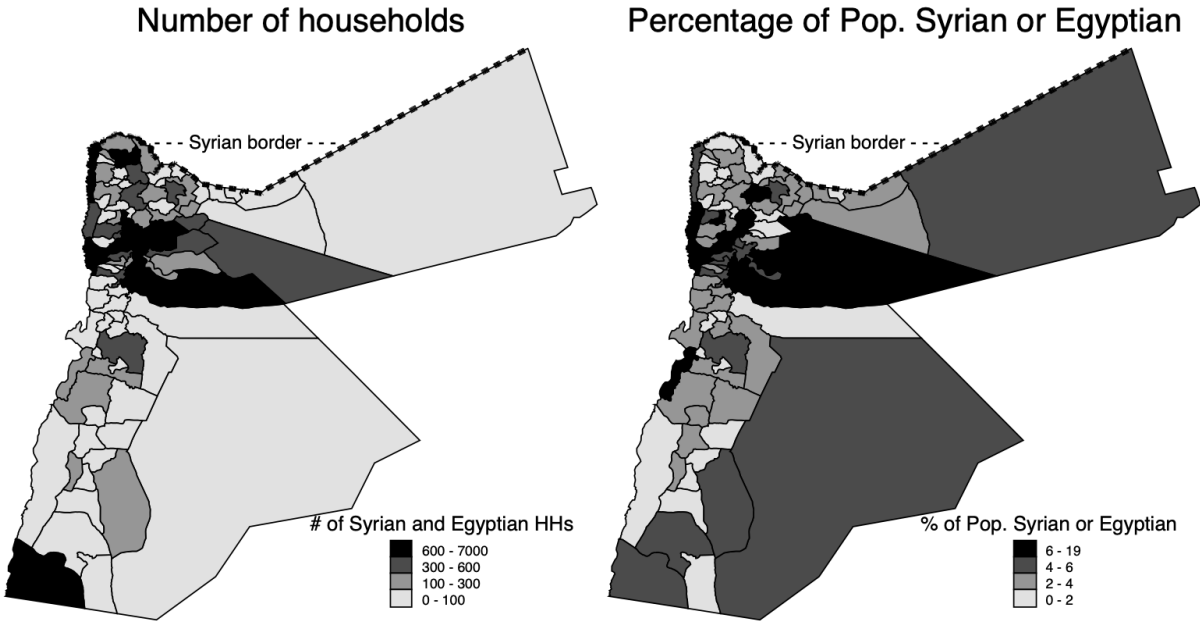
Source: Authors' calculation based on Census 2004

The first stage and second stage for both instruments are presented in Table 24 (the first stage showing the samples for the different outcomes, not the outcomes themselves). The instruments are significant and sufficiently strong for the 2004 census instrument. F-statistics range from 13.8 (for employment/unemployment samples) to 19.0 (for monthly wages sample). The sign on the instrument is positive, as expected, indicating that as the share of Syrians and Egyptians in 2004 increases, so too does the share in 2015. The second stage of the 2SLS estimates with the 2004 census instrument are all consistently insignificant, showing no significant impact of more Syrians locally.

The instruments are consistently significant, but weak, for the distance instrument. F-statistics range from 4.4 (for employment/unemployment samples) to 6.0 (for monthly wages sample). The sign on the instrument is negative, as expected, indicating that each additional kilometer from Za'atari reduces the percentage of households that are Syrian. The second stage of the 2SLS estimates are consistently insignificant.

Table 24. Instrumental variables 2SLS models, men

	Unemployed	Employed	Formal	Ln (hourly wage)	Hours per week	Ln (monthly wage)	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
First stage: 2004 census % Syr. & Eg.										
Percentage of HH Syr. or Eg. in 2004	0.305***	0.305***	0.396***	0.390***	0.391***	0.393***	0.382***	0.380***	0.380***	0.386***
	(0.082)	(0.082)	(0.093)	(0.092)	(0.095)	(0.090)	(0.091)	(0.091)	(0.091)	(0.092)
Controls	X	X	X	X	X	X	X	X	X	X
N (Obs.)	8024	8024	4431	3591	4258	3696	4418	4418	4418	4464
R-sq.	0.649	0.649	0.657	0.685	0.659	0.681	0.654	0.654	0.654	0.656
F-stat	13.776	13.776	17.975	18.036	17.060	18.978	17.697	17.588	17.588	17.648
p-val.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Second stage: 2004 census % Syr. & Eg.										
Percentage HH Syrian										
Percentage of HH Syr.	-0.004	-0.005	0.000	0.004	0.169	0.007	0.008	0.009	0.004	0.005
	(0.004)	(0.008)	(0.007)	(0.017)	(0.273)	(0.012)	(0.005)	(0.006)	(0.005)	(0.006)
Controls	X	X	X	X	X	X	X	X	X	X
N (Obs.)	8024	8024	4431	3591	4258	3696	4418	4418	4418	4464
R-sq.	0.039	0.297	0.169	0.142	0.056	0.126	0.567	0.107	0.173	0.260
First stage: distance to camp										
Za'atari Camp (distance in km.)	-0.057*	-0.057*	-0.072*	-0.073*	-0.074*	-0.072*	-0.072*	-0.073*	-0.073*	-0.071*
	(0.027)	(0.027)	(0.031)	(0.030)	(0.031)	(0.030)	(0.031)	(0.031)	(0.031)	(0.031)
Controls	X	X	X	X	X	X	X	X	X	X
N (Obs.)	8026	8026	4432	3592	4259	3697	4419	4419	4419	4465
R-sq.	0.636	0.636	0.641	0.670	0.644	0.664	0.639	0.639	0.639	0.641
F-stat	4.436	4.436	5.301	5.952	5.566	5.844	5.290	5.517	5.517	5.259
p-val.	0.036	0.036	0.022	0.015	0.019	0.016	0.022	0.019	0.019	0.022
Second stage: distance to camp										
Percentage HH Syrian										
Percentage of HH Syr.	0.006	-0.002	0.007	-0.056	0.105	-0.038	0.013	0.023	0.003	-0.005
	(0.009)	(0.012)	(0.015)	(0.052)	(0.747)	(0.025)	(0.008)	(0.015)	(0.010)	(0.013)
Controls	X	X	X	X	X	X	X	X	X	X
N (Obs.)	8026	8026	4432	3592	4259	3697	4419	4419	4419	4465
R-sq.	0.031	0.299	0.166	0.059	0.057	0.063	0.557	0.055	0.174	0.268

Source: Authors' calculations based on JLMPS 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include district fixed effects, education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the locality level

As a further investigation of the validity of our instruments, we explored whether there were pre-trends (prior to 2011) that might relate these instruments and labor market outcomes. We undertake these using the retrospective data, for men, presenting the results in Table 25 and Table 26. There is some potential evidence of pre-trends with significant interactions for earlier years compared to 2010 for employment with the percentage Syrian and Egyptian in 2004 instrument, as well as significant negative interactions in terms of health and human services employment. For the Za'atari distance instrument, there are some small significant pre-trends for formality and the private sector. Thus, as we noted, the two instruments may not be excludable, but they are likely to be biased in different directions (e.g. migrant workers going to areas with higher employment rates or effects of being near the Syrian border).

Table 25. Instrument pre-trends for percentage Syrian or Egyptian in 2004 census (linear probability model), men, retrospective data, 2004-2010

	Unemployed	Employed	Formal	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
Percentage of HH Syr. or Eg. in 2004	-0.000	0.002	-0.002	0.002	0.007**	0.002	0.006*
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)
Year (2010 omit.)							
2004	0.000	-0.008	-0.035**	0.004	0.004	0.012	0.001
	(0.009)	(0.013)	(0.012)	(0.008)	(0.008)	(0.008)	(0.012)
2005	0.002	-0.006	-0.027*	0.005	0.002	0.010	0.001
	(0.008)	(0.012)	(0.011)	(0.007)	(0.007)	(0.008)	(0.011)
2006	-0.000	-0.005	-0.023*	0.004	-0.001	0.009	0.001
	(0.007)	(0.010)	(0.009)	(0.006)	(0.007)	(0.007)	(0.008)
2007	-0.003	0.006	-0.015	0.007	-0.007	0.009	-0.006
	(0.006)	(0.008)	(0.008)	(0.005)	(0.006)	(0.006)	(0.008)
2008	0.003	-0.003	-0.002	0.004	-0.012	0.009	-0.007
	(0.006)	(0.005)	(0.007)	(0.005)	(0.007)	(0.005)	(0.008)
2009	0.005	-0.007	-0.004	0.001	-0.005	0.003	-0.005
	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)	(0.004)	(0.005)
Int. Year and % of HH Syr. or Eg. in 2004							
2004 # Percentage of HH Syr. or Eg. in 2004	0.001	-0.003*	0.001	-0.001	0.000	-0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
2005 # Percentage of HH Syr. or Eg. in 2004	0.001	-0.003*	0.001	-0.001	0.001	-0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
2006 # Percentage of HH Syr. or Eg. in 2004	0.001	-0.002	0.001	-0.000	0.001	-0.002*	0.002
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
2007 # Percentage of HH Syr. or Eg. in 2004	0.001	-0.003*	0.000	-0.001	0.001	-0.002*	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
2008 # Percentage of HH Syr. or Eg. in 2004	0.001	-0.001	-0.001	-0.001	0.001	-0.002**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
2009 # Percentage of HH Syr. or Eg. in 2004	0.000	-0.001	0.000	-0.000	0.000	-0.002*	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

N	41642	41642	21632	21486	21517	21517	21632
R-sq.	0.047	0.250	0.153	0.567	0.140	0.162	0.272

Source: Authors' calculations based on JLMPS 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include district fixed effects, education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the locality level

Table 26. Instrument pre-trends for distance to Za'atari (linear probability model), men, retrospective data, 2004-2010

	Unemployed	Employed	Formal	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
Year (2010 omit.)							
2004	0.006	-0.019	-0.050***	-0.005	0.003	-0.003	0.027*
	(0.011)	(0.014)	(0.015)	(0.008)	(0.010)	(0.008)	(0.013)
2005	0.012	-0.017	-0.041**	-0.004	0.008	-0.004	0.026*
	(0.009)	(0.013)	(0.015)	(0.007)	(0.008)	(0.007)	(0.012)
2006	0.006	-0.015	-0.034**	-0.001	0.001	-0.008	0.023*
	(0.009)	(0.012)	(0.012)	(0.006)	(0.008)	(0.006)	(0.010)
2007	0.005	-0.010	-0.022*	0.005	-0.008	-0.005	0.008
	(0.007)	(0.009)	(0.009)	(0.005)	(0.008)	(0.005)	(0.008)
2008	0.010	-0.013	-0.005	-0.001	-0.015	-0.000	0.003
	(0.007)	(0.007)	(0.008)	(0.005)	(0.008)	(0.005)	(0.008)
2009	0.008	-0.015*	-0.004	-0.002	-0.011	-0.004	-0.001
	(0.005)	(0.006)	(0.008)	(0.004)	(0.007)	(0.004)	(0.006)
Za'atari Camp (distance in km.)	-0.001	0.000	-0.000	-0.000	-0.000	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Int. Year and Za'atari Camp (distance in km.)							
2004 # Zaatari Camp	-0.000	-0.000	0.000*	0.000	0.000	0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2005 # Zaatari Camp	-0.000	-0.000	0.000	0.000	-0.000	0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2006 # Zaatari Camp	-0.000	-0.000	0.000	0.000	0.000	0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2007 # Zaatari Camp	-0.000	0.000	0.000	-0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2008 # Zaatari Camp	-0.000	0.000	0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2009 # Zaatari Camp	-0.000	0.000	0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	41649	41649	21632	21486	21517	21517	21632
R-sq.	0.049	0.250	0.153	0.567	0.137	0.163	0.270

Source: Authors' calculations based on JLMPS 2016
Notes: *p<0.05; **p<0.01; ***p<0.001
Controls include district fixed effects, education level, mother's education level, father's education level, father's employment status, age, and age squared
Standard errors (in parentheses) clustered at the locality level

Appendix K: Varying levels of geographic aggregation

This appendix investigates the sensitivity of our results to varying the level of geographic aggregation (sub-district or district rather than locality). We focus here on our main sample, panel data for men. Appendix D, which presents the repeated cross-section data, is also an analysis identifying off of variation in the share Syrian at the sub-district level. Before presenting the model results, we discuss the degree of variation in localities within sub-districts or districts. Overall, among Jordanians aged 15-64 (our sample), the median share of households Syrian in their locality is 9.6%, with a standard deviation of 7.1 percentage points. Within sub-districts, the average standard deviation of locality-level percentage of households Syrian was 3.5 percentage points, while within districts the average standard deviation of locality-level percentage of households Syrian was 3.7 percentage points. This suggests variation across localities within sub-districts and districts, but also, unsurprisingly, correlation within districts and sub-districts and less variation than nationally.

Table 27 presents results of the panel data models for men using sub-district share of households Syrian while Table 28 presents results with district share of households Syrian. In both cases, results are similar to the main locality measures, although, unsurprisingly, statistical significance is lost due for some results due to higher levels of aggregation (and clustering of standard errors).

Table 27. Sub-district share of households Syrian: Labor market outcomes (fixed effects linear probability and OLS models), men, panel data

	Unemployed	Employed	Formal	Ln (hourly wage)	Hours per week	Ln (monthly wage)	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
Year (2010 omit.)										
2016	0.040	-0.091	0.157***	0.397**	-3.101*	0.145	0.019	-0.004	-0.006	-0.018
	(0.036)	(0.057)	(0.032)	(0.117)	(1.304)	(0.112)	(0.026)	(0.029)	(0.016)	(0.033)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	-0.000	0.001	0.002	0.004	-0.077	0.002	0.001	0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.096)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
N	7363	7394	4786	3863	4677	3924	4788	4789	4789	4808

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

Notes: *p<0.05; **p<0.01; ***p<0.001

Controlling for age and age squared in year

Standard errors (in parentheses) clustered at the sub-district level

Table 28. District share of households Syrian: Labor market outcomes (fixed effects linear probability and OLS models), men, panel data

	Unemployed	Employed	Formal	Ln (hourly wage)	Hours per week	Ln (monthly wage)	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
Year (2010 omit.)										
2016	0.041	-0.086	0.150***	0.395**	-3.339*	0.157	0.021	-0.007	-0.018	-0.009
	(0.038)	(0.061)	(0.034)	(0.121)	(1.632)	(0.111)	(0.027)	(0.030)	(0.018)	(0.034)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	-0.000	0.001	0.003*	0.004	-0.054	0.001	0.001	0.001	0.001	-0.002
	(0.001)	(0.002)	(0.001)	(0.003)	(0.130)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)
N	7363	7394	4786	3863	4677	3924	4788	4789	4789	4808

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

Notes: *p<0.05; **p<0.01; ***p<0.001

Controlling for age and age squared in year

Standard errors (in parentheses) clustered at the district level

Appendix L: New schools and labor demand in education

One potential mechanism for refugees creating labor demand is through use of health and human services, such as education. Education for Syrians is supported, financially, through both donor aid and government funds (Brussels II Conference 2018). For example, in May 2016 $81.5 million was pledged specifically for education (Human Rights Watch 2016). In this appendix we explore the potential role for such labor demand in the labor market in Jordan, examining the role of new schools and new shifts in Jordan. In host communities, Syrians can enroll in public schools. If there are spots available in existing schools, after Jordanians have enrolled, Syrians can take those spots; otherwise a second shift is added to schools. As of the 2016-2017 school year, there were 209 schools on double shifts and 45 schools providing education to refugee children in camps with Jordanian teaching staff (Ministry of Planning and International Cooperation 2017). Donors, such as USAID, have helped finance expanding or renovating schools as well as building new schools. Both the second shifts and additional schools have hired additional teachers (Human Rights Watch 2016).

As a potential mechanism for creating labor demand, we use data on new schools. In the Education Management Information System (EMIS) data from 2016/17,[6] an observation is a shift within a school (so if a school operates two shifts, it has two observations), which is consistent with the fact that a second shift would have additional hiring. We calculate the percentage of observations ("schools," which may be shifts within existing schools) that are "new," established in 2011 or later based on their establishment date in the EMIS. We calculate this measure at the sub-district level, the lowest level of geography available with the EMIS. We interact this variable with the year (2016) in the panel data. The results are presented in Table 29.

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[6] See Assaad, Ginn, and Saleh (2018) for additional discussion of the EMIS data and analyses of the (non-)effect of Syrians on Jordanians' education outcomes.

In areas with more new schools as of 2016, for each percentage point increase in the share of schools that are "new" there is a 0.3 percentage point increase in the probability of employment in the health and human services sector (which includes education). There are not other significant effects. This multivariate evidence aligns with the patterns in Figure 1 in Appendix A, suggesting a shift into such work between 2010 and 2016.

Table 29. Models including new schools: Labor market outcomes (fixed effects linear probability and OLS models), men, panel data

	Unemployed	Employed	Formal	Ln (hourly wage)	Hours per week	Ln (monthly wage)	Managerial/ Professional Occupation	Open sector	Health and Human Serv.	Private sector
Year (2010 omit.)										
2016	0.042	-0.109	0.207***	0.496**	-2.873	0.286*	0.023	0.023	-0.049	-0.021
	(0.041)	(0.065)	(0.045)	(0.163)	(2.134)	(0.117)	(0.033)	(0.041)	(0.025)	(0.042)
Int. year and % HH Syrian										
Int. 2016 and % HH Syr.	-0.000	0.001	0.003*	0.006	-0.072	0.005	0.001	0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.003)	(0.100)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Int. year and % schools new										
Int. 2016 and % schools new	-0.000	0.001	-0.003	-0.006	-0.014	-0.009	-0.000	-0.002	0.003*	0.000
	(0.001)	(0.002)	(0.002)	(0.006)	(0.121)	(0.005)	(0.001)	(0.002)	(0.001)	(0.001)
N	7363	7394	4786	3863	4677	3924	4788	4789	4789	4808

Source: Authors' calculations based on JLMPS 2010 - JLMPS 2016 panel
Notes: *p<0.05; **p<0.01; ***p<0.001
Controlling for age and age squared in year
Standard errors (in parentheses) clustered at the sub-district level

Appendices References

Amer, Mona. 2014. "The School-to-Work Transition of Jordanian Youth." In *The Jordanian Labour Market in the New Millenium*, edited by Ragui Assaad. Oxford, UK: Oxford University Press.

Assaad, Ragui, Thomas Ginn, and Mohamed Saleh. 2018. "Impact of Syrian Refugees in Jordan on Education Outcomes for Jordanian Youth." *Economic Research Forum Working Paper Series No. 1214*. Cairo, Egypt.

Assaad, Ragui, and Caroline Krafft. 2016. "Labor Market Dynamics and Youth Unemployment in the Middle East and North Africa: Evidence from Egypt, Jordan and Tunisia." *Economic Research Forum Working Paper Series No. 993*. Cairo, Egypt.

Assaad, Ragui, Caroline Krafft, and Caitlyn Keo. 2018. "The Composition of Labor Supply and Its Evolution from 2010 to 2016 in Jordan." *Economic Research Forum Working Paper Series No. 1183*. Cairo, Egypt.

Bagir, Yusuf. 2017. "Impact of the Syrian Refugee Influx on Turkish Native Workers: An Ethnic Enclave Approach." *MPRA Paper No. 80803*. Munich, Germany.

Brussels II Conference. 2018. "We Made a Promise: Ensuring Learning Pathways and Protection for Syrian Children and Youth." Brussels.

Card, David. 2009. "Immigration and Inequality." *The American Economic Review* 99 (2): 1–21.

Human Rights Watch. 2016. "'We're Afraid for Their Future': Barriers to Education for Syrian Refugee Children in Jordan." New York: Human Rights Watch.

Krafft, Caroline, Maia Sieverding, Colette Salemi, and Caitlyn Keo. 2018. "Syrian Refugees in Jordan: Demographics, Livelihoods, Education, and Health." *Economic Research Forum Working Paper Series No. 1184*. Cairo, Egypt.

Ministry of Planning and International Cooperation. 2017. "Jordan Response Plan for the Syria Crisis: 2018-2020." Amman, Jordan.

Mryyan, Nader. 2014. "Demographics, Labor Force Participation, and Unemployment in Jordan." In *The Jordanian Labour Market in the New Millennium*, edited by Ragui Assaad, 39–63. Oxford, UK: Oxford University Press.