Blessing or Burden? The Impact of Refugees on Businesses and the Informal Economy

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Abstract

We study the impact of more than 3 million Syrian refugees on Turkish businesses operating in an economy with a large informal sector. We use an empirical instrumental variable design that relies on exogenous variations in refugee outflows from Syria and the geographic location of Arabic-speaking communities in Turkey before the conflict began. Using yearly censuses of firms, we find that refugee inflows had a positive impact on the intensive and extensive margins of production, which are highly concentrated in the informal economy. The effects are stronger for smaller firms and those that operate in the construction and hospitality industries.

JEL Classification: J46, J61, and O15
Keywords: refugees, firms, informality

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We thank participants at the workshops on Empirical Studies of Conflict at Princeton University, New Perspectives on Political Economy of the Middle East at Oxford University, the International Conference on Migration and Development at the Stanford Center on Global Poverty and Development, and Midwest Economic Association. We also thank the economics departments at UCLA and UC-Santa Barbara, Marshall School of Business at USC, and the Center for Economic and Social Research at USC for their useful comments and suggestions. We thank TurkStat for providing the Foreign Trade Statistics and the Annual Industry and Service Statistics used in this study. Our analysis was conducted at TurkStat's Microdata Research Centre and has respected data confidentiality. We are particularly grateful to Kenan Orhan, Erdal Yildirim, and Senol Bozdag at TurkStat for their help with firm data. We have no conflict of interest or financial support to declare.

I Introduction

Conflict and violence have forcibly displaced 65 million people around the globe, a number that is likely to grow in the near future (UNHCR, 2016). The economic consequences of forced displacement are likely to differ, due to its unique circumstances, from the well-studied implications of voluntary migration. Refugees arrive in large numbers and vulnerable conditions, are traumatized by war, and lose the assets that they cannot transfer to the host country. Most often, the lack of clear regulation on their status, coupled with uncertainty about the duration of their stay, complicates their integration into local labor markets (Dustmann et al., 2017). Given that the majority of refugee populations find shelter in neighboring developing countries in conflict regions, their employment opportunities are usually limited to informal industries. Large inflows of refugees, consequently, may induce profound economic shocks in host economies, not only through changes in production and prices, but also by changing firms' incentives to engage in informal economic activity.

The existing literature mainly focuses on examining the impact of refugee inflows on the wages and employment of native workers, with a strong emphasis on developed countries, which typically receive regulated inflows of forced migrants and have small informal sectors.[1] Following the beginning of the Syrian Civil War in 2011, new evidence has emerged exploring the impacts of refugee inflows on the labor supply of hosting developing economies with sizable informal sectors.[2] These studies suggest that refugee inflows typically reduce the labor supply and wages of local low-skilled workers in the hosting country. Little in known, however, on the impact of forced migrants on the demand for

[1] See Clemens and Hunt (2017) and Borjas and Monras (2017) for a review of this literature

[2] See for example Del Carpio and Wagner, 2015 and Ceritoglu et al., 2017.

labor and on business decisions.[3] It is plausible that businesses in hosting regions are being impacted by refugee inflows via lower input costs, higher demand for their products, or a stronger competition from an enlarged informal sector.

The present study is the first to examine in-depth the implications of refugee inflows on the on the intensive margin of production, input demands, output prices, informal economic activity, market entry and exit, and trade. Firm level data allows us to estimate the differential local average treatment effects by firm type, size, and type of industry. The findings are informative on the economic consequences of hosting refugees, especially in developing countries that are experiencing or will experience similar inflows and may not have comparably rich data to carry out similar analyses.

The empirical analysis is based on the largest involuntary migration shock observed since World War II: the resettlement of more than 3 million Syrian refugees in Turkey. The case of Syrian refugee inflows into Turkey has two appealing features for a causal research design. First, Syrian migration to Turkey was negligible before the Syrian Civil War began and the subsequent large scale of migration was unpredictable. As a result, the timing and the scale of the migration were arguably exogenous to overall economic conditions in Turkey. Second, the incoming refugee population was more likely to settle in locations with ethnic linkages, namely to regions with a higher share of Arabic speakers, generating substantial geographic variation in exposure to refugee inflows across Turkish provinces.

Our empirical design, consequently, relies on an instrumented difference-in-differences approach. It exploits province-year variation in refugee inflows—after accounting for potential endogeneity between firm outcomes and refugee inflows—using a constructed measure of *predicted refugee inflows* as an instrument. Following Altindag and Kaushal

[3]The two exceptions are Akgündüz et al. (2018) and Cengiz and Tenguc (2018) who use aggregate level data to study the effects refugee migration from Syria on the total number of operating firms in Turkey.

(2017), the instrument is constructed as the interaction of the overall number of Syrians who left their country in each year and the share of Arabic-speaking populations in Turkish provinces in 1965. We also take advantage of our data's relatively long time span and use an event-study analysis to compare yearly trends in outcomes in provinces with varying intensity of Arabic-speaking populations in years before and after the population shock, to confirm the parallel-trends assumption. Finally, we supplement the quantitative analysis with observations from face-to-face interviews with business owners and refugees, conducted by researchers at Bahçeşehir University for the International Youth Foundation (IYF, 2018).[4]

To pursue our analysis, we combine multiple data sources, including annual censuses of firms, labor-force surveys, business registrations, and trade statistics, as well as official population and migration figures. Our results suggest that the influx of refugees induces a positive shock on the intensive and extensive margins of production for firms. The size of the effects is economically meaningful: a one-percentage-point increase in the share of refugees to total population boosts firms' electricity and oil consumption by 4.3 percent. These effects are entirely driven by small- and medium-sized firms. We also find that the construction, restaurant, and hotel industries experience the largest positive effects relative to the other sectors of the economy. We further show that the refugees' arrival had a positive impact on firm creation, as revealed by a substantial increase in the number of new firms, especially those that include foreign partnership. A significant proportion of the new firms were established by Syrian business owners, who collaborate with Turkish partners to tackle barriers to market entry.

The effects of refugee inflows, moreover, are largely concentrated in the informal economy. Using firm-level censuses, for instance, we are unable to identify any increase

[4]The research team includes one of the co-authors in this study.

in reported measures of production, sales, or number of formally employed workers—these variables are the official end-of-year figures that firms report to the government for tax purposes. However, a detailed analysis of labor supply data directly reported by workers reveals significant changes in the relative size of the informal economy. Using Turkey's annual Household Labor Force Surveys for the period 2004-2016, we provide evidence that refugees are replacing native workers in the informal labor market and reducing labor costs for firms. Among male native workers, who constitute 75 percent of the employed labor force in our sample, a one-percentage-point increase in the ratio of refugees to overall population decreases the informal employment of native workers by 0.4 percentage points and also decreases the number of hours they worked by 1.3 percent. Notably, those native workers also see their wages drop by 1.9 percent.

Overall, our findings suggest that refugee inflows have a positive impact on local businesses and firm creation, while also increasing the size of the informal economy. In the large set of outcomes and subgroups that we analyze, most of the estimated effects emerge with the arrival of Syrian refugees and year-to-year changes in effect sizes overlap with the intensity of the population shock. Outcome trends net of location fixed effects during the pre-exposure period are remarkably similar across provinces with varying historical settlement of Arabic speakers. We offer multiple specification checks to confirm our results.

We contribute to the group of studies that explore how unskilled migration affects a developing host country with limited institutional infrastructure and a large informal sector. Existing studies on the effects of migrants on firm-level outcomes mainly focus on developed countries and economic migrants.[5] Such studies conclude that unskilled

[5]See, for example, Carrizosa and Blasco (2009) for Spain, Lewis (2011), Ghosh et al. (2014) and Kerr et al. (2013) for the United States, Accetturo et al. (2012) for Italy, Ottaviano et al. (2015) for the United Kingdom, and Dustmann and Glitz (2015) for Germany, each of which investigates the impact of immi-

migration improves firm-level productivity through lower production costs and skill complementarities in the workplace,[6] while the estimated effects on capital investments are mixed.[7]

Our paper contributes to this literature exploring the implications of refugee movements on the demand of labor and firms behavior and to estimating the differential local average treatment effects by firm type, size, and type of industry. Our results also offer insights about the concentration of these effects in the informal economy. In addition, we show that significant capital and entrepreneurial capacity move from their place of origin to host country locations with the forced displacement of migrants.

II Background

The Syrian Civil War started when the Bashar Al-Assad regime responded with disproportionate severity to peaceful protests in March 2011. Violence escalated rapidly and spread to many parts of Syria, leading to a severe humanitarian crisis. As of 2017, approximately 12 million individuals—roughly half of Syria's pre-war population—have

grants who tend to be relatively unskilled compared to native populations.

[6]The group of studies that examines the impact of high-skilled immigration on firm outcomes, on the other hand, largely finds that higher-skilled immigration has been associated with higher productivity (Ghosh et al., 2014), expansion of the employment of skilled natives (Kerr et al., 2013), and large complementarities between high technologies and migrants (Paserman, 2013).

[7]Lewis (2011), for example, finds that plants in areas that received more unskilled immigrants are less likely to adopt automation machinery, which serves as a buffer for the effects of immigration on wages. In contrast, Accetturo et al. (2012) and Ottaviano et al. (2015) find that firms in Italy and the United Kingdom increase their capital investments in response to immigration from developing countries, arguably because Italian and British firms tend to offset the skills-downgrading effect with more capital accumulation. The latter study also finds that immigration acts as a substitute for offshoring (by lowering intermediate imports from the immigrants' countries of origin) and tends to increase exports to the immigrants' countries of origin, as it helps reduce information barriers and trade costs. Finally, Dustmann and Glitz (2015) find that the responses of firms to an influx of immigrants in Germany depend on their sector of economic activity. While firms in the non-tradable sector respond by lowering wages, their tradable sector counterparts primarily respond by scaling up their employment and changing their skill mix. They also find positive net entry effects in firms in the tradable sector.

left the conflict areas. Of them, 6 million people have sought shelter outside of Syria, primarily in neighboring countries (UNHCR, 2016). Turkey was the primary destination for these refugees. A community of more than 3.5 million individuals has resettled there under a temporary protection regime since the beginning of the conflict.

The initial waves of refugees began arriving in Turkey in the second half of 2011; small numbers continued to arrive until mid-2012 (İçduygu, 2015). In the following months, there was a substantial and long-lasting increase in the number of Syrian families seeking shelter at the Turkish-Syrian border. According to official data from the United Nations Refugee Agency (UNHCR), the total number of refugees who arrived in Turkey was only around 170,000 in 2012, but increased to over half a million in 2013. The refugee movement intensified with the increasing presence of ISIS in northern Syria, reaching 1.6 million in 2014 and more than 2.5 million in 2015. As of 2017, 3.1 million Syrians were registered in Turkey, accounting for nearly 4 percent of the country's population.

Initially, the Turkish government made an effort to host the displaced population in 25 refugee camps in the southern part of the country near the Turkish-Syrian border. As the conflict in Syria intensified, however, the number of refugees quickly exceeded the camps' capacity.[8] Currently, only about 8.2 percent of the refugee population lives in the camps (European Commission, 2017). The majority of the refugee population in Turkey is now dispersed across urban areas (Erdoğan, 2017).

Legal regulations concerning the population displaced by the Syrian Civil War in Turkey are based on the 1951 Geneva Convention. Although Turkey is one of the few

[8] According to AFAD, the disaster and emergency management agency, there are no formal rules in place that regulate the allocation of Syrian refugees to camps. The allocation of refugees to camps has responded to availability of resources, flows of immigrants, and spaces available. The location of the camps was chosen based on proximity to Syria and flows of immigrants.

countries to have signed that convention, it does not officially recognize non-European citizens as asylum seekers, irrespective of their motive (Erdoğan, 2017). Syrian citizens in Turkey are under "temporary protection," which permits their freedom of movement and access to health care and education. Indeed, according to these regulations, there were no restrictions on the movement of refugees within Turkish borders during the study period. Syrian citizens have legal access to free health care and basic education, although in practice, a lack of clear regulation, available supply, and formal procedures have restricted access to these services (İçduygu and Şimşek, 2016). Because the temporary protection regime does not grant them work authorization, however, the vast majority of Syrian refugees work in the informal labor market (Durukan, 2015).[9]

Aggregate data from UNHCR suggest that the refugee population in Turkey is balanced by gender, is relatively uneducated, and is young, with 45 percent of the population under the age of 18 (see Appendix I). Unfortunately, there is currently no representative survey of the refugee labor force in Turkey. Qualitative evidence suggests, however, that Syrian refugees are likely to be employed in informal low-wage jobs in agriculture, construction, manufacturing, and service industries (Erdoğan, 2017). Anecdotal evidence also suggests that Syrian child labor is a significant part of the new work force, especially in the manufacturing industry.[10]

[9] Only 6,000 Syrians had effectively received legal work permits as of September 2015 (Hurriyet, 2015).
[10] See, for example, the BBC (2016) media report on Syrian child labor.

III Data

III.1 Refugees Inflows

We employ two sources of refugee data in our analysis. Aggregate figures on total refugee outflows from Syria and inflows from Syria to Turkey come from UNHCR and are available for 2011-2016, covering the entire conflict period. We aggregate these figures annually over the period under study (see Figure I). Province figures on the registered refugee population come from the Directorate General of Migration Management (DGMM), the Turkish migration authority. Although our data include the aggregate number of refugees for each year during the study period, the province level registration process in Turkey only started in late 2014 and until recently DGMM did not update these figures on a regular basis. Thus, we only have data from DGMM on the number of refugees at the province level for three separate months: September 2015, April 2016, and December 2016. The Turkish government also released some estimates on province-level refugee populations in August 2014. We collected these data from the newspapers that published the information.[11] Fortuitously, the geographic dispersion of refugees in Turkey was remarkably stable over time, which allows us to estimate the yearly inflows at the province level by using aggregate figures.

Figure II compares the province-level DGMM numbers after normalizing the overall refugee population to 100 for each period with available data. The figure strongly suggests that the refugees have consistently moved to the same provinces, despite a substantial increase in the overall refugee population, with all the provinces tightly clustered in a 45 degree diagonal formation. While Istanbul stands out as an outlier in August 2014 (as discussed in the empirical section), excluding it from our estimates has no impact on our

[11] See Habeturk (2014) for examples of the news outlets that published the information.

results. Given the persistent distribution of refugees, we use the September 2015 shares to construct an exposure intensity measure as

$$\text{Refugee Population}_{pt} = \text{Refugee Share}_{p,\text{Sept. 2015}} \times \text{Refugee Population}_{t} \tag{1}$$

where $\text{Refugee Population}_{pt}$ stands for our constructed measure of refugee population in province p and year t, $\text{Refugee Share}_{p,\text{Sept. 2015}}$ is the proportion of refugees received in province p as of September 2015, and $\text{Refugee Population}_{t}$ is the total number of refugees who arrived to Turkey at the end of year t. Appendix III shows the constructed measure and the data observed for September of 2015, showing that our constructed measure of refugee inflows is an excellent approximation of the exact values of refugee inflows for that period. It is important to note that the official numbers released by DGMM reflect the number of refugees registered in each province. Refugees might have left the provinces after registration, moving either to another location or out of the country. Measurement error in the local inflow intensity variable is therefore an important drawback, one that we attempt to offset by using a more precisely measured instrument.

Using the constructed measure of the refugee population illustrated in equation (1), we estimate the province-year share of refugees as a percentage of total population as

$$\text{PctRef}_{pt} = \frac{\text{Refugee Population}_{p,t}}{[\text{Refugee Population}_{p,t} + \text{Turkish Population}_{p,t}]} \times 100 \tag{2}$$

where PctRef_{pt} is the variable we use in our main estimates.

III.2 Firm Data

Our main estimates use the Annual Industry and Service Statistics (AISS) survey produced by the Turkish Statistical Institute (TurkStat), which is available for the years 2003-2015. The data set contains a census of firms with at least 20 employees and a representative sample of firms with less than 20 employees. To keep the universe of firms, we use only the census part of the AISS, which covers all firms with at least 20 employees. Since the AISS data for the years 2003-2005 is generally regarded as less reliable, we focus on the period 2006-2015.[12] The unit of analysis in the AISS is the firm, not the plant.

The AISS is a firm census of all economic sectors except agriculture, finance, public administration, community services, and extraterritorial organizations. It includes information on nominal sales, gross production (defined as sales plus changes in inventories), value added, investment, costs, energy consumption, employment (divided into paid and unpaid workers),[13] industry classification,[14] labor expenses, and headquarters location by province. Although we do not observe the firm's capital demand directly, we impute it to each firm based on their reported depreciation levels.[15]

Given that we only observe the location of the headquarters of each firm, in our main analysis, we use the province of the headquarters as the operating region, assuming that

[12] From 1980 to 2001, TurkStat collected the Annual Manufacturing Industry Statistics survey, which sampled private manufacturing plants with at least 10 employees and all state-owned plants. Because of incompatibilities with the European Union (EU) regarding methodology and definitions, TurkStat abandoned this survey in 2002 and began collecting the AISS survey. The objective was to facilitate international comparisons and ensure compatibility with the EU's structural business statistics regulations. Unfortunately, implementation and coordination issues between different administrative bodies involved in the data collection and management exercise made statistics for the initial years less reliable.

[13] Unpaid workers are firm owners, partners, unpaid family workers, and apprentices.

[14] In 2009, the sector classification of the AISS data changed from NACE Rev.1 to NACE Rev.2. Although there is no one-to-one correspondence between these two systems, TurkStat publishes the NACE Rev.2 code for the census part of the AISS for years before 2009.

[15] Unfortunately, for approximately 40 percent of the firms reported depreciation is zero or missing. To solve this issue, we predict capital depreciation using, as predictors, sector and year dummies, value added, number of employees, electricity consumption, and oil expenditures.

all the subsidiary plants are located within the same province. In the robustness analysis, we restrict the sample to firms with a single-plant to test for the sensitivity of our results to this assumption. We present the aggregate time trends for our outcomes in Appendix II.

III.3 Other Data Sources

We use five additional sources of information. Data on the labor-supply-related variables of Turkish citizens come from the annual Household Labor Force Surveys. The surveys are available for the period 2004-2016 and are collected by TurkStat. These repeated cross-section surveys are representative of the Turkish working-age population at the regional level and include a rich set of demographic variables in addition to detailed information on labor-supply status. Population figures of Turkish citizens also come from TurkStat for each year and province during our period of analysis.

Our third source of information is the Turkish Population Census of 1965, which we employ to construct our instrument. The census includes information on the mother language of each individual at the province level. To our knowledge, this is the only publicly available census with this information.[16]

Our fourth source of data is yearly-province level statistics on exports and imports, available from the TurkStat website for the years 2002-2017. The foreign trade figures include all registered international-trade transactions by firms of any size. These data are employed to study the effect of refugee inflows on imports and exports.

[16]The information from the 1965 Census was digitized by Altindag and Kaushal (2017) from the census booklet. In 1965, there were 67 provinces in Turkey. Fourteen districts became provinces later on, the latest one in 1999. For the provinces established after 1965, we use the percentage of the Arabic population within the 1965 administrative boundaries. For example, Yalova was a district of Istanbul in 1965 and became a province in 1995. We assigned the same percentage of Arabic-speaking populations to Istanbul and Yalova in our analysis.

Finally, we use the Company Establishment and Liquidation Statistics data published by the Union of Chambers and Commodity Exchanges of Turkey (TOBB) for the years 2010-2017. These data include the number of new and existing firms, the ownership structure (share of foreign ownership) at an annual-province level and the annual amount of foreign capital by country for newly created firms. We use TOBB data to study the contribution of Syrian capital to total foreign capital as a result of the migration shock, and the effects of refugee inflows on entry and exit firm decisions.

IV Empirical Strategy

Our empirical strategy relies on comparing firm outcomes in locations that are exposed to larger refugee inflows with firm outcomes in those that are not similarly affected, before and after Syrian Civil War began. Refugee resettlement, however, is a potentially endogenous decision and time-varying components for which we cannot account could be affecting both the resettlement pattern and firm behavior. Refugees, for instance, might choose to move to areas where local businesses are more prosperous, which would lead us to overestimate the effects of refugees on firm outcomes. It is also possible, for instance, that measurement error in the refugee figures at the province level could bias our coefficients in the reverse direction. To solve these issues, we estimate the following specification:

$$ln(y_{ipt}) = \tau \widehat{\text{PctRef}}_{pt} + \gamma_{1p} + \gamma_{1t} + \epsilon_{1ipt} \tag{3}$$

$$\widehat{\text{PctRef}}_{pt} = \pi \text{Predicted Inflows}_{pt} + \gamma_{2p} + \gamma_{2t} + \epsilon_{2pt} \tag{4}$$

where p stands for province and t for year; y represents the outcome for firm i, including gross production, sales, oil and energy consumption, labor and capital demand, and average wages; PctRef_{pt} is the population share of refugees in province p in year t, constructed using equation (2). In both equations, γ_p and γ_t account for province and year fixed effects. The standard errors are clustered at the province level to account for time serial correlation in outcomes across provinces.

Following Altindag and Kaushal (2017), we define $\text{Predicted Inflows}_{pt}$ as

$$\text{Predicted Inflows}_{pt} = \left[\frac{\text{Arabic-speaking Pop}_{p,1965}}{\text{Total Pop}_{p,1965}} \times \text{Syrian Aggregate Displacement}_{t}\right] \tag{5}$$

where $\text{Predicted Inflows}_{pt}$ is constructed as the interaction of the share of Turkish citizens with Arabic as their mother language in 1965 and the total number of individuals displaced outside Syria in year t.

In this framework, year fixed effects account for aggregate time variation, whereas province fixed effects purge out the time-invariant differences across areas. Our instrument thus exploits province-year variation and follows the rule of thumb proposed by Card (2001), that past migration patterns are excellent predictors of subsequent migration waves within the same ethnic groups. Note, however, that the instrument in this study is slightly different in that we use the intensity of the Syrian conflict as a proxy for the within-time component of the refugee inflows. Further, we use the geographic distribution of Arabic-speaking Turkish citizens to predict the geographic resettlement patterns of refugees across Turkish provinces. The latter was not a result of an early migration of Syrian citizens to Turkey, but the outcome of the abrupt ending of the Ottoman Empire, which had a multi-ethnic population that was dispersed under many new states after World War I. Migration flows from Syria to Turkey were negligible before the period of

conflict began in 2011.[17]

The identifying assumption that guarantees the validity of our results is that our instrument should be correlated with the supply-side drivers of labor mobility, such as common language with the host population, but should not be directly correlated with firm performance.[18] Our instrument supports both claims. First, as illustrated in Figure III, the year-to-year geographic distribution of Syrian refugees in Turkey strongly overlaps with the Arabic-speaking regions in Turkey.[19] Second, the interaction of the 1965 Arabic-speaking population share and worldwide Syrian refugee inflows should not be correlated with Turkish local business dynamics in any other way than through the movement of Syrian refugees after fully adjusting for differences across firms in different provinces and for aggregate time trends.

Although there is no fully robust test to validate aggregate time trends, we attempt to provide evidence on the validity of the parallel trend behavior in outcomes in the pre-conflict period by estimating a dynamic difference-in-differences model. In particular, for all outcomes, we estimate the following reduced form regression:

$$ln(y_{ipt}) = \sum_{j=2006}^{2009} \theta_j(year_j \times A_{p,1965}) + \sum_{j=2011}^{2015} \theta_j(year_j \times A_{p,1965}) + \gamma_{3p} + \gamma_{3t} + \epsilon_{3ipt} \quad (6)$$

where p stands for province, t for year, and $A_{p,1965}$ is the cross-section component of our instrument: the percentage of Arabic speakers in province p in 1965. $year_j$ is a dummy for year j while γ_{3p} and γ_{3t} account for province and year fixed effects. We exclude the

[17] Consequently, our instrument is not sensitive to concerns raised by Jaeger et al. (2018) on the validity of shift-share instruments for immigration flows. The authors propose that shift-share instruments used in contexts in which the spatial distribution of immigrants is stable over time (corresponding to the same places repeatedly receiving large inflows of immigrants) leads to biases as the short- and long-term effects of immigration are confounded.

[18] See Imbens and Angrist (1994), Abadie (2003) and Angrist et al. (1996) for a general discussion of the exclusion restriction assumption.

[19] We provide formal evidence on the strength of the correlation between these variables in Table I.

year 2010 as it it is the last year before the beginning of the Syrian Civil War. It is thus convenient to have it as the baseline comparison year.

Estimating equation (6) serves two purposes. First, it allows us to observe, on a yearly basis, whether the intensity of the 1965 Arabic-speaking population share is correlated with firm outcomes before refugee inflows began, to ensure that differential trends in outcomes are not artificially producing the reported results.[20]

The other purpose of estimating equation (6) is that the reduced form coefficients in the post-exposure period describe year-to-year changes in outcomes. Thus, if the reduced form identification strategy is correct, we expect any observed impact to emerge around 2013 and then increase, following the overall intensity of refugee inflows. Additional concerns related to the validity of our empirical strategy are addressed in the robustness test section at the end of the paper.

V Results

V.1 Firm Production and Prices

V.1.1 Intensive Margin of Production

We first analyze the effects of refugee arrivals on nominal sales and gross production because these estimates may enable us to decompose the effects of refugee migration on output prices. Specifically, we decompose the overall impact on sales into two components: (i) change in gross production (estimated as sales plus change in inventories) and

[20] In addition to visual inspection, we formally test whether the interaction coefficients are jointly equal to zero in the pre-exposure period; that is, we test whether the provinces that had varying levels of Arabic-speaking populations in 1965 had similar trends in outcomes before the refugee inflows began.

(ii) output prices. Since sales is the product of gross production and prices, the following elasticity decomposition holds:

$$\varepsilon_{sales} = \varepsilon_{price} + \varepsilon_{production} \tag{7}$$

where ε shows the elasticities of sales, prices, and production in relation to the inflow of refugees. Since our main estimated equation is in a log-linear form (see equation 3), it follows that (i) $\varepsilon_{sales} = \tau_{sales} \times \text{PctRef}_{pt}$ and (ii) $\varepsilon_{production} = \tau_{production} \times \text{PctRef}_{pt}$. We can therefore indirectly recover the impact of refugees on output prices by using the following equation:

$$\underbrace{\tau_{sales}}_{\text{observable}} = \tau_{Price} + \underbrace{\tau_{Ouput}}_{\text{observable}} \tag{8}$$

We present the estimates of equations (3) and (4) in Table I and illustrate the estimates of equation (6) in Figure IV.[21] We find no evidence of refugee arrival having a significant effect on nominal sales and gross production and, as a consequence, on output prices. These results must, however, be analyzed with caution, because underreporting in nominal sales and gross production is a common practice in the Turkish economy (see Davutyan, 2008).

To circumvent possible misreporting, we also estimate the effects of refugee arrival on energy consumption, as measured by electricity and oil expenditures. Energy consumption is an indirect measure of production and the data come from administrative records, that is, the electricity bills paid by firms. As a result, for these outcomes, systematic underreporting is highly unlikely. Interestingly, we are able to identify positive effects of refugee inflows on both electricity and oil consumption through our instrumental variable and reduced-form estimates. In particular, we find that a one-percentage-point increase in the share of the refugee population increases electricity and oil consumption

[21] Bars around the point estimates indicate 95 percent confidence intervals.

by approximately 4.3 percent (see Table I, columns 3 and 4). As shown in Figure IV, gross production and sales of firms follow a similar pattern across different provinces in both the in pre- and post-refugee movement periods. The same trends also show a clear change in pattern for the energy consumption of firms in the aftermath of major refugee movements.

V.1.2 Extensive Margin of Production

We next explore the effects of refugee arrival on firm creation. Figure I illustrates descriptive evidence of the dramatic increase of Syrian capital in Turkey, after 2012. Panel B shows that from 2011 to 2016, the share of foreign firms with Syrian partnership increased by 35 percentage points, from 2 percent to 37 percent. The figure also shows that the total number of firms with foreign partnership also saw a drastic increase from 2013 to 2014, entirely driven by an increment in the number of firms with Syrian partnership.[22] The timing of this shock coincides with the year Turkey began receiving large inflows of refugees from Syria.

The ratio of Syrian to total foreign capital in Turkey shows a similar trend, increasing from 2 to 27 percent from 2011 to 2016, as observed in Panel B. Finally, Panel D also shows a sharp increase in the share of the capital of firms that have partnerships with Syrians after the beginning of the Syrian conflict. Together, these figures pose strong descriptive evidence of a sharp arrival of Syrian entrepreneurship to Turkey as a consequence of the intensification of the Syrian Civil War.

To formally test for the effects of refugee inflows on firm entry, we use firm censuses and create province-year cells that add up the total number of firms with more than 20

[22]Foreign partnerships are formed when one or more of the partners in the business joint is not Turkish or the capital to create the firm comes from abroad.

employees. We then use our main specifications to estimate the effects of refugee inflows on the number of firms. Table I and Figure IV indicate a robust growth in the number of firms in refugee host areas, but the point estimates are highly imprecise.

To test for the validity of these results, we also employ data on firm registration and liquidation, available for the years 2010-2016. They include data on the number of all newly established firms, newly established firms with foreign capital, and firms that exit the market on a yearly basis. These data cover all registered firms, independent of their size. The results of our main specifications using these data are shown in the first three columns of Table II, while the reduced form event study coefficients are shown in the left panel of Figure V. Our results in column 1 indicate that a one-percentage-point increase in the share of refugees as a percentage of population leads to 1.5 percentage-point increase in the number of firms and a 6.3 percentage-point increment in the number of firms with foreign partnership. We do not find any evidence of significant effects of the refugee inflows on firm exit. The event study graphs confirm that the observed effects coincide with the period with a substantial increase in refugees inflows to Turkey.

In an effort to test whether the increment in the foreign number of firms in Turkey was reflected in more trade, we also estimate our main regressions using the total Turkish exports and imports as outcomes. For this purpose, we employ foreign trade statistics from TurkStat, available for the years 2002-2017. The results are shown in Table II and Figure V. We are not able to identify a significant effect of refugee inflows on any of these outcomes.

Overall, these results suggest that refugee inflows have a positive effect on firms' intensive and extensive margins of production. These observed changes, however, are concentrated in the informal economy, as we were only able to pick up an effect on the intensive margin of production in observable covariates that correct for underreporting

(of energy consumption, for example). Notably, we were also able to document that the number of firms increases disproportionately in areas that host the refugee population and that part of these effects are driven by Syrian capital flows into refugee host areas during the conflict period.

V.2 Impact of Refugees on Input Demands

We examine the effects of refugee inflows on labor and capital demands in Table III and Figure VI. We only find a negative and significant effect of refugee migration on capital demand. These figures only include formal employment and as such, exclude any informally hired workers, who very likely account for a significant share of the Turkish labor force and an overwhelming majority of refugee workers (as refugees do not have work permits in Turkey). Coefficients for the differential year-to-year trends for formal hiring and wages in both the pre- and post-exposure periods fluctuate around zero, showing that the location and period fixed effects fully capture the outcome differences across firms in Turkey.

The negative estimates on firm capital in Table III (column 4) suggest that the refugee labor supply is a substitute for capital and that firms are modifying their production technology. When we formally test this hypothesis using capital per employee as outcome in our main specification, we do not find evidence of significant effects. These results, however, should be interpreted with caution, for two reasons. First, Figure VI shows a clear differential positive trend in capital in favor of provinces with a higher proportion of Arabic-speaking people. Second, we imputed the capital demand for around 40% of the sample using predicted capital depreciation levels. As a result, the estimated coefficients on capital-related outcomes may have large measurement errors.

V.3 Heterogeneous Effects by Firm Types

Table IV and Table V show the estimated 2SLS results by firm size and sector.[23] We split our sample (i) by firm size, dividing the sample between small and medium size firms (SMEs) with 250 or fewer employees and their larger peers and (ii) by industry, dividing the sample between the firms that operate in the manufacturing, construction, retail, restaurants and hotels, and other sectors that do not fit into any of these categories, as defined by TurkStat.

The results are similar to the effects observed for the all sample estimates across all samples. We find no evidence that refugee inflows have significant effects on sales, formal employment, or wages, but we are able to identify significant positive effects on electricity and oil consumption. We also observe that the positive effects of refugee inflows on energy consumption are entirely driven by SMEs, consistent with previous evidence suggesting that small firms are more sensitive to economic shocks (Narjoko and Hill, 2007; Vannoorenberghe, 2012; Kurz and Senses, 2016).

The sector-based estimates offer similar results for sales and formal employment in addition to positive and statistically significant effects for formal wages paid by firms. The positive effects observed on energy consumption are driven by firms that operate in construction, restaurants and hotels, and "other" sectors. Informal work is traditionally more common and easier in construction and restaurant/hotel sectors, which may be facilitating higher production. Additionally, we speculate that these sectors might also be enjoying a larger aggregate demand shock on housing and the hospitality sector due to increased economic, bureaucratic, and operational activity in the region.

[23] The other specifications and variables are available upon request. We did not report them due to space concerns.

VI Refugee Inflows and the Informal Economy

VI.1 Labor Supply of Native Workers

The reported effects of refugee inflows on labor markets excludes the informal economy, which we attempt to incorporate into our study through an analysis of the annual Turkish Household Labor Force Surveys from the years 2004-2016. These surveys include individual information from Turkish citizens aged 15-64 on their association with the formal and informal employment sectors.

Using these data, we estimate equations (4) and (5), after aggregating the endogenous variable and the instrument at 26 NUTS-2 regions.[24] We examine, in particular, the effects of refugees on formal and informal employment, hours worked, and wages.[25] All regressions include fixed effects for age, education, and marital status (excluding them leads to similar results). The standard errors are clustered at the region-year level (338 clusters).[26]

Table VI and Figure VII, present the results for men aged 15-64,[27] who constitute 75% of the employed Turkish population in our sample. The 2SLS results suggest that

[24] NUTS-2 is the smallest geographic level for which the data are representative.

[25] We define employment as when an individual is a regular paid employee or is self-employed and is neither an employer or an unpaid family worker. We define informal employment as when an individual is employed but does not contribute to social security funds. This is the definition most commonly used by Turkstat to define the size of the informal economy in Turkey. Hours worked and wage outcomes are based on average number of hours reported. Number of hours worked and average wages were transformed using the inverse hyperbolic sine transformation (see Burbidge et al., 1988 and MacKinnon and Magee, 1990 for details). The coefficients can be interpreted as a log transformation on the dependent variable.

[26] We clustered errors at region-year level because the labor force surveys do not include province identifiers and there are only 26 regions in Turkey. Due to insufficient number of clusters for a reliable statistical inference (Angrist and Pischke, 2009), we combined region and year variation and augmented the number of clusters from 26 to 338. Therefore we could only account for the outcome correlations within a region. Note that, however, due to large magnitude of the estimated coefficients, clustering at 26 regions have little impact on the statistical significance levels of employment outcomes for which we reject the null hypotheses in tables VI and VII at traditional significance levels.

[27] TurkStat does not collect labor market information on individuals who are younger than 15.

an increment of 1 percentage point in the ratio of refugees to total population results in a large decline in informal employment (0.4 percentage points), while we find no detectable impact on the likelihood of being formally employed. Overall, the total employment rate drops by 0.3 percentage points among native male workers. The intensive margin of labor supply falls as well, indicating that a one-percentage-point increase in the ratio of refugees to total population reduces total hours worked by 1.3 percent. Natives who remain employed earn less per hour. Using different identification strategies, Del Carpio and Wagner (2015) and Ceritoglu et al. (2017) show similar displacement patterns in the informal sector.

Figure VII shows that the outcomes of interest show strikingly similar trends across provinces from 2004 to 2011, which marks the beginning of labor supply shock.[28] These trends are similar to the production outcome trends that we estimated using the firm data (Figure IV). The estimates confirm a negative impact of refugee inflows on total male employment, mainly driven by a decline in informal employment. We also observe reductions in total hours worked and average wages. Estimated year-to-year reduced form estimates again peak with the intensity of the exogenous population shock.

The results for native women also show a reduction in employment, hours worked, and average wages (see Table VII and Figure VIII). However, in contrast to men, the negative effects of refugee inflows observed on employed native women are mainly driven by a reduction in formal jobs. This is not a surprising result noting that only 6 percent of working age women in our sample are informally employed.[29]

[28]Formally, at any conventional significance level, we cannot reject the null hypothesis that the pre-exposure interaction coefficients in equation (6) are jointly equal to zero. The p-value of the joint F-test in the pre-exposure period on year and Arabic-speaking Population in 1965 interaction coefficients are 0.25, 0.27, 0.39, 1.50, and 1.02 for employment, formal employment, informal employment, hours worked, and hourly wage, respectively.

[29]In general, women work less than men and mostly in the formal sector. Our results suggest that formal women workers are being displaced from the market by most likely informal refugees who may be willing

Overall, our results strongly support the idea that refugees are largely displacing natives from the labor market. In the case of men, refugees seem to be joining the informal sector, displacing informal native male workers in host areas. In contrast, native women seem to be displaced from formal jobs by refugees.

VI.2 Supporting Qualitative Evidence

In this section, we briefly document qualitative evidence from a recent field study based on surveys and focus groups carried out by the International Youth Foundation to business owners and Syrian refugees in Istanbul during 2017.[30] The study aimed to enhance knowledge on the employment needs, challenges, and opportunities of young Syrian refugees in Turkey (IYF, 2018). In this subsection, we focus on their findings concerning what motivates business owners to hire young refugees informally. The report is based on in-depth interviews and focus groups with 22 employers in the textile, apparel, and service sectors, 2 business associations, and 1,003 Syrian refugee workers who were between 18 and 29 years of age in 2017.

The most striking finding was that only 4 percent of all Syrian refugee respondents had applied for a work permit to be hired formally at the time of the interview. Yet almost 90 percent of the interviewees were already working informally in Turkey. Additionally, the interviews suggest that one of the primary motivations of business owners to informally hire Syrian refugees is the low cost of labor and their stronger attachment to low-paid jobs relative to their Turkish peers. In particular, the interviews indicate that young Syrians work for lower wages and longer hours.[31] Business owners also report

to work in worst conditions.

[30] Because the exact population of Syrian refugees in Istanbul is not known, the surveys are not a random sample. In order to account for possible biases, the sample size was large.

[31] The average wage of a young Syrian in Istanbul is 1,492 Turkisk Liras (TL) in contrast to 1,883 TL for

that government restrictions play an important role in creating incentives to hire refugees formally. The bureaucratic process for legally hiring Syrian refugees is reported to be time consuming, costly, and complicated.[32] The surveys also suggest that Syrian employment is also limited by the difficulty around official recognition of skills, education backgrounds, and occupational qualifications. Language is cited, in particular, as a critical barrier to high paid jobs. Finally, the survey suggested that some refugees are not interested in being formalized. Business owners report that while Turkish workers demand to be insured, Syrian refugees just want to be paid the insurance premium in cash as they face uncertainty as to whether they will stay in Turkey as citizens and receive a pension.

VII Robustness Tests

To test the robustness of our empirical analysis, we impose two sample restrictions and run our estimates again. First, we exclude Istanbul from the main estimates because a large share of economic activity takes place in this province and because refugees have also settled in large numbers there.[33] Second, we restrict our sample to single-plant firms. As explained in the data section, in the firm censuses we only observe the location of the headquarters for each firm, and imputed that location for all of the firm's plants, which might not be the case for many of them. We thus re-estimate all our regressions, restricting

young native workers. In addition, approximately 90 percent of young Syrian workers report working more than 48 hours a week. Similar qualitative evidence has been documented by several media outlets (see for example Reuters (2015); Al Monitor (2016); ABC News (2014); Financial Times (2017)).

[32]For example, the Ministry of Labor and Social Security in Turkey dictates that the number of Syrian refugees legally employed in a firm cannot exceed 10 percent of the total number of Turkish employees. Work permits also impose an economic burden, costing 600 TL per year per Syrian worker, and must be renewed annually.

[33]Consequently, Istanbul may be considered as an outlier in our data and may be driving an important part of the variation we observe.

the sample to include only single-plant firms for which we have no measurement error. All of our results are robust to both of these individual sample restrictions, as well as to their combined restrictions.[34]

A final concern with the validity of our estimates is that the variation in our instrument is driven by the provinces located near the Turkish-Syrian border. These provinces might also be negatively affected by the Syrian conflict, independent of refugee inflows. Assuming the impact of the civil war in Syria on nearby provinces is negative, the Wald estimator in the instrumental variable specification would be biased negatively, suggesting that our reported outcomes represent lower-bound estimates for the true effects of refugee inflows. To account for this potential issue, we re-estimate our regressions, excluding the border provinces. Although the residual variation is not sufficiently strong to be a reliable instrument, we do still observe quantitatively similar results for the reduced-form difference-in-differences estimates, suggesting that the main estimates are robust, even to muting a substantial part of the variation in our instrument.[35]

VIII Discussion

In this article, we examine the impact of the largest refugee inflow in recent history on the economic performance of firms in a developing country with a large informal sector that fully absorbs the refugee labor force. Although we are not able to identify significant effects on firms' formal production figures (measured by reported sales and gross output for accounting purposes), we find strong evidence of a positive effect of refugee inflows on production proxies that correct for firms' underreporting such as oil and electricity con-

[34]The results are available upon request, but were not included in the main manuscript due to space concerns.

[35]The results are omitted due to space constraints and are available upon request.

sumption. Similarly, we find that refugee migration boosts firm creation, especially the share of those with a foreign partnership. We conclude that local businesses are booming in the refugee-host areas in Turkey. Most of this growth, however, seems to be taking place in the informal economy, with a net displacement of native workers.

We explain these findings through several potential mechanisms. First, the likelihood of permanently leaving their original location might have induced civil war refugees to bring most of their accumulated wealth to the host country and to invest it there. Our analysis supports the idea that Syrian entrepreneurship and capital have increased dramatically in host areas. Second, fixed costs associated with initial resettlement, such as housing and setting up a new business, might be contributing to the positive shock, especially in the construction sector. Anecdotal evidence suggests that the construction sector is expanding[36] and refugees are more likely to work in this industry through subcontracting (Erdoğan and Unver, 2015). We provide causal evidence that construction sector, a typically high informal industry is booming more than others. Third, the inflow of aid provided to refugee settlement locations by the Turkish government, international governments, and other non-governmental organizations are mainly supplied by local firms (Erdoğan and Unver, 2015). The fact that our empirical results are entirely driven by SMEs that operate locally is consistent with the existing anecdotal evidence. Lastly, as shown in Del Carpio and Wagner (2015) and Ceritoglu et al. (2017), reduced labor costs due to the informal hiring of refugees seems to also contribute to the local production boom in the refugee host areas. We provide supporting evidence on reduced labor costs using a different empirical methodology. The absence of increased formal hiring or reported wages paid by firms further show that the refugee inflows mainly affect the informal production market.

[36] See Al Monitor, 2016; Hurriyet Daily News, 2016 for examples of media reports.

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Table I: Effects of Refugee Inflows on the Extensive and Intensive Margins of Production

Dependent Variable (in logs)	Sales	Gross Production	Electricity	Oil	Number of Firms
	(1)	(2)	(3)	(4)	(5)
Panel A. OLS					
PctRef: Share of Refugees (% Pop)	0.004	0.003	0.014	0.011	0.012
	(0.010)	(0.009)	(0.005)	(0.006)	(0.004)
Adj. R-squared	0.03	0.03	0.03	0.01	0.98
Panel B. Reduced Form					
Predicted Inflows: Syrian Displ. $\times$ Share Arabic$_{1965}$	0.004	0.006	0.053	0.054	0.054
	(0.009)	(0.009)	(0.019)	(0.020)	(0.028)
Adj. R-squared	0.03	0.03	0.03	0.01	0.98
Panel C. 2SLS					
PctRef: Share of Refugees (% Pop)	0.003	0.005	0.043	0.043	0.057
	(0.008)	(0.008)	(0.016)	(0.016)	(0.037)
Panel D. First Stage					
Dependent Variable	**PctRef: Share of Refugees (% Pop)**				
Predicted Inflows: Syrian Displ. $\times$ Share Arabic$_{1965}$	1.246	1.246	1.236	1.257	0.945
	(0.174)	(0.173)	(0.134)	(0.120)	(0.238)
First Stage F-statistic	51.52	51.60	84.97	109.98	15.81
Observations (for all panels)	782,453	781,330	653,027	585,507	810

Notes: All panels include controls for province and year fixed effects. Standard errors clustered at the province level are shown in parentheses. There are 81 clusters in each regression.*Data Source:* AISS.

Table II: Effects of Refugee Inflows on Firm Entry, Exit, and International Trade

Dependent Variable (in logs)	Firm Entry (1)	Firm Exit (2)	Firms with Foreign Partnership (3)	Exports (4)	Imports (5)
Panel A. OLS					
PctRef: Share of Refugees (% Pop)	0.012	-0.009	0.065	0.028	-0.004
	(0.002)	(0.006)	(0.018)	(0.007)	(0.006)
Adj. R-squared	0.99	0.89	0.92	0.93	0.94
Panel B. Reduced Form					
Predicted Inflows: Syrian Displ. $\times$ Share Arabic$_{1965}$	0.016	-0.004	0.065	0.037	0.007
	(0.008)	(0.023)	(0.040)	(0.034)	(0.017)
Adj. R-squared	0.99	0.89	0.91	0.93	0.94
Panel C. 2SLS					
PctRef: Share of Refugees (% Pop)	0.015	-0.004	0.063	0.037	0.007
	(0.009)	(0.022)	(0.026)	(0.039)	(0.018)
Panel D. First Stage					
Dependent Variable	**PctRef: Share of Refugees (% Pop)**				
Predicted Inflows: Syrian Displ. $\times$ Share Arabic$_{1965}$	1.034	1.034	1.034	0.995	0.995
	(0.253)	(0.253)	(0.253)	(0.246)	(0.246)
First Stage F-statistic	16.71	16.71	16.71	16.37	16.37
Observations (for all panels)	567	567	567	1,215	1,215

Notes: Exports and imports are in nominal thousands of dollars. All panels include controls for province and year fixed effects. Standard errors clustered at the province level are shown in parentheses. There are 81 clusters in each regression. *Data Sources:* TOBB data was used for the first 3 columns; and province-level foreign trade data from TurkStat was employed in columns 4 and 5.

Table III: Effects of Refugee Inflows on Input Demands

Dependent Variable (in logs)	Paid Employment (1)	Total Employment (2)	Wages (3)	Capital (4)	Capital per Employee (5)
Panel A. OLS					
PctRef: Share of Refugees (% Pop)	-0.003	-0.003	-0.0002	-0.008	-0.004
	(0.001)	(0.002)	(0.001)	(0.003)	(0.003)
Adj. R-squared	0.01	0.01	0.19	0.03	0.02
Panel B. Reduced Form					
Predicted Inflows: Syrian Displ. $\times$ Share Arabic$_{1965}$	-0.001	0.001	0.002	-0.012	-0.003
	(0.003)	(0.004)	(0.002)	(0.005)	(0.004)
R-squared	0.01	0.01	0.19	0.03	0.02
Panel C. 2SLS					
PctRef: Share of Refugees (% Pop)	-0.001	0.001	0.001	-0.010	-0.002
	(0.002)	(0.004)	(0.001)	(0.004)	(0.004)
Panel D. First Stage					
Dependent Variable	**PctRef: Share of Refugees (% Pop)**				
Predicted Inflows: Syrian Displ. $\times$ Share Arabic$_{1965}$	1.248	1.246	1.248	1.208	1.208
	(0.169)	(0.174)	(0.169)	(0.110)	(0.110)
First Stage F-statistic	54.74	51.52	54.74	120.27	120.27
Observations (for all panels)	761,750	782,526	761,774	505,786	505,786

Notes: All panels include controls for province and year fixed effects. Standard errors clustered at the province level are shown in parentheses. There are 81 clusters in each regression. *Data source:* AISS.

Table IV: Effects of Refugee Inflows by Firm Size

Dependent Variable (in logs)	Sales		Employment		Wages	
Sample	Large	SMEs	Large	SMEs	Large	SMEs
	(1)	(2)	(3)	(4)	(5)	(6)
PctRef: Share of Refugees (% Pop)	-0.018	0.003	-0.002	-0.001	0.001	0.001
	(0.015)	(0.008)	(0.004)	(0.002)	(0.006)	(0.002)
First Stage F-statistic	33.38	52.18	33.38	55.62	33.38	55.62
Observations	36,825	745,628	36,825	724,922	36,825	724,946

Dependent Variable (in logs)	Electricity		Oil	
Sample	Large	SMEs	Large	SMEs
	(7)	(8)	(9)	(10)
PctRef: Share of Refugees (% Pop)	0.002	0.041	-0.019	0.045
	(0.030)	(0.017)	(0.024)	(0.017)
First Stage F-statistic	51.28	86.46	59.28	113.17
Observations	34,469	618,555	33,018	552,488

Notes: A firm is defined as Small or Medium size Enterprise (SME) if it has less than 250 employees. All panels include controls for province and year fixed effects. Standard errors clustered at the province level are shown in parentheses. There are 81 clusters in each regression. *Data Source:* AISS.

Table V: Effects of Refugee Inflows by Sector

Sample	Manufacturing	Construction	Retail	Restaurants/Hotels	Others
	(1)	(2)	(3)	(4)	(5)
Dependent Variable (in logs)			Sales		
PctRef: Share of Refugees (% Pop)	-0.002	0.004	0.008	0.020	0.026
	(0.009)	(0.020)	(0.009)	(0.016)	(0.015)
First Stage F-statistic	83.38	36.86	72.55	63.1	40.06
Observations	275,046	122,483	146,020	45,436	180,756
Dependent Variable (in logs)			Employment		
PctRef: Share of Refugees (% Pop)	0.002	0.001	-0.002	-0.001	0.000
	(0.005)	(0.002)	(0.002)	(0.005)	(0.005)
First Stage F-statistic	89.6	38.54	78.3	66.58	42.25
Observations	269,916	119,837	141,386	44,725	173,847
Dependent Variable (in logs)			Wages		
PctRef: Share of Refugees (% Pop)	-0.001	0.003	0.005	0.002	0.005
	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)
First Stage F-statistic	89.63	38.54	78.3	66.58	42.25
Observations	269,925	119,838	141,386	44,725	173,857
Dependent Variable (in logs)			Electricity		
PctRef: Share of Refugees (% Pop)	0.019	0.041	0.027	0.053	0.056
	(0.013)	(0.016)	(0.023)	(0.016)	(0.019)
First Stage F-statistic	109.04	60.91	102.64	89.17	62.21
Observations	251,093	85,438	128,051	40,838	137,263
Dependent Variable (in logs)			Oil		
PctRef: Share of Refugees (% Pop)	0.025	0.046	0.033	0.037	0.084
	(0.005)	(0.020)	(0.021)	(0.017)	(0.020)
First Stage F-statistic	147.14	116.64	126.15	107.98	62.61
Observations	224,188	83,247	116,751	37,271	113,984

Notes: All panels include controls for province and year fixed effects. Standard errors clustered at the province level are shown in parentheses. There are 81 clusters in each regression. *Data Source:* AISS

Table VI: Effects of Refugee Inflows on Formal and Informal Employment, Sample: Men, 15-64

Dependent Variable	P(employment)			y^*	y^*
Sample	All	Formal	Informal	Hours worked	Hourly Wage
Panel A. OLS estimates	(1)	(2)	(3)	(4)	(5)
PctRef: Share of Refugees (% Pop)	-0.002	0.002	-0.004	-0.008	-0.008
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
Adj. R-squared	0.21	0.26	0.08	0.209	0.327
Panel B. 2SLS Estimates					
PctRef: Share of Refugees (% Population)	-0.003	0.000	-0.004	-0.013	-0.019
	(0.001)	(0.000)	(0.001)	(0.004)	(0.004)
Outcome mean	0.59	0.39	0.20	2.70	1.78
Panel C. First Stage Estimates					
Dependent Variable	**PctRef: Share of Refugees (% Population)**				
Predicted Inflows: Syrian Displ. × Share Arabic 1965		1.227		1.227	1.195
		(0.182)		(0.182)	(0.181)
First Stage F-statistic		45.35		45.35	43.30
Observations (for all panels)		2,059,540		2,059,247	1,679,108

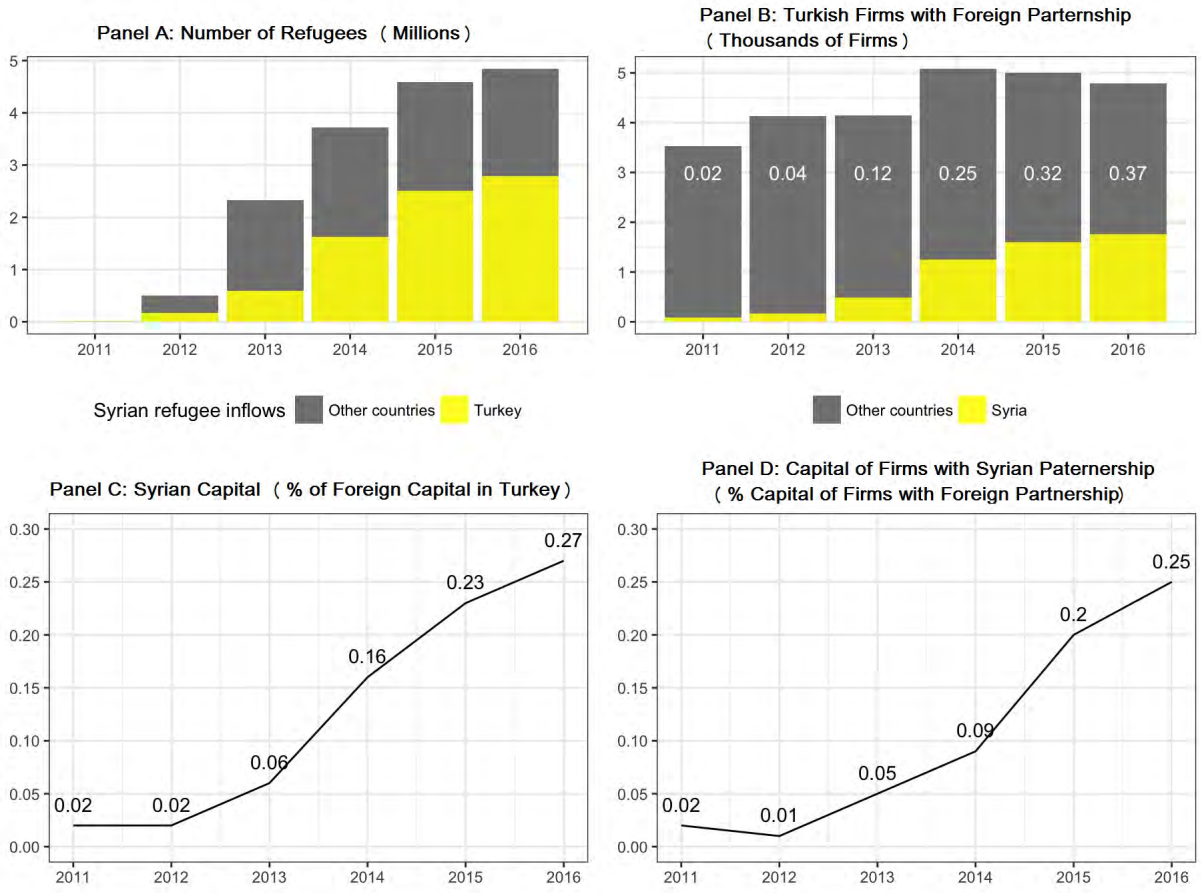
Notes: *: hours worked and wages were transformed using the inverse hyperbolic sine transformation (see Burbidge et al., 1988 and MacKinnon and Magee, 1990 for details). The coefficients can be interpreted as a log transformation on the dependent variable. The HLFS only interviews Turkish nationals. The regressions use data from the Turkish labor force annual surveys from 2004 to 2016. The estimates are by individual and include controls for province, year, age, education, and marital status. Standard errors reported in parentheses were clustered at the region-year level. *Data Source:* HLFS.

Table VII: Effects of Refugee Inflows on Formal and Informal Employment, Sample: Women, 15-64

Dependent Variable	P(employment)			y*	y*
Sample	All	Formal	Informal	Hours worked	Hourly Wage
Panel A. OLS	(1)	(2)	(3)	(4)	(5)
PctRef: Share of Refugees (% Pop)	-0.001	-0.002	0.001	-0.002	-0.007
	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)
Adj. R-squared	0.17	0.27	0.02	0.17	0.29
Panel B. 2SLS					
PctRef: Share of Refugees (% Pop)	-0.003	-0.003	0.001	-0.009	-0.015
	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)
Outcome mean	0.16	0.10	0.06	0.71	0.47
Panel C. First Stage					
Dependent Variable	**PctRef: Share of Refugees (% Pop)**				
Predicted Inflows: Syrian Displ. × Share Arabic 1965		1.225		1.225	1.213
		(0.182)		(0.182)	(0.182)
First Stage F-statistic		45.25		45.25	44.01
Observations (for all panels)		2,190,207		2,190,171	2,108,088

Notes: *: hours worked and wages were transformed using the inverse hyperbolic sine transformation (see Burbidge et al., 1988 and MacKinnon and Magee, 1990 for details). The coefficients can be interpreted as a log transformation on the dependent variable. The regressions use data from the Turkish labor force annual surveys from 2004 to 2016. The estimates are by individual and include controls for province, year, age, education, and marital status. Standard errors reported in parentheses were clustered at the region-year level. *Data Source:* HLFS.

Figure I: Syrian Presence in Turkey, 2011-2016



Data Sources: DGMM refugee data (panel A), TOBB data (panels B to D).

Figure II: Time Persistence of Refugee Inflows into Turkish Provinces - DGMM data

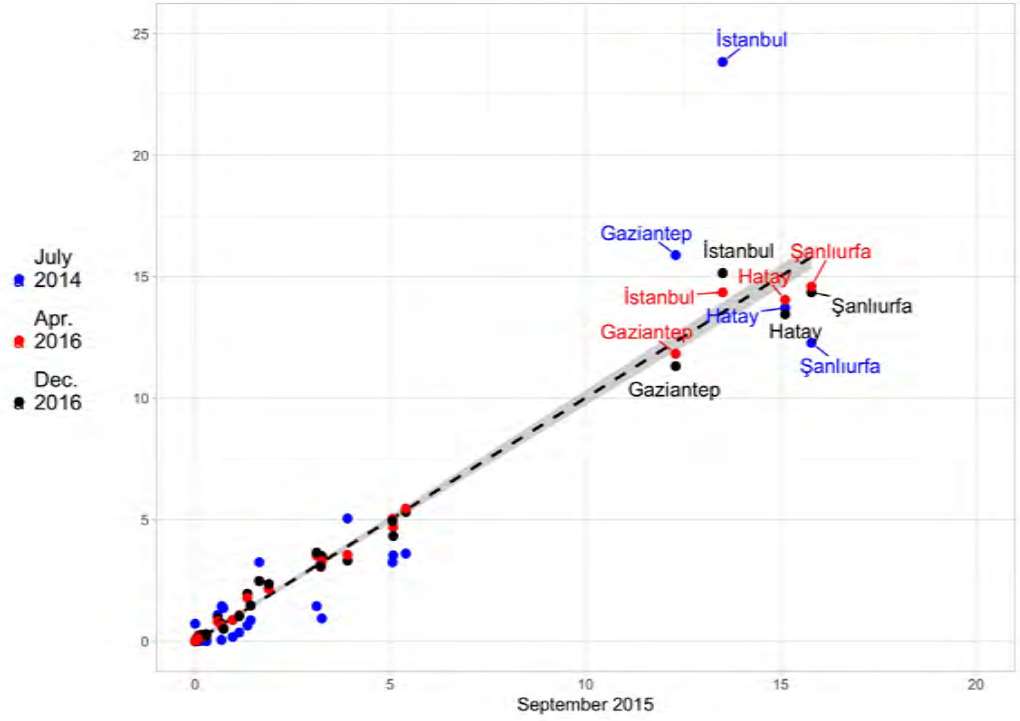


Figure III: Location of Refugees and Arabic-speaking Populations in Turkey - DGMM data

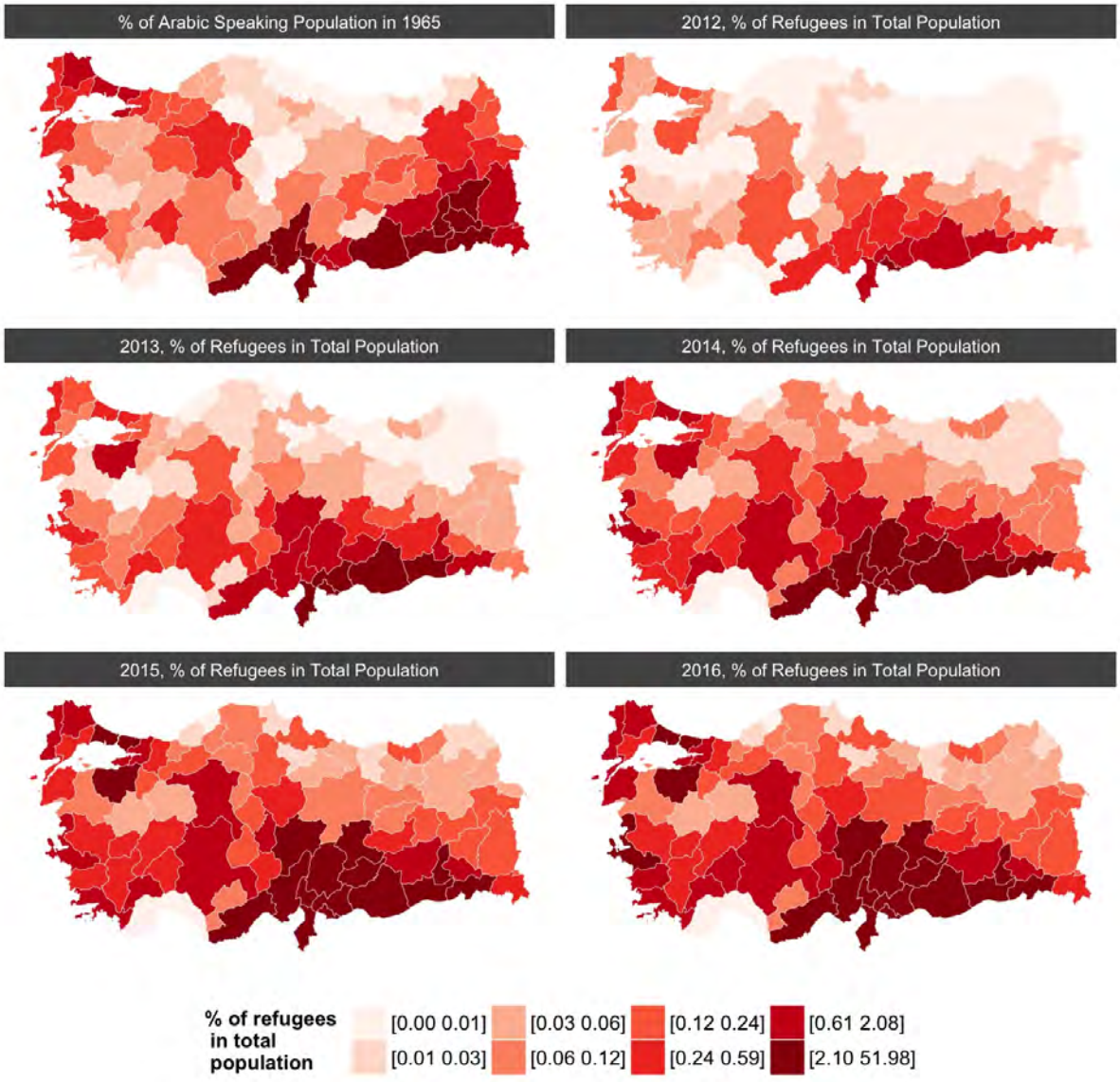


Figure IV: Difference-in-Differences Annual Estimates - AISS data

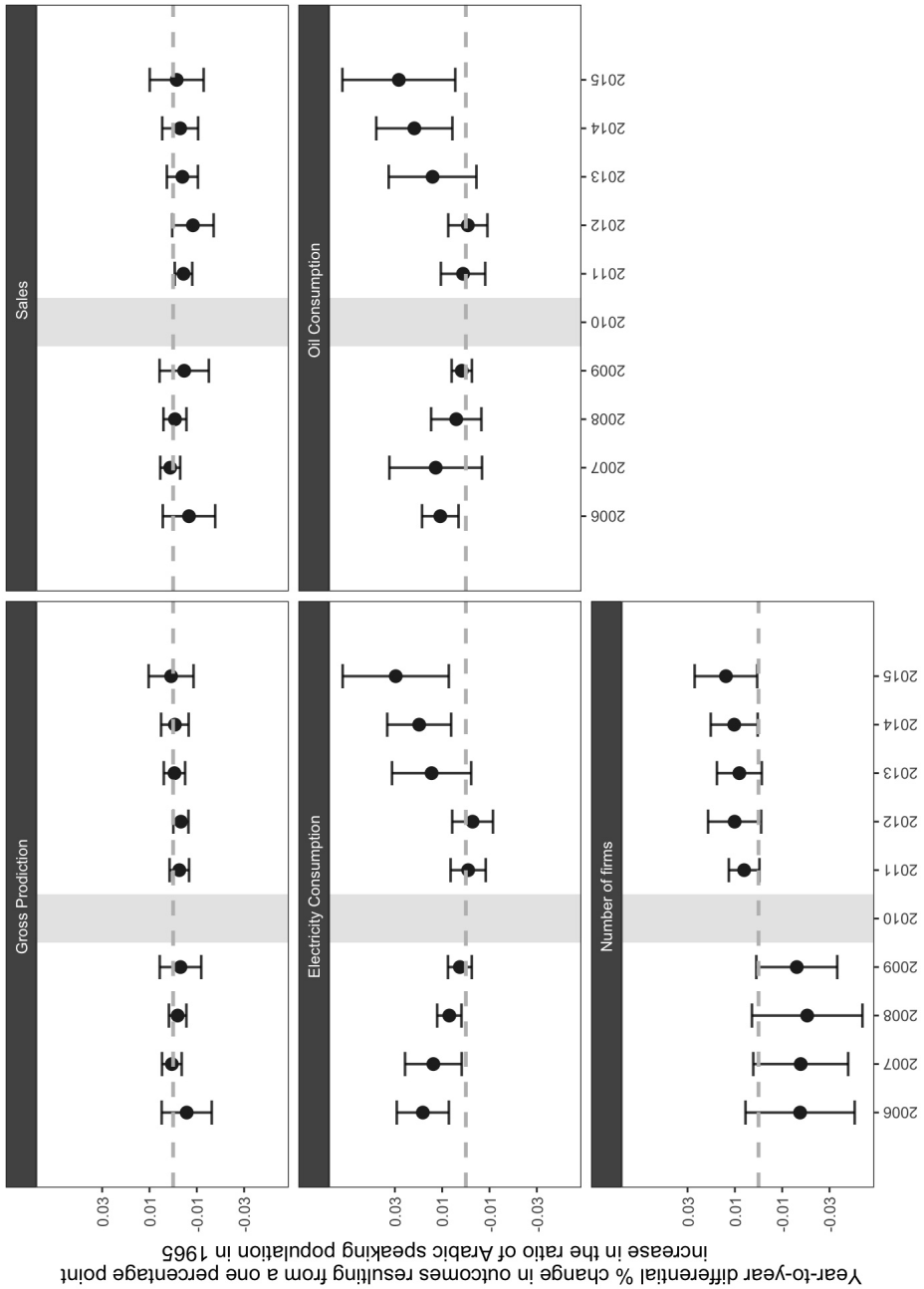


Figure V: Difference-in-Differences Annual Estimates - TOBB and Foreign Trade data

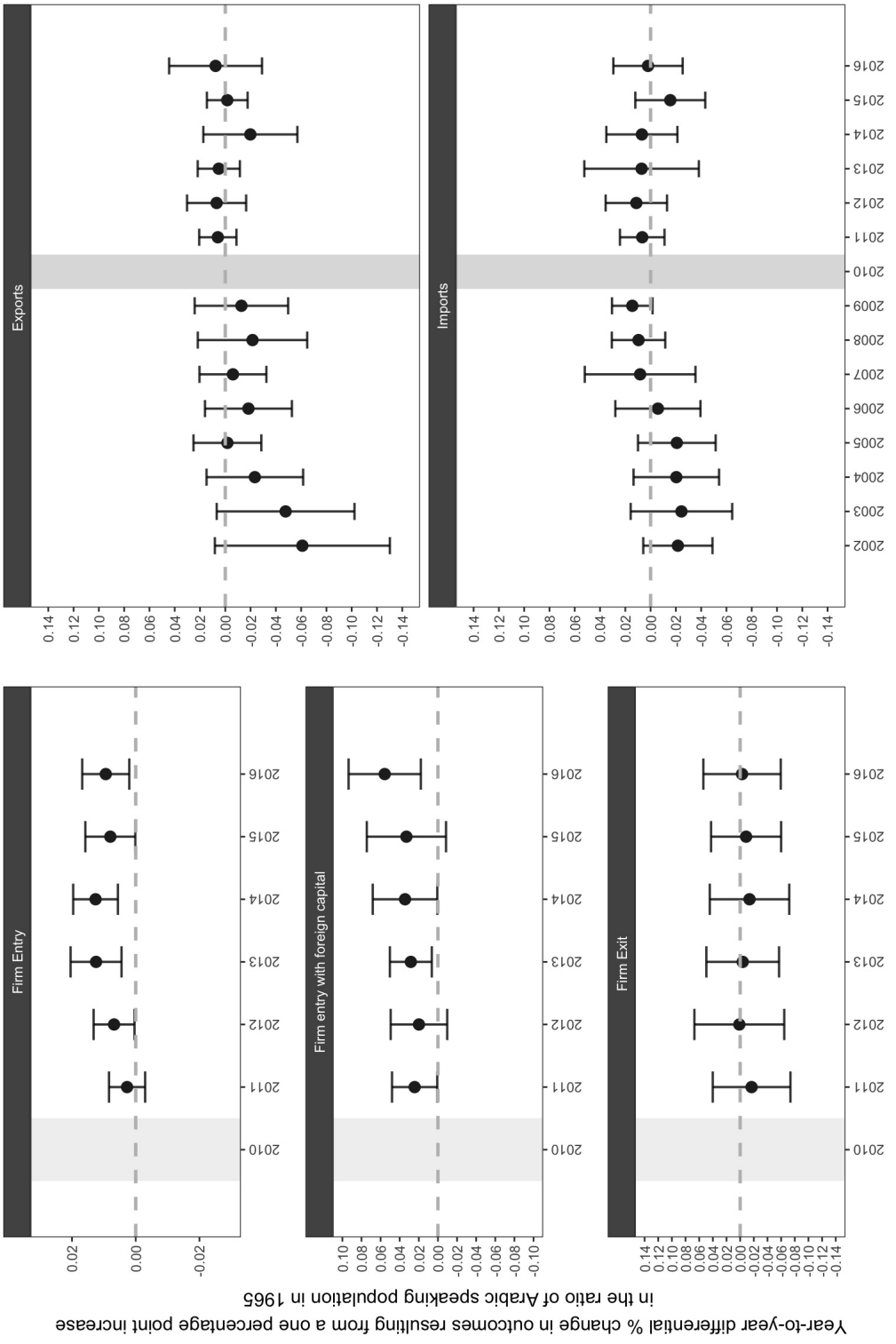


Figure VI: Difference-in-Differences Annual Estimates - AISS data

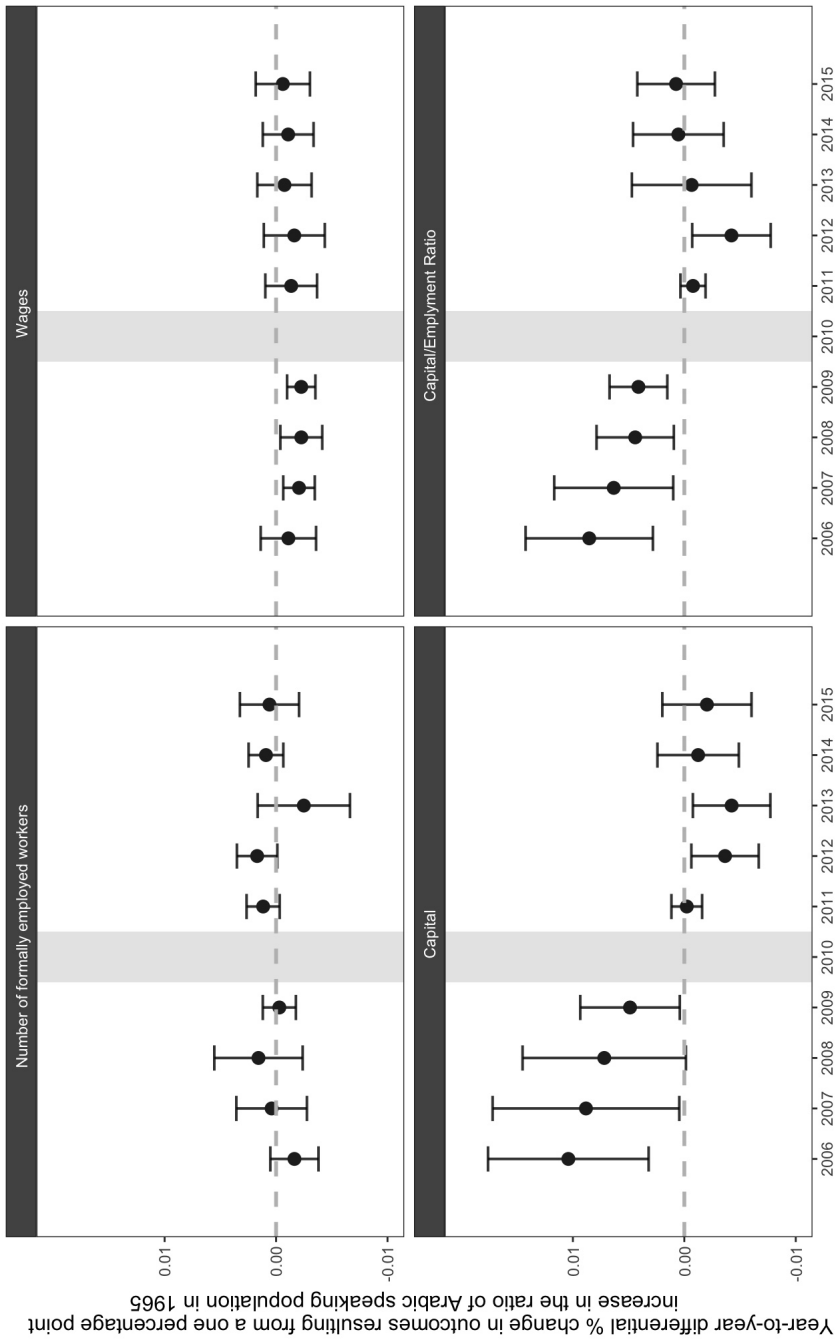
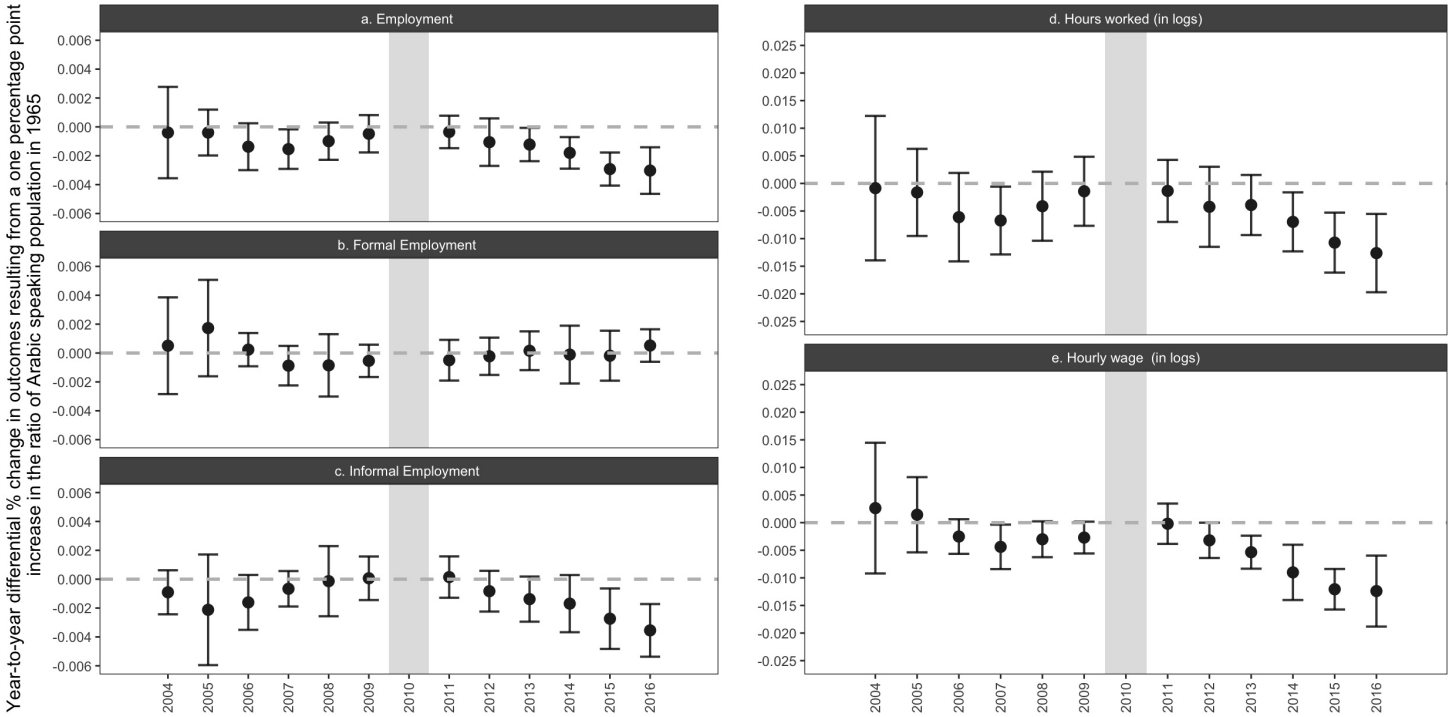
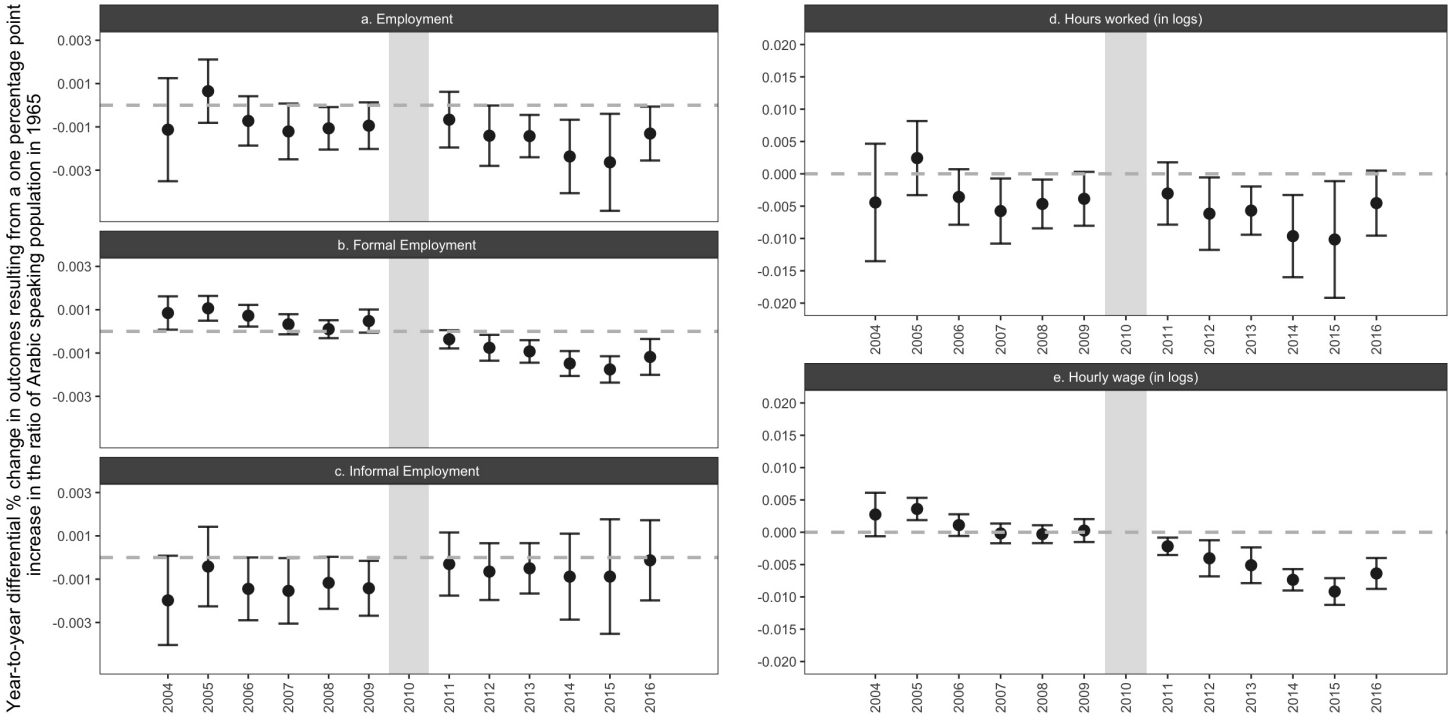


Figure VII: Difference-in-Differences Annual Estimates - HLFS, Sample: Men, 15-64



Notes: The HLFS only interviews Turkish nationals. The regressions use data from the Turkish labor force annual surveys from 2004 to 2016. The estimates are by individual and include controls for year, province, age, education, and marital status. Standard errors reported in parentheses were clustered at the region-year level.

Figure VIII: Difference-in-Differences Annual Estimates - HLFS, Sample: Women, 15-64



Notes: The HLFS only interviews Turkish nationals. The regressions use data from the Turkish labor force annual surveys from 2004 to 2016. The estimates are by individual and include controls for year, province, age, education, and marital status. Standard errors reported in parentheses were clustered at the region-year level.

Appendix I: Characteristics of Syrian Refugees in Turkey

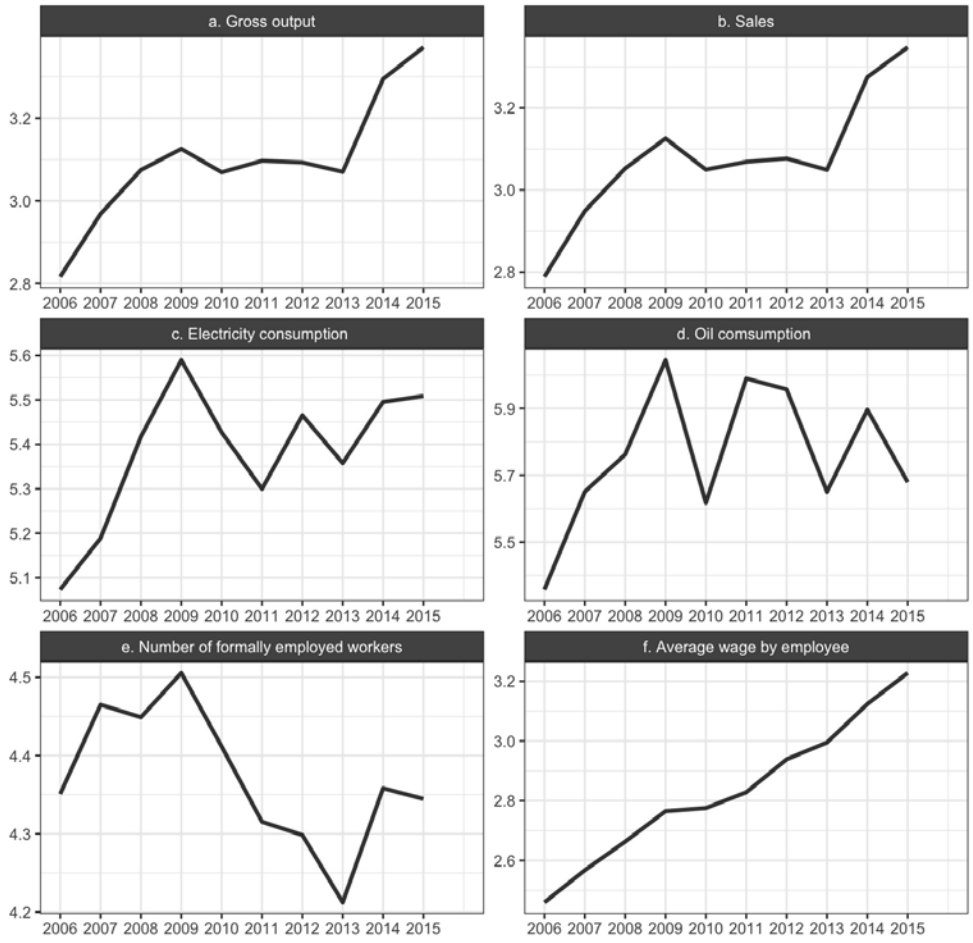
Demographic Characteristics of Syrian Refugees in Turkey, January 2017

I. Gender (%)	
Male	53.2
II. Age (%)	
0-4	13.7
5-11	16.2
12-17	14.8
Minors (18<)	**44.7**
18-59	51.9
60+	3.3
III. Education (%)*	
Illiterate (includes young children)	32.0
No degree (literate)	12.5
Primary	15.8
Secondary	9.9
Some College +	2.0
Unknown	27.8
Total number of refugees:	3,168,757

Notes: *Education data are only available for registered 2.5 million refugees as of April 2016. The information on gender and age comes from the UN Refugees Office as of January of 2017.

Appendix II: Firm Outcomes Time Trends

Annual trends on firms outcomes (Nominal Values in Logs) - AISS data



Appendix III: Quality of Constructed Measure of Inflows of Refugees

Constructed vs. Observed Measure of Province-Level Inflows of Refugees