Tabellini, Marco; Magistretti, Giacomo; Magistretti, Giacomo

Working Paper

Economic Integration and the Transmission of Democracy

CReAM Discussion Paper Series, No. 02/23

Provided in Cooperation with:
Rockwool Foundation Berlin (RF Berlin)

This Version is available at:
https://hdl.handle.net/10419/295699

WWW.ECONSTOR.EU

Mitglied der

Leibniz-Gemeinschaft

Consequences of a Massive Refugee Influx on Firm Performance and Market

Yusuf Emre Akgündüz, Yusuf Kenan Bağır, Seyit Mümin Cılasun and Murat Güray Kırdar

January 2022

Consequences of a Massive Refugee Influx on Firm Performance and Market Structure

Yusuf Emre Akgündüz [†]
Sabanci University

Yusuf Kenan Bağır [‡]
Central Bank of the Republic of Turkey

Seyit Mümin Cılasun [§]
TED University

Murat Güray Kırdar [¶]
Boğaziçi University

Abstract

This study combines an administrative dataset of the full population of Turkish firms and the setting of the sudden mass migration of Syrian refugees to Turkey to identify the effect of migrants on firm performance and market structure. We find that economic activity increases in hosting regions, but negative implications exist for long-term productivity. As a result of the migrant shock, exiting firms expand and new firms are established; however, the resulting market structure shows less concentration. Quantitatively, a 10 percentage-point rise in the migrant-to-native ratio increases firm sales by 3.8% and the number of active firms by 5.8%, but reduces firms' average market share by 4.1%. We further document an increase in the export volume and variety of exported products to the Middle East and North Africa (MENA) region. In addition, a decline in export prices is observed, implying a rise in the competitiveness of exporting firms. We also uncover evidence for an effect of migrants' skills and networks on exports, as the export value and variety of products to the MENA region increase more than those to the EU region while the prices of products exported to the two regions show similar changes.

JEL codes: J15, J61, F16, L11.
Keywords: refugees, firm performance, market structure, sales, informality, exports, migrant business networks.

1   Introduction

While the impact of immigrants on the labor market outcomes of natives has long been of interest to economists, the literature on firm adjustments in response to migrant labor supply shocks is more limited.[1] Even less is known about how market structure is altered as a result. The arrival of migrants affects firm performance in a number of ways. It not only changes the methods (and hence costs) of production for firms and raises the demand for their products, but it also widens the skill mix of the pool of workers and the mix of preferences of the consumers. Moreover, business networks of migrants potentially open up new opportunities for trade in the international markets.

In this paper, to study the impact of migrants on firm performance and market structure, we combine an administrative dataset of the full population of firms in Turkey with a very rich set of outcomes and a very strong quasi-experimental source of variation in the geographical distribution of immigrants: the massive exodus of Syrian refugees into Turkey. Turkey was the largest recipient of refugees displaced by the Syrian civil war, which started in 2011. As of the end of 2015, which is the time frame of this study, 2.5 million Syrian refugees had taken up residence in Turkey. The majority of refugees live in urban areas; only about 10% lived in camps as of 2015 (TDGMM, 2016). Demirci and Kırdar (2021) report a high paid employment rate for Syrian men in Turkey, which is close to that of native men. The majority of refugees are employed in the informal sector.[2] Since refugees are on average less-educated and younger than the natives, their arrival has significantly altered the skill mix: changing the relative prices of informal and formal workers.[3] Moreover, the arrival of refugees (who are willing to work for low wages in the informal sector) lowers the costs of production. Syrian refugees' knowledge of home-country markets, language, and preferences as well as their business networks could be particularly important for trade with the Middle East and North Africa region (MENA).

We use a rich administrative dataset of balance sheets, income statements, social security

---

[1]See, for instance, Dustmann and Glitz (2015), Mitaritonna et al. (2017), Beerli et al. (2021).

[2]Workers in the informal sector have no social security coverage.

[3]In fact, Aksu et al. (2019) find a positive impact on the wages of formal employees but a negative effect on the wages of informal employees.

records, and customs data. Our dataset gives a very comprehensive overview of Turkish firms' activities and covers the entire population of firms.[4] Using this data, we generate three sets of outcomes: sales and profit margins of existing firms, market structure and exports. We begin with the analysis of sales and profit margins of existing firms. Second, we move onto market structure outcomes on firm entry and market concentration. These two sets of results provide an overview of the changes in economic activity and structure, but hold little information on the costs and type of production. Export data fill this gap as customs data allow us to construct detailed price, destination and product outcomes that are comparable over time. Combined, these three sets of outcomes provide estimates on the quantity, structure and costs of production in the aftermath of the refugee inflow.

For identification of the migrant impact on firm outcomes, we use the variation in the migrant supply shock across the 81 provinces of Turkey in a difference-in-differences framework.[5] In several provinces, migrants constitute more than 10 percent of the population. A well-known threat to identification in this context is the potential endogeneity of the provincial distribution of migrants, as they might take the economic conditions of provinces into consideration in choosing their location. We use a variant of the distance instrument in the literature; our particular instrument takes the potential endogeneity in the size and timing of the refugee flow, which is not common in studies using migrant shocks resulting from political events in the origin country. The massive size of the migrant shock in our context is highly important for identification because it essentially dwarfs any other event occurring after the arrival of refugees that may be correlated with our distance instrument. Nevertheless, we check for the effects of potential confounders such as trade between Syria and Turkish regions, which might also be a function of distance. In addition, our estimation strategy pays due attention to the potential regional and sectoral differences in economic trends. Furthermore, we conduct panel event study analysis for all outcomes, which allows us to check the plausibility of our identification assumptions and assess the timing of the refugee effects.

We have three sets of main results: overall sales and profit margins, market structure,

---

[4]The balance sheet data allow us to observe not only firms that report complete balance sheets but also smaller enterprises that only report simple balance sheets for tax purposes and often have no formal employment.

[5]The 81 provinces correspond to the NUTS-3 level classification of regions.

and exports. As a whole, the results suggest that immigration increases economic activity, but has negative implications for the long-term quality of goods produced and productivity. First, our analysis of firm sales reveals that a percentage point increase in the refugee-native ratio raises firm sales by 0.38%. This effect is much larger in the construction and manufacturing sectors. We can therefore conclude that existing firms increase their economic activity. Second, we document that the number of active firms increases and market concentration decreases. For a percentage point increase in the refugee-native ratio, the number of firms rises by 0.55% while the market share of the average firm declines by 0.41%. In other words, the increase in economic activity results in a market with numerous small firms rather than a concentration of activity in large firms. In terms of export behavior, we find that exporters increase their export volume to the MENA region countries while decreasing it to the EU countries. Exporters also raise their product variety to the MENA region. We also find evidence of a decline in the price of a given exported product – consistent with the labor cost advantage provided by refugees.

We make several contributions to the literature. First, this study combines an administrative dataset of the full population of firms with a major natural experiment to examine migrants' impact on firm performance.[6] The only other study that does so, to the best of our knowledge, is the very recent paper by Beerli et al. (2021). However, while the migrants in Beerli et al. (2021) are highly skilled, those in our context are low skilled refugees. In addition, unlike Beerli et al. (2021), we examine the effects of migrants also on international trade and market structure. Other studies that investigate this issue include Dustmann and Glitz (2015), who examine the adjustment of wages and the establishment of new firms after a change in the skill mix in Germany due to the arrival of migrants, and Mitaritonna et al. (2017) who examine the impact of migrants on a number of firm outcomes for French firms with at least 20 employees. Dustmann and Glitz (2015) and Mitaritonna et al. (2017) utilize the geographic variation in past settlement patterns of immigrants via a shift-share instrument for identification and not a sudden and massive exodus of migrants.[7] Moreover, our study differs from

---

[6]Some studies combine full population of firms with minor natural experiments only to examine trade outcomes (see, e.g., Cohen et al. (2017)).

[7]Jaeger et al. (2018) show that when the settlement patterns of immigrants are persistent over time, shift-share instruments conflate the short-run partial equilibrium effects with longer-run general equilibrium effects, which tend to offset each other, resulting in biased

Mitaritonna et al. (2017) also in the way that the migrants in that study are high skilled.[8]

More similar to our study is the analysis by Altındağ et al. (2020), who use a survey of manufacturing and service firms conducted by the Turkish Statistical Institute (TurkStat) to study the impact of the Syrian refugee influx on firms' input demand and sales.[9] While Altındağ et al. (2020) focus on the impact of the refugee influx on input demand and sales,[10] our study also includes a detailed analysis of the impact on market structure and export outcomes (based on rich administrative customs data).[11] A key advantage of our firm performance analysis over Altındağ et al. (2020), whose data cover only firms with more than 20 employees, is the use of administrative data on the full population of firms. Capturing the population of small firms with less than 20 employees is particularly important for understanding the effect of the refugee shock on market structure because most of the new firms fall into this category. In terms of identification, since the empirical specification of Altındağ et al. (2020) does not include firm fixed effects, they cannot disentangle the effect of the refugee shock on existing firms' performance from the effect on the composition of firms, which we show to be highly important in this setting due to the significant increase in the number of active firms.[12]

Our second contribution is the analysis of market structure outcomes like firm entry and market concentration, which is difficult to study without data on the full population of firms. To the best of our knowledge, this is the first study to document the migrant impact on market concentration.[13] Economic dynamism and productivity growth are strongly linked to market structure and competitiveness (Aghion et al., 2015; Akcigit and Ates, 2019a). Estimating the

---

short-run estimates.

[8]See also studies on the impact of highly skilled immigrants on innovation by Kerr and Lincoln (2010), Hunt and Gauthier-Loiselle (2010) and Cristelli and Lissoni (2020).

[9]Akgündüz et al. (2018) also analyze the impact of Syrian refugee inflows on foreign-owned firm entry, sales, and profits and find generally positive effects. However, their analysis is limited to province-level aggregate data and provides no results on market structure, export performance, and the heterogeneity of effects across firms and sectors.

[10]They find an increase in inputs like electricity but no corresponding increase in sales (unlike our findings), which they attribute to a lack of reporting by the firms in the survey.

[11]Altındağ et al. (2020) analyze province-level export values, but find no effects.

[12]In addition, while Altındağ et al. (2020) take the timing and size of the refugee flow entering Turkey as exogenous, like most studies that use migrant shocks resulting from political events do, our instrumental variable accounts for the potential endogeneity in the size and timing of the refugee influx. Their language-based instrument also makes the potentially strong assumption that language does not directly affect employment and firm-level outcomes. Moreover, since Arabic is spoken in just a few provinces in Turkey, their LATE puts substantial weight only on these few provinces, which could be problematic in the case of significant regional heterogeneity in the migrant impact. In fact, Aracı et al. (2021) find evidence for substantial regional heterogeneity in the impact of refugees on labor market outcomes of natives. Finally, we use a more flexible empirical specification including region-year and sector-year fixed effects.

[13]While Dustmann and Glitz (2015) examine new firm creation, they do not analyze market concentration.

impact of immigration on market structure is crucial to understanding the potential long-term structural transformations of local economies in the host regions. Our results show that the arrival of a large number of refugees significantly alters the market structure in hosting regions. The rise in the number of small firms employing the newly abundant informal labor not only decreases market concentration but also fosters the informalization of the economy. These have important implications for productivity in Turkey, where a strong correlation exists between firm size and productivity.[14]

Our third contribution is to uncover a novel effect of migrants on the exports of the host country. Earlier studies focus on the benefits accrued from migrants in increasing trade with their origin countries and point out migrant business networks as the underlying mechanism (Cohen et al., 2017; Parsons and Vézina, 2018; Steingress, 2018). In these studies, the migrant shocks are small to make an impact on the cost of production. In our context, however, we also uncover a cost mechanism. Extending our analysis to export prices at the transaction level, we find evidence of a drop in export prices with the migrant shock. In other words, Syrian refugees improve the international competitiveness of firms in the hosting regions by lowering their costs of production.

Our final contribution is related to the importance of migrant networks in exports. We find that exports to the MENA region increase more than those to the EU. Similarly, some earlier studies provide evidence that migrant networks make it easier to penetrate the import markets of certain countries than those of other countries (see, e.g., Ottaviano et al. (2018)). These studies highlight the network effect accruing from the refugees' business networks and better knowledge of particular markets. However, the rise in export volume could also result from a fall in the price of exported products, which stems from the migrants lowering the costs of production. In this study, we disentangle these two channels. Our results on the prices of exported goods at the transaction level allow us to rule out the cost-of-production channel because the export prices to the MENA and to the EU change similarly, and we can conclusively point out the network effects of Syrian refugees in the greater increase of exports to the MENA region than to the EU. Moreover, our finding that firms increase the

---

[14]Brunello et al. (2020) report a similar effect of low-skilled immigration to Italy, where a rise in the informalization of the Italian economy results from the enlargement of small firms. We, however, find that both small and large firms grow with the Syrian refugee influx.

variety of products they export to the MENA region further highlights the importance of the information advantage that Syrian refugee networks provide in exports.

2 Background Information

2.1 Syrians in Turkey

The Syrian civil war, which started in 2011, displaced 13.1 million Syrians (half of the country's population) of whom 5.6 million had taken refuge in other countries by February 2018 (UNHCR, 2018). Turkey has been the largest recipient of Syrians and 3.6 million Syrian refugees resided in Turkey as of January 2020. In fact, Turkey has hosted the highest number refugees in the world since 2015. As of the end of 2015, which is the time frame of this study, 2.5 million Syrians had taken up residence in Turkey.

The first refugees from Syria arrived in Turkey in April 2011; however, their number at the end of 2011 was very small, around 8,000. Turkey had an open door policy to the Syrian refugees and gave them temporary protection status in October 2011. As the war intensified, the number of Syrians in Turkey had increased to 170,912 by the end of 2012 and to 560,129 by the end of 2013. Meanwhile, the Turkish Disaster and Emergency Management Authority (TDEMA) set up camps for the refugees. By December 2013, 21 camps had been set up in 10 provinces, housing over 210,000 refugees.

The flow of refugees into Turkey accelerated after 2013 and the number of total refugees rose to 1,622,839 by the end of 2014 and reached 2,503,549 by the end of 2015. Given that the population of Turkey was around 78.5 million in 2015, the refugee to native ratio reached more than 3% at the end of 2015. Since the TDEMA could not cope with the increasing number of refugees, the Turkish government established the Turkish Directorate General for Migration Management (TDGMM) in April 2013, which was made responsible for the registration and overall coordination of refugees. Over time, most refugees settled in urban areas, and only about 10% of the Syrians in Turkey lived in refugee camps at the end of 2015 (TDGMM, 2016).

Syrians are younger and less educated than natives. Based on the 2018 Turkey Demo-

graphic and Health Survey, which includes a representative sample of the Syrian refugees in Turkey as well as natives, we calculate that, among the working-age population (15+), 36.8% of Syrians but 20.8% natives are between the ages 15 and 24, and 80.9% of Syrians but 57.1% of natives are between the ages 15 and 44. In terms of education, among the 15- to 59-year-old population, 20.7% of Syrians but 8.6% of natives have no school degree. Among the 20- to 59-year-old population, 17.3% of Syrians have a high school or a higher degree compared to 41.1% of natives. The native-refugee education gap is even wider among men, who are much more likely to be employed among both groups.[15]

Very few Syrian migrants in Turkey had work permits during the time frame of our analysis. Therefore, almost all of them worked in the informal sector, where they had no social security coverage and could be paid below the minimum wage.[16] Examining the 2018 Turkey Demographic and Health Survey, Demirci and Kırdar (2021) find that employment rates of Syrian refugees do not lag behind those of natives much, especially among men. For a sample of 18- to 59-year-olds, they find that 61.8% of refugee men have paid jobs compared to 68.9% of native men, although the gap is wider among women (6.5% vs. 24.8%). Informal employment probability, however, is significantly higher among refugees. Demirci and Kırdar (2021) report that, among 18- to 59-year-old married men, 97.9% of refugees are informally employed compared to 19.1% of natives. Similarly, among 18- to 49-year-old women, 98.0% of refugees compared to 38.3% of natives are informally employed. They also find that, compared to their native counterparts, refugee men are more likely to work in manufacturing, whereas refugee women have a higher likelihood to be employed in agriculture.

Syrian refugees also established new businesses or became shareholders. Using data from the Union of Chambers and Commodity Exchanges of Turkey, TEPAV (2018) reports that the number of companies established in Turkey with Syrian shareholders increased from just 30 in 2010 to 1,599 in 2015. Firms with Syrian shareholders made up around 1% of all new firms in 2015. Moreover, while Syrian capital in new firm openings amounted to 2.2% of all foreign

---

[15]Among the 15- to 59-year-old population, 18.0% of refugee men but 3.8% of native men have no school degree; and, among the 20- to 59-year-old population, 19.2% of refugee men but 46.2% of native men have a high school or higher degree.

[16]Before the enactment of the Council of Ministers Decree number 8375 in January 2016, which allowed Syrians under temporary protection to have work permits under certain conditions, only 7,351 work permits were issued to Syrians; mostly to those who started a business. These figures are provided by the Ministry of Labor and Social Security.

capital in 2011, this figure rose to 15.9% in 2014 and to 22.9% in 2015.

Kirişci et al. (2016) argue that Syrian refugees also contributed to trade, particularly with Syria. They report that exports to Syria from the Turkish provinces bordering Syria increased by more than 200% between 2011 and 2014, while the overall increase in Turkey's exports to Syria was only 11%. They claim that the emergence of firms set up by Syrians with connections to their home country was behind this boom in exports.

2.2 Market Structure, Firm Behavior and Informality in Turkey

The Turkish economy is dominated by the service sector. As of 2018, the share of services in the GDP was 64.7%. The corresponding shares were 19% for manufacturing, 5.8% for agriculture, and 7.2% for construction. The remainder is made up of taxes and subsidies provided by the government. The bulk of employment is also provided by the service sector. While the share of employment in services is 54.9%, it is 19.7% for manufacturing, 18.4% for agriculture, and 6.9% for construction. Although the share of manufacturing is not very high in the GDP or employment, manufactured goods make up 93% of exports.

The size distribution of Turkish firms is right-skewed and the average firm size is small. Around 75% of firms have fewer than 10 employees. Turkey has the largest number of employees in firms with 1 to 9 employees among the OECD countries, edging out Italy at the top (OECD, 2020). Firm size is strongly correlated with the usual indicators of productivity. At the firm level, Table 1 shows the correlation matrix for certain primary firm characteristics. Firm size, as measured in sales, is positively correlated with being an exporter, the number of registered employees, and the probability of reporting formal employment (which is observed from the number of employees registered to the Social Security Institute) and negatively correlated with the profit margin. Figure 1 shows the average value added per worker (in CPI adjusted Turkish Liras) for each firm size as reported by the Turkish Statistical Institute. The figure shows that large firms are on average around 8 times as productive as micro firms. Not only are large firms much more productive in Turkey, but they are also less likely to use informal employment. In 2011, the share of informal workers was 51.9% in firms employing fewer than 10 people, 23.4% in firms employing 10-24 people, 12.6% in firms em-

ploying 25-49 people, 6.5% in firms employing 50-249 people, and 2.6% in firms employing more than 250 people.

Akcigit et al. (2020) analyze firm dynamics and activity in Turkey between 2006 and 2016 and find that economic dynamism rose until 2013, but slowed down or even declined afterwards. Economic dynamism, a term referring to the level of competitiveness and creative destruction in the economy, is measured in line with the US literature through indicators such as the degree of market concentration, profit margins, employee churn, firm entry, and the share of young firms in the economy. Following the 2009 financial crisis, GDP growth exceeded 10% in 2010 and 2011, but slowed down and unemployment rose after 2013. Market concentration, measured as the percentage of employees in the four largest firms (CR4), has also been rising since 2013 both for the manufacturing sector and for the full economy. On the other hand, the firm entry rate declined from 18% in 2012 to 12% by 2016. As expected, new firms are small at the start and their average size, in terms of sales, is equal to a third of the market average.

Taymaz (2009) reports that while most businesses in Turkey are registered, many only partially report employment, excluding informal workers. Therefore, informal firms are very rare but informal employment is very common in Turkey. In 2011, more than 40% of Turkish employment was informal and informality varies considerably by region, sector and firm size. According to the 2011 Turkish Household Labor Force Survey (before the Syrian refugees started arriving in Turkey), the share of informal workers was 82.6% in agriculture, whereas it was lower than 25% in manufacturing and services.

3   Conceptual framework

Here, we first outline a conceptual framework that motivates our empirical analysis and discuss the mechanisms through which Syrian refugees may affect local firm performance. Then, we discuss the effects of the migrant shock within this framework in terms of the three main sets of outcomes we analyze in this paper sequentially: 1) firm sales and profit margins, 2) market structure, and 3) exports.

Since refugees are less-skilled workers who mostly work in the informal sector, their arrival changes the relative abundance of production factors, tilting the balance in favor of unskilled workers. Firms adjust to this change by altering their output and methods of production in a number of ways. First, the arrival of refugees lowers the wages paid to informal workers relative to the wages paid to formal workers, as shown in Aksu et al. (2019). Therefore, for a given output level, firms choose a more informal intensive method of production, replacing formal workers with informal workers. Even in the absence of a change in relative factor prices, as noted by Dustmann and Glitz (2015), this substitution could take place due to the adoption of new technology after the change in relative factor levels, via the methods shown by Acemoglu (1998) and Beaudry and Green (2005). Second, the scale effects resulting from the falling labor costs would cause firms to expand. Third, because of the change in the relative abundance of factors of production, firms change the product mix in the economy. For example in a two goods and two inputs economy as in Rybczynski (1955), an increase in the amount of unskilled labor will lead to an increase in the share of the goods that use unskilled labor intensively.

In addition to the above factors, which highlight the cost advantage of firms that employ refugees, the arrival of refugees affects firms' behavior also through other channels. First, there are demand-side effects of refugees on firms. As the consumption base expands with refugees, demand increases, fueling both prices and production in the standard supply and demand framework.[17] This shift in the demand curve would be especially pronounced for firms producing non-tradable products. Second, refugees not only bring their labor but also their human capital in terms of entrepreneurial skills, language ability and business networks. This might further contribute to the expansion of existing firms (for instance, via improving the export networks with Arabic-speaking countries) and the establishment of new firms.

---

[17]Hong and McLaren (2015) find that immigrants in the US increase consumer demand for local services, leading to both local employment creation and a rise in non-tradable service wages. Similar increases in product prices with the arrival of migrants have been reported for less developed countries as well. See, for instance, Alix-Garcia and Saah (2010) and Maystadt and Verwimp (2014) for Tanzania, Alix-Garcia et al. (2018) for Kenya, Depetris-Chauvin and Santos (2018) for Colombia, Taylor et al. (2016) for Congolese refugees in Rwanda.

3.1 Firms' Sales and Profit Margins

According to the above framework, both the supply effect (due to the falling costs of informal labor and the resulting scale effect) and demand effects (due to the expansion of the consumption base) point to an increase in the quantity sold in any given product market. Hence, as long as the product price does not fall more than the rise in quantity sold (a highly unlikely scenario in this setting),[18] we expect an increase in firms' sales. In mostly non-tradable sectors such as services and construction, this rise in quantity sold would mainly stem from the increase in demand. In sectors like agriculture, construction and manufacturing – where refugees can be easily employed – the rise in quantity sold would stem more from the reduction in production costs. Hence, in the construction sector, which is both non-tradable and requires manual labor that refugee workers can supply, the sales effect would be especially strong.

The impact of the migrant shock on the profit margin (profits/sales) is more complicated. If the cost of sales increases as much as sales, the profit margin does not change. The change in the cost of sales depends on the change in output and input prices, the technology parameters, in addition to the change in quantity sold.[19] While the lower cost of informal labor suggest a rise in the profit margin,[20] a potential decrease in product prices,[21] a rise in the costs of formal labor,[22] and decreasing returns to scale would potentially lower it. Therefore, the direction of the impact on profit margins is a primarily empirical question. At the same time, due to the stronger positive price effect expected for non-tradable products and the stronger negative cost effect expected in sectors that use more informal-labor intensive methods of production, the profit margin is more likely to increase for firms in these sectors.

Testable Hypotheses I: (i) While the migrant shock increases firms' sales, its effect on the profit margin is ambiguous. (ii) The effects on sales and profit margins are more positive

---

[18]This could happen only when the demand curve is highly inelastic and the supply curve shifts outward with not much of an outward shift in the demand curve.

[19]Technology parameters such as the elasticity of the substitution between different factors of production would also affect the size of the effect on sales, but not its direction.

[20]Aksu et al. (2019) find weak evidence of a fall in the wages of informal native workers with the arrival of refugees.

[21]While Balkan and Tumen (2016) find a negative effect of the migrant shock on product prices, Aksu et al. (2019) find a positive effect of the migrant shock on the regional consumer price index. The second approach accounts for the share of different items in households' budget and, hence, puts more weight on non-tradable products like housing expenditures.

[22]In fact, Aksu et al. (2019) estimate a positive effect of the migrant shock on natives' wages in the formal sector.

for firms that use informal-labor intensive methods of production and firms that produce non-tradable products.

3.2 Market Structure and Informality

The refugee shock is also likely to change the pace of the establishment of new firms. Several of the adjustment mechanisms of firms to the labor supply shock, outlined in the beginning of this section (falling labor costs, the rise in local demand, and the arrival of Syrian entrepreneurship) all imply an increase in new firm establishments. In addition, the rise in the establishment of new firms would have important implications for market structure. New firms in Turkey are more likely to be smaller; in fact, the sales of new firms are equal to a third of the market average. In addition, smaller firms, which are more likely to use informal labor in Turkey as illustrated in Section 2.2, would have an advantage in market entry relative to larger firms after the arrival of refugees. Therefore, as the pace of new firm entry and the advantages of small firms increase, we expect a fall in market concentration.

Testable Hypothesis II: (i) The establishment of new firms would take place at a faster pace in the migrant-hosting provinces. (ii) Market concentration falls.

3.3 Exports

Exports of firms in the hosting regions are likely to be affected through both a cost effect resulting from the employment of low-cost refugee labor and a network effect accruing from the refugees' business networks and better knowledge of particular markets. On the other hand, for products exported to other countries, the local demand effect resulting from the arrival of refugees would be limited. Therefore, we would expect the cost effect to dominate the demand effect and the resulting decline in product prices to give a competitive advantage to the exporting firms in the refugee-hosting regions. Consequently, the incidence and level of exports of firms in the refugee-hosting regions would increase.

Migrants' knowledge of home-country markets, language, and preferences as well as their business networks can lead to advantages in exporting for firms in the host country (Gould, 1994). In addition, Rauch and Trindade (2002) emphasize the role of migrant networks in

matching and referral among trade partners and in community enforcement of sanctions that ensures the quality of shipments and the payment for shipments. In a trade model with heterogeneous fixed costs for exporting like that in Jørgensen and Schröder (2008), refugees can be expected to reduce fixed costs for firms in the hosting regions.[23] As the fixed cost of exporting falls, firms are expected to increase their exports, particularly to the regions with which the immigrants have a connection. In the case of Syrian refugees, the export destination that would benefit from such an effect is the MENA region, where their language skills and networks can provide a competitive advantage [24]

It is important to note that exports to the MENA region compared to those to other regions, say for instance the EU, could increase more for another reason. If the cost advantage accrued from the arrival of refugees matters more in the products exported to the MENA region because these products are more intensive in informal labor, exports to the MENA region would also increase more than those to the other regions. Hence, it is critical to account for the change in export prices in disentangling the effect of migrant skills and networks on exports.

Syrian ethnic networks could also affect the variety of exported products. Rauch and Trindade (2002) argue that homogenous products have reference prices,[25] and a comparison of the reference prices of alternative sellers provides sufficient information for potential buyers. However, for differentiated products, prices cannot convey all information necessary for international trade. Here, ethnic networks can play an important role in matching buyers and sellers.[26] Therefore, we expect that the Syrian refugee shock increases the product variety among exports for the MENA region.

Testable Hypothesis III: (i) The incidence and the level of exports by firms in the refugee hosting regions increase due to a decline in costs and prices. (ii) Exports to the MENA region increase more than exports to the EU countries due to the language skills, information

---

[23] Among empirical studies, Peri and Requena-Silvente (2010) attribute the link between province level trade and immigration to reduced fixed costs of exporting.

[24] Prior to the beginning of the civil war in 2010, Syria's share of exports to the Middle East and North Africa was 42.8%. This share was nearly double that of Turkey, where the share of exports to the Middle East and North Africa was around 21.9% in 2018. On the other hand, the total value of Turkish exports (113.8 billion USD) in 2010 was ten times as large as the total value of Syrian exports (11.4 billion USD) in 2010.

[25] Reference prices of homogenous products are quoted on organized exchanges such as the London Metal Exchange.

[26] Rauch and Trindade (2002) find that Chinese networks increase trade more for differentiated than for homogenous products.

advantages, and business networks of the refugees, holding the change in export prices resulting from the arrival of refugees constant across destination regions. (iii) Product variety in exports increases.

4 Data

4.1 Micro-data: The Entrepreneurship Information System of Turkey

Our micro-level data were acquired from the Entrepreneurship Information System (EIS), which is made available to researchers working on-site by the Turkish Ministry of Science and Industry. The EIS covers the entirety of firm population in Turkey with the exception of public and finance sectors. Since it is an administrative dataset, we have no information on any firms that are not registered at all. While informal employment is common, firm informality in Turkey is negligible.[27]

The EIS dataset brings together several administrative datasets and makes it possible to link them through common firm identifiers. In particular, we use three main datasets: 1) annual firm registry indicating the sector and location of all registered firms in Turkey, 2) balance sheet and income statement information reported by firms annually to the Revenue Administration, 3) transaction level customs data provided by the Ministry of Customs and Trade. We use data for 2008–2015 in our analysis. We do not use the post-2015 data because a major policy was implemented at the beginning of 2016; the national minimum wage was increased by 30%, which could drastically affect firm behavior.[28]

4.1.1 Sales and Balance Sheets

We obtain sales information from income statements reported annually to the Revenue Administration. Income statements are actually comprised of two datasets. The first dataset is made-up of balance sheets and detailed income statements reported by firms for which the

---

[27]Most firms employ both formal and informal workers; however, this incidence decreases with firm size as discussed in Section 2.

[28]This hike was substantially higher than previous increases in the minimum wage level, which were at the level of inflation. In addition, the variation in the bite of the minimum-wage policy across provinces could be correlated with the distribution of refugees because wages are on average higher in western Turkey.

value of sales exceeds a certain threshold.[29] Such firms make up around 45% of our sample and this proportion varies little across sectors. However, this threshold does not apply to incorporated firms, which report their detailed income statements regardless of the value of their sales. Firms whose sales fall below the threshold can still voluntarily report detailed income statements. Firms that report detailed income statements give information on numerous elements under the three main headings of assets, liabilities and owner's equity. The second dataset contains simple balance sheets for firms whose sales do not exceed the threshold. Firms in this group include self-entrepreneurships. In this dataset, the reported elements include only basic items like total sales and profits. Since our concern in this paper is the sales and profits of firms and the information on these variables is available regardless of the financial reporting status, our sample covers all firms that report positive sales in Turkey during the relevant years.[30] We define the profit margin of all firms as the ratio of profits to sales. In both datasets, we define the cost of sales as sales net of profits.

Since income statement items like profits and sales have to be reported by all firms, no observations are missing from the data. We exclude from our sample all firms that report sales for a single year during the analysis period because our baseline specifications for firm level outcomes like sales and profit margins always include firm fixed effects. This reduces the total number of firm-year observations from 8.6 to 7.5 million; however, these 1.1 million observations that are excluded account for only 3% of total sales.[31]

The summary statistics for firms' sales and profit margins are presented in Table 2. We observe 3,329,254 unique firms in the complete sample. On average, around 2 million firms report their sales, leading to a sample size of around 15.75 million firm observations across the years. Of these observations, the majority (almost 12.5 million observations) are for firms in the services sector, whereas about 2.24 million observations are for manufacturing firms. The number of observations are fewer for construction firms (about 933 thousand) and firms in agriculture (about 85 thousand). The sales variable in the analysis is defined as the log of reported sales in Turkish Liras and adjusted for inflation using the annual CPI. Since extreme

---

[29]The value of the threshold depends on the year and is adjusted according to inflation. This threshold was 220,000 TL in 2015.

[30]To avoid capturing sales effects from moving to a new province, we excluded firms that changed their headquarters during the sample period, but this corresponds to only 3% of the total sample.

[31]These firms are, however, included in market- and province-level outcomes as well as in the analysis on firm entry.

values are observed in the variable for the profit margin, we convert the values outside the range of minus one to one to missing values.

4.1.2 Market structure

We use sales information from the income statements to construct several indicators for market concentration at the sector-province-year level. We define each sector at the 4-digit NACE level, which provides us information about the market shares of firms with similar products in each province. We define market concentration using three variables: the average market share, the market share of the largest 4 firms in each cell and the Herfindahl-Hirschman (HH) index. There are (theoretically) 48,114 sector-province combinations. We can calculate these market concentration measures only for sector-province-year cells where at least a single firm exists. The top-4 share is further restricted to sector-province-year cells with at least 4 firms. In fact, 14% of the 4-digit sector-province level cells have zero firms while a further 33% have fewer than 4 firms. Therefore, we calculate all three measures also at the more aggregate 2-digit sector level to test the robustness of our results. The summary statistics for market structure variables are presented in Table 3.

We use alternative definitions for the total number of firms according to the depth of information provided in our administrative data. First, the number of firms registered in the firm registry gives the highest total number of firms. There is no indication about whether all firms in the registry are active. Second, the number of firms that report their sales through any type of balance sheet to the Revenue Administration makes up the next highest total number of firms (definition I). This corresponds to the sample used in the analyses of sales and profits using income statements, described in the previous section. Third, we limit the sample further to firms that have at least one employee registered in the social security system (definition II). Fourth, we limit the sample to firms that report detailed income statements (definition III). While definition (III) consists of firms that are a subset of definition (I), it is not a subset of definition (II). We calculate the total number of firms using each definition (I) to (III) for each sector-province cell to understand the impact of Syrian refugees on the firm entry by the type of activity. All number of firms variables are log (+1) transformed when

used as dependent variables.

4.1.3 Exports

For exports, we match firms' balance sheets with data from the Ministry of Trade. Customs data are independent of balance sheets and include all exports made by any firm, including firms that report only simple balance sheets (definition I). As in most other countries, the customs data are highly detailed. We construct variables for firms which show whether the firm is exporting, its export value, the value of exports to specific destinations, the number of export varieties defined at the 4-digit product level, and the price of each export. Since we know the type of goods exported at the 8-digit product level and the data include information on the USD value and the amount of each export, we can further construct price measures for each transaction that are comparable over time.

We disaggregate total exports by region: Europe (EU countries), Middle East and North Africa (MENA), and Syria. The EU is the primary destination for Turkish exports while exports to MENA and Syria may be affected by the social and business networks that Syrians bring with them. Table 4 presents summary statistics for our export-related variables. We observe a general increase in the probability of Turkish firms to export from 2.3% in the pre-shock period to 2.5% in the post-shock period. The incidence of exporting to the EU among all exporters is quite high at almost 70% (1.6/2.3). The rise in the export probability between the pre-shock and post-shock periods appears to be driven by the exports to the MENA region. The probability of a Turkish firm to export to this region increases from 1.0% to 1.2%.

4.2 Data on Refugees

The data on the distribution of Syrian refugees across provinces in Turkey come from the Disaster and Emergency Management Authority for 2013,[32] Erdogan (2014) (who draws on information from the Turkish Ministry of Interior) for 2014, and from the Directorate General of Migration Management for 2015. We also use information on the monthly total number of

---

[32]The Disaster and Emergency Management Authority (2013) provides information on the number of Syrian refugees for provinces with camps in 2013. Although no numbers are provided for provinces without camps, 80,000 refugees are reported to be residing in those provinces. Hence, for provinces without camps, we distribute these 80,000 Syrians based on their shares in these provinces in 2014.

Syrians in Turkey obtained from the UNHCR, which is illustrated in Figure 2.

The cross-provincial numbers on the number of Syrians for 2013–2015 are end of year values. However, as can be seen from Figure 2, the monthly numbers of Syrians display substantial variation over the year, particularly in 2014. Therefore, we make an adjustment on the cross-provincial numbers so that they represent the yearly average rather than the end of year in terms of the total number of Syrians in Turkey.[33] Since no information is available on the provincial distribution of Syrians for 2012, we distribute the total number of Syrians in Turkey in 2012 (obtained from the UNHCR) across provinces according to their provincial shares in 2013. The resulting provincial migrant-to-native ratios are illustrated in Figure 3.[34] The migrant-to-native ratios are set to zero for the pre-shock years (2008–2011).

As can be seen in Figure 3, the refugee-native ratio is much higher for provinces close to Syria. At the same time, Figure 3 illustrates that a disproportionately high number of refugees (after controlling for distance) live in the major industrial cities of western Turkey, including Istanbul, Izmir, Bursa, and Kocaeli. This suggests that some refugees also move in search of job opportunities. In fact, Aksu et al. (2019) find that while distance is the most important determinant of Syrians' settlement patterns, employment opportunities are also a pull factor. The fact that distance is an important determinant of settlement patterns is also critical for the definition of our instrumental variable.

In Figure 3, the Turkish provinces in eastern Mediterranean and the western part of southeastern Anotolia are darker primarily because northwestern Syria is densely populated, including a major city (Aleppo). The Turkish provinces on or close to the Syrian border, which house a higher ratio of refugees, are not sparsely populated. Five contiguous provinces which start in Mersin in eastern Mediterranean and end in Sanliurfa in the western part of southeastern Anatolia in Figure 3 (Mersin, Adana, Hatay, Gaziantep, and Sanliurfa) were five of the top-13 most populated provinces (out of 81) in 2011. In addition, the Turkish provinces in dark color in Figure 3 display significant variation in terms of industrialization. While the

---

[33]First, we calculate the average value of the monthly numbers of Syrian migrants for 2014 and 2015 (call this $x[t]$, where t denotes the year) using the UNHCR data. Then we calculate the total number of Syrian refugees in Turkey according to the provincial data for each year (call this $y[t]$). We adjust the cross-provincial numbers by multiplying it by $x[t]/y[t]$ to align the sum of provincial numbers in each year with the average monthly value for that year.

[34]Aksu et al. (2019) find no evidence of an effect from refugee influx on internal migration, suggesting that the native population at the province level is unaffected by the arrival of refugees.

provinces in the eastern part of the dark region in southeastern Anatolia (Sanliurfa, Mardin, Diyarbakir, Sirnak) are less developed and industrialized parts of Turkey, the provinces in the western part (Gaziantep, Adana, Hatay, and Mersin) are some of the most industrialized parts of the country. For instance, Gaziantep ranked 7th, Adana 8th, Hatay 10th, and Mersin 12th in 2011 in terms of firm sales based on the EIS data.[35]

5   Identification Method and Estimation

To identify the effects of Syrian refugees on firm performance, we exploit the rapidness of their arrival and their geographical distribution after arrival in an instrumental-variables difference-in-differences framework. In this framework, 2008-2011 is the pre-shock period and 2012-2015 is the post-shock period. The effects are then identified through the variation in the refugee intensity across the 81-provinces.

Using our firm-level data, we estimate the following equation,

$$y_{fjt} = \alpha + \beta R_{jt} + \gamma_f + \rho_j + \theta_t + \lambda_{st} + \pi_{f't} + \mu_{rt} + e_{fjt}, \tag{1}$$

where y_{fjt} denotes the outcome for firm f in province j at time t and R_{jt} is the ratio of migrants to natives in province j at time t. The key parameter of interest is β, which shows the effect of increasing the migrant-to-native ratio from 0 to 1 on the firm outcome. In equation (1), γ_f stands for firm fixed effects, ρ_j for province fixed effects,[36] and θ_t for time fixed effects. Since the hosting provinces have different sectoral compositions and sector-specific technological effects might be observed, we include a vector of 2-digit NACE level sector–year fixed effects, λ_{st}. To account for potential changes in firms' reporting type of income statements (f') over time, we further add fixed effects for the interactions of income statement types of firms with year dummies, $\pi_{f't}$.[37] Given the variation in the development levels of Turkey's regions, firms from different regions could have different trends in firm performance. Hence,

---

[35]The province level sales figures are based on the aggregate statistics provided by the Ministry of Industry, Science and Technology at the EIS website: https://gbs.sanayi.gov.tr/.

[36]Province fixed effects are actually absorbed by firm fixed effects as no variation exists in the province of firms. Firms that change provinces in our time frame are excluded from the sample and make up 3% of the total sample.

[37]This also serves as a control for year-specific effects for different firm-size groups because full balance sheets tend to be reported by larger and more formal (incorporated) firms while simple income statements are reported by micro firms.

in equation (1), we also include NUTS-1 region–year fixed effects (μ_{rt}) for the 12 NUTS-1 regions of Turkey.

We also run regressions with data defined at the sector-province-year level, where sector is defined at the 2-digit or 4-digit NACE sector level, when we examine the impact of the migrant shock on market structure outcomes and the number of firms. In this case, we adjust equation (1) as follows,

$$y_{sjt} = \alpha + \beta R_{jt} + \delta_s + \rho_j + \theta_t + \lambda_{st} + \kappa_{sj} + \mu_{rt} + e_{sjt}, \tag{2}$$

where y_{sjt} denotes the outcome for sector s in province j at time t. Firm fixed effects in equation (1) are replaced by sector fixed effects, δ_s. In addition, we include sector-province fixed effects κ_{sj}.[38] The inclusion of κ_{sj} implies that sector-province cells that have constant market shares or a constant number of firms over time drop from the analysis sample. The other control variables are the same as those in equation (1).

We use a different specification in analyzing the effect of Syrian refugees on export prices because the available customs data for prices are considerably richer. Price can be calculated at the product level and each transaction includes information on the export destination. Hence, our data here are at the product-firm-province-destination–time level. In this estimation, we use the following equation,

$$p_{ifjkt} = \alpha + \beta R_{jt} + \eta_i + \gamma_f + \rho_j + \varphi_k + \theta_t + \lambda_{st} + \pi_{f't} + \mu_{rt} + \varpi_{ikt} + e_{ifjkt}, \tag{3}$$

where p_{ifjkt} stands for the price of product i of firm f in region j sold to destination country k at time t. Fixed effects are denoted by η_i for products, by γ_f for firms, by ρ_j for provinces, by φ_k for destinations, and by θ_t for years.[39] Equation (3) includes 4-digit NACE level sector-year fixed effects (λ_{st}), income statement type-year fixed effects ($\pi_{f't}$), and 12 NUTS-1 region-year fixed effects (μ_{rt}) as in equation (1). Equation (3) also includes product-destination-year fixed effects (ϖ_{ikt}). Further allowing each product-destination fixed effect to be year-

---

[38]In equation (1), κ_{sj} fixed effects are captured by firm fixed effects because sector-province combinations do not vary over time at the firm level. We use the last observed 4-digit NACE sector for each firm.
[39]Fixed effects for sectors are absorbed by firm fixed effects.

specific absorbs all time-varying demand related shocks for that product-destination group. In turn, this allows us to estimate the effect of Syrian refugees on comparable products sold to comparable destinations.

Another challenge in estimating the effects of any immigration shock through regional variation is the potential endogeneity of immigrant distribution. If Syrian refugees move to regions where firms are performing well due to better employment conditions, the OLS estimates will be biased. Hence, we use an instrumental variable that is based on the distance of Turkish provinces to the Syrian border. In fact, Aksu et al. (2019) show that distance is the major determinant of the settlement patterns of refugees. Before we define the instrument, we briefly discuss why distance is relevant in this context. Many of the refugee camps that were set up in the early phases of refugees' arrival were in the border regions. Although most refugees moved out of these camps over time, they chose to settle in the neighboring regions. Moreover, refugees were expected to use the health and educational facilities in the province they were registered. Although this was not strictly enforced, it created some inertia to move out of the border regions. In addition, since may refugees have family members back in Syria, residing close to the border was convenient in terms of access to Syria.

We use the instrument in Aksu et al. (2019), an extension of the instrument used by del Carpio and Wagner (2015), which allocate the Syrian refugees in Turkey in each year across Turkish provinces according to the distance of each Turkish province from each Syrian province and the pre-war population shares of Syrian provinces.[40] This instrument assumes that the timing and size of the refugee inflow to Turkey are exogenous, which is standard in studies using migrant supply shocks because these shocks are driven by the political conditions of the country of origin. However, Aksu et al. (2019) argue that since Syrian refugees also arrived in neighboring countries other than Turkey (Lebanon, Jordan, and Iraq) the relative economic conditions and the relative treatment of refugees in these countries, as well as the change in these over time, would influence the timing and size of the refugee inflow to Turkey.[41] Therefore, their instrument accounts for not only the distance of Syrian provinces to Turkish provinces but also their distance to the other three bordering countries in the following way,

---

[40]This instrument has also been used in Aygün et al. (2021) and Kırdar et al. (2022).
[41]In fact, the data show that the arrival of refugees in Turkey compared to the other three countries gained momentum over time.

$$I_{p,t} = \sum_{s=1}^{13} \frac{\left(\frac{1}{d_{s,T}}\right)\pi_s}{\left(\frac{1}{d_{s,T}} + \frac{1}{d_{s,L}} + \frac{1}{d_{s,J}} + \frac{1}{d_{s,I}}\right)} \frac{T_t}{d_{p,s}}, \tag{4}$$

where $I_{p,t}$ stands for the expected number of refugees in Turkish province p at time t, $d_{s,X}$ for $X = T, L, J, I$ stands for the minimum distance of Syrian province s to any entry point in the border of Turkey, Lebanon, Jordan, and Iraq, respectively.[42] In equation (2), π_s stands for the pre-war population share of Syrian province s and T_t stands for the total number of Syrian refugees in the four neighboring countries, which is roughly equal to the total number of refugees exiting Syria given the low numbers in other countries until 2015. Finally, $d_{p,s}$ is the distance of Turkish province p to Syrian province s.

The key difference of this instrument from that in del Carpio and Wagner (2015) is that it essentially reweights the prewar population shares of Syrian provinces according to their distances from the four neighboring countries. For instance, while the prewar population share of the Aleppo province in Syria was 21.6%, this formulation raises its share to 42.3% because Aleppo is much closer to Turkey than to the other three neighboring countries. In fact, the Syrian sample of the 2018 TDHS shows that 57.5% of refugee households originate from this province. In addition, the instrument in equation (4) is different from the del Carpio and Wagner instrument in that T_t stands for the total number of refugees rather than the refugees in Turkey. Therefore, this instrument accounts for the potential endogeneity of the size and timing of the refugee inflow to Turkey.

First stage F-tests confirm the relevance of the instrument. For the regressions in our primary sample with all firms that report sales, the first stage F-test is greater than 30.[43] In unreported robustness tests, we use the instrument of del Carpio and Wagner (2015) and found similar second stage results but the precision in the first stage seems to improve when we use the share of refugees in Turkey from each Syrian province.

We estimate 2SLS regressions using equation (1) with the instrument in (4) in Section 6.1, where the dependent variable is sales or profits, and using equation (2) with the instrument in (4) in Section 6.2, where the dependent variable is the number of firms or market struc-

---

[42]There are six entry points on the Turkish border, three at the Iraqi border two at the Jordanian border, and four at the Lebanese border.
[43]The first stage F-test becomes larger if region-year fixed effects are excluded.

ture variables like concentration. Finally, using equation (3) with the same instrument, we estimate regressions on export prices in Section 6.3. In firm and sector level regressions, the standard errors are clustered at the province level, as our key variable of interest varies at this level. For the transaction level price regressions, we cluster the standard errors at the product-destination level to control for market specific common shocks.

5.1 Identification Assumptions

The assumption for the validity of our instrument is that the trends in outcomes in regions with high and low values of the instrument would have been the same, conditional on region and time fixed effects and a set of covariates, in the absence of the refugee shock. This could fail, for instance, if firm dynamics exhibited more positive or negative time trends in the pre-shock period for provinces bordering Syria (for which our distance-based instrument takes higher values) than for other provinces. In fact, since we use region-year fixed effects, we impose a weaker conditional independence assumption. We assume that within the 5-regions of the country, our instrument is not correlated with the unobserved pre-existing time trends in our firm and market structure outcomes.

In order to test the validity of our identification assumption, we adopt a panel event study design that allows for dynamic lags and leads to the migrant shock. We do this by interacting the instrumented migrant shock for 2015 with the year dummies, while omitting a single year to capture the baseline difference between areas that receive migrants and do not receive them. We check whether the estimated coefficients in the pre-shock period are small and not statistically different from zero, meaning that the instrument does not predict an effect in the pre-policy period. In this sense, this is akin to running placebo regressions in the pre-policy period. In addition, the event study design also provides us with a visual representation of the causal effect, which allows us to assess how quickly firms make adjustments in response to the migrant shock.

A potential concern with our distance-based instrument is that trade between Syria and Turkish regions might also be a function of distance. Although this is unlikely to be a major concern given relative magnitudes of the massive refugee shock and the importance of

the trade with Syria for Turkish firms, we provide direct evidence on this by constructing a measure of "pre-shock trade exposure" for each Turkish region and using it as a control variable in our regressions. This is discussed in more detail in the Robustness Checks Section. Here, it is also important to note that our instrument is a function of the distance between not only Syrian provinces and Turkish regions but also Syrian provinces and other neighboring countries to Syria.

6 Results

6.1 Firms' Sales and Profits

First, we examine the effect of the migrant shock on firms' sales and profits. Panel (A) of Table 5 presents the OLS and 2SLS estimates for sales for all firms, as well as by sector of employment for the four main sectors: agriculture, manufacturing, construction, and services. The dependent variable is the logarithm of sales value. Strong evidence exists that the migrant shock increases firms' sales according to both the OLS and 2SLS estimates, which confirms hypothesis I-(i) in Section 3. Quantitatively, according to the 2SLS estimates, a 10-percentage-point increase in the migrant-to-native ratio (the magnitude of the shock is in fact greater in four provinces) increases firms' sales by 3.8 percent.

While the overall sales effect is positive, this is likely to hide considerable heterogeneity across sectors. As discussed in Section 3, demand and supply effects of refugees may be more pronounced in some sectors. Panel (A) of Table 5 also shows that a 10-percentage-point increase in the migrant-to-native ratio raises the sales of construction firms by 11.5%, manufacturing firms by 6.8% and firms in the service sector by 2.9%. No statistically significant effects are observed for agricultural firms.[44] We find that the effect is largest in construction, where both increased demand and cost advantages due to the arrival of refugees play a role.[45] Since manufacturing output is tradeable, no reason exists to expect a large increase in demand that is specific to the regions hosting refugees. The effect on manufacturing is

---

[44] Among the four main sectors, firms in the agricultural sector are the least representative of total production in that sector because agricultural production in Turkey is mostly family-owned small-farm production.

[45] In fact, Aksu et al. (2019) find substantial employment displacement of natives by refugees in the construction sector, suggesting important cost advantages for this sector.

therefore likely to be driven by cost advantages. Just the opposite holds for the services sector, where fewer migrants can work due to language barriers but products are generally non-tradeable. The much larger positive effect in the manufacturing sector than that in the services sector suggests that cost-advantages provided by refugees play a stronger role than the increased demand with their arrival.

The 2SLS estimates of Table 5 for all firms, as well as firms in manufacturing, services, and construction, are always higher than the OLS estimates. This suggests that firms in the border regions of Turkey, where most migrants chose to settle, would have worse time trends in sales in the absence of the refugee shock than firms in other regions of the country, as the 2SLS estimates put less weight in these provinces near the border.

Panel (A) of Figure 4 presents the event study results for sales. As can be seen in panel (A), prior to 2011, the estimated coefficients are small and not statistically different from zero, supporting our identification assumption that the instrument is not correlated with pre-policy trends in sales. After 2011, however, the estimated cofficients are much larger and either statistically significant or marginally statistically insignificant at the 5-percent level. Moreover, the magnitude of the effect grows over time as the refugee-native ratio increases. These results are consistent with the findings in Table 5 that the refugee shock increases firms' sales.

Panel (B) of Table 5 shows the effects of the refugee shock on profit margins. We find no evidence of a change in profit margins either with the OLS or the 2SLS estimates. In fact, the estimated effects are almost null. This finding implies that the cost of sales increase as much as sales, and hence profits rise as much as sales. As discussed in the conceptual framework section, while the lower costs of informal labor would prevent the cost of sales increasing as much as sales, the higher costs of formal labor and decreasing returns to scale in production would work in the opposite direction. In terms of sectoral heterogeneity, the null effect of the migrant shock on profit margins exits for all sectors but agriculture. For agriculture, there is evidence of a small negative effect on the profit margin. Note that profits can still increase while the profit margin goes down, when sales rise more than profits.

Panel (B) Figure 4 provides the event study results for the profit margin variable. The figure shows that the instrument is correlated with the trend in the pre-policy period for

this outcome variable. Coefficients for all years prior to 2011 are statistically different from zero. Hence, these findings yield the null effects we find for the profit margin questionable; therefore, we refrain from drawing any conclusions about the refugee impact on firms' profit margin.

6.2 Market Structure and Informality

The previous section showed that the arrival of refugees caused existing firms to enlarge in terms of sales. This section examines the results on market structure variables: firm creation and market concentration. In Table 6, we provide the results of this analysis at the 4-digit NACE sector-province-year level in panel (A) and 2-digit sector-province-year level in panel (B).

To understand the effect of refugees on net firm creation, we estimate the effect of the migrant shock on the number of firms using alternative definitions for the number of firms as defined in Section 4.1.2. The dependent variables are all in natural logarithms. As can be seen in panel (A) of Table 6, according to the 2SLS estimates, a 10 percentage-point rise in the migrant-to-native ratio increases the total number of firms that report sales by about 5.8%, the number of firms that report sales through extended balance sheets by about 2.6%, and the number of firms with at least one formal employee by 4.4%—although only the first effect is statistically significant at the 10-percent level and the last effect is marginally statistically insignificant at the same level. In panel (B) of Table 6, we replicate the analysis at the 2-digit sector-province-year level. The coefficient estimates are similar, and the positive refugee impact on the number of firms with at least one formal employee also gains statistical significance. These finding confirms our hypothesis II-(i) that new firms are established at a higher pace due to the arrival of refugees. The size of the effect is larger for firms that report sales compared to firms with registered formal employment and balance sheet reporting firms, which suggests that new entrants were smaller and less formal. As discussed in the conceptual framework section, the cost advantages, increased product demand, and business networks that Syrian refugees provide would all contribute to the effects on firm entry.

Figure 5 illustrates the results of the event study framework. As can be seen in panel (A),

prior to 2011, the estimated coefficients are small and not statistically different from zero, implying that the migrant shock does not help to predict the trends in the pre-policy period for the total number of firms reporting sales. The estimated coefficients after 2011 are much larger and grow in magnitude over time, parallel to the increase in the number of refugees. Moreover, the coefficients for 2012 and 2015 are statistically significant and the coefficient for 2014 is marginally statistically insignificant at the 5-percent level. While the graphs in panels (B) and (C) for the other two measures of the total number of firms show similar patterns, they are overall less conclusive. At the same time, in panel (C), the estimated cofficients in the pre-policy period are not statistically significant, wheras the estimated coefficient for 2015 is—also indicating evidence of a rise in the number of firms. These event study results on the number of firms are highly consistent with our findings in Table 6, where we observe a rise in the number of firms for all three measures of the number of firms, but the estimated effect is the largest and most statistically significant for the first measure.

As the pace of new firm entry increases, as discussed in the conceptual framework, we expect a fall in market concentration (hypothesis II-(ii)). We test this hypothesis by estimating the impact of Syrian refugees on the average market share, the market share of top four largest firms, and the HH index.[46] As can also be seen from the 2SLS estimates in panel (A) of Table 6, evidence of a negative effect exists on the average market share and on the market share of the top four largest firms, and the negative effect on the HH index is marginally statistically insignificant. Quantitatively, a 10 percentage-point increase in the refugee-native ratio causes about a 1 to 1.2 percentage-point drop in all three market structure variables. Given the mean value of the average market share in Table 3, this amounts to a 4.1% drop. The results of the analysis at the 2-digit NACE sector-province-year level, provided in panel (B) of Table 6, confirm that these findings are not driven by small-sized cells. The results remain qualitatively and quantitatively similar. These findings are in line with our Hypothesis II-(ii) that market concentration falls. Although we find evidence for the expansion of firms, the establishment of new firms overwhelm this effect and market concentration falls. Our rich

---

[46]The number of observations is slightly lower for market concentration variables because these cannot be calculated for sector-province-year cells with zero firms. The number of observations is lowest for the top 4 share estimation, where each cell needs to include at least four firms.

data—including information on very small firms—are particularly helpful in this sense.

Figure 6 provides a visual assessment of the migrant flow's effect on the market structure variables over time. For all three variables measuring market concentration, the coefficients for the pre-shock period are small and not statistically significant; hence, the conditions for the identification assumption are met. The negative coefficients for the post-shock period grow gradually in absolute magnitude as the number of refugees increases and become much larger in magnitude for 2014 and 2015. In addition, for the market share variable in panel (A), the coefficient for 2015 is statistically significant at the 5-percent level and the coefficient for 2014 is marginally statistically insignificant at this level. For the HH index variable in panel (B), the coefficient for 2015 is much larger in absolute magnitude and statistically significant; and for the top-4 share variable in panel (C), the coefficients for all years from 2013 to 2015 are statistically significant at the 5-percent level. In essence, the event study graphs present a very clean and clear negative impact of the migrant shock on market concentration.

6.3 Firms' Export Performance

In this subsection, we examine the impacts of the migrant shock on several outcomes measuring firms' export performance.

6.3.1 Probability to Export, Value of Exports, and Export Variety

Estimating equation (1), Table 7 presents the effects of the migrant shock on firms' probability of exporting as well as the effects of the migrant shock on the value of exports and the product variety of exports among exporter firms. Table 8 gives the estimates on prices at the transaction level, where destination-product-year fixed effects are included to capture the effect on the price of individual products. In Tables 7 and 8, the results are also presented for three separate destination regions: the EU, the MENA region, and Syria.

Panel (A) of Table 7 shows strong evidence of an increase in the likelihood of exporting for all firms. According to the 2SLS estimates, a 10 percentage-point increase in the refugee-native ratio causes a 0.28 percentage-point increase in the probability of exporting. This amounts to a 12-percent increase in exporting as only 2.3 percent of all firms export dur-

ing the pre-shock period. The increase in export probability primarily stems from exports to Syria.

Figure 7 illustrates the results of the event study analysis for the probability to export. As can be seen in panel (A), prior to 2011, a downward trend exists in the coefficients, and the coefficients for 2008 and 2009 are statistically different from zero. However, after the migrant shock, the direction of the trend changes sharply and points in the upward direction. Moreover, the positive coefficients for 2013 to 2015 are much larger than the positive coefficients in the pre-policy period, and the coefficients for 2014 and 2015 are statistically significant at the 5-percent level. Hence, the overall picture suggests that the migrant impact has a positive impact on export probability, whose magnitude increases over time as the number of refugees rises. This picture becomes cleaner and sharper when we focus on the export probability to Syria, given in panel (C) of Figure 7. While the overall picture is similar to that in panel (A) for all destinations, the pre-policy period coefficients' differences from zero are smaller in magnitude, wheras the positive effects in the post-policy period are much larger. Therefore, evidence of a positive impact of the migrant shock on the export probability to Syria exists, which is in line with the findings in Table 7. In Figure 7, also consistent with the results in Table 7 is the non-existence of any evidence of a migrant impact on the export probability to the EU in panel (B) and to the MENA region in panel (D).

In the interpretation of export performance by destination, it is important to note that the increase in export probability to Syria could in part result from the direct effects of the war, unlike the effects in exports to the EU and the MENA region. The Syrian war caused substantial destruction to the production infrastructure in Syria, and northwestern Syria on the Turkish border (in particular, around Aleppo) is a heavily-populated area. Kirişci et al. (2016) report a rise in exports from the Turkish provinces on the Syrian border to Syria. Hence, we need to focus on the exports to the EU and the MENA region to understand the impact of refugees in Turkey on firms' export behavior.

Next, we examine the impact of the refugee shock on the value of exports for a given firm. In the results given in panel (B) of Table 7, the 2SLS estimates indicate a positive impact of the migrant shock on the export value. Moreover, the magnitude of the effect is large; a 10

percentage-point increase in the refugee-native ratio brings about a 16-percent increase in the value of exports. The results showing the effect on export value by destination region are more mixed. While the effect for the EU as the destination is negative, that for the MENA region is positive.[47] The increase in export volume to MENA supports hypothesis III-(i), which states that refugees would improve trade with certain countries – those with which they have closer business networks and information advantages – than other countries.

The event study results for the value of exports, given in Figure 8, support the identification assumption and the above findings. The results for all destinations, presented in panel (A), show that the coefficents in the pre-shock period are small and statistically insignificant. Hence, the identification assumption is met. The coefficients for the post-shock period, particularly for the later years of 2014 and 2015, are larger in magnitude. Moreover, the coefficient for 2014 is statistically different from zero at the 5-percent level. Although the cofficient for 2015 is not statistically significant at the 5-percent level, its level is very similar to that for 2014. The results for the EU region, provided in panel (B), clearly indicate that the identification assumption is met and a negative impact of the migrant shock on the export value exists. The results for the MENA region, given in panel (D), also show that the coefficients for the pre-policy are not statistically different from zero at the 5-percent level, whereas the coefficients for 2013 and 2014 in the post-shock period are. Although the cofficient for 2015 is marginally statistically insignificant, its magnitude is even larger than those for 2013 and 2014. The gradual increase in the cofficient magnitude over time in the post-shock period also provides further support for the impact of a refugee shock that intensifies over time.

Finally, we examine the effect of the refugee shock on the variety of exported products. Panel (C) of Table 7 shows the effect on the number of 4-digit products exported to each destination. The overall effect is positive, indicating a 10.8% increase in export variety in response to a 10 percentage-point increase in the refugee-native ratio and confirming hypothesis III-(iii). In line with the results on the export value, we find evidence of a reduction in the export variety to the EU countries. On the other hand, export variety to the MENA countries rises by

---

[47]The negative effect on the export volume to the EU presumably stems from the fact that firms in the refugee-intensive regions substitute their exports to the EU for exports to the MENA region, using their comparative advantage resulting from the presence of Syrian refugees, and allow firms in the other regions of the country to make-up for this fall in the exports to the EU.

11.3% per 10 percentage-point increase in the refugee-native ratio. Although the coefficient estimate for Syria is also positive and large, it is not statistically significant.

Panel (A) of Figure 9 shows that the identification assumption is clearly met for the export variety variable for all destinations. Moreover, this figure clearly shows the timing of the effects; evidence of the effect first emerges in 2013 and the magnitude of the effect grows as the number of refugees rises. The figure for the variety of the exported products to the MENA region shows identical patterns, except for the failure of null effect for a single pre-shock period (2010). However, the positive coefficients for the post-shock period are much larger in magnitude than the negative coefficients for the pre-shock period, and all statistically significant after 2013. The results for the variety of the exported products to the EU region are less conclusive. Although the post-shock coefficients are all negative and statistically significant for 2013, the pre-shock coefficients for 2008 and 2010 are also statistically different from zero, raising concerns about the identification assumption. Overall, the event-study results support the findings in Table 7 that the product variety of exported products to all destinations, and particularly to the MENA region, increases.

6.3.2 Export Prices

The evidence on the increase in the volume of exports and the variety of exported products to the MENA region by existing exporters is certainly interesting. As discussed in the conceptual framework section, this could result either from the cost advantages accruing from the arrival of cheaper refugee labor or from the ethnic and language networks of refugees. In our context, it is possible to identify the effects of these two mechanisms separately because the latter mechanism would apply to the MENA region (with a common language and culture to Syrians) but not to the EU, whereas the former channel would apply to both destinations. In order to distinguish between these two channels, we examine the effect of the refugee shock on export prices.

Table 8 presents the results about the effect of the refugee shock on the price of a given product exported to a given destination. This price measure differs from the firm level price because changes in the composition of product types and destinations are controlled for by

the product-destination level fixed effects. Two different specifications are used: one that uses firm fixed effects eliminating the effects of compositional changes in the firm pool due to entry and exit to exporting and another that does not use firm fixed effects. Both specifications indicate a decline in the prices of exported goods. This decrease is larger when compositional effects due to entry and exit are included (implying that the price effect is mostly driven by firms that are new to exporting). According to the 2SLS estimates, one percentage-point increase in the refugee-native ratio reduces prices by 0.74% without firm fixed effects and by 0.46% with firm fixed effects. When we examine the refugee effect on the price of a given exported product by destinations, we observe that the negative effect is somewhat larger for the EU region than the MENA region when firm fixed effects are used.

Figure 10 presents the results of the event study analysis for the price of a given exported product. The graph in panel (A) for all destinations does not provide as clear results as those in Table 8. This is primarily because the coefficient estimates for the pre-shock period are positive; moreover, the coefficent for 2010 is statistically significant, and that for 2009 is marginally statistically insignificant. On the other hand, the coefficient estimates for the post-shock period take either much smaller positive values or are negative; in fact, the negative values for 2013 and 2015 are marginally statistically insignificant. This difference between the pre-shock and post-shock coefficients result in the negative estimate in Table 8, although we cannot identify a clear negative impact of the shock from the event-study graph. On the other hand, the graph for the EU as the destination, provided in panel (B) of Figure 10, presents a much clearer picture. In this case, the identification assumption for the pre-policy period is met. In addition, the coefficients in the post-shock period are all negative, and statistically significant for 2012 and 2015. Moroever, the negative value for 2015 (when the number of refugees is the highest) is larger in absolute value. The event study plot for the MENA region indicates no clear effect of the shock on prices, which is consistent with the statistically insignificant negative effect for this region in Table 8 when firm fixed effects are used. Overall, the time trajectories of the effects provided in Figure 10 are consistent with the effects given in Table 8.

Since transaction level specifications include product-destination-year fixed effects, they

are free of changes in the composition of exports and yearly demand shocks at the product-destination level. Therefore, we can interpret the decline in prices as the cost-of-production effect of Syrian refugee inflows. This finding implies that the arrival of Syrian refugees increases the competitiveness of Turkish firms in the international markets.

Since the refugee effect on prices of exported products is either as large or larger for the EU region than the MENA region as the destination, we can conclude that the decrease in costs accruing from employing Syrian refugees is universal among exporters. Therefore, we can conclude that the larger increase in the intensive margin of exports to the MENA region, compared to the EU, must result from the skills provided by Syrian ethnic networks. Essentially, firms that had been exporting prior to the inflow of Syrian refugees benefit more from networks of Syrian refugees to the MENA region. In addition, the impact on the export value to the EU suggests that the increased competition from new exporters and the increased availability of exporting opportunities to the MENA region cause exporters to reduce their export share to the EU region.

6.4 Robustness Checks

In this subsection, we check the robustness of our findings using alternative specifications. Tables A1 and A2 in the Appendix show the results from the estimation of six alternative specifications using 2SLS estimations for firm level outcomes. The first column presents results where we estimate equation (1) without sector-year and region-year fixed effects. The second column adds sector-year fixed effects at the 2-digit NACE sector level. The third column includes sector-year fixed effects at the 4-digit NACE sector level. The fourth column controls for potential regional differences in time effects by including region-year fixed effects for 5 regions of Turkey,[48] as well as sector-year fixed effects at the 2-digit sector level. The fifth column includes a finer control for regional differences in time trends by including region-year fixed effects for the 12 NUTS-1 regions of Turkey, as well as sector-year fixed effects at the 2-digit sector level, and is equivalent to our baseline specification. Finally, in the sixth column, we incude a term for "pre-shock trade exposure" in the form of the ratio of

---

[48]We define these five regions as follows: West (NUTS-1 regions 1 to 4) Central (NUTS-1 regions 5 and 7), South (NUTS-1 region 6), North (NUTS-1 regions 8-9), and East (NUTS-1 regions 10-12).

exports to Syria to total sales at the province level and interact it with a post-shock dummy variable, on the top of the controls included in the fifth column.

As can be seen in Table A1, the inclusion of sector-year fixed effects in columns 2 and 3 makes little difference to the point estimate for sales, indicating that the refugee density is not correlated with the sectoral trends in sales. On the other hand, including region-year fixed effects in columns 4 and 5 leads to smaller estimates, showing that pre-shock regional trends that are correlated with refugee densities exist. While the estimated effect of a percentage-point increase in the refugee-native ratio on sales is about 0.8% in columns 2 and 3, the effect declines to about 0.4% in columns 4 and 5. A similar pattern is observed for the profit margin variable across the specifications. For the export probability variable in Table A1 and the export value and product variety variables in Table A2, the inclusion of region-year fixed effects in columns 4 and 5 also makes a bigger difference; however, for these variables, the coefficient estimates grow with the inclusion of region-year fixed effects. In essence, the inclusion of region-year fixed effects is critical for all firm level outcomes. This is not a surprise as our key variable of interest varies across provinces and years. In this sense, it is assuring that our findings are robust the alternative specifications in terms of region-year fixed effects: 5 region-year fixed effects in column 4 and 12 NUTS-1 region-year fixed effects in column 5.

The results in columns 6 of Tables A1 and A2 show that the inclusion of the additional controls for the pre-shock trade exposure to Syria makes little to no difference in the estimates. This is not a surprise because the pre-shock trade levels with Syria of the Turkish provinces on the border were small. The highest value of the average ratio of exports with Syria to total sales was 1.79% for the tiny province of Kilis; in all other provinces, this ratio was below 0.52%. In comparison, the refugee-native ratio in 2015 was 0.72 in Kilis, 0.18 in Hatay, 0.15 in Sanliurfa, and 0.13 in Gaziantep. The latter three are large provinces in terms of population; they were all among the 13 largest provinces out of 81 in terms of population in 2015.

Table A3 shows the 2SLS results of varying specifications for the market structure variables at the province-sector (4-digit) level. The specification in column 1 includes only year, sector, and province fixed effects. In column 2, 2-digit sector–year interactions and 5 region–year interactions are introduced. In column 3, 4-digit sector–province region interactions are

added on the top of the specification in column 2. Column 4 includes NUTS-1 region-year and 4-digit sector–province region interactions on the top of the basic specification in column 1. The specification in column 4 is similar to that in column 2, but 5 region–year interactions are replaced with the more flexible NUTS-1 region–year interactions; this specification is identical to our main specification used in Table 6. Finally, in column 6, we add the controls for the pre-shock trade exposure to Syria on the top of the our main specification. Overall, the results change comparatively little throughout the specifications for our market structure outcomes. In this case, the inclusion of the pre-shock trade exposure to Syria increases the coefficient estimates for the three variables on the number of firms non-trivially.

7 Conclusion

In this study, we combine an administrative dataset of the full population of firms in Turkey covering a very rich set of outcomes with the massive exodus of Syrian refugees into Turkey to study migrants' effect on firm performance and market structure. The results from various outcomes indicate an increase in economic activity at the cost of negative long-term implications for productivity.

Turkish firms significantly benefit in terms of sales. Moreover, the rise in sales is more pronounced in manufacturing and construction, where many Syrian refugees work informally, but smaller in the services sector, where it is harder for the refugees to secure jobs due to the language barrier. The arrival of the refugees also leads to an increase in the establishment of new firms. These findings are consistent with the declining costs of production resulting from the employment of refugees in the informal sector, the inflow of Syrian refugees with entrepreneurial skills, and the rise in the consumption base due to the arrival of refugees. Quantitatively, a 10 percentage point increase in the refugee-native ratio raises firms' sales by 3.8%, and the number of active firms by 5.8%.

Our dataset covering the full population of Turkish firms allows us to study market concentration. We find a drop in market concentration. The fact that the average firm size is smaller is in line with the more informal-labor intensive production methods of smaller firms

36

and the reduction in the relative costs of informal labor. These findings suggest an informalization of the production process in Turkey. While the size of economic activity increases, as evidenced by the increase in the sales of existing firms and the rise in the number of active firms, the market structure becomes less concentrated and a larger share is taken up by new and small firms. Since productivity is higher and informality is lower in large firms in Turkey, this may have adverse long-term implications for productivity.

Using the detailed price measures for each exported product, destination, and firm in our dataset, we find that the prices of exported products fall. This also points out the cost advantages of employing Syrian refugees informally. In other words, the arrival of Syrian refugees increases the competitiveness of Turkish firms in international product markets. As a result of the arrival of Syrian refugees, exports to the MENA region increase substantially, somewhat at the expense of exports to the EU. In addition, the product variety of exports to the MENA region also increases. Customs data is the only source of data which allows us to see what firms actually produce.

The increase in the volume of exports to the MENA region can take place due to either the cost advantages that are accrued from refugees or the network effects of Syrian refugees in trading. The fact that the prices of exported products to the EU and the MENA region change similarly as a result of the refugee shock allows us to disentangle the effects of these two channels. Since the export volume and the product variety to the MENA region increase much more, we can conclude that business and social networks of Syrian refugees and their knowledge about the MENA region play an important role by reducing informational barriers, providing matching and referral services, and increasing contract enforcement in trade. In other words, while refugee workers make exported products less expensive both to the EU and to the MENA regions, refugee networks increase the volume and variety of exports to the MENA region disproportionately.

To get a better overview of the economic impact of Syrian refugees, our results need to be considered together with the previous findings on the labor market effects of Syrian refugees. Ceritoglu et al. (2017) find relatively small negative effects on native employment and Aksu et al. (2019) find no negative effect on native men's employment but a negative effect on

the employment of native women with weak attachment to the labor market. The increase in output and firm performance explains the limited negative effects Syrians have had on native employment. Essentially, firms use more of the production factor, which becomes more abundant after the arrival of refugees. The sectors that can benefit most from this – such as construction and manufacturing – see the highest rise in sales. This is consistent with the findings in Aksu et al. (2019), which report a substantial replacement of informally-employed native workers with refugees in both of these sectors as well as a significant rise in formally-employed native workers in manufacturing.

The productivity growth of Turkish firms in the 2006-2016 period has been shown to be stagnant (Akcigit et al., 2020). Since large firms tend to be more productive and less informal, growing incentives to remain small and informal by employing Syrian refugees can have adverse consequences on the long-term productivity of the hosting regions. This is particularly problematic for the Turkish economy, which is already dominated by relatively unproductive small firms. Akgündüz and Torun (2020) show that the capital intensity of firms has also declined due to the arrival of Syrian refugees. Together with this decrease in capital intensity, our finding that the sales increase is accompanied by an increase in informality and a decline in concentration is worrying for the long-term productivity of hosting regions. Since the average value added per worker of a large firm in Turkey is around 8 times that of a micro-firm, a switch towards a market structure with more numerous but smaller firms may have long-term negative effects on the productivity of hosting regions.

While recent studies suggest that lower market concentration could increase competition and spur growth, the underlying assumption in these models is that firms with higher productivity will be allowed to grow in a competitive environment (Akcigit and Ates, 2019b; Autor et al., 2020). Introducing an incentive to remain small and informal will similarly result in lower market concentration, but not due to increased competition or the creative destruction of firms. Even if aggregate economic activity is positively affected by the availability of low-cost labor and increased demand, this increase may be at the cost of declining firm productivity. These long-term concerns further emphasize the need for policy-making to encourage the unequivocally positive aspects of refugee inflows, by supporting the en-

trepreneurship of refugees and the export activity of firms with countries where refugees'
business networks matter.

References

Acemoglu D. 1998. Why do new technologies complement skills? Directed technical change and wage inequality. *The Quarterly Journal of Economics* **113**: 1055–1089.

Aghion P, Akcigit U, Howitt P. 2015. Lessons from schumpeterian growth theory. *American Economic Review* **105**: 94–99.

Akcigit U, Akgunduz YE, Cilasun SM, Ozcan-Tok E, Yilmaz F. 2020. Facts on business dynamism in Turkey. *European Economic Review* : 103490.

Akcigit U, Ates ST. 2019a. Ten facts on declining business dynamism and lessons from endogenous growth theory. Working Paper 25755, National Bureau of Economic Research.

Akcigit U, Ates ST. 2019b. What happened to U.S. business dynamism? Working Paper 25756, National Bureau of Economic Research.

Akgündüz YE, Torun H. 2020. Two and a half million Syrian refugees, tasks and capital intensity. *Journal of Development Economics* : 102470.

Akgündüz YE, van den Berg M, Hassink W. 2018. The impact of the Syrian refugee crisis on firm entry and performance in Turkey. *The World Bank Economic Review* **32**: 19–40.

Aksu E, Erzan R, Kırdar MG. 2019. The impact of mass migration of Syrians on the Turkish labor market. Technical report, CREAM Discussion Paper 15.

Alix-Garcia J, Saah D. 2010. The effect of refugee inflows on host communities: Evidence from Tanzania. *The World Bank Economic Review* **24**: 148–170.

Alix-Garcia J, Walker S, Bartlett A, Onder H, Sanghi A. 2018. Do refugee camps help or hurt hosts? the case of Kakuma, Kenya. *Journal of Development Economics* **130**: 66–83.

Altındağ O, Bakis O, Rozo S. 2020. Blessing or burden? impacts of refugees on businesses and the informal economy. *Journal of Development Economics* : 102490.

Aracı DT, Demirci M, Kirdar MG, et al. 2021. Development level of hosting areas and the

impact of refugees on natives' labor market outcomes. Technical report, Institute of Labor Economics (IZA).

Autor D, Dorn D, Katz LF, Patterson C, Van Reenen J. 2020. The fall of the labor share and the rise of superstar firms. *The Quarterly Journal of Economics* **135**: 645–709.

Aygün A, Kırdar MG, Tuncay B. 2021. The effect of hosting 3.4 million refugees on native population mortality. *Journal of health economics* **80**: 102534.

Balkan B, Tumen S. 2016. Immigration and prices: quasi-experimental evidence from Syrian refugees in Turkey. *Journal of Population Economics* **29**: 657–686.

Beaudry P, Green DA. 2005. Changes in us wages, 1976–2000: ongoing skill bias or major technological change? *Journal of Labor Economics* **23**: 609–648.

Beerli A, Ruffner J, Siegenthaler M, Peri G. 2021. The abolition of immigration restrictions and the performance of firms and workers: evidence from switzerland. *American Economic Review* **111**: 976–1012.

Brunello G, Lodigiani E, Rocco L. 2020. Does low-skilled immigration increase profits? evidence from Italian local labour markets. *Regional Science and Urban Economics* **85**: 103582.

Ceritoglu E, Yunculer HBG, Torun H, Tumen S. 2017. The impact of Syrian refugees on natives' labor market outcomes in Turkey: evidence from a quasi-experimental design. *IZA Journal of Labor Policy* **6**: 5.

Cohen L, Gurun UG, Malloy C. 2017. Resident networks and corporate connections: Evidence from World War ii internment camps. *The Journal of Finance* **72**: 207–248.

Cristelli G, Lissoni F. 2020. Free movement of inventors: open-border policy and innovation in switzerland. *Available at SSRN* .

del Carpio XV, Wagner M. 2015. *The impact of Syrians refugees on the Turkish labor market*. The World Bank.

Demirci M, Kırdar M. 2021. The labor market integration of Syrian refugees in Turkey. Working Paper 14973, IZA.

Depetris-Chauvin E, Santos RJ. 2018. Unexpected guests: The impact of internal displacement inflows on rental prices in Colombian host cities. *Journal of Development Economics* **134**: 289–309.

Dustmann C, Glitz A. 2015. How do industries and firms respond to changes in local labor supply? *Journal of Labor Economics* **33**: 711–750.

Erdogan M. 2014. Syrians in Turkey, social acceptance and integration research. *Hacettepe University Migration and Politics Research Center, Ankara* .

Gould DM. 1994. Immigrant links to the home country: empirical implications for US bilateral trade flows. *The Review of Economics and Statistics* : 302–316.

Hong G, McLaren J. 2015. Are immigrants a shot in the arm for the local economy? Working Paper 21123, National Bureau of Economic Research.

Hunt J, Gauthier-Loiselle M. 2010. How much does immigration boost innovation? *American Economic Journal: Macroeconomics* **2**: 31–56.

Jaeger DA, Ruist J, Stuhler J. 2018. Shift-share instruments and the impact of immigration. Working Paper 24285, National Bureau of Economic Research.

Jørgensen JG, Schröder PJ. 2008. Fixed export cost heterogeneity, trade and welfare. *European Economic Review* **52**: 1256–1274.

Kerr WR, Lincoln WF. 2010. The supply side of innovation: H-1B visa reforms and US ethnic invention. *Journal of Labor Economics* **28**: 473–508.

Kırdar MG, Cruz IL, Türküm B. 2022. The effect of 3.6 million refugees on crime. *Journal of Economic Behavior & Organization* **194**: 568–582.

Kirişci K, Ferris EG, KARGIN IA. 2016. *The Consequences of Chaos: Syria's Humanitarian Crisis and the Failure to Protect*. Brookings Institution Press.

Maystadt JF, Verwimp P. 2014. Winners and losers among a refugee-hosting population. *Economic development and cultural change* **62**: 769–809.

Mitaritonna C, Orefice G, Peri G. 2017. Immigrants and firms' outcomes: Evidence from France. *European Economic Review* **96**: 62–82.

OECD. 2020. Structural and demographic business statistics. Database, Organisation for Economic Co-operation and Development.

Ottaviano GI, Peri G, Wright GC. 2018. Immigration, trade and productivity in services: Evidence from UK firms. *Journal of International Economics* **112**: 88–108.

Parsons C, Vézina PL. 2018. Migrant networks and trade: The Vietnamese boat people as a natural experiment. *The Economic Journal* **128**: F210–F234.

Peri G, Requena-Silvente F. 2010. The trade creation effect of immigrants: evidence from the remarkable case of Spain. *Canadian Journal of Economics/Revue canadienne d'économique* **43**: 1433–1459.

Rauch JE, Trindade V. 2002. Ethnic Chinese networks in international trade. *Review of Economics and Statistics* **84**: 116–130.

Rybczynski TM. 1955. Factor endowment and relative commodity prices. *Economica* **22**: 336–341.

Steingress W. 2018. The causal impact of migration on US trade: Evidence from political refugees. *Canadian Journal of Economics/Revue canadienne d'économique* **51**: 1312–1338.

Taylor JE, Filipski MJ, Alloush M, Gupta A, Valdes RIR, Gonzalez-Estrada E. 2016. Economic impact of refugees. *Proceedings of the National Academy of Sciences* **113**: 7449–7453.

Taymaz E. 2009. Informality and productivity: Productivity differentials between formal and informal firms in Turkey. *Country Economic Memorandum (CEM)–Informality: Causes, Consequences, Policies* .

TDGMM. 2016. Turkey immigration report 2015 (in Turkish). Turkish Directorate General for Migration Management Publications no: 35.

TEPAV. 2018. Firms founded with foreign capital - Syrian firms january 2018. Sitrep, Turkish Foundation for Economic Research.

UNHCR. 2018. Unhcr Syrian emergency facts and figures. Facts and figures, The United Nations Refugee Agency.

Figures and Tables

Figure 1: Value added per worker and firm size
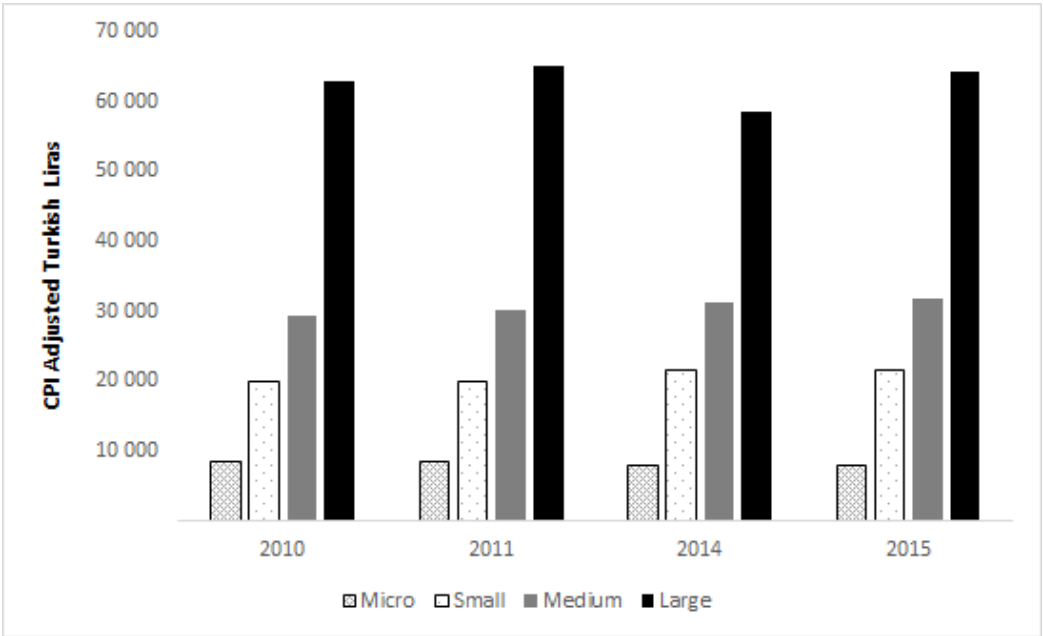
Figure 2: Total Number of Registered Syrian Migrants in Turkey (in millions)
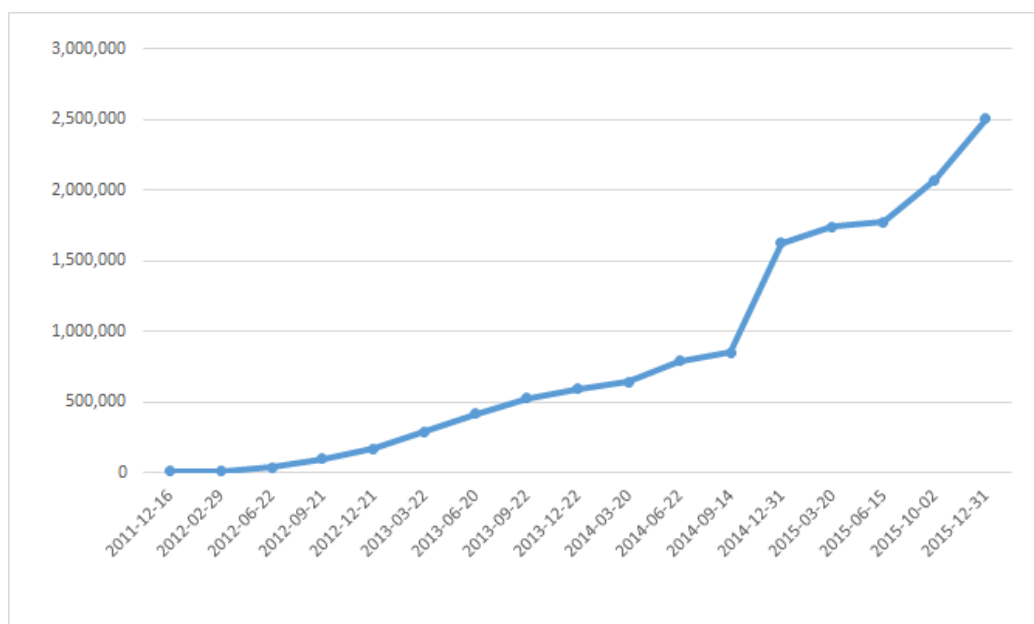
Figure 3: Ratio of Migrants to Natives across Provinces (multiplied by 100), 2012–2015
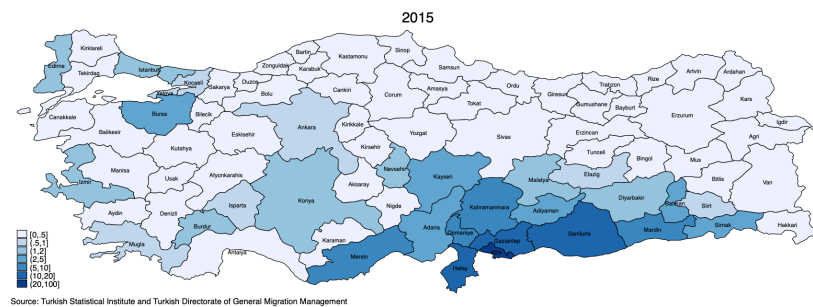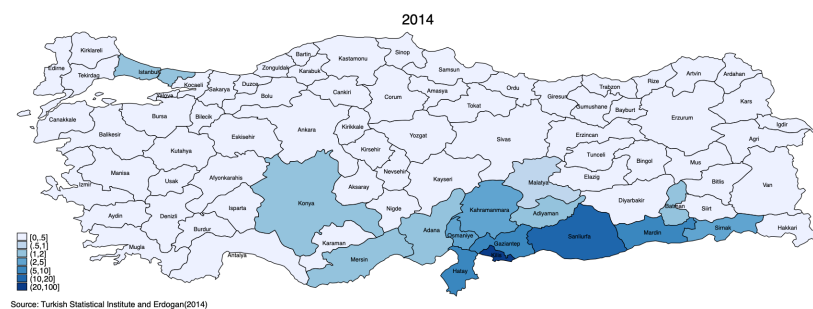
Figure 4: Event study - Sales and Profit margins

(A) Sales
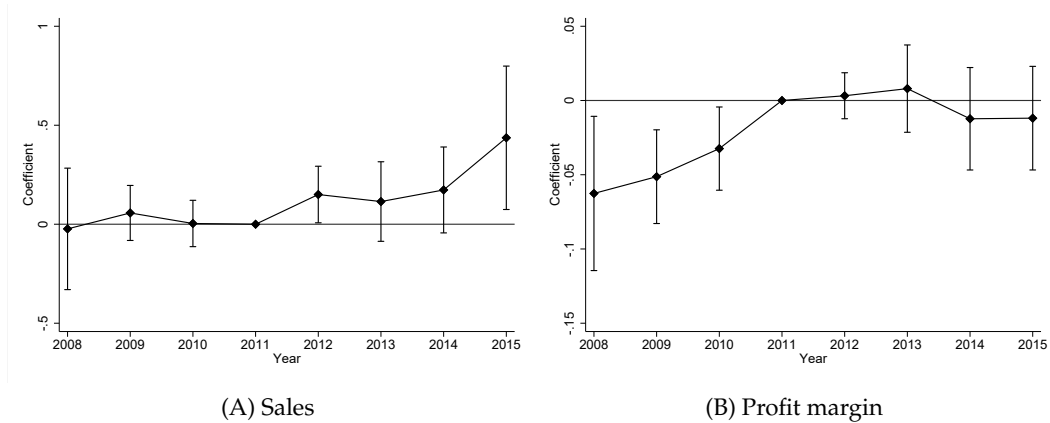
(B) Profit margin

Notes: The dependent variable in panel (A) is CPI-adjusted and log-transformed sales, and in panel (B) is the profit margin (profits/sales). The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include firm, 2-digit NACE sector-year, NUTS-1 region-year, income statement type-year fixed effects. Province and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Figure 5: Event study - Number of firms
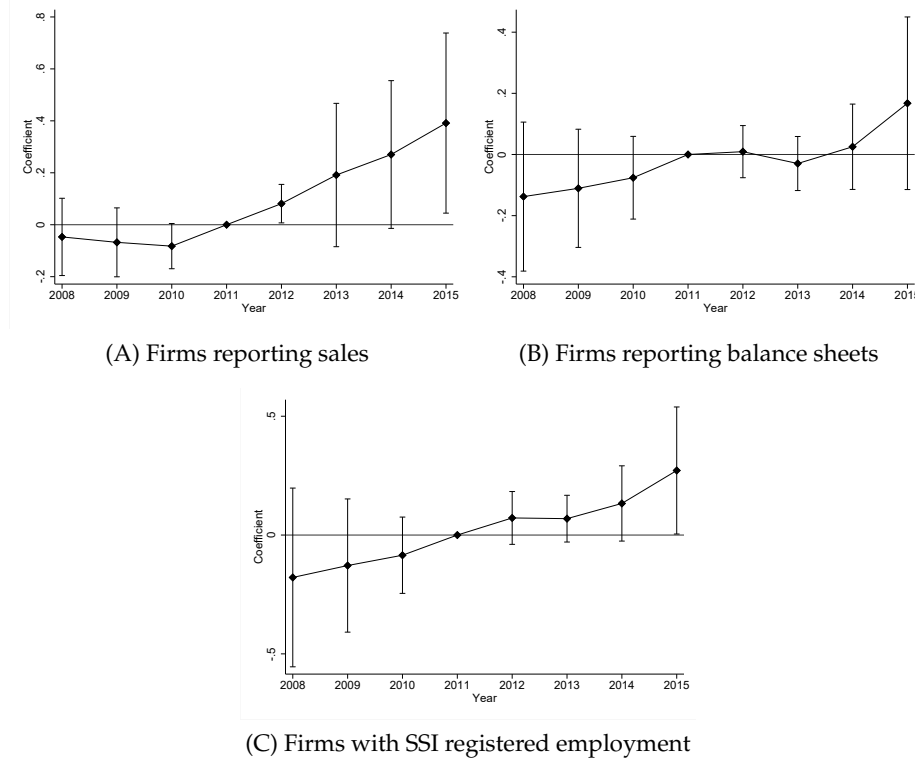
(A) Firms reporting sales

(B) Firms reporting balance sheets

(C) Firms with SSI registered employment

Notes: All estimations are made at the 4-digit NACE sector-province level. The dependent variable in panel (A) is the log transformed number of firms that report positive sales, in panel (B) is the log transformed number of firms that report detailed balance sheets and in panel (C) is the number of firms that have Social Security registered employment. The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include 4-digit NACE sector-province, 2-digit NACE sector-year and NUTS-1 region-year fixed effects. Province, sector and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Figure 6: Event study - Market structure
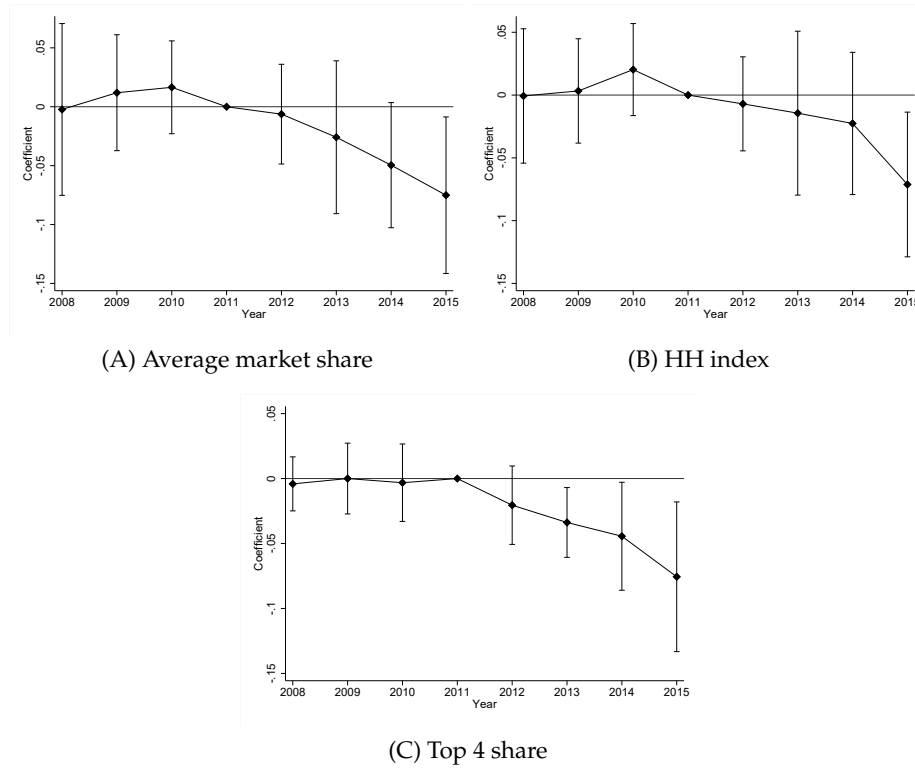
(A) Average market share

(B) HH index

(C) Top 4 share

Notes: All estimations are made at the 4-digit NACE sector-province level. The dependent variable in panel (A) is the average market share of firms, in panel (B) is the HH index and in panel (C) is the share of sales of the largest 4 firms. The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include 4-digit NACE sector-province, 2-digit NACE sector-year and NUTS-1 region-year fixed effects. Province, sector and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Figure 7: Event study - Export probability by destination

(A) All

(B) EU

(C) Syria

(D) MENA
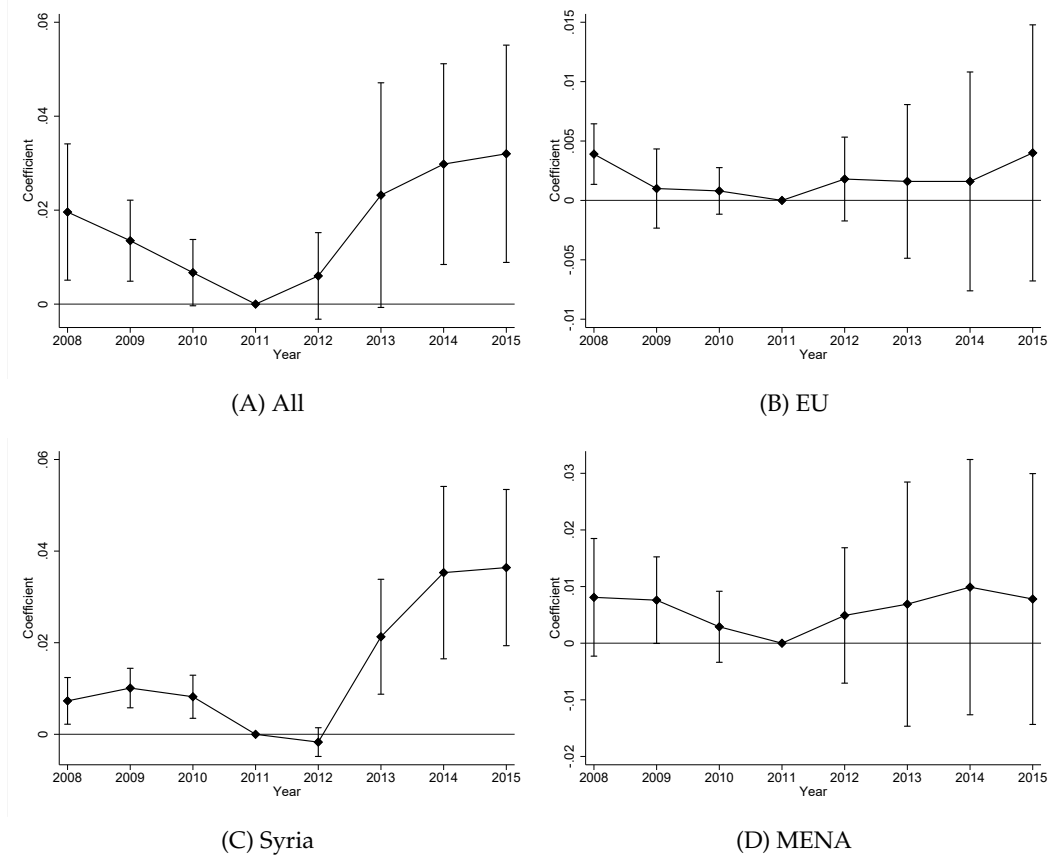
Notes: The dependent variable in panel (A) is an indicator variable for exports, in panel (B) is an indicator variable for exports to EU, in panel (C) is an indicator variable for exports to Syria and in panel (D) is an indicator variable for exports to MENA countries. The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include firm, 2-digit NACE sector-year, NUTS-1 region-year, income statement type-year fixed effects. Province and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Figure 8: Event study - Export value by destination

(A) All

(B) EU

(C) Syria

(D) MENA

Notes: The dependent variable in panel (A) is log transformed export value, in panel (B) is log transformed export value to EU, in panel (C) is log transformed export value to Syria and in panel (D) is log transformed export value to MENA countries. The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include firm, 2-digit NACE sector-year, NUTS-1 region-year, income statement type-year fixed effects. Province and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Figure 9: Event study - Export variety by destination
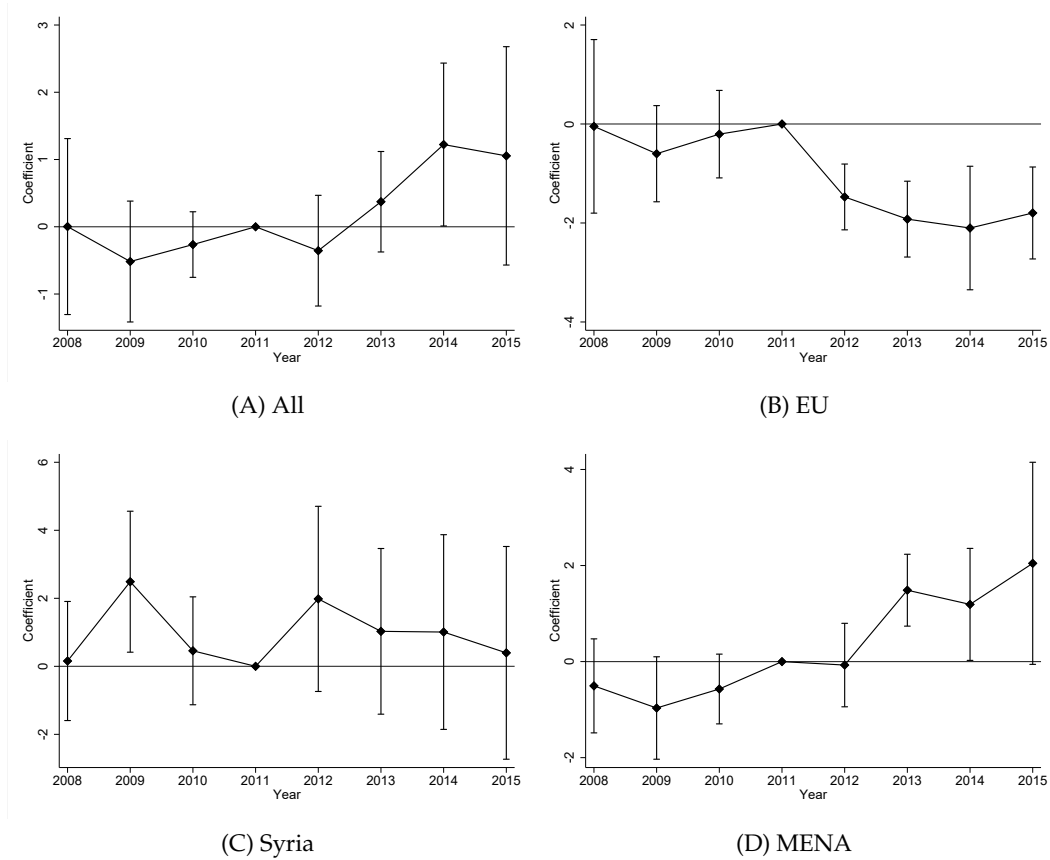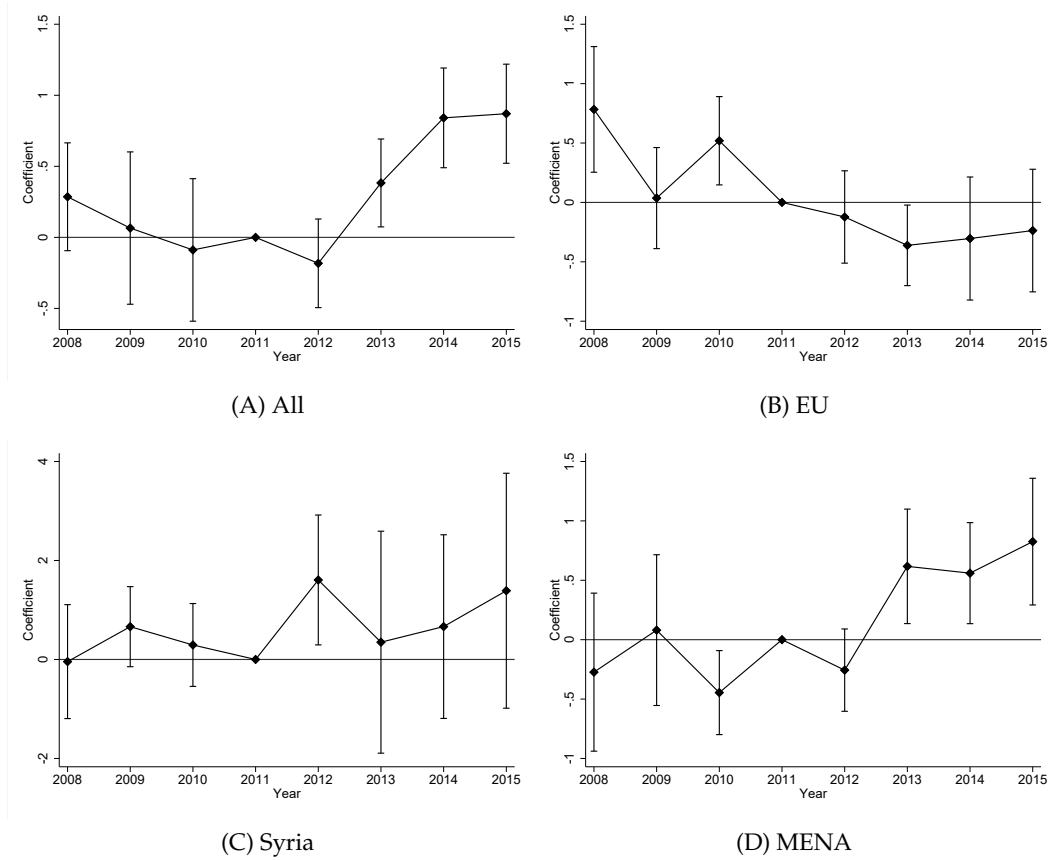

(A) All

(B) EU

(C) Syria

(D) MENA

Notes: The dependent variable in panel (A) is log transformed export variety, in panel (B) is log transformed export variety to EU, in panel (C) is log transformed export variety to Syria and in panel (D) is log transformed export variety to MENA countries. The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include firm, 2-digit NACE sector-year, NUTS-1 region-year, income statement type-year fixed effects. Province and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Figure 10: Event study - Transaction level export prices
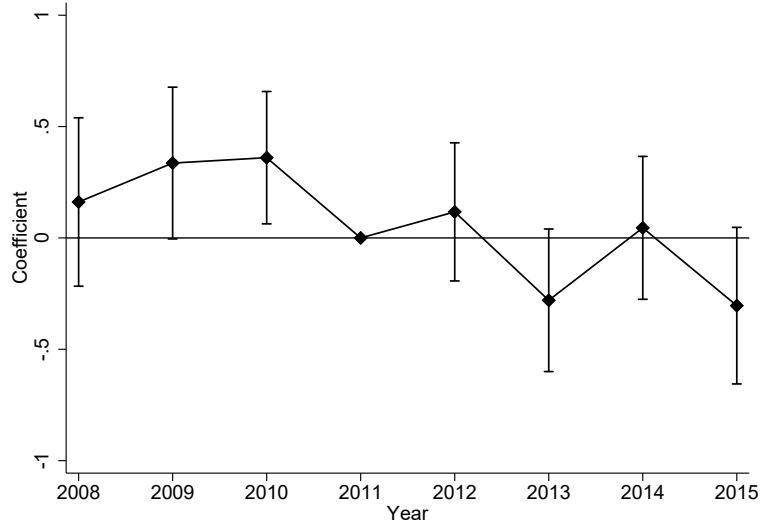
(A) All
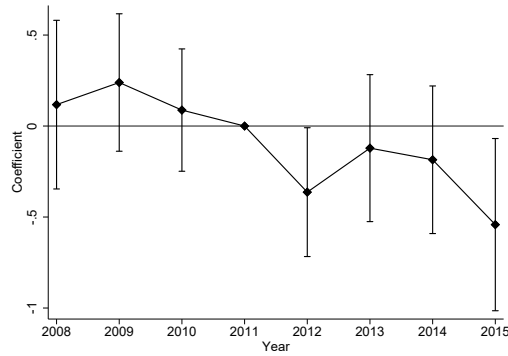
(B) EU
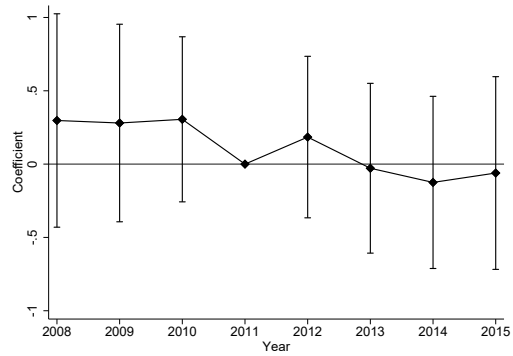
(C) MENA

Notes: All estimations are made at the firm-product-destination level. The dependent variable in panel (A) is log transformed export price, in panel (B) is log transformed export price to EU and in panel (C) is log transformed export price to MENA countries. The key variable of interest is the ratio of Syrian refugees to the native population in each province, and the figure shows yearly coefficient estimates for this ratio variable. The ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. The estimates come from a regression where the 2015 ratio variable is interacted with year dummies. The baseline year is 2011. Other control variables in this regression include firm, 8-digit product, 4-digit product-destination-year and NUTS-1 region-year fixed effects. Province and year fixed effects are omitted due to collinearity. The vertical bars illustrate the 95% confidence intervals.

Table 1: Inter-correlation of firm characteristics in Turkey

	Sales	Profit margin	Employment	SSI registered employment (0/1)	Exporter
Sales	1				
Profit margin	-0.130	1			
Employment	0.162	-0.004	1		
SSI registered employment (0/1)	0.530	-0.062	0.094	1	
Exporter	0.255	-0.006	0.118	0.140	1

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey, except for those in public and finance sectors. We use the period 2008-2015 to construct the table, which corresponds with the years of our baseline analysis. The unit of sales obtained from firm balance sheets is Turkish Liras deflated using the annual CPI. Profit margin is defined as profits to sales ratio. We define exporters using customs data information. Employment is the average number of employees reported to the Social Security Institute (SSI) over 4 quarters in a given year. SSI registered employment (0/1) indicates whether a firm has an employee reported to the SSI.

Table 2: Summary statistics – balance sheets

	Mean	Median	SD	p10	p90	N
Sales:						
2008-2011						
All	10.666	10.611	2.333	7.824	13.638	7,379,802
Agriculture	10.885	10.818	2.445	8.030	14.032	39,007
Manufacturing	11.010	10.959	2.455	7.960	14.158	1,051,551
Construction	11.424	11.646	2.382	8.358	14.190	414,710
Services	10.549	10.480	2.289	7.775	13.477	5,874,534
2012-2015						
All	10.792	10.751	2.371	7.908	13.782	8,371,670
Agriculture	11.187	11.275	2.514	8.156	14.292	46,214
Manufacturing	11.178	11.138	2.482	8.082	14.346	1,184,395
Construction	11.655	11.919	2.380	8.554	14.364	518,107
Services	10.653	10.586	2.327	7.846	13.594	6,622,954
Profit margin:						
2008-2011						
All	0.040	0.017	0.272	-0.215	0.391	6,758,704
Agriculture	-0.014	0.000	0.261	-0.286	0.244	35,638
Manufacturing	0.027	0.017	0.261	-0.218	0.324	964,108
Construction	0.034	0.031	0.248	-0.196	0.280	380,363
Services	0.043	0.016	0.275	-0.212	0.409	5,378,595
2012-2015						
All	0.053	0.022	0.267	-0.184	0.399	7,617,939
Agriculture	-0.001	0.008	0.250	-0.253	0.241	42,216
Manufacturing	0.043	0.021	0.254	-0.182	0.340	1,083,238
Construction	0.038	0.031	0.239	-0.171	0.268	475,423
Services	0.057	0.021	0.271	-0.185	0.418	6,017,062

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey, except for those in the public and finance sectors. The sample is restricted to firms with positive sales for years 2008 to 2015. All sales variables are in log form. The unit of sales is Turkish Liras deflated using the annual CPI. The profit margin (defined as profits divided by sales) variable is constructed for firms that report a profit margin between -1 and 1.

Table 3: Summary statistics for market structure at sector-province-year level

	Mean	Median	SD	p10	p90	N
2008-2011						
Number of firms that:						
Reported sales	2.194	1.946	1.829	0.000	4.796	109,254
Reported balance sheets	1.416	1.099	1.567	0.000	3.689	109,254
Registered employment (SSI)	1.487	1.099	1.612	0.000	3.850	109,254
Market concentration:						
Average market share	0.323	0.143	0.367	0.008	1.000	109,254
HH-index	0.502	0.439	0.355	0.066	1.000	109,254
Top 4 share	0.699	0.758	0.254	0.311	0.986	63,044
2012-2015						
Number of firms that:						
Reported sales	2.285	1.946	1.849	0.000	4.905	112,317
Reported balance sheets	1.536	1.099	1.616	0.000	3.850	112,317
Registered employment (SSI)	1.654	1.386	1.673	0.000	4.060	112,317
Market concentration:						
Average market share	0.305	0.143	0.358	0.007	1.000	112,317
HH-index	0.482	0.404	0.353	0.059	1.000	112,317
Top 4 share	0.687	0.741	0.259	0.293	0.985	67,061

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey, except for those in public and finance sectors. The sample is defined at the level of 4 digit NACE level sector–province combinations for years 2008 to 2015. The number of firms variables in regression specifications are in log (plus 1) transformed.

Table 4: Summary statistics – exports

	Mean	Median	SD	p10	p90	N
2008-2011						
Exporter	0.023	0	0.151	0	0	7,379,802
Exporter EU	0.016	0	0.124	0	0	7,379,802
Exporter Syria	0.002	0	0.040	0	0	7,379,802
Exporter MENA	0.010	0	0.098	0	0	7,379,802
Export value	11.685	11.669	2.425	8.724	14.774	172,979
Export value EU	11.343	11.314	2.531	8.277	14.585	115,734
Export value Syria	10.823	10.784	1.933	8.532	13.266	11,914
Export MENA	11.418	11.402	2.226	8.702	14.217	71,537
Product variety	1.302	1.099	1.184	0	2.944	172,979
Product variety EU	1.105	1.099	1.061	0	2.639	115,735
Porduct variety Syria	0.633	0.000	0.843	0	1.792	11,914
Product variety MENA	1.030	0.693	1.101	0	2.639	71,538
Price	2.454	2.167	2.756	-0.634	6.153	3,710,218
Price EU	2.243	2.05	2.594	-0.667	5.564	1,654,799
Price Syria	2.492	2.028	3.133	-0.916	6.954	48,635
Price MENA	2.689	2.31	2.756	-0.634	6.153	837,718
2012-2015						
Exporter	0.025	0	0.157	0	0	8,371,670
Exporter EU	0.015	0	0.123	0	0	8,371,670
Exporter Syria	0.001	0	0.031	0	0	8,371,670
Exporter MENA	0.012	0	0.108	0	0	8,371,670
Export value	11.712	11.700	2.410	8.720	14.793	210,399
Export value EU	11.268	11.207	2.513	8.205	14.530	129,487
Export value Syria	11.179	11.059	1.847	8.945	13.605	7,816
Export MENA	11.514	11.495	2.207	8.808	14.317	98,256
Product variety	1.317	1.099	1.193	0	2.996	210,400
Product variety EU	1.095	0.693	1.058	0	2.639	129,488
Porduct variety Syria	0.711	0	0.926	0	2.079	7,816
Product variety MENA	1.056	0.693	1.096	0	2.639	98,257
Price	2.526	2.203	2.789	-0.608	6.318	4,717,945
Price EU	2.304	2.062	2.652	-0.661	5.763	1,831,414
Price Syria	1.753	1.034	3.014	-1.253	6.672	42,987
Price MENA	2.673	2.287	2.874	-0.556	6.641	1,217,978

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey, except for those in public and finance sectors. The sample covers firms with positive sales for years 2008 to 2015. Export values and prices are reported in US dollars and transformed into logs. Product variety is measured at the 4-digit level and log transformed.

	All	Agriculture	Manufacturing	Construction	Services
A- Sales					
OLS					
Ratio	0.2381	0.5988	0.3428*	1.0075***	0.1800
	(0.1546)	(0.4563)	(0.1943)	(0.2051)	(0.1466)
2SLS					
Ratio	0.3770**	0.1228	0.6802***	1.1487***	0.2945*
	(0.1663)	(0.5366)	(0.2390)	(0.4052)	(0.1665)
F-test	31.54	42.37	30.04	54.45	30.92
N	15,751,466	85,221	2,235,946	932,817	12,497,482
B- Profit margin					
OLS					
Ratio	0.0032	-0.0287	0.0083	-0.0142	0.0027
	(0.0161)	(0.0586)	(0.0122)	(0.0208)	(0.0183)
2SLS					
Ratio	0.0135	-0.1207*	0.0181	-0.0545	0.0157
	(0.0259)	(0.0700)	(0.0240)	(0.0333)	(0.0272)
F-test	33.14	42.85	30.87	51.49	32.80
N	14,184,804	76,826	2,023,249	845,874	11,238,855

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. The sample is restricted to firms with positive sales (who report balance sheets). The sales variable is log transformed. For profit margin estimations, the sample is restricted to firms with a profit margin between -1 and 1. Each cell comes from a separate regression. Ratio is the ratio of Syrian refugees to the native population in each province. The coefficients show the effect of the ratio variable on sales in panel (A) and on the profit margin in panel (B). The estimates are given by the sector of production, as well as for all firms. In 2SLS estimations, the ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. All regressions also include firm, income statement type-year, 2-digit NACE sector-year, and NUTS-1 region-year fixed effects. Province and year fixed effects are omitted due to multicollinearity. First-stage F-tests are presented underneath the 2SLS estimates. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.

Table 6: Market structure

	Number of firms			Market concentration		
	Reported sales	Reported balance sheets	Reported SSI	Market share	HH index	Top 4 share
A- 4-digit level						
OLS						
Ratio	0.1930	0.0624	0.1709	-0.0942***	-0.0626***	-0.0312
	(0.1315)	(0.1266)	(0.1257)	(0.0267)	(0.0227)	(0.0197)
2SLS						
Ratio	0.5800*	0.2606	0.4412	-0.1236*	-0.1001	-0.1062**
	(0.3418)	(0.2243)	(0.2761)	(0.0718)	(0.0672)	(0.0495)
F-test	6.35	6.35	6.35	6.35	6.35	7.57
N	219,919	219,919	219,919	219,919	219,919	128,686
B- 2-digit level						
OLS						
Ratio	0.2114*	0.0920	0.2864***	-0.1351***	-0.0994***	-0.0342
	(0.1127)	(0.1532)	(0.1022)	(0.0353)	(0.0268)	(0.0292)
2SLS						
Ratio	0.4816*	0.2530	0.4828**	-0.0729	-0.0886	-0.0883
	(0.2806)	(0.2450)	(0.2258)	(0.0744)	(0.0589)	(0.0773)
F-test	6.02	6.02	6.02	6.02	6.02	6.27
N	45,001	45,001	45,001	45,001	45,001	35,777

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. Dependent variables are calculated at the sector-province level and the number of firms variables are in log form. Reported SSI stands for firms that have a registered employee at the Social Security Institute. Each cell comes from a separate regression. Ratio is the ratio of Syrian refugees to the native population in each province. In 2SLS estimations, the ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. All models include province-sector (2 or 4 digit NACE), 2 digit NACE x year and NUTS-1 x year fixed effects. Province, sector and year fixed effects are omitted due to multicollinearity. First-stage F-tests are presented underneath the 2SLS estimates. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.

Table 7: Export probability, value and variety by destination

	All	EU	Syria	MENA
A- Export probability				
OLS				
Ratio	0.0177***	0.0013	0.0182***	0.0046
	(0.0049)	(0.0024)	(0.0062)	(0.0054)
2SLS				
Ratio	0.0283**	0.0023	0.0390***	0.0052
	(0.0130)	(0.0056)	(0.0096)	(0.0135)
F-test	31.54	31.54	31.54	31.54
N	15,751,466	15,751,466	15,751,466	15,751,466
B- Export volume				
OLS				
Ratio	0.4816	-1.3983***	-2.0593***	1.9874***
	(0.6112)	(0.4573)	(0.4250)	(0.7204)
2SLS				
Ratio	1.6610*	-1.8530***	-0.5467	2.6241**
	(0.9473)	(0.6661)	(1.5632)	(1.0510)
F-test	104.14	170.00	16.60	106.32
C- Product variety				
OLS				
Ratio	0.8050***	-0.4358**	0.8197***	0.7939***
	(0.1943)	(0.2181)	(0.2822)	(0.1514)
2SLS				
Ratio	1.0777***	-0.6048***	0.9229	1.1349***
	(0.2414)	(0.2254)	(1.0200)	(0.2801)
F-test	104.14	170.00	16.60	106.32
N	348,929	219,535	14,849	149,149

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. The sample is restricted to firms with positive sales (who report balance sheets). Export value and product variety variables are log transformed. Each cell comes from a separate regression. Ratio is the ratio of Syrian refugees to the native population in each province. The coefficients show the effect of the ratio variable on sales in panel (A) and on the profit margin in panel (B). In 2SLS estimations, the ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. All regressions also include firm, income statement type-year, 2-digit NACE sector-year, and NUTS-1 region-year fixed effects. Province and year fixed effects are omitted due to multicollinearity. First-stage F-tests are presented underneath the 2SLS estimates. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.

Table 8: Transaction level impact on export prices

	All	EU	Syria	MENA
A- Without firm FE				
OLS				
Ratio	-0.0083	0.5532***	-0.5206**	-0.4899**
	(0.1120)	(0.2062)	(0.2533)	(0.2147)
2SLS				
Ratio	-0.7409***	-0.4496*	-0.3571	-0.6502**
	(0.1587)	(0.2317)	(0.5820)	(0.2652)
F-test	26,000	5,850	422	22,000
N	8,276,226	3,444,285	89,421	2,054,547
B- With firm FE				
OLS				
Ratio	-0.2566**	-0.4225**	-0.1312	-0.2538
	(0.1179)	(0.1796)	(0.3411)	(0.2443)
2SLS				
Ratio	-0.4597***	-0.5317**	-0.7841	-0.3364
	(0.1630)	(0.2206)	(0.6355)	(0.2973)
F-test	38,000	8,612	346	31,000
N	8,256,279	3,428,939	86,297	2,022,658

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. The sample is restricted to firms with positive sales (who report balance sheets). Export prices are log transformed. Each cell comes from a separate regression. Ratio is the ratio of Syrian refugees to the native population in each province. In 2SLS estimations, the ratio variable is instrumented by a composite measure of the distance of Turkish to Syrian provinces, the prewar population shares of Syrian provinces, and the distance of Syrian provinces to the four neighboring countries. All regressions include 8-digit product, 4-digit product x country x year and NUTS-1 x year fixed effects. Destination, province and year fixed effects are omitted due to multicollinearity. First-stage F-tests are presented underneath the 2SLS estimates. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.

Appendix

Table A1: Specification tests – 2SLS Sales and Profit margin

	(1)	(2)	(3)	(4)	(5)	(6)
A- Sales						
Ratio	0.8889**	0.8504**	0.7665**	0.4411***	0.3770**	0.3771**
	(0.3584)	(0.3330)	(0.3204)	(0.1608)	(0.1663)	(0.1663)
F-test	44.37	44.92	45.47	34.26	31.54	31.54
B- Profit margin						
Ratio	0.0864	0.0842	0.0726	0.0260	0.0135	0.0135
	(0.0561)	(0.0541)	(0.0478)	(0.0230)	(0.0259)	(0.0259)
F-test	45.15	45.76	46.34	35.24	33.14	33.14
Firm	+	+	+	+	+	+
Year	+					
2 digit sector x year		+		+	+	+
4 digit sector x year			+			
5-region x year				+		
NUTS-1 x year					+	+
Post-2012 x Syrian trade (2011)						+

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. The sample is restricted to firms with positive sales (who report balance sheets). The sales variable is log transformed. For profit margin estimations, the sample is restricted to firms with a profit margin between -1 and 1. Province fixed effects are omitted due to multicollinearity. Ratio is the ratio of Syrian refugees to native population. The weighted distance of a province to Syrian regions is used as an instrument for the ratio of Syrian refugees to native population. First-stage F-tests are presented underneath the 2SLS estimates. Syrian trade (2011) is the ratio of exports to Syria to total sales at the province level in 2011. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.

Table A2: Specification tests – 2SLS Export outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
A- Export probability						
Ratio	0.0149	0.0141	0.0179*	0.0270**	0.0283**	0.0283**
	(0.0159)	(0.0128)	(0.0099)	(0.0122)	(0.0130)	(0.0130)
F-test	44.37	44.92	45.47	34.26	31.54	31.54
B- Export value						
Ratio	-0.0323	0.0297	0.4261	1.3985*	1.6610*	1.6606*
	(0.6895)	(0.6006)	(0.5313)	(0.7626)	(0.9473)	(0.9474)
F-test	198.04	227.54	233.20	124.34	104.16	104.16
C- Product variety						
Ratio	0.0965	0.0935	0.2228	0.9020***	1.0777***	1.0773***
	(0.1577)	(0.1914)	(0.1852)	(0.1999)	(0.2414)	(0.2416)
F-test	198.04	227.54	233.20	124.34	104.16	104.16
Firm	+	+	+	+	+	+
Year	+					
2-digit sector x year		+		+	+	+
4-digit sector x year			+			
5-region x year				+		
NUTS-1 x year					+	+
Post-2012 x Syrian trade (2011)						+

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. The sample is restricted to firm-year observations with positive exports. Province fixed effects are omitted due to multicollinearity. Ratio is the ratio of Syrian refugees to native population. The weighted distance of a province to Syrian regions is used as an instrument for the ratio of Syrian refugees to native population. First-stage F-tests are presented underneath the 2SLS estimates. Syrian trade (2011) is the ratio of exports to Syria to total sales at the province level in 2011. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.

Table A3: Specification tests - 2SLS 4-digit NACE level market structure outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
A- Number of firms that reported sales						
Ratio	0.5991**	0.4329	0.5974*	0.5707*	0.5800*	0.7742*
	(0.2798)	(0.2971)	(0.3052)	(0.3298)	(0.3418)	(0.4058)
F-test	7.82	6.23	7.17	6.41	6.35	7.80
B- Number of firms that reported balance sheets						
Ratio	0.4304**	0.1643	0.4155	0.2324	0.2606	0.3988
	(0.2104)	(0.1873)	(0.2588)	(0.1881)	(0.2243)	(0.2425)
F-test	7.82	6.23	7.17	6.41	6.35	7.80
C- Number of firms that reported employment to SSI						
Ratio	0.5163**	0.3167	0.5655*	0.3987*	0.4412	0.5935*
	(0.2009)	(0.2175)	(0.2995)	(0.2204)	(0.2761)	(0.3136)
F-test	7.82	6.23	7.17	6.41	6.35	7.80
D- Average market share						
Ratio	-0.1386**	-0.0802	-0.1008	-0.1355*	-0.1236*	-0.1206
	(0.0565)	(0.0565)	(0.0703)	(0.0685)	(0.0718)	(0.1060)
F-test	7.82	6.23	7.17	6.41	6.35	7.80
E- HH index						
Ratio	-0.0896*	-0.0707	-0.0817	-0.1051	-0.1001	-0.1124
	(0.0503)	(0.0598)	(0.0623)	(0.0686)	(0.0672)	(0.0972)
F-test	7.82	6.23	7.17	6.41	6.35	7.80
F- Share of top 4 firms						
Ratio	-0.0904**	-0.0675*	-0.0899**	-0.1000**	-0.1062**	-0.1282**
	(0.0364)	(0.0340)	(0.0424)	(0.0500)	(0.0495)	(0.0609)
F-test	10.46	7.46	8.45	7.74	7.57	10.79
Year	+					
4-digit sector	+			+		
4-digit sector x year		+	+		+	+
5-region x year		+	+			
NUTS-1 x year				+	+	+
NUTS-3 x 4-digit sector			+	+	+	+
Post-2012 x Syrian trade (2011)						+

Notes: The data come from the Entrepreneurship Information System of Turkey, which covers the entire firm population of Turkey except for those in public and finance sectors. Ratio is the ratio of Syrian refugees to native population. In all estimates, the weighted distance of a province to Syrian regions is used as an instrument for the ratio of Syrian refugees to native population. First-stage F-tests are presented underneath the 2SLS estimates. Syrian trade (2011) is the ratio of exports to Syria to total sales at the province level in 2011. Standard errors are clustered at the 81 province level. Statistical significance *** at the 1 percent level, ** at the 5 percent level, * at the 10 percent level.