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Syrian Refugees in the Turkish Labour Market

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1   Introduction

The succession of revolts that followed the Arab Spring was typically characterized by short-termed demonstrations and/or outbursts of violence in most of the affected countries; all but one: Syria. Since March 2011 until now none of the multiple belligerents fighting in Syria have been able to regain full control of the country, causing, according to UNHCR, more than 5.68 millions[1] of registered refugees of which 3.6 millions [2] were welcomed by Turkey under the temporary protection regime.[3] For Turkey in particular, this unprecedented situation has not only produced a humanitarian emergency but also has likely affected the lives of millions of Turkish people. In this context, the demand for policy responses is pressing and so does the demand for relevant information. This report aims, precisely, at filling this information gap by providing statistics on Syrians' living and working conditions, on possible internal migration patterns and on the impact of providing refugees with work permits.

The use of microdata when informing about the Syrian refugees' crisis has been scarce. Some research has been conducted using macroeconomic data with regards to the Syrians' regional presence. For example Konun & Tümen (2016) and Tümen (2016) study the effect of Syrian refugees on the price level of goods, finding that the goods whose production process intensely employs informal workers showcased a decline in their prices. This is explained by Syrian workers replacing Turkish natives in informal jobs at a cheaper rate, passing the lower labour costs onto the goods' prices. Our research, even though confirming a certain degree of substitutability between informal Turkish workers and Syrian workers, adds a layer of complexity to the analysis by finding that Syrians might be doing jobs natives might not be willing to do, thus complementing them. In addition, Tümen (2016) also finds that natives not only have lower chances of finding an informal job, but also higher chances of finding a formal one due to the increase in the provision of public services caused by the arrival of the refugees. Another article analyzing the impact of Syrian refugees is found in Del Carpio & Wagner (2015), this

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[1]According to https://data2.unhcr.org/en/situations/syria accessed as of 4th April, 2019.

[2]Data from the DGMM, updated as of 4th April, 2019.

[3]See https://help.unhcr.org/turkey/information-for-syrians/temporary-protection-in-turkey/ for more information on this regime.

time by combining microdata from the Turkish Labour Force Survey with macro data on the number of refugees by region. These authors, in addition of finding large displacement of Turkish natives from the informal sector due to the arrival of the refugee population, also find a net displacement of women and the low educated away from the labour market.

Other investigations like the ones written by İçduygu & Millet (2016) and İçduygu & Diker (2017) study possible ways of integrating Syrian refugees in the society from a legal and a social standpoint. In particular, these authors highlight the importance of the current legislative challenges faced by Turkey, including the enactment of regulation that prevents refugees from taking on informal jobs or incentives to employers to provide formal jobs to refugees. Our research not only confirms this extent, but is also able to quantify the role of legal constraints on Syrian's ability to obtain a work permit. An item related to integration is skill building, however, our research finds a triple threat in this regard, first, the proportion of highly qualified Syrians is decreasing in younger cohorts, second, the few Syrians with tertiary studies tend to work in jobs for which they are overqualified and, at last, their qualifications are not rewarded in the same way Turkish natives' ones are. The need for skill building is well explained in, for instance, İçduygu & Diker (2017), who argues in favour of skill building programs for refugees as a necessary step toward their integration in the labour market. In addition to these challenges, the studies prepared by İçduygu & Millet (2016) and ORSAM (2015) mention an increasing probability that Syrian refugees will become permanent residents of Turkey, which raises the importance of investments in education. However, and irrespectively of whether 3.6 million Syrians become Turkish nationals or not, we are no longer talking about a short-term humanitarian response but, rather, about a long-term integration problem which demands effective policy responses.

Existing data sources. Despite some successful attempts at producing studies on the impact of Syrian refugees at the macroeconomic level, little is known about their personal circumstances. One of the most remarkable attempts from a sociological point of view is the Syrian Barometer, see Erdoğan (2017), a national-level survey covering 11 provinces and interviewing 1,235 Syrian families, reaching out, in total, 7,591 Syrians. Even though attractive in terms of understanding Turkish nationals' sentiment with regards the Syrian population, it lacks, beyond a few basic questions, deep information with regards Syrians' labour market performance.

Other ad-hoc surveys on Syrian refugees' socio-economic conditions are not as ambitious and the few existing sources lack national representativeness. Still, a remarkable effort in gathering data at the microeconomic level can be found in Uçak & Raman (2017). This research uses a survey on Syrian-owned SMEs to provide a snapshot of this type of companies, including the value of having them for the Turkish economy. With regards to the dataset, which can be taken as a small-scale enterprise survey, it included visits to 230 businesses equally split between Istanbul and Gaziantep on the condition that they were legally established, currently active and had at least an employee. On the negative side, this database is not meant to be nationally representative, as it is also confirmed by its authors. Data collection efforts can also show glimpses of creativity, as in Kaymaz & Kadboy (2016),

where the authors' make use of a survey carried out on migration routes to find that around 30 per cent of Syrian refugees have university degrees. The extent to which Syrian refugees have such high qualification might be have been exaggerated due to the survey mode but it brings to the spotlight the importance of developing a model for recognition of prior learning of refugees.

Lack of data affects the depth of any research on Syrian refugees; an example can be found in Yavçan (2017), where the author tries to illustrate the challenges faced by Turkey regarding Syrian refugees resorting to a small survey done by UNCHR in some Greek islands. Another example is Cagaptay (2014), who, in an attempt to gauge the impact of Syrian refugees on the ethnic and sectarian balance of south-eastern provinces has to rely on data from the 1960 Census because it was the last one that collected data on ethnicity. The lack of nationally-representative data on Syrian refugees in Turkey is in contrast with the availability found for Lebanon, where at least 2 such surveys have been carried out, see Alsharabati & Nammour (2016) or BRIC (2013), or in Jordan, where Syrian refugees can be identified within the Labour Force Survey.[4]

Household Labour Force Survey. The fact that the refugee population in Turkey represents 4.4% of the population living in Turkey[5] creates a growing need for nationally representative data on Syrian refugees in Turkey that is not currently being fulfilled. Fortunately, the relatively high proportion of Syrian refugees in the Turkish economy might have as well opened the door to the use of nationally representative microdata from the Turkish Statistical Institute. Using Turkstat databases for analysing Syrian refugees is not straightforward, though. Household surveys in Turkey usually target families that are inscribed in the Address Based Population Registration System (ABPRS) and Syrian refugees under temporary protection are not included in that registry.[6] An exception to this survey methodology is given by the Household Labour Force Survey[7] which instead of families targets addresses, thus allowing interviewers to find Syrian families under certain conditions.[8]

Even though Syrians refugees now take part of the HLFS, their identification is not direct; the HLFS publicly available microdata does not provide the nationality of those classified as foreign-born, thus mixing up Syrians with the normal flow of migrants coming to Turkey (see Appendix A for a quick visual inspection of how this flow looks like). In practice, we propose an indirect identification whereby we remove non-Syrian migrants during the 2011-2017 period, thus finding Syrian refugees as a leftover. Full details of this methodology can be found in Appendix B, including a comparison between the Syrians' age distribution found in the HLFS and the one recorded by the DGMM. The rest of the report is mostly based on data from the 2017 HLFS, which we exploit to gain some understanding about Syrian refugees living and working conditions. In addition, wherever appropriate, we compare Syrians' statistics with those of Turkish natives with the intention of having a reference point.

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[4]Syrian refugees are under-represented in the Labour Force Survey, however their survey weights have been adjusted to add-up to their total population.

[5]As reported by the DGMM at http://www.goc.gov.tr/icerik6/temporary-protection_915_1024_4748_icerik.

[6]Their information is kept separately by the DGMM.

[7]See http://tuik.gov.tr/MicroVeri/Hia_2017/turkce/index.html for more information.

[8]See Appendix C for more details on this aspect.

Who is identified?   Our indirect identification method should capture all irregular migration that came into Turkey between 2011 and 2017. In practice, this means all Syrians who migrated during that period have been identified, including those covered by the temporary protection regime, those with short-term residence permits and Syrian who acquired the Turkish nationality. It should be noted that some other migrants (particularly those coming from Iraq or Afghanistan in recent times) might have also been included in the group. Still, throughout the report we refer to the group as a whole as 'Syrian refugees', first, because of the likely similar characteristics in terms of labour market indicators and, second, because of the small number other migrants would represent in comparison with Syrians refugees.

2   Characterization of Syrian refugees

2.1   Socio-demographics

The Syrian refugee population is rather unique in several socio-economic aspects. One of these aspects lies on its age distribution, much younger than the population of most countries in the world and on par with many Sub-Saharan African countries. In fact, the average age of the Syrian refugees living in Turkey is 23.0 years old, similar to that of Ethiopia and only a few years older than those of Angola (20.6), Zambia (20.7) or the Democratic Republic of Congo (21.7). These averages are in marked contrast to the average held by, say, Turkish natives, which stands at 33.0 years, in line with other emerging economies.[9]

Figure 1: Syrian refugee population, age distribution

(a) Total number   (b) Population pyramid
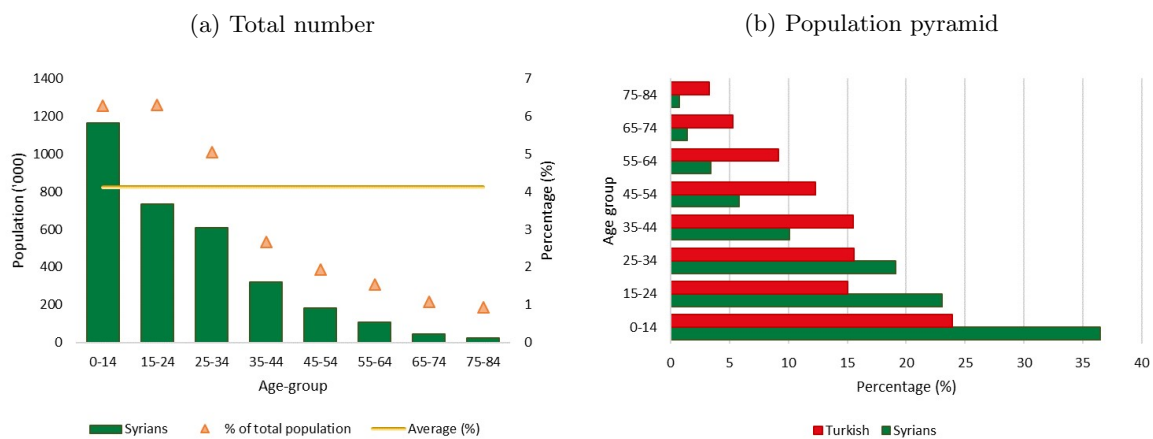
Source: HLFS 2017 and author's own calculations. Notes: The figure shows (a) the total population of Syrian refugees in Turkey together with the percentage of Syrians with respect to the population of Turkish natives by age-group and (b) the age group-specific percentage of Syrian refugees in the total population.

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[9]For instance, Mexico's average stands at 31.5 while Brazil's is 34.5.

The young age held by most Syrian refugees directly affects the within age-group balance between Turkish natives and refugees themselves. In fact, even though in 2017 Syrian refugees represented 4.1 per cent of the Turkey-born population, the share among those aged 0-24 was up to 6.3 per cent, see Figure 1(a). Wide-base population pyramids like the one exhibited by Syrian refugees pose short-term and long-term challenges to the wider society; in the present, the high number of children demand more education services in spite of a relatively fix (since it takes some time to build new schools) number of places. As a result, the number of children per classroom might increase, lowering education quality and creating tensions, specially in the more crowded schools. In addition to the short-term consequences, a relatively large number of young Syrians is expected to crowd labour markets in regions with a heavy representation of refugees. In this regard, measures directed at skill development for the jobs of the future should begin as soon as possible, together with progressive measures directed at job creation in the affected regions.

Figure 2: Educational attainment of Syrian refugees

(a) Distribution

(b) Percentage with tertiary education
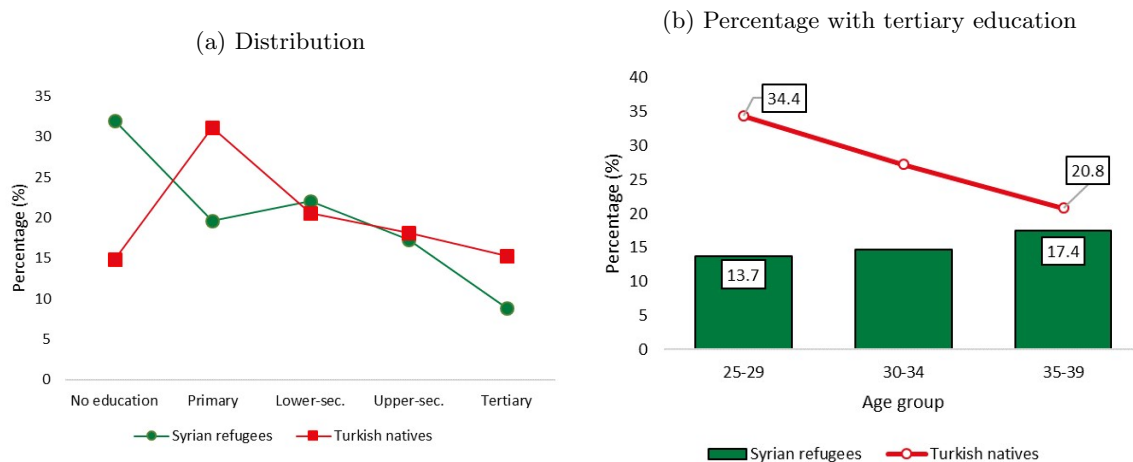
Source: HLFS 2017 and author's own calculations. Notes: The figure reports (a) the nationality-specific percentage of +15 years old Syrians and Turkish natives in each of the 5 educational levels (no education, primary, lower-secondary, upper-secondary and tertiary) and (b) the age-group and nationality-specific percentage of Syrians and Turkish natives with tertiary degrees.

The development of Syrian refugees' skills is not only pressing because of a likely bottleneck in the labour market but also because there is a risk of having a lost generation[10] in terms of access to education. The war disrupted the normal lives of many Syrians and that included their courses of study. An example highlighting this disruption is the 70 per cent of Syrian children not attending an educational institution in Turkey -UNHCR (2014) (pp.52)-, but children are not the only ones affected. Many students who should have finished their tertiary studies during the war could not finish them. In fact, younger cohorts of Turkish natives have been attesting gradual increases in the share

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[10]See Bircan & Sunata (2015) for an assessment of Syrian refugees' education prospects and its consequences.

of individuals with university degrees, the contrary of what is found among young Syrians.[11]

The change in the pattern of individuals with tertiary studies can be best seen in Figure 2(b), which shows the age-group specific share of individuals with a tertiary degree among Syrian refugees and Turkish natives. It could be argued that the decrease in the rate of university degree holders among Syrians could also be due to a composition effect, i.e. most 25-29 aged Syrians left the country while only the best educated ones left among the 30-34 years old, however, the similar number of individuals in these two groups favors the disruption theory.

In terms of educational attainment, the main difference between Syrians and their Turkish hosts is found among the least educated ones; while 31.8 per cent of Syrians (aged 15 or older) did not complete primary education only 14.9 per cent of Turkish natives left school at such an early stage. This difference in primary school dropouts in further translated in higher percentages of Turkish people with primary education but not among those secondary or tertiary education. This might be due to the Syrian population being relatively young while the statistics presented in Figure 2(a) refer to all Turkish. Anyhow, the information presented in Figure 2 suggests the existence of some highly capable Syrians that might not be realizing their full potential, something that is not only negative for them but also for the Turkish economy.

Labour force status. Young Syrian refugees saw their advanced education disrupted and chances are it will continue being in the foreseeable future -at least until current kids make it to the university. For men, low schooling rates among refugees are reflected on a very strong labour market attachment, which is, in turn, translated into an employment rate of 66.1 per cent for 15-year-old boys. Such figure presents an unique situation when compared to other labour markets in the world. Indeed, not even the rural populations of developing African's countries reach this proportion nowadays. Three factors might be behind the high employment rate found among young Syrians: First, many Syrian boys may find themselves idle since they do not attend school. Second, there is a pressing need for income arising from the fact that most Syrians work informally earning less than the minimum wage (see Section 2.2 where this point is further developed). Last, but by no means the least important reason, is a cultural background where men are expected to work away from home while women are expected to do so at home.

The case of Syrian women is diametrically opposed to that of men; only 11.2 per cent of those aged 15-65 work compared with the 71.0 per cent of men who do so. To some extent, this detachment from the labour market seems to have increased their schooling rate with respect to that of men, although it is still far away from the one held by Turkish women - see Figure 4(a) and (b). The small percentage of working women among Syrians is not uncommon across MENA region countries; Morocco (11.4 per cent, 2010), Iraq (9.8 per cent, 2012), Tunisia (20.8, 2014) or Jordan (13.8 per cent, 2016) are examples of countries with a closer cultural background to Syria also showing low female employment rates.

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[11]We do not analyze younger cohorts than those aged 25-29 because they would not have had a chance to finish their studies.

Figure 3: Labour force status by age, men
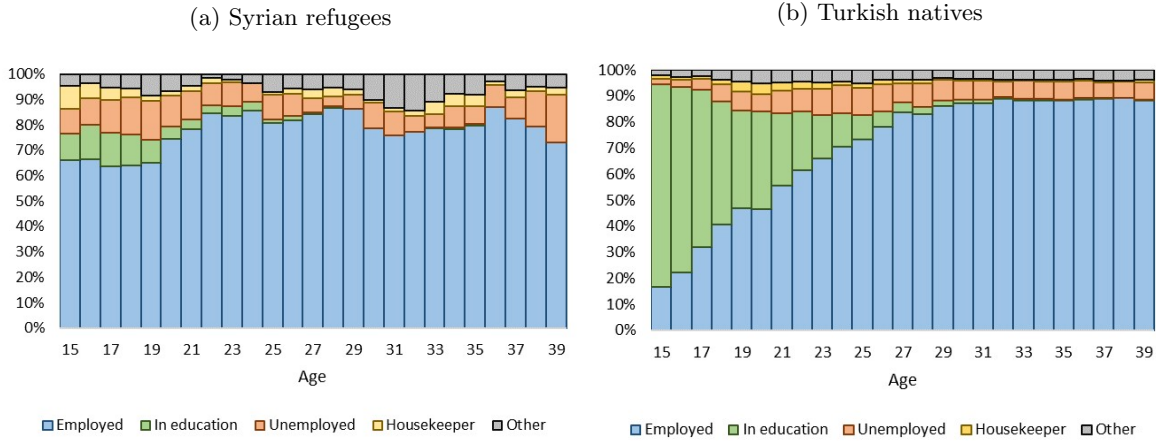
(a) Syrian refugees

(b) Turkish natives

Source: HLFS 2017 and author's own calculations. Notes: The figure shows the age-specific percentage of men in each of the labour force statuses (employment, education, unemployment, housekeeping and other) among (a) Syrian refugees and (b) Turkish nationals. Employment is measured with the ILO definition and include students who are also working. Unemployment is defined broadly, including discouraged job-seekers.

Figure 4: Labour force status by age, women
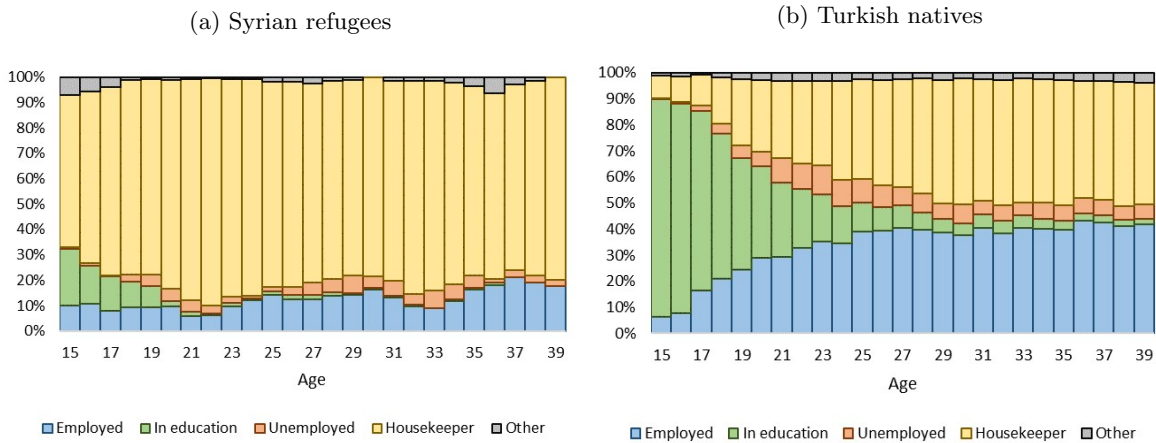
(a) Syrian refugees

(b) Turkish natives

Source: HLFS 2017 and author's own calculations. Notes: The figure shows the age-specific percentage of women in each of the labour force statuses (employment, education, unemployment, housekeeping and other) among (a) Syrian refugees and (b) Turkish nationals. Employment is measured with the ILO definition and include students who are also working. Unemployment is defined broadly, including discouraged job-seekers.

Even though cultural factors are undeniably behind the observed low female employment rates, current working conditions may not be very helpful either. On the one hand, informal work arrangements are known to deter women from keeping jobs in the long-run and, on the other hand, the long working hours typically worked by Syrian refugees give women a hard time achieving an optimal work-

life balance. In addition, the high proportion of children in the refugee population is likely to be an added burden in Syrian women's attempts to join the labour force.

An interesting aspect of Syrians' labour market experience is the similar unemployment rates among adults (aged 30-65), 13.3 per cent, and young people (aged 15-29), 13.0 per cent. This situation is not only rare in Turkey, where young people have historically endured much higher unemployment rates than adults (18.0 per cent vs. 8.1 in 2017) but also in most other countries of the world. The reason behind this oddity might be found in the fact that both, young and adults, start afresh in the Turkish labour market, i.e. with no recognition of prior-learning and in many cases no professional networks to rely on. In a sense, the Syrian experience in Turkey can be regarded as a natural experiment that tests whether adults have lower unemployment rates because they are more productive or just because they have spent more time in the labour market than young people.

Table 1: Key labour market statistics, by sex and nationality

	Group	Participation	Rate (%) Unemployment	NEET
Syrian	Men	81.0	12.3	19.6
Syrian	Women	13.7	18.2	82.2
Syrian	All	47.5	13.1	50.1
Turkish	Men	77.9	9.6	12.6
Turkish	Women	37.6	14.3	30.7
Turkish	All	57.8	11.1	21.5

Source: HLFS 2017 and author's own calculations. Notes: The table shows sex and nationality-specific (a) labour force participation rate, (b) unemployment rate and (c) NEET rate for Syrian and Turkish men and women. The NEET rate refers to the percentage of 15-24 years old people who are neither in employment nor in education or training. Labour force participation rates and unemployment rates are defined for those aged 15-65.

In addition, it seems that Syrian and Turkish women have higher unemployment rates than their gender counterpart. A plausible explanation could go along the lines of women having less chances than men in the labour market. Other reasons should not be discarded, though. For instance, the fact that most men work may lower women's pressure to find a job. In addition, women being in charge of household duties may decrease the number of jobs they can to apply to.

Low female employment rates and the small number of young women in education among Syrians result in one of the highest female NEET rates in the world, almost doubling those held by, for example, India (46.6 per cent, 2012) or Bangladesh (43.6 per cent, 2016), to name two of the countries with some of the highest female NEET rates. In contrast, the male NEET rate held by Syrian refugees (see Table 1) is much lower than that of Syrian women although this is the result of men being engaged in employment from an early age, which is not positive for their career development.

Labour market transitions and employee turnover. Syrian refugees are likely to have rather unstable labour market experiences, jumping from one job to another. However, they would also be expected to learn their way around the Turkish labour market as time goes by. This is, in fact, what the data reveals; as of 2017, year-to-year transitions[12] have improved for refugees in comparison with 2015. For instance, the share of those who were unemployed in 2016 and had found a job in 2017 is higher among Syrians than among natives. Likewise, the share of salaried employees in 2016 is similar to the share in 2017 for both of the mentioned groups while it used to be lower for Syrians.

Shorter unemployment spells are positive in the sense of guaranteeing an steady flow of income but they also signal Syrians would take on any job regardless of its conditions. This could, at least partially, explain why half of the refugees had changed jobs in the last year, compared to 30.7 per cent of Turkish natives (see Figure 5, bottom rows). Higher employee turnover could, in principle, be a deterrent for employers to request the necessary work permits. However, this behavior could be openly discriminatory; in reality, Syrian refugees' turnover rates are approaching fast those of *comparable* Turkish workers. For instance, among employees in trade, construction and manufacturing, the turnover rate of Syrians arrived to Turkey between 2011 and 2014 is only seven percentage points higher than among Turkish.

Figure 5: Current (2017) labour force status of 2016 employees
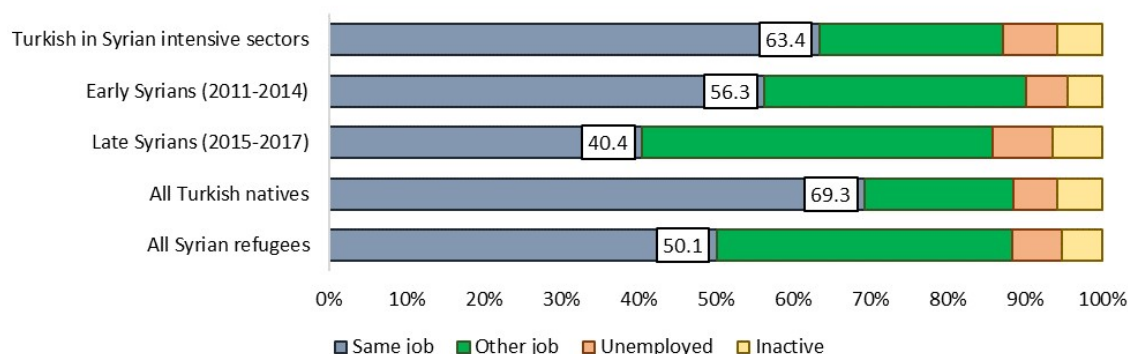
Source: HLFS and author's own calculations. Notes: The figure shows 2016 employees' labour force statuses after one year for 15-65 year-old individuals. The percentages are group-specific. 'Turkish in Syrian intensive sectors' refer to employees in construction, trade and manufacturing. The terms 'early' and 'late' refer to the date of arrival to Turkey; early means 2011-2014 and late 2015-2017.

A similar conclusion arises when comparing the number of years (permanency) of refugees spent in their jobs. As things stand in 2017, Syrian refugees have been serving their employers 4.4 years less than Turkish natives. It is when we take into account the fact that they have spent less years in Turkey than the average Turkish person, the type of sectors where they work on and the nature of the contract offered by the employer, that the difference in permanency goes down to half a year. It should also be noted that temporary contracts, which are often found in agriculture and construction, are

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[12]Individuals are asked about their labour force status one year before the interview and at the present.

generally accepted (91.3 per cent) because the person could not find a longer-termed work relationship, not because it was their preferred choice. To sum up, Syrians seem to prefer long-term over short-term contracts and their permanency and turnover rate do not differ much from the one held by comparable Turkish workers.

Working children. One of the drawbacks of the HLFS has to do with the labour and education modules not targeting individuals younger than 15 years old. As a result, critical information on school enrollment and on the number of working children is missing. Still, the small percentage of 15-year-old Syrians in education signals that a large share of Syrian children might find themselves out of school. For example, we find that only 29.4 per cent of 15-year-old Syrian girls attend school, compared to the 86.8 per cent attested among Turkish girls of the same age. An even bigger gap exists between 15-year-old Syrian and Turkish boys, with, respectively, 12.9 and 88.4 per cent attending school.

By the same token Syrian boys are not expected to massively attend school, they are also suspected to work in high numbers, especially after taking into account the high employment rate held by those aged 15 (66.1 per cent). Figure 6(b) provides an attempt to recover the missing data on children employment rates by extrapolating the employment rates held by those aged 15. This exercise is done with the help of children employment rates from urban areas[13] of Zambia. The choice of Zambian data might seem odd at first but it is explained by the complications behind extrapolating the employment rates of a population whose circumstances are hardly mimicked elsewhere.

In principle, an obvious candidate would be to use former child labour surveys carried in Turkey but the socio-economic conditions of Syrian refugees have little in common with those of native Turkish and the estimates would be biased downwards. A second possibility for the extrapolation would have been the Jordan LFS where Syrian refugees can be identified, however, this survey does not ask questions from the labour module to anyone below the age of 15.[14] Another candidate could have been drawn from migrant populations elsewhere in the world, however, in the case of south-north migrants we also find surveys that do not include children as part of their labour modules. In other cases where migrants are located in a non-developed economy, as it is the case of Ethiopia, the few observations available in the data prevent us from accurately calculating employment rates that can be extrapolated.

As a result, we rely on working children data from natives and three data sources that fulfill some of the minimum criteria for a meaningful extrapolation are identified; Bangladesh, Tanzania and Zambia, all of which asked children aged 5-14 questions from the labour module. In all three cases, there is a population at risk of poverty meaning children might need to bring income from an early age, and also informal work arrangements are prevailing among young people. Of these candidates, Bangladesh and Tanzania are dropped, the former because there is a sharp of jump[15] in the share of formal workers

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[13]Because the majority of the Syrian population is located in urban areas.

[14]And even if it has asked those questions to children the fact that the language in education is Arabic would change school attendance rates and the share of working children, losing, as a result, any resemblance with respect to the situation in Turkey.

[15]From 0 to 10 per cent, something not likely to be observed among Syrian refugees.

between those aged 14 and 15 (because the reach the legal age to work) and the latter because it has a smaller sample size than the Zambian LFS.

Figure 6: Underage workers among Syrian refugees in Turkey (extrapolation)

(a) Number of 5-14 years old workers
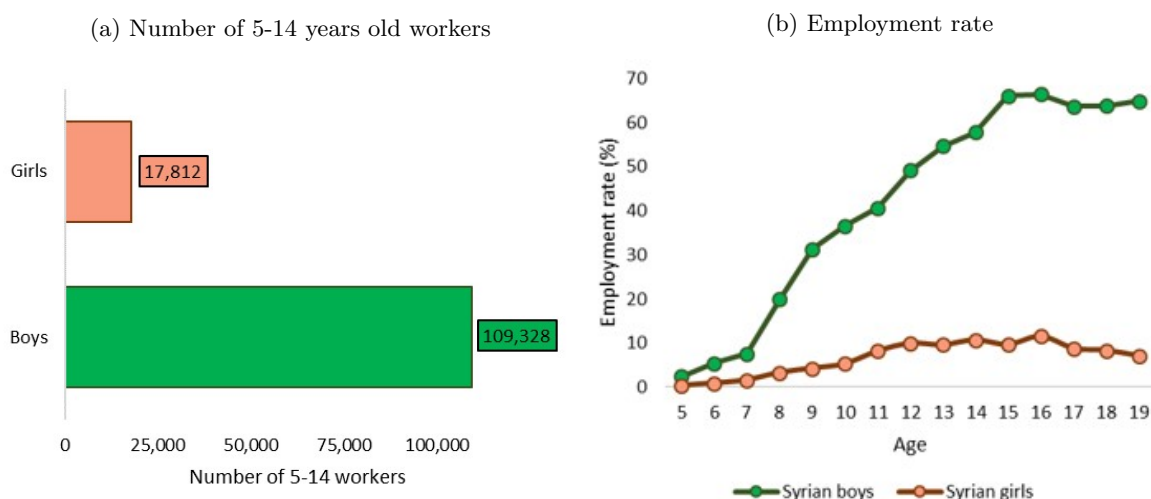
(b) Employment rate

Source: Turkey HLFS 2017, Zambia LFS 2008 and author's own calculations. Notes: The figure shows (a) the number of 5-14 Syrian children working in Turkey separately for boys and girls, and (b) the age-specific employment rate for boys and girls. The data referring to the employment rates of those aged 5-14 has been extrapolated with the help of the 2008 LFS of Zambia (urban areas).

The extrapolation results are shown in Figure 6, with the total number of Syrian working children estimated in 127,140 -see part (a)- of which 109,328 are boys. In addition, estimated sex and age-specific employment shares are shown in Figure 6(b) for girls and boys aged 5-14.[16] These estimates are speculative and are shown for informative purposes exclusively, however, the severity and urgency of the situation- if these figures were close to be true- demand more information on the topic. Reasons behind this pressing need for information are first of all, humanitarian; these children should be attending school so as to get the best possible start in life. Moreover, the completion of compulsory education opens the door to university degrees and a higher number of future opportunities in the labour market. Apart from having an accurate estimate of how many Syrian children are working, gathering information on these kids' family situations and the sector their employers belong to would also help policy makers in the creation of measures aimed at lowering both, the demand and the supply of child labour.

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[16]Note that the employment shares for those aged 15-19 are based on real data from the HLFS 2017.

2.2 Type of employment and working conditions

It is estimated that 940,921 Syrians work in Turkey as of 2017,[17] most of them men and some working from an early age, see Figures 3 and 4. Of these, 862,039 (91.6 per cent) do so informally, occupying low-skilled positions in sectors where productivity is relatively low. These facts raise questions with regards the quality of the jobs held by Syrians and the kind of industries that provide them. This section analyzes, to the extent possible given the data limitations, where and how Syrian refugees work, with an emphasis on wages and hours worked. It should be noted that no information is available for working children in the HLFS.[18] This section, thus, covers the 813,781 Syrian workers who are 15 years old or older.

Table 2: Number of Syrian refugees by economic activity

	Statistic		
Activity	*Total number of Syrians*	*Share among Syrians*	*Within sector share*
Agriculture	63,110	7.8	1.2
Manufacturing	392,350	48.2	7.4
of which TCLF	(252,888)	(64.5)	(16.1)
of which others	(139,462)	(35.5)	(3.7)
Construction	107,389	13.2	5.2
Transport and comm.	11,492	1.4	0.8
Trade and hospitality	144,273	17.7	2.6
of which retail	(51,572)	(35.7)	(2.0)
of which food	(43,363)	(30.1)	(3.5)
of which others	(49,338)	(34.2)	(3.0)
Busines activities	12,843	1.6	0.5
Education	22,258	2.7	1.4
Health	8,990	1.1	0.8
Other services	51,076	6.3	5.0
Total (1)-(2)/Average (3)	813,781	100.0	2.9

Source: HLFS 2017 and author's own calculations. Notes: The table shows (i) the number of Syrian refugees working in each economic activity, (ii) the nationality-specific share of Syrian workers in each economic activity and (iii) the sector-specific share of Syrian workers. TCLF refers to textile, clothing, leather and footwear, ISIC rev.4 codes 13, 14 and 15.

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[17]Including the estimates on working children from Figure 6(a).

[18]Obviously, the 127,140 children aged 5-14 work informally by definition but little else is known about them.

Employment structure. The economic activities and occupations held by Syrian refugees are determined by their informal working arrangements. As such, sectors like trade, construction and manufacturing, which have historically showcased high informality rates, became the main receivers of Syrian labour. In total, these three sectors account for 79.1 per cent of the Syrian workers (see Table 1), however, one of these sectors stands out in terms of employment: Textile, clothing, leather and footwear industries (TCLF) provide jobs to almost one in every three Syrians. The reasons behind this sector's attachment to Syrian labour are commented in Section 3.1, together with an assessment of how much money is saved by its employers by hiring -most- Syrians informally. In addition to these activities, a relatively high share of Syrians are working in a black box called 'other services'. In practice, a combined analysis of ISCO and ISIC codes at the 2 digit level allows us to shed some light finding that these services refer -mostly- to repair of personal goods and clothing activities (the latter are garment workers in occupational terms but not in terms of economic activity) vehicle and domestic cleaners as well as possibly some waste pickers/scrap collectors.

There are cases where the concentration of Syrians working in particular activities have produced an impact at the national level despite the fact that Syrians only represent 2.9 per cent of all workers in Turkey. Some candidates to witness this impact include the TCLF industries, where Syrians represent 16.1 per cent of the Turkish workers and the construction sector, with 5.2 per cent. The impact includes profitability boosts due to the low salaries and the informal nature of the workers but also the crowding out of national workers -especially those with few years of schooling- who may not find an informal job with the same ease as before.

Figure 7: Share of informal workers with and without Syrian refugees, selected sectors
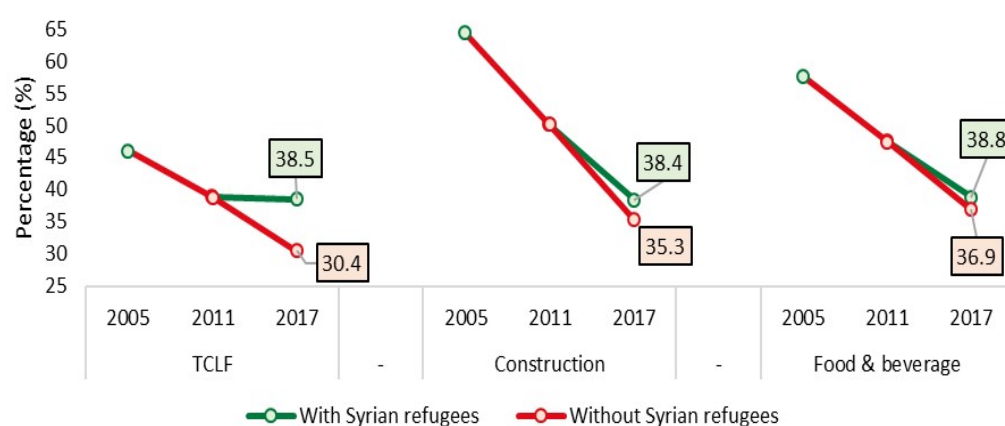
Source: HLFS and author's own calculations. Notes: The figure shows the share of informal workers in Turkey in three economic activities for the years 2005, 2011 and 2017. The 2017 figures are estimated with and without the presence of Syrian refugees and use the weight adjustments proposed in Appendix C. 'TCLF' refers to the textile, garment, leather and footwear industries.

In addition to enhancing the survivability of certain companies, Syrian refugees are also modifying nation-wide informality rates. This is especially so in the garment sector -see Figure 7- which currently

showcases an informality rate of 38.5 per cent with Syrian refugees and 30.4 without them.[19] Higher informality rates can also be seen in the construction sector as well as in the food and beverage service activities. In these cases, though, the difference between the informality rates attained with and without Syrian refugees are more modest. The effect of Syrian refugees at the country level is smaller but still significant; the share of informal workers (including those self-employed) goes from 34.4 per cent without Syrians to 36.0 per cent with them. The difference when only employees are taken into account is slightly larger, going from 17.4 per cent to 20.1 per cent but in either case the strong trend towards formal work arrangements that Turkey has witnessed in recent times has been partially reversed.

Table 3: Number of Syrian refugees by occupation

Occupation (ISCO code)	Syrian refugees		Informal Turkish workers
	Total	Share	Share
Labourers in manufac. and construc. (93)	137,210	16.9	6.9
Stationary plant and machine opera. (81)	131,305	16.1	2.7
Woodworking and garment workers (75)	105,123	12.9	4.9
Sales workers (52)	61,194	7.5	15.5
Building and related trades workers (71)	57,440	7.1	7.5
Agricultural labourers (92)	56,429	6.9	5.8
Metal, machinery workers (72)	38,741	4.8	2.9
Personal services (51)	35,281	4.3	4.3
Cleaners, helpers (91)	35,000	4.3	4.4
Other occupations	156,058	19.2	42.1
Total	813,781	100.0	100.0

Source: HLFS 2017 and author's own calculations. Notes: The table shows (i) the number of Syrian refugees by occupation, (ii) the population-specific share of Syrian refugees and informal Turkish workers in each occupation. Subsistence agricultural workers are excluded from the Turkish group for better comparability. Occupations are measured using ISCO-08 codes.

A high share of Syrians can be found in low and semi-skilled occupations. This is partly due to the low number of years in school but also the informal nature of the jobs held and the type of sector where they are employed. Indeed, the occupations held can be traced back to the economic activities they work for; for instance, among labourers in manufacturing and construction (ISCO-08, group 93), more than a third work in the construction sector while half of them do so in the manufacturing industry.

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[19]The informality rate without Syrian refugees is probably lower than it would have been if Syrians had never come to Turkey. This is because Syrians may have crowded out some of the Turkish informal employees that used to work in the sector.

Likewise, the majority (89.1 per cent) of stationary plant and machine operators are employed in the TCLF industries. Aside from the traceability between economic activities and occupations, what stands out of the occupational distribution is that 32.0 per cent of Syrian work in low-skilled occupations while 60.9 per cent do so in semi-skilled ones. This also implies that, only 7.2 per cent of them work in high-skilled occupations, compared to 21.0 per cent of Turkish natives.

In principle, the occupations held by Syrian refugees (most of whom are informally employed) and informal Turkish workers[20] would be expected to be of similar nature, putting Syrians forward as direct competitors of informal Turkish workers for the same jobs. However, a closer look at the last two columns of Table 3, which shows nationality-specific employment shares by occupation, reveals that this is not exactly the case. Syrian refugees have a much higher chance to be employed as manufacturing labourers, machine operators and garment workers (groups 75, 81 and 93) than informally employed natives, i.e. Syrians might be, to some extent, complementing -instead of substituting- Turkish labour occupying jobs natives might not willing to perform.

Even though in purely economic terms Turkey might momentarily benefit from having Syrians with skills that most complement those of natives it is unclear whether the country would be better off in the long-term. On the one hand, keeping a large share of Syrians in low skill occupations hinders their chances for a quick integration while maintaining a drain on many social services. The slow integration might also cluster Syrians in poor neighborhoods, potentially generating social conflict. On the other hand, cheap labour might foster what would otherwise constitute unprofitable economic activities, taking valuable resources from long-term sustainable, more productive sectors.

Another negative side of Syrians being clustered in low-skilled, informal jobs has to do with the existence of overqualified workers. It is estimated that 84,479 Syrians -roughly 10 per cent of all Syrian workers- work with tertiary degrees. However, as it can be seen in Figure 8, only 28.9 per cent managed to find a job in the professional category. By digging into the specific occupations held by Syrian workers in the professional category it is possible to find that half of them work as teachers without a work permit, narrowing further down the range of available professions for this group. A plausible reason for the lack of access to high-skilled jobs could be related to the existence of a language barrier, however, this should not be interpreted like teaching Turkish to random Syrians would improve their labour market experiences in the short-run; Syrians are relatively clustered in a few provinces and chances are their customers/co-workers are Syrian too. High-skilled Syrian refugees, though, might benefit greatly -themselves and their hosting country- from more integration, including learning Turkish.

In addition to the language related issues, problems validating foreign degrees and acknowledgment of prior learning are likely to lower the value of Syrians capacities, particularly in highly regulated professions where signals matter as much -if not more- than actual human capital. Together with the two commented reasons, the fact that high skilled jobs are usually provided under *formal* work arrangements conform a triple threat to well educated Syrians in their quest to use their abilities.

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[20]Subsistence agricultural workers are excluded from this comparison.

Figure 8: Occupations of tertiary degree holders, by nationality
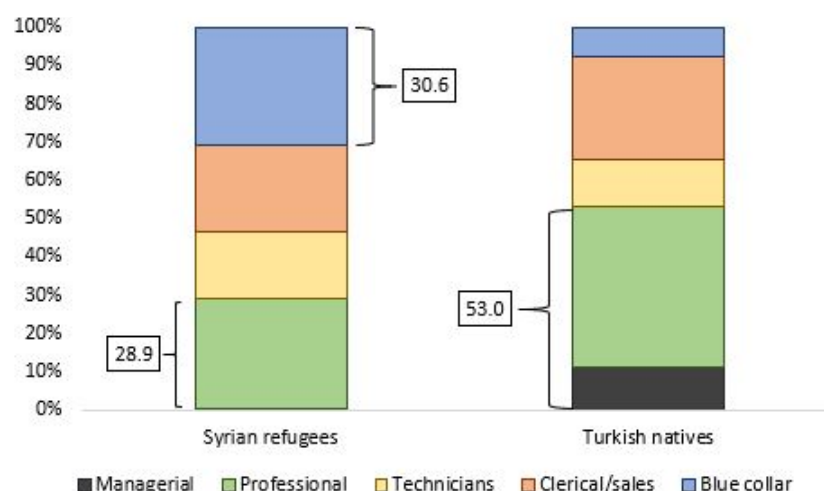
Source: 2017 HLFS and author's own calculations. Notes: The figure shows the education and nationality-specific occupational distribution for Syrian refugee and Turkish native workers with tertiary education. Occupations measured with ISCO-08 codes.

Although high-skilled Syrians might be among the ones who lost the most in terms of foregone earnings due to the lack of work permits, informal work arrangements are pervasive across Syrian refugees with 9 in 10 working without being registered in the social security institution. Generally, employees hired informally tend to work in small businesses. This is for two reasons; firstly, because this practice is unlawful and it is easier to conceal the activity if the premises are not visible. Secondly, because these businesses tend to be less profitable than bigger companies and, thus, might need to rely on a cheaper workforce. At the international level examples of this behaviour are easy to find;[21] in Mexico 81.6 per cent of informal employees work in businesses with less than 10 employees while in India and in Egypt the percentages are, respectively, 86.7 and 88.4 per cent. A similar share of informal employees working in micro-enterprises is also found in Turkey for natives, 78.5 per cent, with almost half of them working in hard to spot (non-regular) places such as irregular/mobile premises or at home -see Figure 9(a).

Surprisingly, the empirical regularity regarding company sizes for informal employees is broken for Syrian refugees. According to Figure 9(b), 43.8 per cent work informally in businesses of more than 10 people. Moreover, 32.0 per cent of Syrians work in companies with more than 20 employees; something rare to witness elsewhere in the world of work. On top of the high share of informal employees working outside of micro-businesses, those working in companies with less than 10 employees also showcase a higher tendency to do so in regular premises which are arguably easier to spot by the labour inspection.

To sum up, Syrian refugees' employment structure is uncommon in terms of the combination of

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[21]The examples provided rely on microdata from the ENOE 2016 I for Mexico, LFS 2016 for Egypt and Employment-Unemployment NSSO 68th round for India as well as the author's own calculations. The data from all three countries has been harmonized and is part of the LFM v2.0.

Figure 9: Firm size distribution and type of microbusinesses, informal employees

(a) Turkish natives   (b) Syrian refugees
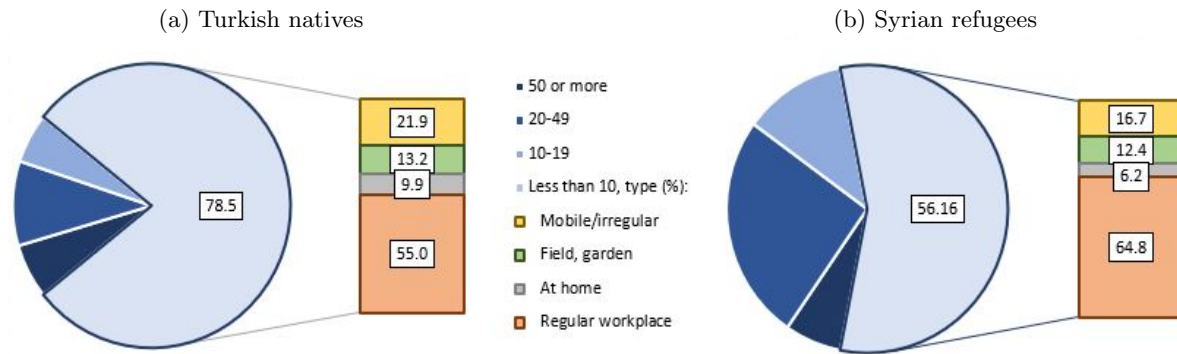
Source: 2017 HLFS and author's own calculations. Notes: The figure shows (i) the nationality-specific distribution of company sizes for Syrian refugee and Turkish informal employees (in blue) and (ii) the nationality and company size-specific share of workplace types for companies with less than 10 employees.

characteristics -informal employment in relatively large companies and high prevalence of the manufacturing sector- and definitely only representative of Syrians in Turkey. For instance, in Jordan only 20.6 per cent (48.2 per cent in Turkey) of Syrians are employed in the manufacturing sector while 36.8 per cent work in the construction sector and 29.8 in trade and hospitality. The above-mentioned characteristics are not necessarily negative, though, and might play in favour of Syrian refugees' future labour market experiences. The relatively high visibility of the businesses where Syrians work could, in principle, be used by the labour inspection of Turkey to optimize its efforts in reducing informality. Moreover, the productivity of the manufacturing industries is higher than that of the trade and hospitality sector, increasing the viability of the formalization of Syrian refugees in their current posts. Obviously, the above-stated remarks would do little good if Syrians are not eligible to request a work permit. We invite the reader to follow the discussion on section 3.2 with regards the extent to which Syrian refugees under temporary protection can request a work permit.

Working conditions.   High informality rates and jobs clustered in some of the sectors where longer hours[22] are worked in Turkey are likely to shoot up the hours worked by Syrian refugees beyond legal limits. Indeed, Syrian refugees work, on an average week, 52.3 hours, almost five and four hours more than, respectively, formal and informal native employees. In addition, more than half (53.7 per cent) of the Syrian employees work more than 50 hours a week and 34.7 per cent work 60 or more hours.

The complete distribution of average weekly hours is provided in Figure 10(a) for Syrian employees and in Figure 10(b) for, separately, Turkish formal and informal employees. At first sight, the distribution of hours worked by Syrian resembles neither of the natives' distributions, however, the devil is in the detail and a closer look reveals things are not really that different. For instance, weekly hours worked by formal natives go up by 2.1 when removing the public sector -represented in Figure

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[22]Only below informal workers in the health sector, almost exclusively personal care workers working on average 64.4 hours a week.

10(b) by the peak at 40 hours. That is, without public employment (that belong exclusively to formal native employees) both, the Syrians and the Turkish distribution share a peak at 48 hours, the most common arrangement in Turkey. Still, the distribution of hours worked by Syrians is 'shifted' to the right, with a second peak at 60 hours which is characteristic of the informal economy. The distribution of hours worked by informal natives does not seem to measure up to the Syrian one; the former has a much 'heavier' left tail (individuals who work part-time) than that of Syrian refugees. However, if we only take into account full-time informal employees, Syrians (55.0 hours) and informal native employees (55.8 hours) look very much like each other. In sum, it could be said that the Syrian refugee distribution of hours worked is a mixture of full-time informal Turkish employees (right-hand side of the distribution) and part-time formal Turkish employees (for the left part of the distribution).

Figure 10: Employees average weekly hours worked, by nationality

(a) Syrian refugees   (b) Turkish natives
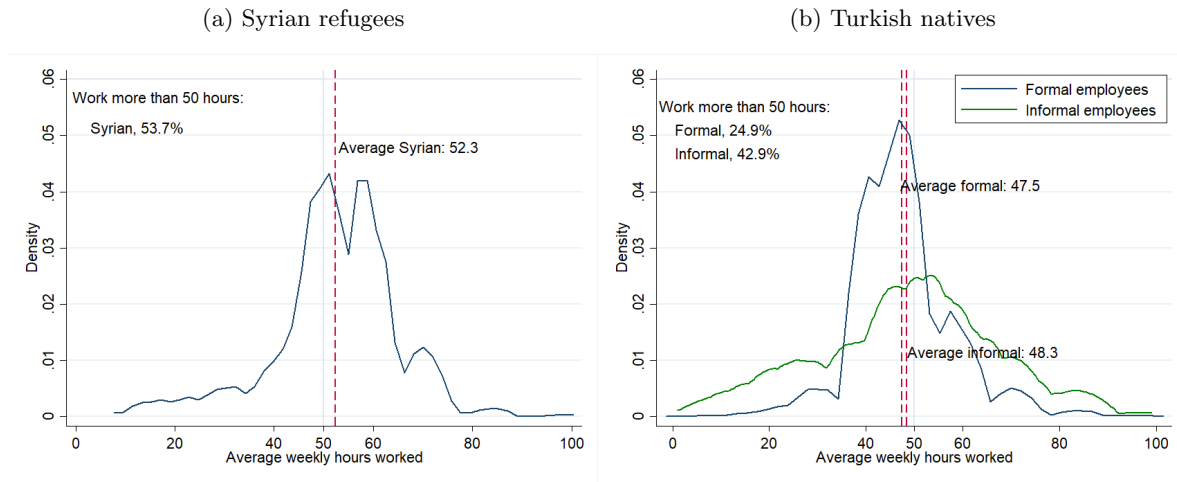
Source: HLFS 2017 and author's own calculations. Notes: The figure shows the distribution (probability density function) of average weekly hours worked by (a) Syrian employees, (b) Turkish informal employees and (c) Turkish formal employees using Kernel density estimation. The height of graph corresponds to the frequency of employees with a given number of hours worked.

A salient issue of the weekly hours distribution has to do with the low prevalence of part-time arrangements among Syrians and natives; despite an increase in this mode of work from 10.1 per cent back in 2005 to 14.4 in 2017 among 15-65 female employees, it still falls short in comparison with some European countries like France (30.5 per cent, 2016) or the United Kingdom (44.8 per cent, 2016). This, in turn, might still constitute a barrier of entry to the labour market for women who also carry out duties at home.

Another reason that might be driving Syrian women away from the labour market is the lower wages earned in comparison with men. The unadjusted monthly gender wage gap for Syrian refugees stands at 23.4 per cent while the hourly counterpart is 9.4 per cent. These are, in both cases, higher

than the gender wage gaps of Turkish citizens.[23] Women is not the only disfavored group among Syrian refugees, young people (15-29 years old) also earn 18.2 per cent less than adults per month and 21.6 per cent per hour worked.

Table 4: Syrian employees' net earnings

| | Syrian employees | | | | | | |
Statistics	All	Male	Female	Istanbul	Other areas	Young	Adult
Average monthly wage	1,302	1,337	1,083	1,460	1,177	1,216	1,438
Average hourly wage	6.21	6.29	5.75	6.81	5.74	5.73	6.97

Source: HLFS 2017 and author's own calculations. Notes: The table shows average hourly and monthly net wages of Syrian refugees measured in nominal 2017 TRY by sex, age-group and Istanbul/rest of the country. Young refers to those aged 15-29 and adult to those aged 30-65.

Irrespective of the group we put the focus on, Syrian refugees' jobs are characterized by low earnings; the average take-home salary is ₺1,302 which, in 2017, was below the statutory minimum wage for full-time employees, ₺1,404. Minimum wage compliance provides a darker picture when assessed from an hourly point of view. Syrians tend to work more than the 45 hours required to earn a full-time salary and, as a result, 3 out of 4 Syrian employees earn less than the minimum wage per hour. The percentage of Syrians earning below the minimum wage is slightly lower in Istanbul, where refugees enjoy higher wages than in other regions, however, this difference is likely due to the higher living cost displayed by the largest city of Turkey and not to the generosity of employers. Perhaps surprisingly in light of the gender wage differential is the fact that a higher share of men earn below the hourly minimum wage, 76.8 per cent compared to 68.7. This result is driven by the shape of each genders' wage distribution; low female earners earn very little but there is a higher percentage of them earning above the minimum wage than among men.

On average, Turkish natives earn 63.1 per cent more than Syrians and an obvious question is whether refugees might be discriminated against by employers. One way to answer this question, at least partially, is by means of a so-called wage regression. This tool allows us to control for job-related and personal characteristics that might influence hourly wages; for example, Syrians' low wages might be partly explained by the fact that they work informally. Some of the variables used in this exercise include the sex, age[24] and educational attainment of the person. In addition, job-related variables like the economic activity, the occupation and the formality of work arrangements are also taken into account.[25]

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[23]This does not necessarily mean Syrian women are more discriminated than Turkish women. Their jobs are very different. For example, Syrian women do not have access to public employment -a major earnings boost for Turkish women- and tend to be employed in low-skilled professions where the gender wage gap is highest.

[24]Including a square term to proxy for potential labour market experience.

[25]A complete accounting of the variables included in the regression goes as follows: 11 economic activities (ISIC rev.4),

Table 5: Minimum wage compliance

| | | Hourly earnings | | |
Group	Hourly M.W.	Below 95%	95%-105%	Above 105%
All		75.4	7.7	16.9
Men	7.17	76.4	7.7	15.8
Women		68.7	7.4	23.9

Source: HLFS 2017 and author's own calculations. Notes: The table shows shows the group-specific percentage of Syrian employees earning below (<95%) at or around (95%-105%) and above (>105%) the net hourly minimum wage. The minimum wage is expressed in nominal TRY of 2017.

Results from the wage regression are mixed; on the one hand, we find that informal Syrian employees are paid the same as Turkish informal employees -other things being held constant. On the other hand, the few Syrians working formally earn, on average, 10 per cent less than Turkish citizens with similar characteristics. An even bigger loss, though, is faced by highly educated Syrians who work without a work permit. By using a modified wage regression[26] we can calculate the 'return to schooling' -the increase in wages due to an increase in the number of years spent in school- for Syrians[27] as well as for formal and informal Turkish employees. The results, which can be seen in Figure 11, show for each of the three groups under analysis the percentage increase in earnings achieved by a higher level of educational attainment. It should be noted that the comparison is in relative terms and that the return to schooling of Syrian refugees' with no formal education is set to 0.

We find that Syrians with tertiary degrees are penalized twice in the labour market. First for not having a work permit and then for their degrees not being recognized. Indeed, Syrians' return to a college degree is 5 times smaller than the one received by a formal Turkish native. As expected, the informality of work arrangements halves the return to college, from 76.9 per cent to the 37.1 per cent actually enjoyed by Turkish informal workers. However, it looks like employers of informal employees also value differently the knowledge brought by Turkish and Syrians, with the latter obtaining a mere 14.6 per cent increase in their hourly wages for their degrees. This would, perhaps, give support to the importance of job-market signals as pioneered by Spence (1973) in contrast to the importance attached to sheer human capital.

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9 occupations (ISCO-08), company size, public/private ownership, place where the business takes place, formality of work arrangements, a binary variable for being a Syrian refugee and an interaction term bringing formal and Syrian refugees together. The adjusted R^2 of the regression is 0.5852.

[26]The modification consists of interactions between binary variables with the highest degree achieved and a dummy for, respectively, formal and informal Turkish employees.

[27]We do not distinguish between formal and informal Syrian refugees due to the small number of observations in the former group.

Figure 11: Return to schooling by formality of work arrangements and nationality
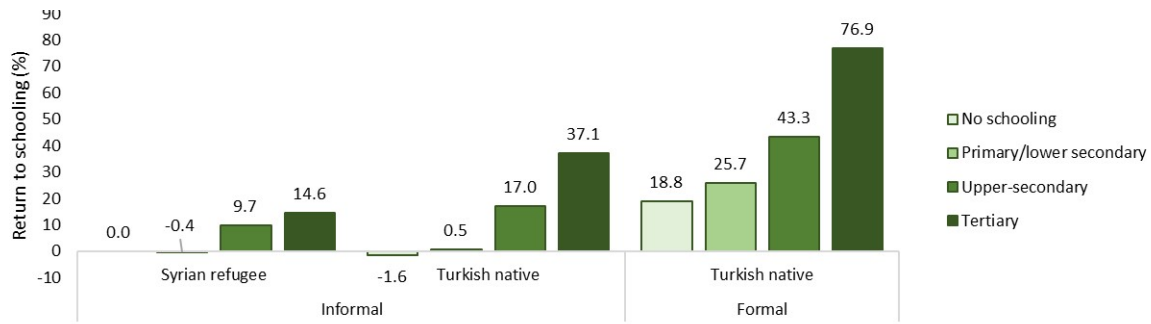
Source: 2017 HLFS and author's own calculations. Notes: The figure shows the return to schooling (additional salary earned for having spent more years in education) of three groups, informal Syrian employees, informal Turkish employees and formal Turkish employees. Results are extracted from a (log) wage regression where controls for sex, age, occupation, economic activity, firm size, type of workplace and ownership (public/private) are also included. Syrian refugees with no schooling constitute the reference point and their return is set to zero.

2.3   Conclusions

A few years ago, Turkey opened its doors to Syrian refugees, allowing them to escape from a civil war and granting them, among other basic social services, free access to health care. As a result, more than 3 million Syrians settled in Turkey, found employment and started businesses in an effort to normalize, once again, their lives.

In spite of the tremendous effort made by Turkey in ameliorating the effects of one of the largest refugee crisis, there still remains considerable challenges ahead. Some of these are long-term and are represented by a broad-base population pyramid of potentially low-educated individuals. The combination of low-skilled workers and a world of work increasingly dominated by the forces of globalization and digitization incurs the risk of developing a new underclass whose reversal could take several generations. As new technologies come along, it is more important than ever that workers keep pace with new developments. In this light, the 22.0 per cent of 15-year-old Syrians attending school is, by any reckoning, insufficient to guarantee a successful future to young refugees.

There are also short-term challenges with respect to the provision of decent work that need to be tackled even in the event of an early return of refugees to their homeland. This report have detected working conditions' deficits in relation to excessive working hours, non-compliance of the minimum wage legislation and denial of rights at work derived from the absence of work permits. The consequences of these deficits on Syrians' well-being include an increased risk of falling into poverty, social exclusion and marginalization. For instance, the Confederation of Turkish Trade Unions (Türk-İş) defined the hunger threshold[28] at ₺1,529 but the average monthly salary falls short at ₺1,302. This poses a limitation to families with a single income earner and would, indirectly, encourage children to enter the labour market at an early age.

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[28]As of May 2017 -same year as the data used- for a family of four.

The role of education as a social lift is also seriously limited in the current context. Not only young Syrians might not have incentives to remain in education but also those with university degrees find themselves unable to benefit from their studies. In particular, this report finds that informal work arrangements together with the lack of recognition of prior learning is decreasing the earnings that these individuals derive from their university degrees by a factor of 5 in comparison with similar Turkish citizens.

Last but not least, the arrival of Syrian refugees has had an impact that goes beyond this group's living conditions. Informality rates have increased in several economic sectors as a result of employing Syrians without a work permit. Moreover, it cannot be discarded that refugees are crowding out natives from informal jobs -especially in the textile and garment industries- despite the occupations held by the refugees being, to some extent, complementing those of informal Turkish workers. Turkish and Syrian workers aside, informal work arrangement are also damaging to the social security institution (SSI) of Turkey. Section 3 of this report analyzes the extent of the impact and provides estimates regarding the income foregone by SSI.

3   The macroeconomic impact of informal employment

As of 2017, latest year for which data is available, we estimate that 657,385 (15+ years old) Syrian employees did not have a work permit in Turkey. The consequences of informal work arrangements for employees are well known[29] and involve denied labour rights and benefits as well as a higher degree of uncertainty with respect to the future of their jobs.

This research, even though concerned about the impact of informality at the individual level, proposes to fill a gap in the literature on Syrian refugees by carrying out an assessment of the aggregate cost of informal employment. Research so far has tended to focus on other macroeconomic indicators; for example, Tümen (2016), studied the effect of informal Syrian workers on the price level of goods. He finds that the goods whose production process intensely employs informal workers showcased a decline in their prices. He explains this phenomenon by arguing that Syrian workers are replacing Turkish natives in informal jobs at a cheaper rate, passing some of the lower labour costs onto the goods' prices. In addition, the research carried out by Semih Tümen also finds that natives have lower chances of finding an informal job, an extent that we confirm with the use of microdata in the textile and garment industries, while Turkish natives' opportunities of finding a formal job increase due to the expansion in the provision of public services caused by the arrival of the refugees.

The present section drifts away from the impact of Syrian refugees on the labour market to focus on the effect of informal employment on the income of the Social Security Institute, the Treasury, employers and Syrian refugees. The reason behind this approach is to stress the often overlooked damage which is brought by informal work to business competition and to the viability of public health systems. With respect to the former, informal labour constitutes an unfair advantage that diminishes

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[29]See, as examples for the case of Syrian refugees in Turkey Eder & Özkul (2016) or Şenses (2016).

the competitiveness of compliant businesses while promoting and rewarding less efficient companies and economic sectors. In a sense, hiring informal employees is nothing but a subsidy granted by the wider society without their consent. Something similar happens with the Social Security Institute of Turkey with regards Syrian refugees;[30] informal work does not change their obligation to provide health care but prevents them from the funds that would be needed to carry out such activities.

The contribution of this study is twofold; first, we calculate the taxes and social security contributions that would have been due, were Syrians formally employed. We do this by taking advantage of an identification strategy that separates Syrian refugees from other migrants in the HLFS, thus obtaining access to the refugees' labour earnings. This, in turn, allows to quantify how much is saved by Syrians' employers and how much income is foregone by the Social Security Institute. The second contribution assesses a number of future scenarios with regards to the prevalence of informality among Syrian refugees in Turkey. In particular, we combine HLFS microdata with data from the DGMM to estimate the percentage of Syrians under temporary protection that would not be eligible to apply for a work permit under the existing hiring constraints.

The section is split into two parts; the first one explains the methodology utilized to calculate the earnings of informal Syrian employees in a hypothetical setting that assumes they are formally hired. This section also provides some details about relevant pieces of the Turkish tax system as well as the social security legislation. The second part calculates the macroeconomic impact of informality in a number of plausible scenarios for the whole country as well as by subregion and by economic sector. The section concludes with an evaluation of the current constraints faced by those applying for a work permit and with some policy recommendations.

3.1 Payroll accounting

The formalization of a worker go hand in hand with changes in the amounts due and received by several economic actors, including employees, employers, the Treasury and the Social Security Institution of Turkey. Two major triggers of these changes are taxes and social insurance contributions. Our aim in this subsection is to build a simplified version of the Turkish tax system of 2017, year the data[31] on earnings used for this analysis comes from, with the purpose of calculating the labour cost of Syrian refugees had they been hired formally.

Social insurance contributions for private employees. Social security contributions are provided by the social insurance and universal health insurance Act 5510, which states the type of insurances and the extent of the contribution provided by each of the three economic agents involved, employers, employees and the treasury, see Table 1. Government contributions are calculated as one

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[30]It should be noted that there exists no difference between an ordinary citizen's informality and a Syrian's in terms of social security legislation. Informal employment is a problem that exists independently of whether the worker is a Turkish citizen or a foreigner.

[31]Data from the 2017 Household Labour Force Survey. We gratefully acknowledge the provision of the HLFS data by the Turkish Statistical Institute under reference number 27964695-622.03-E.26626.

quarter of the sum of employer and employee contributions towards the long-term, short-term and health insurance (unemployment insurance is not included in this calculation, the treasury contributes 1 per cent of the gross income towards this item). In the past, short-term insurance primes were determined locally, ranging from 1 per cent to 6.5 per cent but they are now fixed at 2 per cent nation-wide.

The term 'long-term insurance' in Table 1 refers to the invalidity, old-age and survivors insurance premium. Crucial for the type of analysis being performed in this section is Act 5763, which amends Act 5110 and states that 5 percentage points of the long-term insurance contribution originally covered by the employer shall be now paid by the treasury as crisis relief. This discount is already reflected in Table 6. Overall, and after applying the long-term insurance discount, Turkey divides the contributions almost equally among employees (15 per cent), employers (17.5 per cent) and the Treasury (14.125 per cent), with employers still bearing an slightly higher burden than the other two agents separately.

Table 6: Social security contributions, 2017

Type of risk	Percentage (%)			
	Employer	Employee	State	Total
Short-term insurance	2	0	0	2
Long-term insurance	6	9	10	25
Health insurance	7.5	5	3.125	15.625
Unemployment insurance	2	1	1	4
Total	17.5	15	14.125	46.625

Income tax. In addition, employees are liable to pay income tax in accordance to appropriately updated thresholds provided in the article 103 of the Income Tax Act 193[32]. The income tax brackets and the tax rates applicable in 2017 are displayed for the reader's convenience in Table 7. It should be noted that income taxes in Turkey are paid from the first Lira earned irrespective how low is the income earned.

Even though Turkey does not have a minimum amount of income exempt of taxes, it does have a so-called minimum living allowance (Asgari Geçim Indirimi, article 32, Income Tax Act 193), a monetary compensation that is added to the net income after paying social contributions and income tax. This allowance depends on the personal circumstances of the employee; for a single employee, the allowance is 50% of the income tax paid by the minimum wage -which in practice means that the allowance is tied to the minimum wage level. The allowance increases by 10 percentage points when the employee is married to a non-working partner and, in presence of dependent children, 7.5 percentage points for the first 2 kids, 10 percentage points for the third kid and 5 percentage points

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[32]See Gelir Vergisi Kanunu, 193, 31/12/1960 and its amendments.

for the fourth and fifth kids can be added to the coefficient. The maximum allowance is set at 85%
irrespective of the family circumstances and if both spouses work, only one[33] of them is entitled to
claim an extra allowance because of the children. Last but not least, the Law understands by children
those aged less than 18 under the taxpayer supervision or those aged less than 25 if they are still in
education. Aside from the income tax, employees are also liable for the so-called stamp tax (Damga
Vergisi) which in 2017 was set at 0.759% of the *gross* salary (not the tax base, which is the one used
for the calculation of the income tax).

Table 7: Income tax, 2017

Range (TRY)	Rate (%)
0-13,000	15
13,001-30,000	20
30,001-110,000	27
110,000+	35

Calculating gross incomes.   Assessing the impact of the formalization of Syrian refugees requires
information on the taxes and the social insurance contributions that Syrian refugees, their employers
and the Treasury would need to pay were the former to be registered in the SSI. In order to calculate
said contributions we need to reverse-engineer the payroll accounting so as to convert net incomes, N,
the information that is available, into gross incomes. This is the opposite exercise most accountants
do, though, since generally it is information on gross income, G, what is available. The equation
that transforms gross to net income, $f(G)$, as well as the equation showing the inverse function that
transforms net to gross incomes, $f^{-1}(N)$, are presented in Appendix D, including a version that uses
data from the 2017 fiscal year which de facto constitutes a simplified version of a payroll calculator
for Turkey. These two equations are, then, used to calculate the different contributions and taxes paid
and received by the different economic agents under study.

3.2   The impact of formalization

The idea of calculating the changes that public institutions as well as employers and employees would
face if Syrian refugees were to be hired formally is relatively simple and undoubtedly appealing on
the grounds of labour rights compliance. However, in practice, such counter-factual analysis requires
assumptions on how 'formal' the employee is going to be, in other words, how many hours is the
employer going to declare to the Social Security Institution. These assumptions implicitly refer to the
negotiations between employers and employees and there are reasons to suspect some employers may

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[33]In the HLFS microdata it is not possible to know which spouse claimed the dependency of the children and the
additional points are allocated at random to one of them.

be buying their employees short since the phenomenon of misreporting hours worked is a relatively well-established in Turkey. According to the relevant labour legislation, workers cannot be employed for more than 2,600 hours[34] a year, however, 25 per cent of the country's *formal* employees report in the 2017 HLFS having worked more than said limit.

If a significant share of formal employees works more than it is legally allowed, it can be reasonable to expect Syrian refugees would too. Several reasons support this line of thought; first, informal workers have less bargaining power and less support to make their rights prevail. Second, informal Syrian refugees tend to be employed in similar jobs as the ones formal employees who work too much tend to have. In sum, the structural reasons for which formal workers are asked to work overtime are likely to make Syrian refugees work overtime too. This factor is augmented in the case of Syrian employees due to the fact that informal workers are less capable to claim their rights and avoid abusive conditions. The information from the 2017 HLFS seems to support the previously-discussed ideas as 56.1 per cent of informally employed Syrians (more than double the share of Turkish formal employees -24.0 per cent-) work more than 50 hours on an average week, while 35.3 per cent do so for 60 hours or more.

Scenarios. Based on the fact that some employers provide abusive working conditions even to *formal* employees, we design three scenarios under which the formalization of Syrian refugees could become a reality. These scenarios vary on the capacity and the willingness of employers to bear the full cost of formalizing Syrian employees with the assumptions behind each of the scenarios being summarized in Table 8. The first scenario, labeled 'pessimistic', assumes that employers are able to almost fully evade the cost of formalizing an employee. In practice, this scenario is built with the assumption that the gross pay offered by the employers under a formal contract is made equal to the net salary currently earned by informal Syrian employees. Such behavior entails two consequences; one is monetary, Syrians' lower disposable income would also lower their contributions to the Social Security Institute. The other consequence has to do with the number of hours reported by the employer to the SSI; since most Syrian employees are already (while being informally employed) earning less than the minimum wage, a reduction in their salaries would need to be accompanied by a proportional reduction in the hours officially worked.

The second scenario is labeled 'conservative' and it is built on the assumption that employers would formalize Syrian employees while keeping their net wages constant, i.e. they would absorb the due taxes and the social insurance insurance contributions. In this scenario, the declaration of working hours by the employer to the SSI works in a similar fashion it does under the 'pessimistic' scenario; as many as possible provided the hourly minimum wage is respected. The only difference comes from the fact that salaries are higher and, thus, the number of hours declared will increase proportionally.

The last scenario proposes to make Syrian employes *as formal as possible* by making employers declare as many hours as their employees work to the SSI (within the legal limit of 50 hours a week). As a

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[34]That is an average week of 45 hours + 5 hours of overtime.

result, the so-called 'optimistic' scenario, also implies higher salaries and social insurance contributions, both in line with the number of hours actually declared.

Table 8: Summary of assumptions in each scenario

Variable	Scenario		
	Pessimistic	Conservative	Optimistic
Net income	Derived from gross income using Eq. D.7 formula.	Same as the net income earned when informally hired.	As much as implied by the number of hours actually worked (cap at 50 hours a week) if hourly wage is lower than minimum wage. Does not affect those earning above the hourly minimum wage.
Gross inc.	Same as the net income earned when informally hired.	Derived from net income using Eq. D.9 formula.	Derived from net income using Eq. D.9 formula.
Hours declared	As many as the gross income allows to declare (cap at 50 hours a week). Does not affect those earning above the hourly minimum wage.	As many as the gross income allows to declare (cap at 50 hours a week). Does not affect those earning above the hourly minimum wage.	Equal to the number of hours actually worked (cap 50 hours a week).

Measuring the impact.   Four monetary indicators, one per economic agent involved, are derived from the calculation of gross incomes with the intention of assessing the effect[35] of the hypothetical formalization of -currently informal- Syrian employees' working arrangements. For the employees themselves, we focus on the take-home pay, also known as net salary. In the case of employers, we report the difference in labour cost (C) between what the employer pays to an informal employee, $C = N$, and what the employer would pay once that employee has been made formal, $C = (1 + s_c)f^{-1}(N^h)$, where s_c is the share of the gross income the employer contributes to the SS on behalf of the employee

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[35]It should be noted that the calculations performed in this section are an *educated* guess to the actual taxes and contributions that would had been paid by the different economic actors under several hypothetical scenarios using a simplified version of the 2017 Turkish tax system. There are several reasons why these figures are only an approximation, for instance, the lack of accuracy of the family links in the HLFS data (which affects the minimum living allowance), the lack of other income information (affecting the applicable marginal tax rate) and/or not knowing the work history of the person during the fiscal year (which affects the annual gross income).

and $f^{-1}(N^h)$ is a function that calculates the gross income of an employee from a hypothetical net income, see Equation D.3 for more details (Appendix D). As for the Social Security Institute, we sum all the social insurance contributions collected, $S = (s_e + s_c + s_g)f^{-1}(N^h)$, with s_e, s_c and s_g being the shares respectively applying to employees, companies and the government. Last but not least, we focus on the Treasury of Turkey which has both, a source of income (income tax, T) and an obligation to pay (SS contributions on behalf of the employee). The statistic reported is the subtraction of the two, $D = T(N^h) - s_g f^{-1}(N^h)$, with the functional form of the taxes collected, $T(N^h)$, being available in Equation D.8 (Appendix D).

Table 9: Changes induced by the formalization of Syrian employees (TRY per year)

| Statistic | Current | Formality scenarios | | |
		Pessimistic	Neutral	Optismistic
Employer cost	-14,638	-17,200	-21,832	-27,067
Hours declared to SS	na	1,559	1,895	2,415
Hours actually worked		2,729		
Employee gross income	14,638	14,638	18,580	23,036
SS contribution	0	-2,195	-2,787	-3,456
Taxes	0	-738	-1,155	-1,586
Net income	14,638	11,705	14,638	17,994
Treasury	0	-1,329	-1,469	-1,667
Taxes	0	738	1,155	1,586
SS contribution	0	-2,067	-2,624	-3,253
Social security	0	6,824	8,663	10,740
Employee	0	2,195	2,787	3,456
Employer	0	2,562	3,252	4,031
Treasury	0	2,067	2,624	3,253
Informal employees (Syrian)		657,385		

Source: HLFS 2017 and author's own calculations. Notes: The table shows the effect of formalizing the average Syrian informal employee on a number of statistics for four economic agents, employers, employees, the Treasury and Social Security Institution. The changes are shown under three scenarios, a) a pessimistic one that makes the gross income equal to the informal net, b) a neutral one that keeps the net income received by the employee constant and c) an optimistic one that pays the minimum wage for as many hours as the average informal Syrian employee actually works (with a cap at 50 hours).

All four indicators are calculated (see Table 9) for the average informal Syrian employee in the current scenario (i.e. the one where Syrian refugees are employed without a work permit) and in the three hypothetical setups designed to build counterfactual scenarios where Syrian refugees are

employed with a work permit. For employers, the effect of formalizing Syrian refugees goes from mild -an increase of ₺2,562 per employee (annual figures) in the pessimistic scenario-, to extreme -an increase of ₺12,429 that almost doubles the original cost of the worker. The sizable differences in labour cost between the three scenarios are largely explained by the number of hours officially declared by the employer to the SSI. The reason why employers cannot declare all the hours worked is given by the fact that many Syrian refugees earn below the minimum wage while working more hours than the ones legally permitted. As a result, declaring a higher number of hours would be accompanied by a pay rise so as to prevent the hourly wage from falling below the minimum wage level. It should be noted, though, that some payroll fraud would exist irrespective of the scenario chosen for the analysis; from 314 hours misreported per employee a year in the 'optimistic' scenario to an staggering 1,170 hours a year in the 'pessimistic' one, i.e. there would be work for the labour inspection even in the best[36] scenario under consideration.

While it is clear that the formalization process would be costly for employers, it is also clear that the main beneficiary of such process is the Social Security Institute of Turkey. The income received per worker is estimated in the range of ₺6,824 to ₺10,740 per worker, with the contributions coming almost in equal proportion from employers, employees and the Treasury of Turkey. The size of the latter contribution, sparked by the five percentage points relief the Treasury temporarily took care of, yields a negative net income for the Turkish public administration. Indeed, the Treasury might need to 'pay' an average of ₺1,329-₺1,667 for every worker formalized because the social contributions paid by the government greatly exceed the taxes received from low income earners. It should also be noted that without the five percentage points (originally part of the employers' long-term social insurance contribution) that is being currently paid by the government, the Treasury would be close to break-even -although it would still find itself in the 'red'.
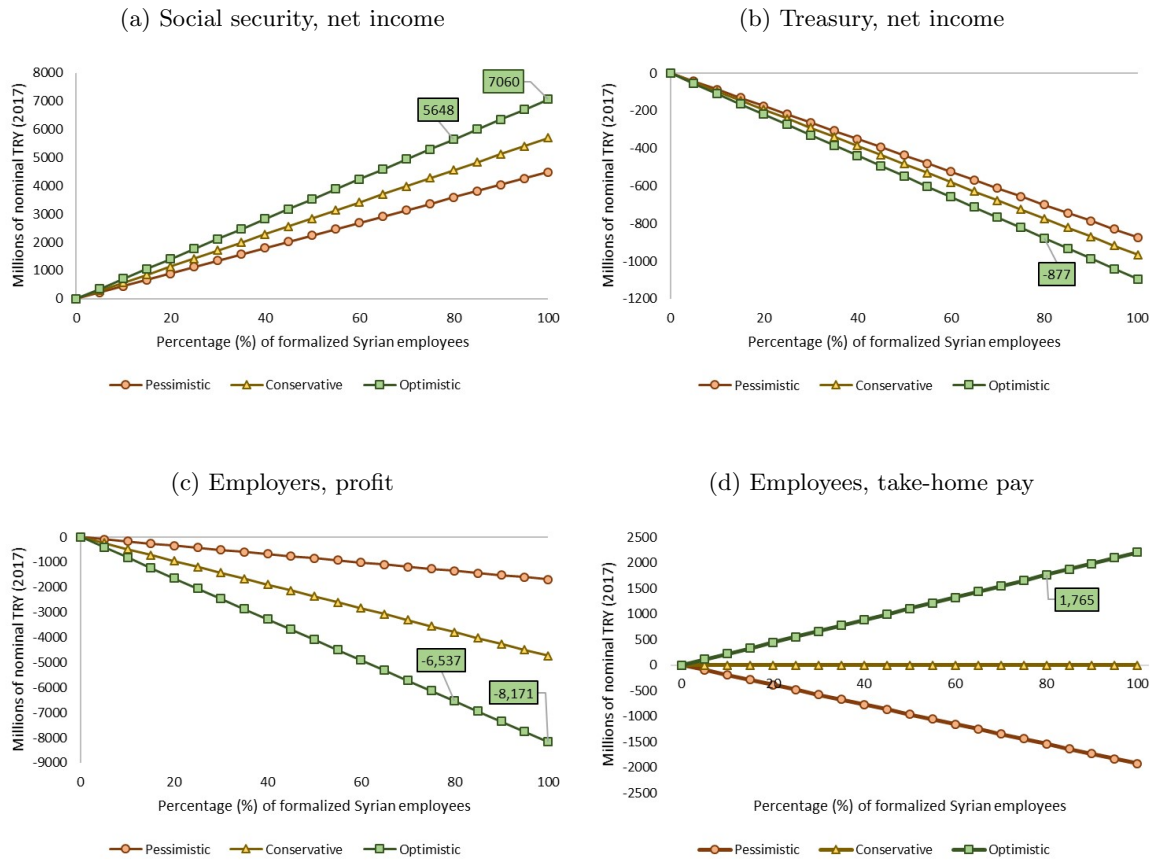
The effect of the formalization process on the Syrian employees is, perhaps, the most unclear one; depending on the scenario, the change on Syrian employees' take-home pay goes from a loss, (-)₺2,933 to a gain of ₺3,356 per year. The ambiguous effect of having a formal job on net income, which is arguably a major source of concern for this sub-population,[37] may lower informal workers' incentives for demanding a work permit. Net income is definitely not the only benefit carried by the formalization of work arrangements and there are other benefits like the right to be represented by a trade union, a higher level of certainty with respect to contractual conditions, access to a pension after retirement and health insurance, just to mention the most prominent ones. However, the benefits that in a different environment would constitute a powerful incentive for a regular worker to desire a formal job, turns out being not-so advantageous for Syrian refugees who, first of all, already have access to health care due to the temporary protection regime and, second, might not want to retire in Turkey, thus, lowering the value attached to their long-term insurance contributions.

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[36]By best it is meant the one with the higher number of hours declared.

[37]In many Syrian families there is a single income earner due to the low female labour force participation.

Macroeconomic impact. The number of (+15) Syrian employees working without a valid work permit is estimated at 657,385, that is 4.2 per cent of the total number of formal employees working in Turkey in 2017. This percentage is large enough to expect a substantial impact in the budgets, profits and disposable incomes of, respectively, the SSI, employers and employees. In order to improve the visualization of the macroeconomic impact, Figure 12 reports the changes that would have accrued to each of the economic agents under all three scenarios for a varying share of Syrian employees formalized. Some labels have also been added at the point where 80 per cent of currently informal Syrian employees obtain a work permit; this point is chosen because it roughly corresponds to the current share of Turkish employees enrolled in the SSI. On top of that, some extra labels are used to illustrate the full impact under the optimistic scenario.

Figure 12: Impact of formalizing Syrian refugees on four economic actors under three scenarios

(a) Social security, net income

(b) Treasury, net income

(c) Employers, profit

(d) Employees, take-home pay

Source: HLFS 2017 and author's own calculations. Notes: The figure shows the macroeconomic impact of formalizing currently informal Syrian employees for four economic agents, employers, employees, the Treasury and the Social Security Institution. The impact is shown under three scenarios, a) a pessimistic one that makes the new gross income equal to the informal net income, b) a neutral one that keeps the net income constant and c) an optimistic scenario where Syrian employees are paid the minimum wage for as many hours as they actually work (with a cap at 50 hours).

The biggest beneficiary of the registration of informally employed Syrian refugees is the SSI; the

institution could expect ₺5,648 millions to be added to its budget if the share of formalized employees matched the current share of formal Turkish employees. SSI's foregone income is even higher; under full-compliance its revenue could go up to ₺7,060 millions or, put differently, the SSI budget could go up by 2.2 per cent[38] nation-wide. Moreover, it is well-known that Syrian refugees are not evenly spread over the Turkish territory. In practice, they tend to populate neighboring regions with Syria (Adana, Gaziantep, Hatay, Şanlıurfa) as well as some of the most-populated cities of the country (İstanbul, Bursa, Konya and İzmir). In some of these subregions the share of informal Syrian employees with the respect to the formal population of employees more than doubles the national average (see Table 10) as does the income that the regional branches of the SSI could collect from the formalization of refugees. For example, the SSI could receive an extra income of up to ₺433 millions a year from Gaziantep, most of which at the expense of employers. A slightly lower impact could be achieved in the subregion of Konya (where informally hired Syrian made up to 8.1 per cent of the formal employment), Adana or Hatay but still much higher than in the subregions outside the top-8, where Syrian refugees only make up for 1.2 per cent of all formal employees.

Table 10: Macroeconomic impact due to the formalization of all Syrian employees (optimistic scenario), by subregion

	Informal Syrian employees		Impact (millions TRY 2017)		
Subregion	*Total*	*% of all employees*	*Social sec.*	*Treasury*	*Employers*
İstanbul	288,219	7.2	3,161	-467	-3,288
Bursa	59,754	6.0	645	-103	-786
Adana	58,536	8.6	605	-102	-854
Gaziantep	41,470	10.8	433	-74	-576
Hatay	39,245	8.7	406	-68	-524
Konya	33,672	8.8	373	-58	-454
İzmir	21,875	2.1	234	-42	-256
Şanlıurfa	21,330	6.8	242	-36	-312
Rest of Turkey	93,284	1.2	962	-147	-1,121

Source: HLFS 2017 and author's own calculations. Notes: The table shows the change in income derived derived from formalizing the work arrangements of all informal Syrian employees by subregion (NUTS-2) in the optimistic scenario. It also shows the number and the percentage of informal Syrian employees in each subregion.

Of all the economic activities benefiting from the presence of Syrian refugees, one stands out from the rest; the textile, clothing, leather and footwear industries[39] (hereinafter referred to as TCLF), which together employ almost a third of the informal Syrian employees. TCLF industries' attachment

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[38]The budget of the Social Security Insitute stood at 312,734 millions in 2017, source: www.ceicadata.com.

[39]These industries are defined by the ISIC rev.4 codes 13, 14 and 15.

to informal work is not new, though, and the reasons behind it need to be assessed from a national and a global perspective. As it can be seen in Table 12, back in 2005 TCLF industries were already employing almost half million informal workers; by 2014 the informality phenomenon had decreased in both, the total and the share, with only 379,132 informal workers adding up to 26.4 per cent of all TCLF employees. The positive trend towards formality came to a halt with the arrival of Syrian refugees who not only crowded out nationals from informal jobs but also increased the number of informal employees, bringing it back to the 2005 level.

Table 11: Macroeconomic impact due to the formalization of all Syrian employees (optimistic scenario), by economic sector

| | | Informal employment | |
Activity	*Increase in payroll (mill.)*	*Total*	*Share*
Agriculture	768	60,750	9.2
TCLF manufacturing	2,771	218,628	33.3
Other manufacturing	1,279	106,373	16.2
Construction	1,170	99,505	15.1
Transport & comm.	61	6,099	0.9
Trade, hospitality	1,360	105,396	16.0
Business act.	81	6,277	1.0
Education	105	10,401	1.6
Health	58	5,567	0.8
Other services	517	38,389	5.8
Total	8,171	657,385	100.0

Source: HLFS 2017 and author's own calculations. Notes: The table shows 1) the change in companies' payroll derived from formalizing the work arrangements of all informal Syrian employees by economic activity (measured by the ISIC rev.4) in the optimistic scenario and 2) the number and the percentage of informal Syrian employees working in each economic activity. TCLF refers to the ISIC rev.4 codes 13, 14 and 15.

Historical reasons by themselves are not sufficient to explain the strong attachment of TCLF industries to informal labour. Another contributing factor has to do with the strong competition Turkey-based garment factories face in the international market. Their products have to compete with those coming from Viet Nam, Bangladesh, Mexico or Thailand just to name a few markets where wages are at the level or lower than the ones offered in Turkey. In fact, employment growth between 2005 and 2015 in the TCLF industries of 20 countries (including major producers) is highly correlated[40] with the level of wages[41] initially held in 2005, adding yet another argument to the hypothesis of highly

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[40]Data from the ILO-Labour Force Micro-dataset v1.5.

[41]Wages are measured in 2011 constant USD to facilitate the comparison.

mobile capital in response to international competition -also sparked by the expiration of the Multi Fibre Arrangement's successor in 2005.[42] To sum up, some producers, especially those operating in the TCLF industries, may have strong incentives to keep an illegal workforce in operation.

Table 12: Type of employment in the TCLF industries, by year

| | Year | | |
Type	2005	2014	2017
Informal	494,230	379,132	491,278
of which Syrians			218,628
Formal	683,878	1,059,164	1,046,977
Total	1,178,108	1,438,296	1,538,255
Informality rate	42.0	26.4	31.9

Source: HLFS 2005, 2014, 2017 and author's own calculations. Notes: The table shows the number of formal and informal employees in the textile, clothing, leather and footwear industries (ISIC rev.4 codes 13, 14 and 15) in Turkey for three years, 2005, 2014 and 2017. In addition, it shows the year and sector-specific rate of informal employment in the TCLF industries.

Which scenario and why? The calculations use three intra-firm bargaining scenarios alongside a continuum of formalized Syrian employees ranging from 0 to 100 per cent of the target population. The multiplicity of situations opens an obvious yet relevant question, where will Turkey be in the coming future? The main difficulty when assessing the outcome of the negotiations between employers and employees with respect to the formalization of work arrangements lies on the fact that this negotiation has not happened yet, i.e. it is hypothetical. In spite of this difficulty, some light is thrown in by a similar negotiation that has already happened: the one between current formal Syrian employees and their employers. The simplest analysis would compare the average net earnings of formal Syrian employees (₺1,937 a month) with that of those employed informally, ₺1,185, finding an increase of ₺752 after formalization. However, this analysis is not only simple, it is also simplistic insofar it does not take into account the likely differences in skill, educational background and sector of employment between those employed formally and informally. If these factors were to be taken into account we would expect the earnings differential to be reduced due to formal employees being employed in sectors with higher labour productivity and/or in highly skilled occupations.

The results from a linear regression on monthly earnings[43] after taking into account differences in the above-mentioned characteristics as well as others[44] actually reduces the counterfactual differential

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[42]In reference to the Agreement on Textiles and Clothing.

[43]$R^2 = 0.3515$, survey weights used.

[44]Other characteristics include the year of arrival to Turkey, the number of hours worked, the occupation, the sector, the company size and the sex of the worker.

to ₺341 a month. This estimate should be taken with caution due to the existence of other pieces of information -most notably, the extent of their personal and professional networks- that could be correlated with employees' earnings and not taken into account in this regression. For instance, in the particular case where information on networks is omitted we would expect the earnings differential to be brought further down. Still, and with this caveat in mind, the result from the regression points out at the optimistic scenario (which assumes an increase of ₺275 a month) as being the most likely scenario to happen of the three presented for the formalization of the employment arrangements.

According to the salary prime associated to the formality of the work arrangements it looks like formal means *fully formal*, i.e. employers do not misreport a massive amount of hours so as to lower the cost of the employee. This brings the discussion to the second dimension under analysis, what percentage of informal Syrian employees can we expect to receive a work permit in the coming years? On the one hand, it will depend on the individual incentives of employees and employers; unfortunately, as things stand no increases in the effort of these agents can be expected. This is particularly so for employers, particularly those operating in historically informal sectors.

Figure 13: Work permit, non-eligible Syrian refugees under temporary protection
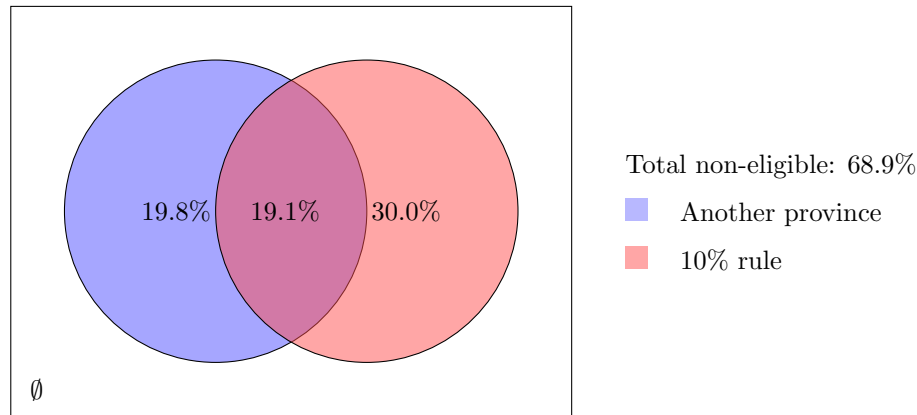
Source: DGMM, HLFS 2017 and author's own calculations. Notes: The Venn diagram shows the percentage of Syrian refugees informally employed as salaried workers that are not eligible to receive a work permit because 1) they reside in a different province to the one they are registered in -blue, left-, 2) they work in a company with less than 10 employees, thus violating the 10% rule -red, right- or 3) both reasons at the same time -combined colour, center-.

An even more important dimension, at least in practical terms, lies on whether Syrian refugees themselves are eligible to apply for a work permit. According to an UNHCR (2018) information leaflet, Syrians covered by the temporary protection regime (96.6 per cent of the Syrians that came to Turkey since the war) can only work in the province where they were initially registered. Moreover, an employment quota whereby those on temporary protection cannot exceed 10 per cent of the total number of nationals in their company is imposed to all but agricultural business. In practice, 311,553[45] Syrian refugees (49.1 per cent) work in non-agricultural companies of less than 10 employees which

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[45]This figure is the result of assuming that informally employed Syrian refugees who are not under the temporary protection regime work in similar size companies as the rest.

automatically makes them ineligible for a work permit. To make matters more complicated, 1,196,894 of Syrian refugees under temporary protection (38.9 per cent) are estimated to be living in provinces other than the ones where they were initially registered by the authorities.[46] Obviously, some of the Syrians affected by the 10 per cent quota might also be living in a different province, making the sum of the populations affected an inaccurate predictor of the percentage of Syrian unable to obtain a work permit. Unfortunately, information on the province where the person was registered is not available in the microdata (the number is a macroeconomic estimate) and a cross-tabulation is, thus, not available. The solution we propose is to assume that working in a company with less than 10 employees is independent of living in a different province than the one where the person was registered.

The percentage of ineligible refugees based on the above-mentioned assumption is shown in Figure 13. According to these estimates, 68.9 per cent of all Syrian refugees would not even be eligible to obtain a work permit; 19.8 per cent because they are working in a province other than the one they registered in, 30.0 per cent because they work in a company with less than 10 employees and 19.1 per cent because of both reasons at the same time. As a result, and provided the current conditions do not change, Turkey should not expect more than 31.1 per cent of the informal Syrian employees to be formalized in the short-run.

3.3   Conclusions and way forward

This section calculates the impact of formalizing Syrian employees for their employers, the Social Security Institute (SSI), the Treasury and the employees themselves. This research is carried out with the aim of bringing all economic actors under the spotlight since, as Bangasser (2000) lucidly pointed out, it is often '... much safer to *help* those suffering from informality than to confront those benefiting from it'. In this respect we find that Turkey-based employers may be saving ₺8,171 millions a year at the expense of the SSI and those employed without a work permit. At the same time, the SSI is not only deprived of an income flow estimated in ₺7,060 millions per year but is also required to provide health care services to Syrian refugees who belong to the Temporary Protection regime, putting pressure on the institution and endangering its sustainability.

The importance of providing work permits to informal Syrian employees goes beyond social security contributions gone astray; it is related to the provision of decent work, including access to health care, to a pension after retirement as well other labour rights provisioned by the law. In spite of the importance of providing formal work arrangements, only 27,930[47] temporary protection beneficiaries had received a work permit by September 2018, a figure that anticipates a long and arduous path ahead in the quest for formalizing this group of employees.

Some measures aimed at facilitating the work permit application process have already been put in place by the government; these include online processing of application forms, the provision of an

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[46]This number is calculated by adding up the differences between the DGMM and our own (based on the 2017 HLFS, see Appendix C) estimates on the number of Syrian refugees in the sub-regions that gained population.

[47]Source: http://www.asylumineurope.org/reports/country/turkey/access-labour-market-0.

step-by-step guide designed to walk employers through the process and a dramatic reduction in the application fee from ₺761.1 to ₺283.2[48] for a 1 year work permit as of 2019. Still, existing restrictions related to eligibility may be dramatically reducing the number of Syrian refugees who could obtain a work permit. Two of these restrictions, the 10 per cent employment quota and the obligation to work in the same province where the person was initially registered, might, in practice, discard 68.4 per cent of the informal Syrian employees from receiving a work permit. In addition, Syrian refugees' guaranteed access to health services and uncertainty with respect to their future living arrangements may lower their incentives to demand their formalization, thus delaying the conversion even further.

In light of the poor conversion rate to formality of Syrian employees, and with the objective of providing decent work for all as well as supporting the SSI's operations, some additional measures might be due. At a minimum, effective guidance should be developed for Syrian workers. Social security rights and obligations should be well explained and information activities should be organized within this scope. One direction that could be explored is the relaxation of the employment quota for those under the temporary protection regime, which currently is even more stringent than the one applied to other migrants. Another dimension that could be further studied is the removal of the mobility restrictions, especially in view of the limited success it has had in preventing internal migrations for job search purposes. In addition to the measures directed at enlarging the pool of eligible applicants, some policies aimed at increasing the incentives of Syrian refugees to demand their formalization can also be used. One such policy could offer a lump-sum with a share of the social security contributions to returning refugees. This would not only increase the demand of work permits but would also facilitate the return and re-integration of Syrian refugees in their country of origin.

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[48]Source: http://turkishlaborlaw.com/work-permits-in-turkey/666-2019-work-permit-fees.

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Appendix A: Derived variables from the HLFS

Number of children aged 0-14.   The data provided in the HLFS by the Turkish Statistical Institute only refers to those aged 15 or older, however, information regarding the number of people aged 0-14 living in the household can be retrieved. This variable is calculated by subtracting the variable hh_buyukluk, which contains the number of people in the household (including children), with a variable of our own creation that contains the number of household members aged 15 or more. Some pieces of household-level information are assigned to the children, for instance, the region (NUTS-1), the subregion (NUTS-2) and the survey weight; in addition, children living in a household whose head is foreign-born are given the year of arrival to Turkey of the head of the household provided the head did not arrived before 2003. In all other cases it is assumed that the children were born in Turkey.

Year of arrival to Turkey of persons born abroad.   One of the questions available in the HLFS asks respondents whether they were born abroad or in Turkey. As an example, this group contains 10,032 observations in the 2017 HLFS -including children aged 0-14, see first paragraph of Appendix A. For most[49] of the foreign-born population, the dataset also provides information on their year of arrival to Turkey. The variable 'year of arrival' is built in two steps as its information comes from two sources, the variable buil_yil for those who have been living in the same province since their arrival to Turkey and the variable tr_yil for those who changed provinces within Turkey at least once since their arrival to the country *and* have lived abroad for at least 12 months.

Table A.1: Construction of the variable 'year of arrival to Turkey'

	Variable	Sub-population	Obs. HLFS 2017
Year of arrival	buil_yil	dogum_yer=Abroad buil_yasama=No[50] onceki_ikamet=Abroad	8,310
	tr_yil	dogum_yer=Abroad buil_yasama=No onceki_ikamet=Turkey yurtdisi_durum=Yes	1,377

The full list of logical skips used to build the year of arrival is shown in Table A.1, where the

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[49]The survey does not ask the arrival year to foreign-born residents who have changed their province of residence if they have lived less than 12 months outside Turkey. For instance, in the 2017 HLFS, this group totals 344 observations out of the 1,721 that conform the group of foreign-born who have changed provinces within Turkey at least once in their lives.

[50]In practice, it is not possible for a person born abroad to have lived permanently in the same Turkish province his/her whole life. There is only one observation (out of 10,032) in the 2017 HLFS for which a Yes is recorded in 'buil_yasama' despite being born abroad and it is disregarded.

column 'sub-population' presents the conditions that respondents need to fulfill for their year of arrival to come from either of the two options. It should be noted that the condition referring to the variable `buil_yasama` (which asks whether the person have permanently lived in his/her current province) is shown for completeness but it does not make any difference as it is logically impossible to have lived the whole life in the same Turkish province while being born abroad.

The resulting variable is plotted in Figure A.1 which shows the number of observations by year of arrival. It can be observed the existence of two peaks, one in 1989, which coincides with the migration/expulsion of Turks from Bulgaria and a second one from 2011 onwards, right after the Syrian civil war.

Figure A.1: Born abroad by year of arrival to Turkey
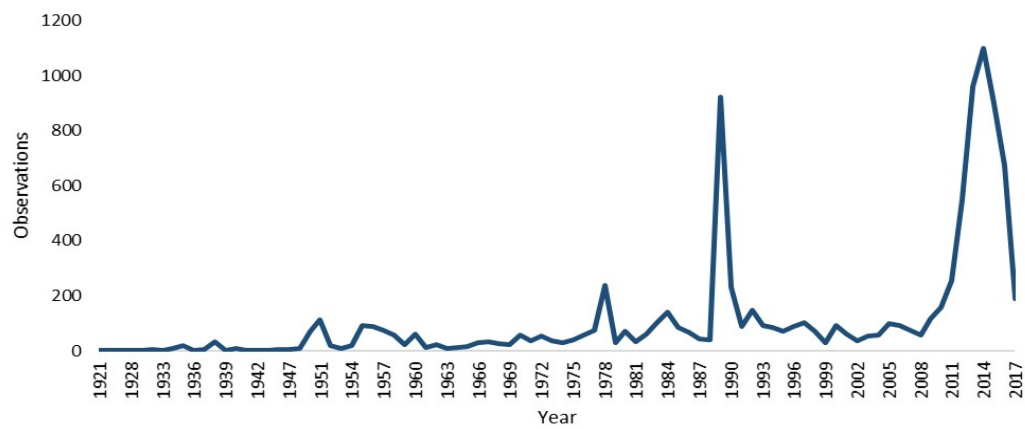
Appendix B: Identification strategy for Syrian refugees in the HLFS

The number of foreign-born individuals present in the 2017 Household Labour Force Survey (HLFS) is six times larger among those who arrived between 2011 and 2017 than among those that did so between 2004 and 2010, suggesting the survey may have captured Syrian refugees. Unfortunately, the publicly available microdata of the HLFS does not contain information on the country of origin and, even though we suspect that Syrian refugees make up for the majority of observations among those who migrated between 2011 and 2017, they are unlikely to be the only foreigners who entered Turkey since the onset of the Syrian crisis. This hypothesis is supported by Figure B.1, which shows the existence of a relatively constant number of foreign-born individuals arriving to turkey during the years that preceded the Syrian war (2004-2010). As a result, Syrian refugees are probably mixed up in the data with the hereinafter called 'regular' migrants, thus preventing a direct identification of Syrian refugees.

Figure B.1: Number of foreign-born individuals in Turkey by year of arrival, 2004-2017
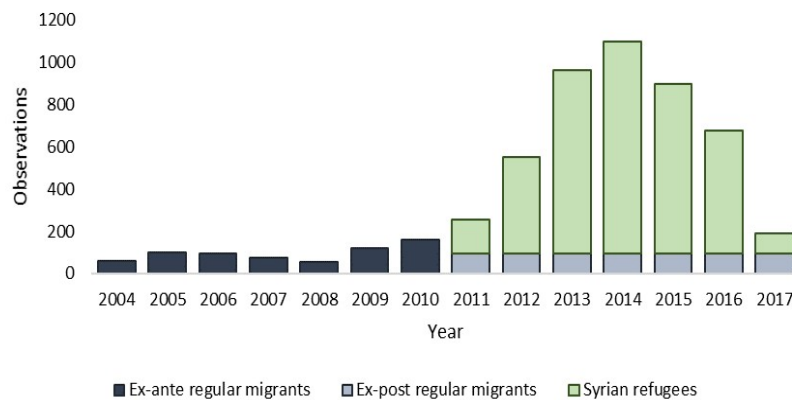
Source: Household Labour Force Survey 2017 and ILO's own calculations. Note: The figure shows the number of foreign-born observations living in Turkey. 'Syrian refugees' are obtained by subtracting the average number of foreign-born individuals during the 2004-2010 period (the so called 'ex-ante regular migrants') from the total number of observations in each of the years between 2011 and 2017 (ex-post migrants).

Assumptions

In order to identify the Syrian refugees present in the sample we pursue an indirect identification strategy. Instead of finding Syrians among the 2011-2017 migrants we find those who are not, to then remove them from the sample (see Figure B.1 for a visual explanation of the idea) with Syrian refugees being a 'left-over' of the procedure. For this strategy to work we assume that there is a relatively constant flow of what we call 'regular' migrants. This assumption is critical in that it provides the number of observations that need to be removed from the ex-post migrants' group -migrants arrived

between 2011 and 2017.

In addition, ex-ante and ex-post 'regular' migrants, some of them thought to be Turkish-German by Bel-Air (2016), are assumed to share similar socio-economic characteristics which are (1) observable in the microdata and (2) significantly different from those of Syrian refugees. This allows for a successful separation of 'regular' migrants from Syrian refugees in the ex-post migrants' group. If, for instance, the ex-ante and the ex-post migrants' groups were identical, the matching would be trivial and refugees would not be identified, i.e. we would be removing ex-post migrants at random which would not help more than doing no matching at all. The comparability of ex-ante and ex-post migrants is tested (see Table B.1) by comparing mean values of variables where, in principle, we would expect Syrian refugees and 'regular' migrants to differ. It should be noted that for the sake of relevance, the comparison is done at the family level. This is because we match families -as opposed to individuals- so as to keep within-household coherence. Moreover, only individuals arrived during the prescribed period are included as part of the family; that is to minimize the noise due to mixing[51] with the local population and/or other migrants.

Table B.1: Summary statistics at the family level: Before matching

Variable	Migrant families 04-10	Migrants Families 11-17	Ratio (ex-post/ex-ante)
Family size	1.68	3.34	2.00
Proportion of 0-14	0.09	0.20	2.23
Proportion of 15-24	0.16	0.24	1.50
Proportion of 15+ women	0.75	0.63	0.83
Existence of a widow	0.03	0.08	2.37
Existence tertiary educ.	0.41	0.23	0.55
Proportion of 15-24 students	0.67	0.20	0.29
Proportion of 15+ female workers	0.31	0.14	0.44
Proportion of 15+ NEETs	0.50	0.59	1.18
Number of workers	0.51	0.78	1.53
Number of informal workers	0.18	0.63	3.50
Existence of male garment workers	0.02	0.11	6.61

The table shows averages at the family level for a number of variables. The wording 'existence' refers to the existence of at least one person with the mentioned characteristic in the household. The proportions of 15-24 students and 15+ female workers are calculated for families who, respectively, have 15-24 aged old individuals and 15+ women.

It stems from Table B.1 that sharp differences exist between the families who arrived to Turkey between 2004 and 2010 and those who did so between 2011 and 2017. For example, family size doubles

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[51]This noise is particularly acute among ex-ante migrants, with a higher tendency to live in mixed households.

among ex-post migrants, as it roughly does the proportion of children aged 0-14, proving the existence of a much younger population. The relatively high number of households with a widow is a hint that points at the possibility of having some ex-post migrant families escaping from a civil war. In addition, we observe significantly less individuals with tertiary education, less female workers and more NEETs among ex-post migrants, which strongly suggests the existence of strong differences at the cultural and at the socio-economic level between the two groups under analysis. At last, the high prevalence of informal workers among ex-post migrants, 43 per cent of their households have at least one such worker, fits well with these families being Syrian as not many of their members have managed to obtain a work permit. In sum, based on the observed differences, it is reasonable to argue that ex-post migrants constitute a different group which, in turn, supports the use of matching.

Matching

The matching of ex-post 'regular' migrant families with ex-ante 'regular' migrant families uses nearest neighbor propensity score without replacement. In practice, this translates into the calculation of a probability (propensity score) of being an ex-ante 'regular' migrant family for ex-ante migrant families based on observable characteristics -like the ones shown in Table B.1. Then, based on the scores every ex-ante migrant family is matched with the ex-post migrant family who has the closest score -the nearest neighbor- and is not considered again for matching, hence the lack of replacement.

Model estimation. Propensity scores are built with the help of a Logit model so as to maintain the probabilities of being a 'regular' migrant family bounded between 0 and 1. The model is defined for the ith family using the logistic cumulative distribution function (CDF) as follows:

$$Pr(n_i = 1|X_i) = G(\beta X_i), \tag{1}$$

where the probability of being a 'regular' (n=1) migrant family given some characteristics (X) is given by the logistic function $G(\cdot)$. The arguments inside this function are given by:

$$\beta X_i = \beta_0 + \beta_1 \text{kids}_i + \beta_2 \text{young}_i + \beta_3 \text{women}_i + \beta_4 \text{widow}_i + \beta_5 \text{university}_i + \beta_6 \text{student}_i$$
$$+ \beta_7 \text{fem\_work}_i + \beta_8 \text{NEET}_i + \beta_9 \text{workers}_i + \beta_{10} \text{informal}_i + \beta_{11} \text{garment}_i + \vec{\delta} R_i + \epsilon_i, \tag{2}$$

where *kids*, *young* and *women* denote the proportion in the household of, respectively, individuals aged 0-14, individuals aged 15-24 and women. The variable *widow* stands for the existence of at least 1 widow in the family. Likewise, *university* denotes the existence of at least 1 person with tertiary studies in the family. The variables *fem_work*, *NEET* and *student* are proportions of (1) women working among +15 women, (2) NEETs among the +15 population and (3) students among the 15-24 population; in all cases a zero is assigned when the proportion is not applicable (i.e. there are no women in the family).[52] At last, *workers* and *informal* measure, respectively, the number of workers

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[52]The population proportions (*young*, *women*) provide the marginal probability for those families containing the applicable population but lacking the characteristic. For instance, if there are 15-24 individuals but no one is studying.

and informal[53] workers in the household while the variable *garment* controls for the existence of at least one male worker in the textile, garment, footwear and leather industry (TCLF).[54] On top of the above-mentioned variables, regional dummies are included in the matrix denoted by the letter R.

Table B.2 contains the marginal probability of being a 'regular' migrant family after estimating the Logit model for 1,756 families, of which 377 are ex-ante migrant families and 1,379 are ex-post migrant families. The estimates confirm that the socio-economic and cultural differences shown in Table B.1 are significantly different from zero; for example, it can be seen that the existence of at least a widow in the household raises the probability of having found a Syrian family by 13 per cent, while the existence of at least one informal worker increases the mentioned probability by 30 per cent. With respect to the proportions, the results show that an increase of 0.1 in the proportion of 0-14 kids in the family lowers the probability of being a 'regular' migrant family by 2.8 per cent. In addition, it is found that 'regular' migrant families have a much higher propensity to live in the subregions of Antalya and Van (not shown in Table B.2 for space reasons) than Syrian refugees.

Table B.2: Estimates of the probability of being a 'regular' migrant family

Variable	Probability	Variable	Probability
Prop. 0-14	-0.26^{***}	*Prop. +15 female workers*	0.13^{*}
Prop. 15-24	-0.28^{***}	*Prop. +15 NEETs*	-0.16^{**}
Prop. +15 women	0.07	*Number of workers*	0.03
Exist widows	-0.13^{*}	*Number of informal workers*	-0.15^{*}
Exist +15 tertiary educ.	0.06^{*}	*Prop. informal worker*	-0.14
Prop. 15-24 students	0.23^{***}	*Exist male garment worker*	-0.19^{*}

Significance: *** at 99%, ** at 95%, * at 90%. Pseudo R^2: 0.1680.

Identification.   Given the marginal probabilities shown in Table B.2 we build propensity scores for each of the 1,756 families in the sample. Then, every ex-ante migrant family is matched with an ex-post migrant family and the 1,002 leftover families are labelled 'Syrian refugees'. The propensity scores of ex-ante and ex-post migrant families are shown in Figure B.2 (a) confirming these two groups of migrant families are very different from each other. Figure B.2 (b) shows the propensity scores *after* the matching is done, with probabilities assigned separately for ex-ante 'regular' migrant families (those arrived between 2004 and 2010), ex-post 'regular' migrant families (matched families from those arrived between 2011 and 2017) and Syrian refugee families (unmatched families arrived between 2011 and 2017). In addition to isolating a group of Syrian families which is markedly distinct from earlier migrants, the matching has been able to create a control group with an almost similar distribution of propensity scores. This is reassuring with respect to the first identification assumption, the existence

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[53]Informality occurs whenever contributions to social security are not provided on behalf of the worker.
[54]ISIC rev.4 codes 13, 14 and 15.

of a constant flow of regular migrants and the comparability of ex-ante and ex-post 'regular' migrant families.

Figure B.2: Propensity scores, before and after matching

(a) Before matching   (b) After matching
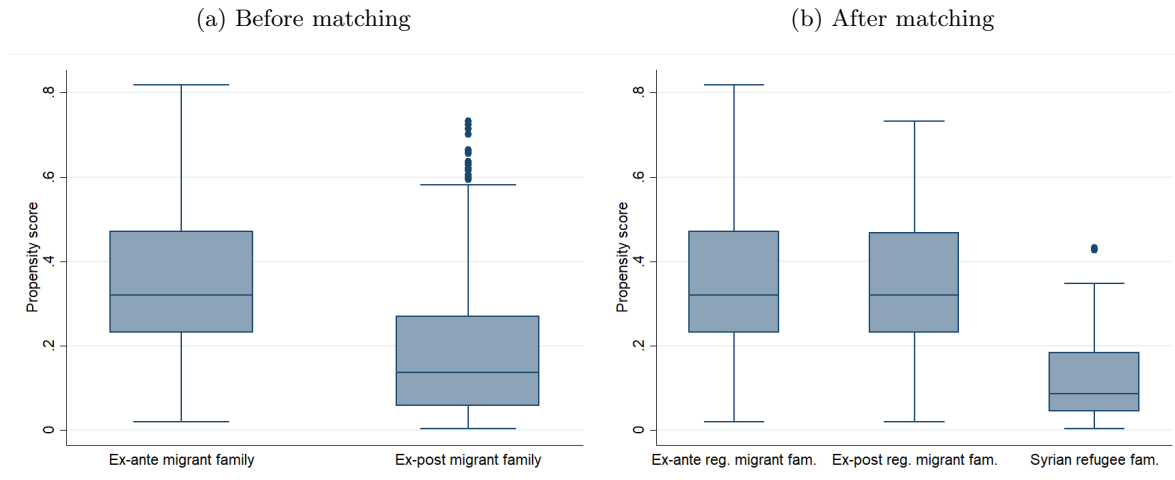
Source: Household Labour Force Survey 2017 and ILO's own calculations. Notes: The box plots show propensity scores distributions; the three horizontal lines of the blue boxes denote from top to bottom, the third quantile, the median and the first quantile. Part (a) shows the distribution before matching for foreign-born families who arrived, respectively, between 2004-2010 and between 2011 and 2017. Part (b) splits the scores of 2011-2017 migrant families between those families matched (ex-post 'regular' migrant families) and those unmatched (Syrian families.

The resulting matching can also be tested with the help of the same variables shown in Table B.1; in this regard, Table B.3 provides averages for 12 family-level variables for all three groups identified, ex-ante and ex-post 'regular' migrant families and Syrian refugee families. Overall, the matching provides a cleansing effect over all the statistics under analysis by increasing the differences between the averages held by Syrian refugee families and 'regular' migrants. These differences are even more dramatic than in Table B.1; for example the average Syrian refugee family has 3.85 members compared to 2.00 members living in the ex-post 'regular' migrant families.[55] Other revealing examples include the number of informal workers (0.81 vs. 0.16), the existence of female workers (0.08 vs. 0.29) and the proportion of 15-24 students (0.11 vs. 0.63).

Certain dissimilarities can still be found between the two groups of 'regular' migrant families, the ex-ante and the ex-post. These differences are not necessarily signal a lack of comparability between the two groups and might be due to the time spanned between the arrival of the ex-ante migrant families and the present time. For example, the fact that ex-ante migrants are 7 years older than ex-post migrants might well explain the imperfect match in, say, the lower percentage of ex-post 'regular' migrant families where at least one individual holds a tertiary education degree.

[55]Ex-post migrants families' (i.e. Syrian and ex-post 'regular' families together) size is 3.31 before the separation, refer to Table B.1.

Table B.3: Summary statistics at the family level: After matching

Variable	Regular migrant families '04-'10	Regular migrant families '11-'17	Syrian families
Family size	1.68	2.00	3.85
Proportion of 0-14	0.09	0.09	0.24
Proportion of 15-24	0.16	0.16	0.26
Proportion of 15+ women	0.75	0.76	0.58
Existence of a widow	0.03	0.03	0.09
Existence tertiary educ.	0.41	0.38	0.17
Proportion of 15-24 students	0.67	0.63	0.11
Proportion of 15+ female workers	0.31	0.29	0.08
Proportion of 15+ NEETs	0.50	0.50	0.62
Number of workers	0.51	0.47	0.90
Number of informal workers	0.18	0.16	0.81
Existence of male garment workers	0.01	0.01	0.14

The table shows averages of the mentioned statistics at the family level. The 'existence' refers to the existence of at least one person with the mentioned characteristic. The proportions of 15-24 students and 15+ female workers are calculated for families who, respectively, have 15-24 aged old individuals and 15+ women.

Quality check

The sharp increase in foreign-born individuals captured by the HLFS after the onset of the Syrian civil war and the marked differences in the socio-economic indicators shown by those identified as Syrian refugees leave little doubt about them belonging to refugees. However, questions might still arise about the sub-population represented by those captured in the HLFS.

As a quality control check, Figure B.3 compares the population pyramid of the 3,858 Syrian refugees identified as such by the matching methodology with the pyramid of the Syrian refugees under temporary protection registered by the Turkish Directorate General of Migration Management.[56] The figure shows the proportion held by each of the 8 age groups in which the population has been split. The conclusion is that the age distribution of those identified as Syrian refugees in this appendix have a very similar age distribution to the one of those they are suppose to be representing in all age groups under consideration.[57]

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[56]Data retrieved from http://www.goc.gov.tr/icerik6/temporary-protection_915_1024_4748_icerik.

[57]It should be noted that we are comparing figures on Syrian refugees under temporary protection with estimates from the HLFS that represent *all* Syrian refugees. This is because the age breakdown of Syrian refugees with short-term residence permits and those with Turkish nationality could not be retrieved from Turkstat. This could explain why according to the HLFS estimates Syrian refugees are slightly older.

Figure B.3: Syrian refugees' population pyramid, HLFS vs. DGMM
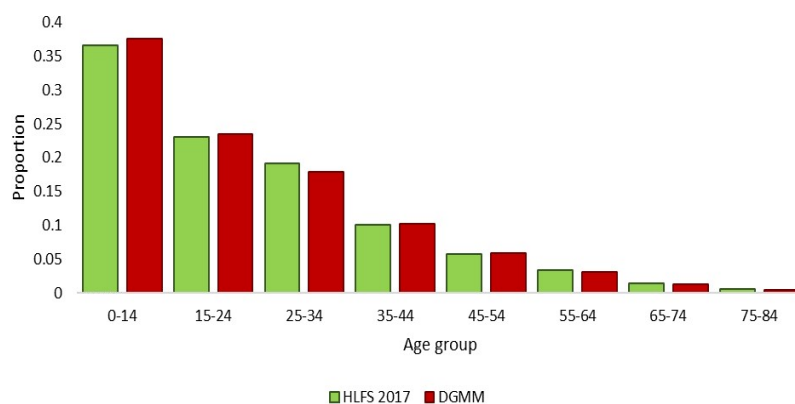
Source: Household Labour Force Survey 2017, Directorate General of Migration Management and ILO's own calculations.
Notes: The figures shows the proportion of Syrian refugees in a number of age groups from two sources, the HLFS 2017 and the DGMM. A chi-square test cannot reject that the HLFS and DGMM data are drawn from the same distribution.

Appendix C: Survey weights' adjustments

Background. The Household Labour Force Survey (HLFS) covers[58] at the sampling stage all settlements in Turkey, thus, providing nationally representative figures on all residents with the exception of the non-institutional population. In practice, though, the coverage is further restricted to Turkish natives residing in Turkey and foreigners with long-term residence permits, see pages 8-9 from İçduygu (2013). This restriction, which can be perceived as a minor issue turns out to exclude several millions of Syrian refugees that currently populate Turkey.

The source of the exclusion revolves around the Address Based Population Registration System (ABPRS), a registry set up by the Law 5490 of 2006 on Population Services which is used by the Turkish Statistical Institute to sample addresses. This system[59] matches, for foreigners with residence permits of at least 6 months,[60] addresses from the National Address Database (NAD) with passport numbers before storing the information in the ABPRS. The problem is that most Syrian refugees have not received neither a residence permit nor the Turkish nationality; according to Article 20, point (g) of the Law 6458 of 2013 on Foreigners and International Protection 'a residence permit shall not be required from those foreigners holders of the documents listed in paragraph 7 of Article 69 as well as the first paragraphs of Articles 76 and 83'. The mentioned paragraphs make reference to those applying for international protection in the different phases of the application process, in practice excluding Syrian refugees from (1) the need of having a residence permit and (2) being registered in the ABPRS as their addresses are kept in a separated registry by the Directorate General of Migration Management.

Syrian refugees in the HLFS. In spite of the initial inability of covering individuals under the temporary protection regime, some of the interviewed households in the HLFS (approximately 1,000 households) are occupied by foreigners whom, given the year of arrival to Turkey (among other characteristics) are likely to be Syrian refugees.

Two problems arise from the appearance of Syrian refugees in the HLFS sample; on the one hand around 3,858 Syrian refugees are now representing more than a million[61] Turkish citizens (including foreigners with long-term residence permits) even though their socio-economic characteristics are far from comparable to the ones of the people they are supposed to be representing. On the other hand, since the sample now includes Syrian refugees, the total population represented by the sample should be increased to 81.6 millions as of July 2017, i.e. 78.6 Turkish and long-term foreign residents plus 3.19 millions of Syrian refugees as estimated by the DGMM (including Syrian who acquired the Turkish nationality, those on short-term residence permits and those covered by the temporary protection regime).

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[58]See http://tuik.gov.tr/MicroVeri/Hia_2017/english/meta-data/index.html for more details.

[59]See Taştı (2009) for more information on how the system works.

[60]As mentioned in Bel-Air (2016).

[61]Expanded number of Syrian refugees using the original survey weights of the HLFS 2017.

Non-response adjustment for Turkish residents. We propose to solve the former problem by treating the existence of Syrian refugees as a non-response problem, i.e. as if the Turkish family that should have been interviewed was not present at home at the time of the visit. By following this assumption the expanded number of Turkish people is down to 77.6 millions thus requiring an upwards adjustment of the survey weights. In this research we perform the adjustment by multiplying each non-Syrian refugee observation's survey weight, w, by a sub-region specific adjustment factor. These adjustment factors, f_j^{adj}, are defined at the NUTS-2[62] subregion level, $j \in (1, J)$, as follows

$$f_j^{adj} = \frac{\sum_{i=1}^{N} w_{i,j}}{\sum_{i=1}^{T} w_{i,j}}, \tag{3}$$

where N is the total number of observations in the sample, T is the number of Turkish natives plus foreigners with long-term residence permits and, a result of adding up survey weights the numerator and the denominator are equal to the respective expanded populations in a given subregion. Adjusted survey weights, w^{adj}, are then created by multiplying the original survey weights by the region-specific adjustment factor,

$$w_{i,j}^{adj} = w_i f_j^{adj} \qquad\qquad \text{for all non-Syrian refugees.} \tag{4}$$

Post-stratification adjustment for Syrian refugees. The problem related to the representativeness of the Syrian refugees' sample is more contentious. To start with, the survey weights initially assigned to them in the HLFS have little value because they were meant for other people; they are, consequently, dropped altogether. In this case a post-stratification adjustment can be performed provided that something close to a census informing us of the total count of Syrian refugees in the country exists and provided the sample of Syrian refugees is randomly drawn. The former is fulfilled by figures on the total population of Syrian refugees in Turkey regularly published by the Directorate General of Migration Management.[63] The latter assumption can be justified by arguing that Syrian refugees were not expected to appear in the sample and, since the original sampling was meant to be representative of all regions of Turkey so are the households with Syrian refugees found by mistake. In other words, we do not expect the appearance of households with Syrians to happen more often in Adana than in Samsun other than by the fact that there are more Syrians refugees living in Adana than in Samsun.

The survey weights for Syrian refugees are assumed to be a function of the inverse probability a person has of being selected in a specific subregion, p_j^{-1}, where the proportion is defined as

$$p_j = \frac{\sum_{i=1}^{N} i_j}{\sum_{i=1}^{N} w_{i,j}}, \tag{5}$$

and N represents the total number of observations in the sample. In addition, because some Syrian-inhabited households had a zero probability of being visited (because they are not present in the

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[62]See https://ec.europa.eu/regional_policy/en/policy/what/glossary/n/nuts/ for an explanation on the statistical regional units classification. In Turkey there are 26 subregions at the NUTS-2 level.

[63]Even though these figures are published at the NUTS-3 level (provinces), we disregard the provincial distribution because we suspect Syrian refugees have incentives to re-distribute themselves within Turkey to areas with a higher number of job opportunities, for instance, areas like Bursa or İstanbul.

ABPRS) weights may still not add up to the actual population of Syrian refugees. This is fixed by a correction factor that makes the sum of the weighted sample add up to the official figure of Syrian refugees as of July 2017,[64] $\bar{S}$. Survey weights are defined by multiplying the inverse proportion of being selected in a particular subregion by the adjustment factor as follows,

$$w_{i,j}^{adj} = p_j^{-1} \frac{\bar{S}}{\sum_{j=1}^{J} p_j^{-1} \sum_{i=1}^{S} i_j} \qquad \text{for Syrian refugees,} \qquad (6)$$

where S is the number of Syrian refugees in the sample. It should be noted that, in practice, the correction factors divides the actual population of Syrians by the expanded population of Syrians that arises from the probability of choosing a person in a particular subregion. Both, the adjustment factors for Turkish residents and the adjusted weights for Syrian refugees can be found in Table C.1.

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[64]Which includes DGMM estimates on Syrian refugees under temporary protection and short-term residence permits as well as Syrians who acquired the Turkish nationality.

Table C.1: Re-weighting by subregion (NUTS-2), 2017 HLFS

Subregion	Provinces	Turkish Adj. factor	Syrian refugees Inv. prob.	Syrian refugees Adj. weight
İstanbul	İstanbul	1.0203	338	1,511
Tekirdağ	Tekirdağ, Edirne, Kırklareli	1.0024	109	485
Balıkesir	Balıkesir, Çanakkale	1.0016	96	428
İzmir	İzmir	1.0078	196	876
Aydın	Aydın, Denizli, Muğla	1.0086	157	700
Manisa	Manisa, Afyon, Kütahya, Uşak	1.0039	171	765
Bursa	Bursa, Eskişehir, Bilecik	1.0212	195	871
Kocaeli	Kocaeli, Sakarya, Düzce, Bolu, Yalova	1.0044	188	838
Ankara	Ankara	1.0071	192	856
Konya	Konya, Karaman	1.0442	83	370
Antalya	Antalya, Isparta, Burdur	1.0082	166	743
Adana	Adana, Mersin	1.0293	183	817
Hatay	Hatay, Kahramanmaraş, Osmaniye	1.0141	187	837
Kırıkkale	Kırıkkale, Aksaray Niğde, Nevşehir, Kırşehir	1.0239	85	378
Kayseri	Kayseri, Sivas, Yozgat	1.0085	160	716
Zonguldak	Zonguldak, Karabük, Bartın	1.0007	110	490
Kastamonu	Kastamonu, Çankırı, Sinop	1.0032	55	246
Samsun	Samsun, Tokat, Çorum, Amasya	1.0020	139	620
Trabzon	Trabzon, Ordu, Giresun Rize, Artvin, Gümüşhane	1.0003	120	552
Erzurum	Erzurum, Erzincan, Bayburt	1.0013	75	335
Ağrı	Ağrı, Kars, Iğdır, Ardahan	1.0010	77	343
Malatya	Malatya, Elazığ, Bingöl, Tunceli	1.0015	120	537
Van	Van, Muş, Bitlis, Hakkâri	1.0000	92	411
Gaziantep	Gaziantep, Adıyaman, Kilis	1.0264	144	642
Şanlıurfa	Şanlıurfa, Diyarbakır	1.0126	177	791
Mardin	Mardin, Batman, Şırnak, Siirt	1.0020	159	711

The numbers from the column 'Adj. weight' multiply the numbers of the column 'Inv. prob.' by a factor of 4.4673; the multiplications might not add up in the table due to rounding.

Table C.2, in turn, shows the expanded population of Syrian refugees under temporary protection after applying the adjusted weights as well as the official figures from the DGMM for comparison purposes.

Table C.2: Syrian refugees under temporary protection in Turkey by subregion (NUTS-2), 2017

		Syrian refugees in Turkey		
Subregion	*Provinces*	*Official*	*HLFS estimated*	*Difference*
İstanbul	İstanbul	497,135	1,093,701	596,565
Bursa	Bursa, Eskişehir, Bilecik	113,989	270,691	156,702
Konya	Konya, Karaman	76,744	201,085	124,341
Adana	Adana, Mersin	308,641	378,422	69,782
Kırıkkale	Kırıkkale, Aksaray Niğde, Nevşehir, Kırşehir	15,055	68,110	53,054
Aydın	Aydın, Denizli, Muğla	26,483	74,111	47,628
Antalya	Antalya, Isparta, Burdur	15,438	51,517	36,079
Manisa	Manisa, Afyon, Kütahya, Uşak	13,554	49,325	35,771
Ankara	Ankara	75,881	96,429	20,547
Kocaeli	Kocaeli, Sakarya, Düzce, Bolu, Yalova	46,533	63,759	17,226
Samsun	Samsun, Tokat, Çorum, Amasya	7,579	22,671	15,092
Kastamonu	Kastamonu, Çankırı, Sinop	1,449	9,719	8,270
Erzurum	Erzurum, Erzincan, Bayburt	950	8,052	7,103
Ağrı	Ağrı, Kars, Iğdır, Ardahan	1,333	4,287	2,954
Zonguldak	Zonguldak, Karabük, Bartın	883	3,300	2,417
Balıkesir	Balıkesir, Çanakkale	6,222	8,235	2,013
Tekirdağ	Tekirdağ, Edirne, Kırklareli	15,719	14,525	-1,194
Trabzon	Trabzon, Ordu, Giresun Rize, Artvin, Gümüşhane	4,027	3,191	-836
Van	Van, Muş, Bitlis, Hakkâri	4,662	0	-4,662
İzmir	İzmir	112,881	103,718	-9,163
Malatya	Malatya, Elazığ, Bingöl, Tunceli	29,689	12,290	-16,769
Kayseri	Kayseri, Sivas, Yozgat	67,207	48,966	-18,241
Mardin	Mardin, Batman, Şırnak, Siirt	136,673	12,322	-124,352
Gaziantep	Gaziantep, Adıyaman, Kilis	497,371	210,195	-287,176
Şanlıurfa	Şanlıurfa, Diyarbakır	466,811	134,796	-332,015
Hatay	Hatay, Kahramanmaraş, Osmaniye	536,986	134,500	-402,486

Official figures on Syrian refugees under temporary protection from the DGMM as of July 2017. Estimated figures are calculated with the help of adjusted survey weights that take into account the proportion of the population sampled in each subregion as well as a correction factor. Differences of less than 20,000 should not be used due to the small sample size; in these cases the figures are shown for informative purposes exclusively.

Figure C.1: Number of Syrian refugees under temporary protection by subregion, DGMM July 2017
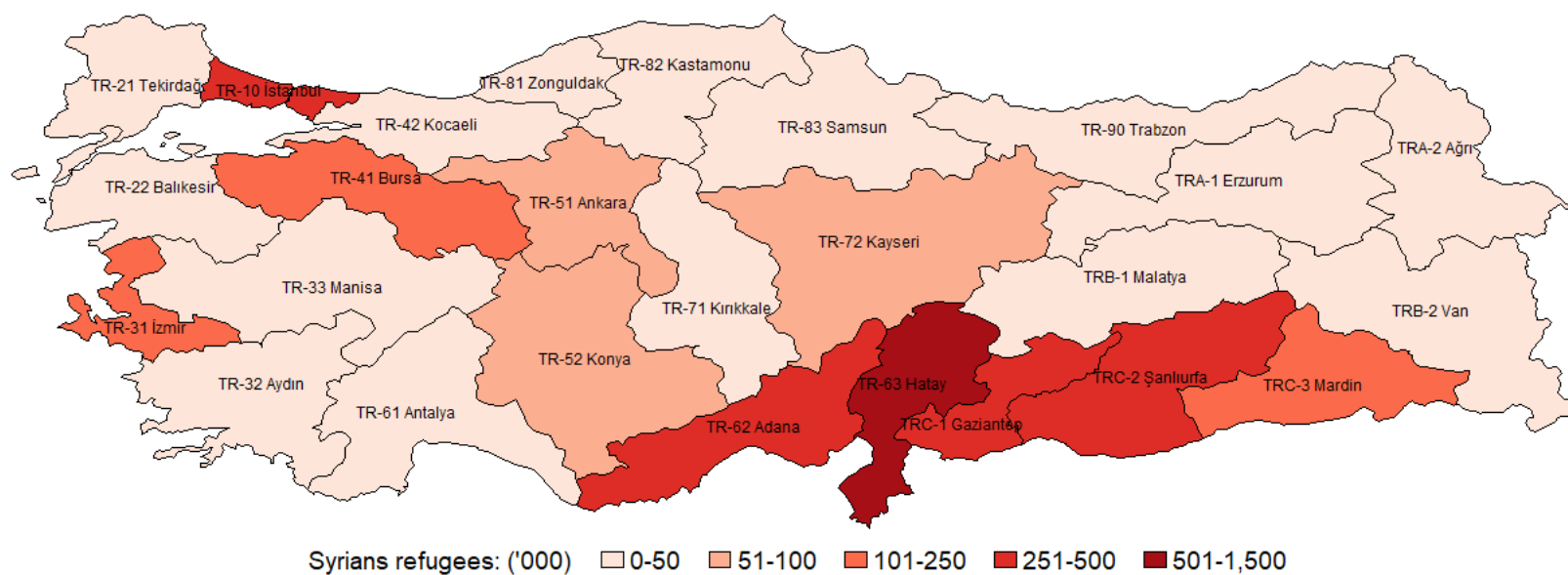
Figure C.2: Number of Syrian refugees under temporary protection by subregion, HLFS 2017
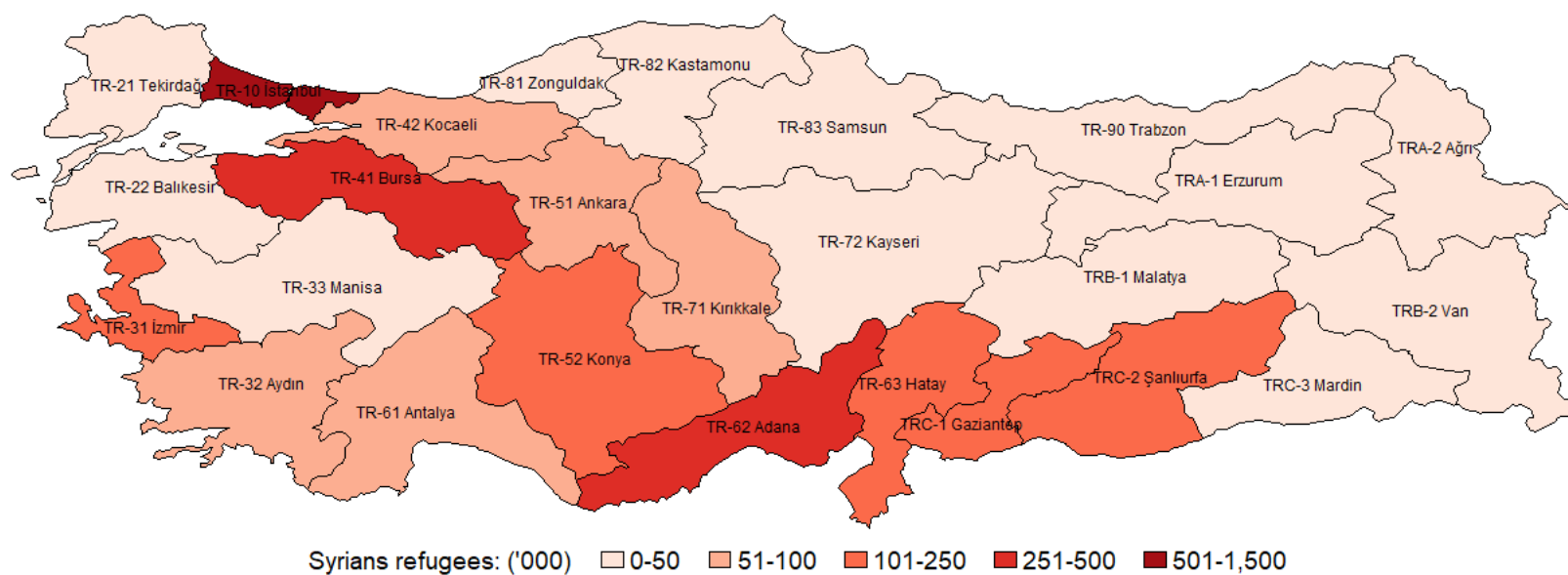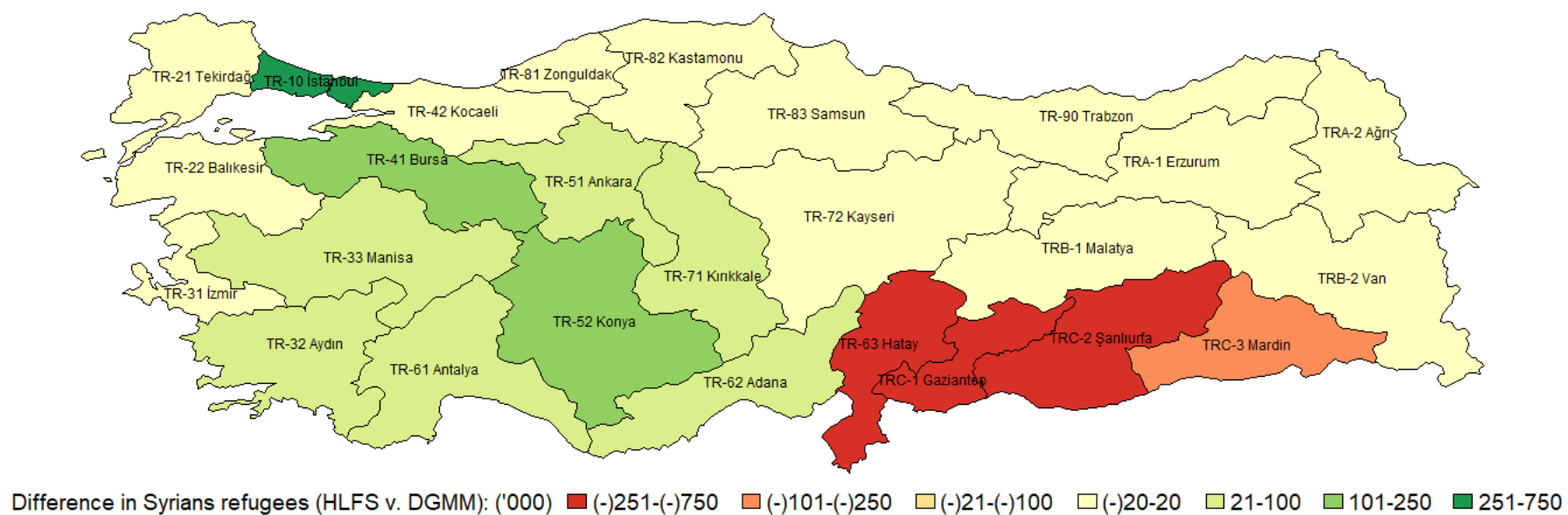
Figure C.3: Difference in Syrian refugees under temporary protection by subregion, HLFS vs. DGMM

Appendix D. Net to gross earnings

Gross to net income. Given a gross annual salary, G, taxable income, B, can be obtained as $B = (1 - s_e - u_e)G$, where s_e and u_e are the proportion of the gross salary destined to, respectively, pay social security contributions[65] and the unemployment insurance.

Furthermore, for a given progressive tax with four tax rates, $\tau_i \in (0,1)$, $i \in (1,4)$ and three income thresholds $t_i \in \Re^+$, $i \in (1,3)$, the annual net income (or take-home pay) can be calculated as follows:

$$
N = \begin{cases}
[(1-\tau_1)(1-s_e-u_e)-d]\,G + pa\tau_1 G^{mw} & \text{if} \quad G \le \frac{t_1}{(1-s_e-u_e)} \\
[(1-\tau_2)(1-s_e-u_e)-d]\,G + pa\tau_1 G^{mw} + (\tau_2-\tau_1)t_1 & \text{if} \quad \frac{t_1}{(1-s_e-u_e)} < G \le \frac{t_2}{(1-s_e-u_e)} \\
[(1-\tau_3)(1-s_e-u_e)-d]\,G + pa\tau_1 G^{mw} + \sum_{i=1}^{2}(\tau_{i+1}-\tau_i)t_i & \text{if} \quad \frac{t_2}{(1-s_e-u_e)} < G \le \frac{t_3}{(1-s_e-u_e)} \\
[(1-\tau_4)(1-s_e-u_e)-d]\,G + pa\tau_1 G^{mw} + \sum_{i=1}^{3}(\tau_{i+1}-\tau_i)t_i & \text{if} \quad G > \frac{t_3}{(1-s_e-u_e)}
\end{cases}
\tag{D.7}
$$

where d refers to the stamp tax (a proportional tax on gross earnings). The term $pa\tau_1 G^{mw}$ refers to the minimum living allowance, with $a \in (0.5, 0.85)$ being the coefficient, $p \in (0,1)$ the type of work arrangement (proportion of a full-time week worked) and G^{mw} the annual gross minimum wage. The empirical gross to net income calculator for income earned during 2017 in Turkey can be obtained by plugging in the appropriate tax-related parameters:

$$
N = \begin{cases}
0.715G + 3,200pa & \text{if} \quad G \le 15,294 \\
0.672G + 650 + 3,200pa & \text{if} \quad 15,294 < G \le 35,294 \\
0.613G + 2,750 + 3,200pa & \text{if} \quad 35,294 < G \le 129,411 \\
0.545G + 11,550 + 3,200pa & \text{if} \quad G > 129,411
\end{cases}
\tag{D.8}
$$

Net to gross income. The calculation of gross income from net income inverts the function shown in equation D.1 as follows:

$$
G = \begin{cases}
\frac{N - pa\tau_1 G^{mw}}{[(1-\tau_1)(1-s_e-u_e)-d]} & \text{if} \quad N \le k_1 \\
\frac{N - pa\tau_1 G^{mw} - (\tau_2-\tau_1)t_1}{[(1-\tau_2)(1-s_e-u_e)-d]} & \text{if} \quad k_1 < N \le k_2 \\
\frac{N - pa\tau_1 G^{mw} - \sum_{i=1}^{2}(\tau_{i+1}-\tau_i)t_i}{[(1-\tau_3)(1-s_e-u_e)-d]} & \text{if} \quad k_3 < N \le k_3 \\
\frac{N - pa\tau_1 G^{mw} - \sum_{i=1}^{3}(\tau_{i+1}-\tau_i)t_i}{[(1-\tau_4)(1-s_e-u_e)-d]} & \text{if} \quad N > k_3
\end{cases}
\tag{D.9}
$$

where

$$
k_1 = \frac{t_1\left[(1-\tau_1)(1-s_e-u_e)-d\right]}{(1-s_e-u_e)} + pa\tau_1 G^{mw},
\tag{D.10}
$$

$$
k_2 = \frac{t_2\left[(1-\tau_2)(1-s_e-u_e)-d\right]}{(1-s_e-u_e)} + pa\tau_1 G^{mw} + (\tau_2-\tau_1)t_1,
\tag{D.11}
$$

and

$$
k_3 = \frac{t_3\left[(1-\tau_3)(1-s_e-u_e)-d\right]}{(1-s_e-u_e)} + pa\tau_1 G^{mw} + \sum_{i=1}^{2}(\tau_{i+1}-\tau_i)t_i.
\tag{D.12}
$$

---

[65]Including long-term -invalidity, old-age and survivors- insurance premium as well as the health insurance premium.

If we plug into Equation D.3 the parameters referring to the Turkish tax system in 2017, we obtain:

$$
G = \begin{cases}
\frac{N - 3,200pa}{0.715} & \text{if} \quad N \le 10,935 + 3,200pa \\[2mm]
\frac{N - 3,200pa - 650}{0.672} & \text{if} \quad 10,935 + 3,200pa < N \le 24,367 + 3,200pa \\[2mm]
\frac{N - 3,200pa - 2,750}{0.613} & \text{if} \quad 24,367 + 3,200pa < N \le 82,079 + 3,200pa \\[2mm]
\frac{N - 3,200pa - 11,550}{0.545} & \text{if} \quad N > 82,079 + 3,200pa
\end{cases}
\tag{D.13}
$$

which depends on the net income earned by the employee, the type of work arrangement, p, and the minimum living allowance coefficient, a.

Treasury taxes.   At last, the net taxes, T, obtained by the Treasury can be calculated with the help of the gross income as follows:

$$
T = \begin{cases}
G\left[\tau_1(1 - s_e - u_e) + d\right] - pa\tau_1 G^{mw} & \text{if} \quad G \le \frac{t_1}{(1 - s_e - u_e)} \\[2mm]
G\left[\tau_1(1 - s_e - u_e) + d\right] + t_1(\tau_1 - \tau_2) - pa\tau_1 G^{mw} & \text{if} \quad \frac{t_1}{(1 - s_e - u_e)} < G \le \frac{t_2}{(1 - s_e - u_e)} \\[2mm]
G\left[\tau_1(1 - s_e - u_e) + d\right] + \sum_{i=1}^{2} t_i(t_i - \tau_{i+1}) - pa\tau_1 G^{mw} & \text{if} \quad \frac{t_2}{(1 - s_e - u_e)} < G \le \frac{t_3}{(1 - s_e - u_e)} \\[2mm]
G\left[\tau_1(1 - s_e - u_e) + d\right] + \sum_{i=1}^{3} t_i(t_i - \tau_{i+1}) - pa\tau_1 G^{mw} & \text{if} \quad G > \frac{t_3}{(1 - s_e - u_e)}
\end{cases}
\tag{D.14}
$$