Implications of Forced Migration on Demographics, Labor Market, and Welfare*

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Abstract

The seven years of the civil war in Syria has led to thousands of deaths and the flight of a quarter of the pre-war population from their homeland. This paper focuses on the effects of 3.5 million displaced Syrians on the Turkish economy via an intertemporal CGE analysis. The results highlight adverse labor market outcomes for natives and support similar findings in the related literature. On the other hand, due to increasing government expenditure intended to provide essential humanitarian services to incoming Syrians, the picture changes remarkably. Declining informal employment, lower inflation, and positive economic growth are favorable outcomes. These are traded-off against worsening the most vulnerable household groups' shares in total disposable income. Moreover, if some of the Syrians are formally employed, the economic growth and employment generation are getting stronger at the expense of even worsened size distribution of income.

Keywords: Forced migration, Dynamic general equilibrium, Labor market, Welfare, Syrians in Turkey

JEL classifications: C68, F22, J61, O15

1 Introduction

International migration from less developed/developing territories to advanced territories has been the focus of several academic disciplines for decades. In the case of voluntary migration mainly driven by economic and social conditions, the migrants' adjustment to daily life and integration issues of children to the education system constitute the major social obstacles. Adaptation of those people to society of the host country also generates economic and social costs. In the case of

*The previous version of this paper has been presented at the 21st Annual Conference on Global Economic Analysis, June 13-15, 2018, Cartagena, Colombia.

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involuntary/forced migration due to political instabilities, armed conflicts or (civil) wars, the term "migration" becomes insufficient to define the situation. The influx of thousands of migrants in a narrow window of time amplifies these costs exponentially.

From the beginning of the civil war started on March 15, 2011, thousands of people died while countless more have been injured or permanently disabled. The United Nation High Commissioner of Refugees (UNHCR) reports that as of August 2018, 5.6 millions of the Syrians (26.5 percent of the pre-war population of the country) are asylum-seekers and 3.54 million of them relocated to Turkey[1]. The figure corresponds to 4.4 percent of Turkey's total population and 63.3 percent of the displaced Syrians. Only 5.8 percent of these migrants sojourn in government-operated temporary shelter centers equipped with schools, hospitals, and athletic facilities. The remaining Syrians live in several provinces by their own means and the Turkish government's in-kind and cash aids. One particular example is the case of Kilis, a province on the Syrian border, where the number of Syrians is almost equal to the total Turkish population of the province.

Besides the shock on the demographic structure of Turkey, such a flow naturally has impacts through several dimensions. As shown by several studies, the Syrians adversely affected the employment probability of natives. The second critical effect is on ever-increasing government expenditure and the resulting redistributional effects. Total government expenditure on activities such as the construction of temporary shelter centers, free of charge health-care services, vocational training activities, education for Syrian children, and the like have reached 30.3 billion USD in 2011-7[2]. It should be noted that the total expenditures of the Turkish government on the Syrian people account for almost half of its total welfare transfers to her citizens during the same period and it is an essential indicator due to the following two facts. As a developing economy which has long suffered from issues of fiscal and debt sustainability, Turkey also deals with a massive poverty problem. The poverty rate, the fraction of the population whose income is less than 60% of median income, is recorded to be 21.2% in 2016. Secondly, despite such a high poverty rate, Turkey has the lowest total social transfers to GDP ratio and one of the highest poverty rates among the OECD member countries. In such an environment, it is evident that the concentration of Syrians in Turkey affects the income distribution in the country.

In addition to the expenditures that are directly related to the Syrians in Turkey, the Turkish government has engaged in two cross-border military operations to eliminate hostile armed forces

[1] The other major countries hosting Syrians are Lebanon and Jordan. 17.4% and 11.9% of the total displaced Syrians live in these two countries, and those correspond to 16% and 7% of the total populations of these countries, respectively (UNHCR, 2018).

[2] This is the only figure announced by a government official, the deputy PM R. Akdağ, on December 2017 to the Turkish media (Sputnik, 2017).

at the border. Today, and for an unforeseeable period in the future, the Turkish army and Turkey-backed local forces control a region to maintain a secure border. These security activities in the region escalate military expenditures and put a further burden on the government budget constraint.

Even if the war in Syrian territory ends today and although these security operations led some Syrians to return their homeland, it is highly likely that the return process will be only partial and will take time, at least until the infrastructure and the superstructure of the country are repaired[3]. Balcılar (2016, 5-6) states that those Syrians who do not have shelter available in the home country and who have war casualties are less likely to return to Syria while women are more likely to return. The author also states that as the time span after leaving the home country increases, the probability of staying in the host country or moving to another country increase whereas the likelihood of returning to home decreases. Therefore, the repercussions of such a migration inflow are likely to have long-lasting effects on the Turkish economy.

This paper analyzes the effects of the Syrians influx into Turkey in the 2011-17 period. A variant of a small open economy dynamic general equilibrium model developed by Yakut and Voyvoda (2017) is utilized. The Syrians are incorporated into the model economy as a separate household group, and their parameters are chosen as very close to those of the native informal workers. In the main two experiments, on alone effects of the influx and the effects of the government expenditure are evaluated. The first experiment is designed to compare the results with the existing literature on the Syrians in Turkey that mainly based on the reduced-form econometrics. The second experiment, in fact, is very close to the situation in Turkey where the influx is accompanied by substantial government expenditure. Additionally, as a counter-factual analysis, an alternative tax policy of the government is considered. In all of these experiments, the demographic change based on an internal migration driven by the rural-urban wage differential is assumed to be given. In these experiments, the Syrians are assumed to be informal workers. However, their integration into the formal labor market also plays a crucial role concerning to increase both their ability to survive and contributions to the Turkish economy. In this respect, the model economy is further extended by the inclusion of another Syrian household group whose members are assumed to be formal employees and parameters are equal to those of the native unskilled formal wage earners. The same set of experiments are conducted by using the further extended model.

The results reveal that the influx has a limited positive impact on the real gross domestic product while the per capita, including the Syrians, real GDP decreases significantly. Government expenditure on commodities to provide vital services for the Syrians lead to higher growth rates

[3] According to the Turkish media, the total number of returned Syrians is around fifty thousand after the first operation and the returning process is still in progress after the second operation, but any number has not been known.

in the Turkish economy. In per capita terms, the growth rate is quite significant if the government fixes her revenue to its base-run level by altering the corporate tax rate. In the labor market, decreasing the share of informal employment and generation of new employment opportunities for all natives but the informal workers constitute the positive outcomes. On the other hand, worsening size distribution of income against the non-Ricardian households is one of the significant adverse consequences. In the case of formal employment of a tiny fraction of the Syrians, the economic growth and employment generation are substantially higher, relative to the entirely informal employment of the Syrians. However, the decline in the total informal employment is limited, and the size distribution of income is getting even worse for the non-Ricardian households.

Although there is a growing literature on the effects of Syrians that is primarily focused on the labor market outcomes of natives, the results are either minimal in magnitudes or statistically insignificant. Often, this has been the product of reduced-form econometrics being applied without taking into account the general equilibrium effects. This study, on the contrary, is the very first attempt to analyze the topic by using a detailed general equilibrium model.

The next section is devoted to present some figures on the Syrians in Turkey in several dimensions including the legal status, demographics, labor market outcomes, and the government expenditure. Section 3 briefly summarizes the literature on the Syrians in Turkey by focusing on their effects on the natives' labor market outcomes. Section 4 gives both the details of the model economy utilized in this study and explains the modifications on the SAM and in the system of equations applied to introduce the Syrians into the model. The design of the experiments and their results are discussed in section 5 and section 6 concludes.

2 Syrians in Turkey

2.1 Legal Status

The Republic of Turkey has ratified the 1951 Refugee Convention by imposing a geographical limitation such that the state only accepts those asylum-seekers who flee from Europe as refugees. The constraint determines the legal status of the Syrian people as "under temporary protection" and prevent those people from being refugees[4]. As a result of having such legal status, a Syrian under temporary protection cannot be forcibly returned (non-refoulement principle) to Syria as long as he/she wants to stay in Turkey.

[4] The legal definition of temporary protection is *"an arrangement developed by States to offer protection of a temporary nature to persons arriving en masse from situations of conflict or generalized violence, without prior individual status determination"* (IOI, 2018).

The high-ranked government officials generally use the terms our Syrian guests or brothers while the media usually refer those people as asylum-seekers or refugees. On the other hand, the academic literature prefers the term refugees since it is more common in daily life regardless of the legal status of those people. In this study, abbreviation "UTP" (under temporary protection) will be used to define the (legal) status of the Syrian people.

2.2 Registration and Access to Services

The Directorate General of Migration Management (DGMM) has been established in April 2014 as a sub-directorate of the Ministry of Interior to manage the processes of temporary protection of foreigners. In October 2014, the government has released the Temporary Protection By-law to regulate the rights of the Syrians in Turkey concerning registration, accessing health-care and education services, social transfers, and the labor market.

The biometric information of each Syrian and new-born children is registered to a database, and the office of governor issues a temporary protection document with a unique identification number. If there is no available space in the center(s) in the province, registered people can stay in a province that is determined by the DGMM. The by-law strictly states that the temporary protection document is not a substitute of a residence permit and does not give a right to apply for Turkish citizenship.

According to the by-law, all health-care and education (including pre-school) services are provided to Syrians UTP free of charge. From the beginning of the crisis, 953,466 medical operations have been carried, 26 million outpatient services have been rendered, and 1.15 million patients were treated. Moreover, 224,750 Syrian babies have been born in Turkey. 223,000 Syrian attended vocational training and more than 500,000 students enrolled in a school (AFAD, 2017).

Since having a temporary protection document does not give the right to work to a Syrian, he/she has to apply for a work permit to be employed in sectors and geographical regions approved by the Council of Ministers. According to the Implementing Regulation on Work Permits for Temporary Protection Provided Foreigners (January 2016), Syrians must wait six months after completion of their registration to be eligible to apply for a work permit. This permit is valid for no more than one year and limits eligibility to work to the specific province from which the document has been issued. An employer has to have at least one Turkish employee to employ a Syrian and the share of Syrians cannot exceed 10% of total employment within a workplace. The Syrians UTP are exempted from a permit for seasonal agricultural and livestock farming activities, and these activities are exempted from 10% employment quota.

The by-law states that Syrians in need can receive cash / in-kind social transfers and the Min-

istry of Family and Social Policies (MoFSP) has been empowered to organize these assistance activities. The ministry and the Turkish Red Crescent has initiated the Social Adjustment Program (SAP), in collaboration with the United Nations World Food Program, and paid 120 TL per Syrians UTP on a monthly basis. The cost of the first phase of the SAP was 348 million EUR, financed by the European Commission, and 750,000 Syrians were benefited. The commission has released another 650 million EUR in December 2017 for the second phase which seeks to reach 1.3 million Syrians until early 2019 (TRC, 2017).

2.3 Demographics

The first group of Syrian migrants reached the Turkish border at the end of April 2011 (T24, 2011). As political protests devolved into armed conflict between protesters and security forces, the number of those seeking safety beyond Syria escalated. From the very beginning of the battle, to prevent a humanitarian crisis, the Turkish government has implemented an "open gate" policy for everyone who reached the border. Such a strategy requires emergency management measures including provisions of shelter, food, and health-care services especially for those who are injured, disabled and sick. The Disaster and Emergency Management Authority (AFAD) has been empowered to operate temporary shelter centers to provide the vital services. The first center was taken into operation in May 2011, and the number of centers reached to five at the end of 2011. Until the end of 2014, the AFAD has established 22 centers in total in several provinces including Hatay, Kilis, Şanlıurfa, Gaziantep, and Mardin which are on the Syrian border, and in some neighbor-provinces such as Osmaniye, Kahramanmaraş, Adıyaman, Adana, and Malatya.

Table 1 provides the total number of Syrians UTP by years retrieved from three different sources. The figures in the second column come from Balcılar (2016) which provides descriptive statistics of the surveys on the Syrians residing in Turkey conducted in 2013, 2014, and 2015. On the other hand, the figures on the third and the fourth columns are retrieved from the website of the DGMM and the UNHCR, respectively, and show the number of "registered" Syrians UTP. Vast differences between the numbers for the pre-2014 period are results of the lack of public management. As mentioned, the DGMM who is responsible for registering the Syrians has been established in April 2014, and the differences between the figures shrink for the year of 2014 and onwards. Moreover, the numbers indicate that the total number of Syrians is still in an upward trend despite some of the Syrians returned to Syria. The main reasons are that the government has solved the mismanagement issue of the crisis and has established the system to register these people and, in turn, Syrians has started to complete their registration processes to have access to

several vital services.

< Insert Table 1 here >

The distribution of the Syrians UTP by provinces is highly asymmetric. Total Syrian population of Kilis, the second (fourth) smallest province of Turkey by its surface (population), is 95.41% of the total Turkish population of the province and Kilis is followed by Hatay (28.3%). The main reason for such huge shares is that these are the closest provinces to Aleppo, the largest city of pre-war Syria. Şanlıurfa and Gaziantep are the other two provinces on the border, and the shares of Syrians UTP in total Turkish population are 24% and 18.8%, respectively. Total Syrian population's 40% live in these four cities. Mersin, Osmaniye, and Mardin are the other major provinces hosting Syrians. On the other hand, Istanbul, the most crowded province and economic and cultural capital of Turkey, is hosting on alone 15.6% of the total Syrians UTP but the share of Syrians in total Turkish population is 3.7%.

The distribution of the Syrians UTP by age and gender indicates the size of the situation that the Turkish government and Turkish society are faced with. The Syrian population under aged 19 constitutes 45.75% of the total Syrian population in Turkey. The total number of Syrians UTP aged under 4 is 483,643 that corresponds to 7.5% of the Turkish-peer population. The shares in the age groups of 5-9, 10-14, and 15-18 are 7.7%, 6.1%, and 4.4%, respectively. In other words, the Syrians UTP increase the total school-age population of Turkey at all levels, including pre-school, by 6.4% in total. According to the Ministry of National Education (MoNE), the total number of enrolled Syrians UTP is 608,000, as of February 2018. The schooling rate of the Syrians is 94% in primary school age, 43% in middle school age, and 18% in high school age. The figures mean that the total capacity of the education facilities and the number of teachers and thus total expenditure on education have to expand. However, the problem is not only a matter of budget; Syrian children also face a major language barrier. Those children have to be educated both in Turkish and Arabic due to consideration towards knowing their own culture and language as well as awareness that they will return to their homeland at some point in time in the future. In that respect, the MoNe also employs Syrian teachers, the number is around 22,500, and focuses on their education, in collaboration with the UNICEF.

The total number of the Syrians in higher education age is 545,557 that corresponds to 8.45% of the Turkish population in the same age group. On the other hand, according to the Higher Education Council, only 10,000 male and 5,000 female Syrians are enrolled to a program in a higher education institution that corresponds to 3.4% and 2.2% of the total Syrians UTP, respectively. Erdoğan

(2017, 10) confirms the total figure for the education year of 2016-17 and reports that it increased to 19,650 at the beginning of the 2017-18 education year.

2.4 Labor Market Outcomes

The working-age population of the Syrians UTP is more than 2.1 million. However, regardless of various bureaucratic obstacles, other difficulties such as providing evidence of educational attainment and not knowing Turkish constitute significant challenges to becoming labor market participants. As mentioned by Aydemir and Kırdar (2017), being fluent in Turkish allowed Bulgarian-Turk repatriates to adjust quickly and efficiently to the local labor market at the expense of local native workers after the flow of almost 170,000 people in 1989[5]. According to the Council of Higher Education's press release in March 2013, due to the absence of diplomatic correspondences between the states, the council is not able to provide approval services of diploma equivalence (CHE, 2013). By considering the fact that the situation worsened since then, it is highly likely that the problem has not been solved yet.

< Insert Table 2 here >

According to the findings of Erdoğan (2017)[6], 38.6% of the Syrians UTP are employed while 19.7% of them are looking for a job. On the other hand, Balcılar (2016) reports the share of employed Syrians as 26% in total while it is 29% (31.2%) for the age group of 18-19 (30-44). According to these figures, the total number of employed Syrians UTP is around 815-850 thousand, when considering the population aged between 15-64 and 15+, respectively. However, according to the Labor Statistics of the Ministry of Labor and Social Security, the number of granted work permits for the Syrians UTP was 13,290 (1,145 female) in 2016. These numbers for 2015 and 2014 were 4,019 (280 female) and 2,541 (157 female), respectively.

< Insert Table 3 here >

Table 3 provides the summary statistics of the Household Labor Force Survey (HLFS) by NUTS-2 level regions which host the majority of the Syrians UTP. The unemployment rate and

[5] Although it is a compelling motive to hire an immigrant, fluency in the language is not sufficient. The authors also mention that there were no legal barriers to prevent these repatriates' entrance into the labor market and outstanding reputation for the work ethic of the previous waves of immigrants from Bulgaria and the other Balkan countries were also important phenomena. They also mention the flexibility of the Turkish labor market that creates an environment in favor of young and relatively inexperienced workers in the hiring process.

[6] The first wave of the survey of the Syrians UTP and Turkish citizens was conducted in 2014. This study constitutes the second wave that covers 2,089 Turkish citizens and 7,591 Syrians UTP in 26 provinces.

informality in these regions are relatively higher than the average of Turkey. The unemployment rate's trend in line with the overall unemployment rate but the regional rate of change is higher than that of Turkey. For instance, the unemployment rate in the region TRC3 increased by more than two-fold in the last eight years. The share of informal employment in Turkey decreased by around 3% per year on average while it decreased by 5%, 4.9%, and 4.6% per year on average in the regions of TRC3, TRC1, and TR63, respectively. Interpretation of these figures by claiming that the trend in each region is the result of the existence of Syrians, indeed, is not accurate. On the other hand, to our best knowledge, there were no substantial changes in the legislation to fight against the informality in this period. However, the divergent regional trends from the overall pattern of Turkey may be attributed, to some extent, to the displacement of the native informal workers by the Syrians UTP.

2.5 Government Expenditure

There is no doubt that provision of the essential vital services for newly arrived 3.5 million people who are escaping a war requires a huge organization. Mainly two public institutions, the DGMM and the AFAD, constitute the governing body of the Syrians influx. The AFAD coordinates the services in temporary shelter centers and is the winner of the "Best Public Services" in 2015 given by the United Nations. In these centers, the AFAD coordinates mainly health-care and education services in collaboration with several ministries and public institutions. The expenditure on these activities should be traceable either in the budgetary figures of these ministries or AFAD, but there are no officially announced numbers on their annual activity reports.

< Insert Table 4 here >

On the other hand, there are reasonable political facts for the government not to announce the details od expenditure. Erdoğan (2017) reports that 57.8% of the survey respondent Turkish citizens state that Syrians are "victims who escaped from persecution/war" while 43% (39%) of them claim that the Syrians are "burden on the Turkish state" ("dangerous people who will lead us into trouble in the future"). The Turkish respondents define the Syrians as lazy (59%), rude (53.2%), and nasty (52.7%). The majority (54.6%) of Turks defend the idea that the Syrians should never be given work permit while only 11.8% states that an indefinite work permit should be granted. Four-fifths of the Turkish respondents think that the Syrians are not beneficial for the Turkish economy and three-fourths state that we cannot live together with them in peace. Finally, and not surprisingly, 75.8% of Turks strictly oppose the citizenship idea of the Syrians while some argue that the Turkish

citizenship should be granted to only educated Syrians (5.9%), only those who born in Turkey (4.8%) and only those who know Turkish (2.2%). By considering the residential segregation theory, Balkan et al. (2018) attribute the results on increasing rents of high-quality residential properties to possible native-refugee conflict and negative attitudes against the Syrians.

In such an environment, the government intentionally does not announce the details of expenditure on the Syrians UTP, but they only give some numbers when the political opposition questions the issue. The deputy Prime Minister Recep Akdağ has announced that the total expenditures on the Syrians UTP are around 84.8 billion TL (30.3 billion USD); roughly 200 USD per Syrian UTP, on average, per year. To our best knowledge, he has shared some details of the expenditure for the first time. Table 4 provides the breakdown of the total spending. After the first military operation, to make the region habitable, Turkey has started to renovate the infrastructure and the superstructure of the region by constructing schools, hospitals, security buildings, etc. and the total cost of these activities is 1.6 billion TL. After the second military operation terminated in mid-March 2018, it is reasonable to think that this kind of expenditures of the government will increase to accelerate the returning process of the Syrians UTP.

Although the press release is the first official statement on the government spending, there are some questionable expenditure items. For instance, the seventh and the tenth items in Table 4 cannot be classified as public expenditure. Moreover, the Turkish Red Crescent's Social Adjustment Program is financed by the European Commission, and it is unclear in the release that whether these international aids are included or not in the total expenditure figure. The fourth item also does not belong to the public expenditures, and the deputy PM's claim is that "we guess that our citizens have spent this amount as aid". Nevertheless, from the figures, we can say that total public expenditure on the Syrians UTP is 67.8 billion TL (24.85 billion USD). On the other hand, it should be noted that it is also not known whether the fifth item covers the cost of the military operations or not and this may lead to underestimation of the total figure.

3 Literature

The literature on the effects of the Syrians UTP on the Turkish economy is heavily based on micro-level reduced-form econometric analyses. The results of difference-in-differences analyses of Ceritoğlu et al. (2017) conclude that the Syrians has decreased the employment probability of natives while there are no statistically significant effects on wage rates. They find that males (females) are displaced from informal employment to unemployment (out of labor force). Del Carpio and Wagner (2015) claims that once the composition of native employment is accounted for,

the Syrians UTP lower the wage rate of informal employees due to their lower productivity. On the other hand, every 10 Syrian employee generates three additional *formal* employment for the natives whose educational attainment is less than high school. The employment rate is not affected significantly, although the coefficients are negative and relatively more prominent for less-educated people (Akgündüz et al., 2015). Akgündüz et al. (2018) states that firms established by the Syrians UTP not only positively affect the share of foreign firms but also partially lessen the displacement of low-skilled natives.

Balkan and Tümen (2016) concludes that declining cost of labor due to lower wage rates of the informal workers decreases CPI by 2.5% in the regions where Syrians live. The regional analysis of Akgündüz et al. (2015) indicates that the Syrians UTP increase food prices by 0.22 percentage points while the effects on housing prices are statistically insignificant.

Another critical reflection of the displacement of the natives in the labor market may be an increase in internal migration flows. The micro-level analysis of Del Carpio and Wagner (2015) finds no significant changes in the migration flows but the probability of natives' migration into the regions where Syrians live decreases. Another micro-level analysis of Balkan and Tümen (2016) states that the domestic migration decision of the natives is affected insignificantly. However, the province-level migration analysis of Akgündüz et al. (2015) shows that the net migration of natives from the provinces where the Syrians live decline.

The literature mentioned above serves several essential clues on the immigrants' effects on the host labor markets but is quite weak to draw comparable conclusions on the impact of forced migration that has exceptionally different nature than that of voluntary migration. For instance, location choices of voluntary immigrants depend on either the location choices of previous immigrants from the same source country by considering easier settling-in and finding a job or the economic potential of locations within the host country. In case of forced migration, on the contrary, the choice of location is mainly unrelated to the economic conditions (Ruiz & Vargas-Silva, 2015). Moreover, the skill complementarity/substitutability is much less relevant for those forced migrants (Kancs & Lecca, 2017) who are more vulnerable than any other group and have to find a way to survive.

Ruiz and Vargas-Silva (2013) provides a review of the literature on forced migration and states that it is quite young and focuses on few events (internal displacements in Uganda and Colombia, migrations of Burundians and Rwandans to Tanzania and some events related to the WWII). The common conclusion of those studies can be summarized as the forced migration is beneficial for agricultural producers due to lower cost of labor while children and displaced local workers are the losers. The important statement of the authors' is that those forced migrants who are more mobile are more likely to be successful in the long-term. A more recent paper on the domestic

displacement in Colombia due to the civil conflict states that wage rates of urban unskilled informal wage earners has been adversely affected due to competition between those and forced immigrants (Calderón-Mejía & Ibáñez, 2016).

In a general equilibrium setting, Trefler (1997) states that closed economy arguments of immigrants' positive effects on welfare at the expense of worse off position of less-skilled workers vanish in the Ricardian or Heckscher-Ohlin trade models. Yabuuchia and Chaudhuri (2007) emphasize the importance of the capital intensities of the low- and high-skill sectors and unskilled labor market's institutional structure on worsening skilled-biased wage gap. The endogenous growth model of Lundborg and Segerstrom (2002) underlines the fact that although static models show that households are better off in host countries, the dynamic model gives the opposite results even host country experiences economic growth. It should also be noted that the CGE literature on the effects of international migration focuses on the effects of economic migration rather than forced migration. Kancs and Lecca (2017) is the most recent example which attempts to explore the effects of remarkably increased asylum seekers in the EU. The results reveal that if refugees are fully integrated (participation and employment rates are equivalent to those of the natives) into the labor market via acquiring professional and language skills, GDP increases by up to 1.5% while its cost is equal to 1% of GDP in the long–run, and the net gains become prominent in the medium-run.

4 Model Economy

The CGE model used in this study has been developed based on Yakut and Voyvoda (2017) and some modifications on the Social Accounting Matrix (SAM) and substantial changes in the system of equations have been applied to incorporate the Syrians UTP[7].

The original model comprises seven representative household groups (RHGs) that reflects the structure of the Turkish labor market. The household parameters are calibrated by using the Household Budget Survey (HBS-2011), and the sectoral distribution of employment is compiled from the Household Labor Force Survey (HLFS-2011). The set of households is divided into two subsets; Ricardians (*RIC*) and non-Ricardians (*NRIC*) to introduce the primary heterogeneity among RHGs. The *RIC* consists of Ramsey type individuals with savings who maximize the present discounted value of their lifetime utility while the *NRIC* comprises households without savings who maximize their intratemporal utility. The budget constraint of each RHG is quite different concerning income items. The Ricardians receive wage and capital income (distributed dividends of enterprises), trans-

[7] The system of equations, the list of variables of the modified model, and abbreviations for households and firms can be found in the appendices.

fers from the government and the social security institution (SSI) and pays wage income tax and social security premium. The wage earner *NRIC* households (*USF* and *IW*) receives wage income and transfer income from the government, and the *USF* also gets transfer income from the SSI but pays tax and premium over her wage income. The group of *RET* receives only transfers from the SSI while the group of *TRF* receives transfers from the government and the SSI and the total transfer income constitutes their disposable incomes. Each representative household's problem is solved in two stages. In the first stage, households choose per capita composite values of consumption and labor supply. The second stage has two sub-stages. In the first, households disaggregate their composite consumption into commodities by maximizing their intra-period utility via Linear Expenditure System (LES) in which households pay the bill of the subsistence level of consumption in the first place and then use the budget, i.e., discretionary expenditure, to determine the level of consumption by commodities. In the second sub-stage, households except *RET* and *TRF* allocate their composite labor supplies among different sectors by maximizing total wage income under the assumption that each sector is an imperfect substitute for one another.

The production side of the model economy consists of 11 representative firms which are assumed to produce only one product by using intermediate goods, capital and labor which is a composite input of different types of workers. The production side shows heterogeneity with respect to the investment decision. A firm is considered to be either a dividend maximizer (*DM*) or a non-dividend maximizer (*NDM*). In addition, the public services (*PSER*) sector does not have an investment decision and operates at the fixed level of capital stock. A *DM* firm maximizes the value of the firm that is equal to the present discounted value of its dividends by choosing the investment, capital stock, and composite labor. Sectoral investment expenditure includes an adjustment cost which is an increasing and convex function of investment; for a given level of sectoral capital stock, the cost of installing new capital equipment will be higher. Firms in the subset of *NDM*, however, maximize the value of the current period's value added and their sectoral investment expenditure is fixed shares of their previous period's gross profits.

The model economy also constitutes the accounts of the government and the social security institution. These agents collect taxes and social security premiums and contributions, respectively, at the fixed rates, and they do not have any objective function.

The base year of the model economy is 2011 which is the year that the influx of the Syrians started while most of the studies assume that they have no effects on the Turkish economy, reasonably. Therefore, the primary strategy in choosing the parameters and initial values for the Syrians not to distort the structure of the SAM substantially. Although the government expenditure had increased due to the construction of five temporary shelter centers during 2011, it is assumed that

there is no change in the government accounts on the SAM. In line with this argument, the initial value of government expenditure on the Syrians, namely $GTRSYR$, is set to be equal to zero.

In the first extended version of the model economy, the introduction of the Syrians is accomplished by assuming that they are one of the RHGs, namely informal Syrians ($ISYR$). The RHG is assumed to be the new member of the group of the NRIC households. The members of $ISYR$ work as informal wage earners in agriculture, textile, construction, and services sectors. The population and per capita composite labor supply of the $ISYR$ are assumed to be 9,118 and 0.26, respectively, by following Balcılar (2016), and their initial wage rate is assumed to be two-thirds of the wage rate of IW. The total $ISYR$ employment is distributed arbitrarily across the four sectors by assuming that sectoral shares in total Syrian employment are 42.6%, 25.1%, 19.7%, and 12.6%, respectively. The share parameters of the $ISYR$ in these sectors' composite labor input are set to one-third of the original share parameters of the native informal workers[8]. Since the Syrians substitute the native informal workers, total employment and total wage income figures of the RHG are lowered by the same amounts those correspond to 0.048% and 0.075% of their original values on the SAM. The wage income of $ISYR$ is assumed to be equal to its disposable income. The consumption expenditure of the Syrians is also deducted from the consumption of the IW by implying that their compositions are identical. The total spending of the Syrians constitutes 0.0017% of the total private consumption expenditure in 2011. After these modifications on the SAM, it is reasonable to argue that the effects of the Syrians on the Turkish economy in 2011 are negligible and there is no reason not to compare two versions, with and without the RHG of $ISYR$, of the model. The problem of the $ISYR$ is equivalent to that of the non-Ricardians, but the Syrians are assumed not to have the subsistence level of consumption.

In the second extended version, another RHG, namely $FSYR$, is introduced to represent formal wage earner Syrians. In this version, it is assumed that the RHG of $ISYR$ ($FSYR$) constitutes 90% (10%) of all Syrians. All assumptions made in the first extended version for the $ISYR$ are preserved in the second version. The $FSYR$ is assumed to replace the native unskilled (high school and less educated) formal wage earners (USF) in all sectors. The share parameters of the $FSYR$ in all sectors' composite labor input are set to one-tenth of the original share parameters of the USF. The composite wage rate of the $FSYR$ is assumed to be two-thirds of that of the USF, per capita composite labor supply is set to 0.3, and the composition of private consumption of the $FSYR$ is identical to that of the USF. The problem of the $FSYR$ is formulated as similar to that of the $ISYR$.

[8] Since the total and thus sectoral employment figures and the wage rate of the Syrians are too low, these share parameters are calibrated for minimal values. In this case, neither the influx nor any policy changes produce significant differences relative to the base-run.

Due to these quite small alterations on the SAM, the second extended version is also comparable to the base-run of the model economy.

5 The Effects of the Syrians on the Turkish Economy

5.1 Experiment Design

In this study, four different experiment paths are evaluated by using the first extended version of the model.

- **The Internal Migration - The Path *M*:** The path describes the dynamics in the Turkish economy due to the demographic change introduced via internal migration of individuals from rural to urban areas under the assumption that there is no any policy change.
- **The Influx under the Internal Migration - The Path *MS*:** On this path, the total population of the *ISYR* is assumed to increase on a yearly basis, as shown on the right column at most of Table 1. It is assumed that the population of the *ISYR* is fixed at 3.4 million in the seventh period and onwards. This path shows the effects of such an influx on the Turkish economy without any changes in the policy setting.
- **The Government Appears - The Path *MSG*:** The government increases her expenditure on commodities to provide services for the Syrians. A yearly expenditure is equal to a fixed amount of money per Syrian per year times the population of the Syrians. The total amount of the expenditure announced by the deputy PM is divided by sum of annual populations of the Syrians and annual per capita expenditure on the Syrians is calculated.
- **Tax Financing Government - The Path *MSGT*:** For the same level of annual expenditure on the Syrians, the government aims to keep her total revenue constant at its base-run level by altering the corporate tax rate.

The same set of experiments are also conducted by using the second extended version of the model. The consistency of the total population of the Syrians UTP in Turkey in the two models implies that the total government expenditures on those people are also equal to each other. The differences between the paths of the two models reflect how the Syrians' access to the formal labor market would affect the Turkish economy. Notice that the path of *M* is purely identical in the two extended versions of the model.

5.2 The Results

Along the path of M, migration flows from rural to urban lower (increase) the population and thus the labor supply of the RH (IW and USF) and increase (lower) her (their) composite wage rate(s) in the short-run, relative to the base-run[9]. The substitutability and wage differentials across households induce demand of labor and invoke wage increases in all labor market strata. Higher labor demand also increases investment expenditures of firms due to the substitution between capital and labor and the volumes of real sectoral value added increase. As domestic production increases, supplies to the domestic market and to abroad increase but since the price effect suppresses the quantity effect, trade balance, i.e., net exports, worsens, although there is a decline in import demand. Worsening external balances for the fixed level of foreign savings depreciates the domestic currency. Acceleration in the economic activity leads to an increase in indirect tax receipts of the government, and the nominal gross domestic product (GDP) increases by 1.25%, on average in the short-run. Higher nominal GDP increases the government transfers to households, and higher domestic prices lead higher overall price level which increases the SSI transfers to households, the government consumption expenditure, and the government transfers to enterprises. Higher wage income and unearned income increase the disposable income of each Ricardian RHG and allow them to increase their consumption, despite higher commodity prices, at the expense of lower savings, except the rural residents. The disposable incomes of the non-Ricardians and thus the volumes of composite consumption decline since they are more vulnerable against an adverse shock in the economy. In the transition, as price adjustments occur, both the economic activity and the overall price level slow down, and the real GDP returns to its base-run level in the medium-run. Lower transfer income and wage income of all households, except the rural residents, decrease disposable incomes. The Ricardian households increase their consumption and continue to decrease their precautionary savings while the non-Ricardian households reduce the volumes of their consumption.

As the total population of the $ISYR$ increases, their wage rate drops to roughly 50% of the IW's wage rate, along the path of MS, and drags down all wage rates relative to the base-run; more than 20% for the IW, and around 10% for the rest of the households. Lower wage rates both induce labor demands (except that of the IW due to the replacement effect of the $ISYR$) and dampen investment appetite of firms. As total production increases, domestic prices decline and lead to a limited improvement in the trade balance. The real GDP experiences a quite small increase in the short-run, and it returns to its base-run level towards the medium-run. The disinflation lowers both the government transfers to enterprises and the transfers from the SSI to households. Although

[9] The short-run and the medium-run stand for the fifth and the twentieth periods of the model horizon.

the net borrowing requirement improves, the government debt stock-to-GDP ratio increases by 16.7% (7.1%) in the short (medium)-run. Wage incomes and transfer incomes and thus disposable incomes of all households decline but the volumes of composite consumption, except that of the *IW*, increase due to lower commodity prices. Total private savings decline by 10% and the *SF* is the most affected RHG. On the contrary, because of substantial decreases in wage income (34%) and disposable income (30%), the *IW* reduces the volume of composite consumption by around 22%. In the case of inclusion of the *FSYR*, the direction of the overall macroeconomic environment does not change while the effects of the influx are larger in magnitudes. For instance, the economic growth is quite stronger in the short-run and even positive in the medium-run.

< Insert Table 5 here >

Injection of the government expenditure to the economy has significant implications. In the seventh period of the model horizon, the total population of the Syrians and thus the total government spending (almost 15% of the base-run spending) on those people reach their maximum. As long as the population of the Syrians is constant, the government is assumed to spend that amount of money in each year. Although the influx lowers the wage rate in all labor market strata, induced government demand puts upward pressures on the commodity prices. As a result, the volumes and the values of sectoral value added increase in all sectors except agriculture. The Turkish economy experiences an economic growth by around 3.8% in the short-run and 4.9% in the medium-run along the path of *MSG*. Higher domestic prices and induced demand lead to a deterioration in the trade balance by more than 3%. The deficits of the SSI decrease remarkably as higher wage incomes (bills) of all households, except the *IW*, (firms) increase her total income and the disinflation lowers her transfers to the households. The government net borrowing requirement improves due to increased revenue and declined transfers to the enterprises and the SSI. The government indebtedness-to-GDP ratio drops by one-fourth, relative to the base-run, in the short-run, and its downward trend is still strong in the medium-run. Increasing disposable incomes of all households, except the *IW*, induce the consumption demands, savings, and labor supplies. The reduction in disposable income of the *IW* is 20%, relative to the base-run, and this corresponds to an improvement relative to the path of *MS*. If some of the Syrians work as formal wage earners, an increase in the government spending accelerates the economic growth by roughly 1.5 percentage points, reduces the government indebtedness and inflation by three percentage points, and increases total capital stock by 2.5 percentage points.

The strong economic growth due to 15% increase in the government final consumption demand heats the economy and increases the total government revenue. However, as the government intends

to keep her revenue constant, the corporate tax rate declines by 7% in the short-run along the path of $MSGT$. The lower corporate tax rate increases the sectoral profits and thus the investment expenditures of firms. Higher sectoral capital stocks also induce the labor demand and generate higher economic activity along the path of $MSGT$, both relative to the base-run and to the path of MSG, and reduce commodity prices. The overall CPI declines by around 4%, relative to the base-run, which is also a quite significant decline relative to the MSG. The improvement in the government savings leads to a decline in the government indebtedness-to-GDP ratio, relative to the base-run, while the ratio is higher along the path of $MSGT$ than the path of MSG. In the households side, higher sectoral labor demands induce wage rates and thus wage incomes. Higher profitability of the firms also increases the capital income of the Ricardian households. Therefore, households increase the volumes of their composite consumption and savings. The disposable income of the IW declines and lower their composite consumption. If the RHG of $FSYR$ is introduced, the economic growth rate increases by 2.6 percentage points and reaches 9.5% in the medium-run. The expansions of the total capital stock and the total private savings are quite stronger. The per capita real GDP growth approaches to 5% in the medium-run, relative to the base-run, which is almost double of the per capita GDP growth along the path of $MSGT$ of the model without the RHG of $FSYR$.

5.3 The Labor Market

The en masse inflow of the Syrians has significant repercussions in the labor market outcomes of the natives. Along the path of M, the total native informal worker (IW) employment increases due to the domestic migration from rural to urban areas. Notice that a migrant becomes either a IW (70%) or a USF (30%). Along the other three experiment paths, the total IW employment declines by around 15% both because of the influx of the $ISYR$ and the reduction in the migration flows (Table 6). Since declining wage rate of the IW narrows the urban-rural wage differential, the level of migration drops to its one-tenth in the short-run, relative to the path of M. This finding is in line with Akgündüz et al. (2015)'s province-level findings.

< Insert Table 6 here >

As the $ISYR$ lowers the cost of labor, labor demands in all labor market strata and the total employment increase. The Turkish economy experiences the highest employment expansion along the path of $MSGT$ which is followed by the MSG. Although the Syrians are employed informally, the total informal employment, i.e., the sum of the $ISYR$ and the IW employment, declines which

indicates that the number of displaced natives are higher than the total $ISYR$ employment. The panel (b) on Table 6 shows that every one Syrian employee displaces 1.3 native informal workers from the labor market in the short-run and the effect declines in the medium-run. In addition to increasing total employment, the decline in total informal employment lowers the share of informal employment by 8%. According to Table 3, the share of informal employment declines by around ten percentage points (25%) in the period 2010-17. It should be noted that since the HLFS's coverage of the Syrian employment is quite weak, the total employment figure does not reflect the situation accurately. However, as the native informal workers are displaced from the labor market, total informal employment and thus the informality shrink. Since the model economy accounts for all these effects, the decline in the informality is quite moderate relative to the actual figures.

Another significant finding is that every Syrian employee generates more than three formal employment and the rural residents and the capitalists are the most affected types of labors. The figure is substantially higher than the findings of Del Carpio and Wagner (2015) who claims that every 10 Syrian employee generates three formal employment for the natives who have less than a high school degree. In this paper, the RHG of USF comprises the formal wage earner natives whose educational attainment is high school or less and the employment generation figure for this RHG is quite close to but higher than the findings of the authors as they do not consider the general equilibrium effects.

In all experiments, the total $ISYR$ employment sharply increases in the first seven periods along with the increasing population and reaches the level of 450 thousand along the path of MS. In the medium-run, the total employment of the $ISYR$ is 1.4% (2.1%) higher along the path of MSG ($MSGT$), relative to the path of MS.

The same set of experiments after the introduction of the $FSYR$ display quite different effects on the labor market. The increases in the total employment are higher by 1-1.5 percentage points, and the displacement effects on the total IW employment are lower by roughly three percentage points. On the contrary, every 10 $FSYR$ employee displaces three native unskilled formal wage earners (USF) from employment while the displacement effect disappears in the medium-run of the path of $MSGT$. The stronger total employment generation and the weaker decline in the total informal employment lower the share of informal employment in total employment in the short-run, although it increases in the medium-run along all experiment paths.

5.4 The Income Distribution

The domestic demographic change alters the income distribution in favor of the non-Ricardian households, but the magnitude of the change is insignificant. Along the path of *MS*, the share of the *IW* in total disposable income drops by 0.78 percentage points, and they are the only losers of the forced migration. Almost one-third of the loss goes to the *ISYR*, another 0.12 percentage points go to the USF, and the Ricardian households gain the remaining. Among the Ricardian households, the *RH* is the most affected one. Along the path of *MSG*, the loss of the *IW* is almost the same and its one-third goes to the *ISYR*, and another one-third goes to the *SF*. Along the path of *MSGT*, on the contrary, the half of the loss of the non-Ricardians are gained by the *CH*. In all cases, the share of *ISYR* in total disposable income is 0.24%, and it is irrespective of the government expenditure or the proposed tax policy.

< Insert Table 7 here >

The inclusion of the $FSYR$ slightly increases the losses of the *IW*. In addition, the USF also experiences declines in their shares in total disposable income around 0.4 percentage points, and the loss is the highest along the path of *MSGT*. The gains of the *CH* is the highest along the path of *MSGT*, while the *RH*'s (*SF*'s) share increase by the highest value along the path of *MS* (*MSG*). The share of *ISYR* increases from 0.24% to 0.33% in the medium-run while the $FSYR$ gets only 0.03% of the total disposable income.

Another essential income distribution indicator is the functional income distribution. Accordingly, the ratio of total net wage income to total distributed dividends slightly increases along the path of *M*, but the refugee influx leads roughly a 1.7% decline in the ratio. Introduction of the government expenditure increases the net wage income, and the functional income distribution returns to its base-run level in the medium-run. If the government fixes revenue in the presence of increasing government spending, the total wage income sharply declines in the short-run and then recovers, but the functional income distribution worsens relative to the base-run in the medium-run. The RHG of $FSYR$ alters the functional income distribution against wage income by roughly 3% in the short-run and 1.5% in the medium-run of the path of *MS*. Along the path of *MSG*, the decline in wage income to dividend income ratio is slightly more than 2% while the ratio returns to its base-run level in the medium-run. However, worsening functional income distribution in favor of dividend income is quite substantial both in the short-run (5.3%) and in the medium-run (2.9%) along the path of *MSGT*.

6 Conclusion

The incoming of 3.5 million Syrians who flee from a civil war in a quite short period has had severe impacts in several dimensions including shelter and vital services necessities, education of children, employment of working-age population, etc on the Turkish economy and society. The international community appreciates the "open gate" policy and the considerable efforts of the Turkish government. However, the total cost of these public servicing has reached almost half of the total social transfers of the government, and it seems that the level of these spending will stay same as long as the total population of the Syrians in Turkey is constant. Therefore, these policies and the status of the Syrians in Turkey are debated both politically and economically. At the end of almost seven and a half years, as it is still hard to say that the war will end soon, it is evident that at least the majority of, the Syrians will not leave Turkey in the near future.

This paper investigates the effects of the Syrian influx to Turkey by using an intertemporal general equilibrium model by considering that entrance of such a massive number of refugees has long-lasting impacts on the economy. The model developed by Yakut and Voyvoda (2017) is extended by the inclusion of the Syrians who are assumed to work as informal wage earners. This model version is used to take a snapshot of the Turkish economy in the existence of a vast number of refugees. The model is further extended by adding the formal wage earner Syrians to quantify the possible effects of the integration of the Syrians into the formal labor market.

The results reveal that unless the government spending increases, the influx of alone erodes the per capita real income. On the other hand, the government can amplify the effects of higher expenditure by keeping the revenue constant and supporting the investment appetite of firms via lowered corporate tax rate. More importantly, the results of the model with the formal Syrians highlight that the fixed-revenue government can further increase the effectiveness of public expenditure even if a tiny fraction of the Syrians are allowed to work as formal wage earners. In the light of these results, the main policy implication of this study is that the government should lift, or at least relaxed, the administrative obstacles for the Syrians to get their work permits. However, granting work permits readily to the Syrians alters the size distribution of income against the native non-Ricardian, i.e., hand-to-mouth, households who are more vulnerable to an adverse shock. Avoiding such an outcome via increasing unilateral transfers to those worse off households implies more government expenditure, and might lead the natives' leaving from work (or reducing hours of work) due to increasing unearned income.

7 Tables and Figures

Table 1: Number of Syrians by Years

	Balcılar (2016)	DGMM	UNHCR
Dec-11	9,118		
Dec-12	152,981	14,237	144,755
Dec-13	578,389	224,655	560,129
Dec-14	1,552,839	1,519,286	1,622,839
Dec-15	2,412,991	2,503,549	2,503,549
Jun-16	2,743,497		
Dec-16		2,834,441	2,814,631
Dec-17		3,426,786	3,424,237
Apr-18		3,567,130	3,561,707
Aug-18		3,542,250	3,542,250

Note: DGMM (UNHCR) stands for the Directorate General of Migration Management (The United Nation High Commissioner of Refugees).

Table 2: Employment Status of the Syrians UTP

	In Camp		Out of Camp		Total	
	#	%	#	%	#	%
Employed	314	24.5	1,788	43	2,102	38.6
Housewife	303	23.7	1,033	24.8	1,336	24.5
Unemployed	319	24.9	755	18.1	1,074	19.7
Student	273	21.3	365	8.8	638	11.7
Disabled / elderly	57	4.5	185	4.4	242	4.4
Retired	5	0.4	36	0.9	41	0.8
No Answer	9	0.7			9	0.2
Total	1,280	100	4,162	100	5,442	100

Source: Erdoğan (2017), includes those aged 12+.

Table 3: Regional Unemployment and Informality

	2010	2011	2012	2013	2014	2015	2016	2017
	Unemployment Rate							
TR62 - Adana, Mersin	16.7	10.7	10.6	12.8	10.7	9.8	10.4	10.7
TR63 - Hatay, Kahramanmaraş, Osmaniye	13.6	12.0	10.4	12.2	15.4	16.4	14.4	11.5
TRC1 - Gaziantep, Adıyaman, Kilis	12.1	14.4	11.8	7.3	8.0	9.9	14.3	15.1
TRC2 - Şanlıurfa, Diyarbakır	13.1	8.4	6.9	17.5	17.4	17.5	17.2	13.8
TRC3 - Mardin, Batman, Şırnak, Siirt	11.8	12.7	21.3	21.1	24.0	24.8	28.3	26.9
Turkey	11.9	9.8	9.2	9.7	9.9	10.3	10.9	10.9
	Share of Informal Employment, %							
TR62 - Adana, Mersin	52.8	53.4	47.5	44.0	45.7	43.3	44.3	40.0
TR63 - Hatay, Kahramanmaraş, Osmaniye	61.3	58.6	53.7	48.9	40.9	36.7	42.2	42.1
TRC1 - Gaziantep, Adıyaman, Kilis	57.8	53.2	49.1	44.3	38.5	35.1	34.0	38.7
TRC2 - Şanlıurfa, Diyarbakır	63.6	60.7	63.3	61.6	67.7	65.1	62.8	62.0
TRC3 - Mardin, Batman, Şırnak, Siirt	61.1	57.3	51.5	49.1	54.7	51.5	41.2	40.5
Turkey	43.2	42.0	39.0	36.8	35.0	33.6	33.5	34.0

Source: Household Labor Force Survey Summary Results, Turkish Statistical Institute.

Note: Share of informal employment is calculated by dividing total number of informal (those who do not have social security due to their main job) employees to total employment.

Table 4: Government Expenditures on the Syrians UTP by Items

#	Item	Million TL	Share
1	Municipal Services	17,527.48	21.21
2	Health	16,030.11	19.39
3	Education	15,489.97	18.74
4	Citizens' aids	11,649.43	14.09
5	Security and public order	9,228.71	11.17
6	AFAD	5,586.59	6.76
7	Foundations, Associations, the Turkish Red Crescent	2,058.12	2.49
8	Euphrates Shield Region	1,630.46	1.97
9	Depreciation of camp equipments	1,505.39	1.82
10	Other NGOs	852.60	1.03
11	DG of Migration Management	780.81	0.94
12	Campaigns organized by municipalities	312.09	0.38
	Total	82,651.76	100.00

Source: Sputnik (2017)

Table 5: Macroeconomic Environment

(% change relative to the base-run)

	M		1st Model: Only Informal Syrians					
			MS		MSG		MSGT	
	SR	MR	SR	MR	SR	MR	SR	MR
GDP	1.14	-0.08	-10.60	-10.67	3.54	2.99	1.35	0.34
Real GDP	-0.22	0.01	0.51	-0.09	3.82	4.88	5.64	6.87
Per Capita Real GDP*	-0.22	0.01	-2.85	-4.61	0.35	0.14	2.11	2.04
Net Exports	0.35	0.38	-2.50	-1.67	3.35	3.79	2.19	1.24
Gov. Revenues	1.19	-0.19	-10.21	-10.25	4.07	3.30	0.00	0.00
SSI Deficits	2.07	-0.08	-15.67	-13.28	-26.75	-35.39	-34.73	-44.51
Debt Stock-to-GDP	-2.00	-1.66	16.73	7.14	-26.33	-19.01	-20.71	-10.68
Total Investment	0.62	-0.49	-10.62	-10.53	6.17	2.70	6.12	0.84
Dist. Dividends	1.12	-0.09	-10.57	-10.72	3.10	2.31	1.86	0.07
Capital Stock	0.07	-0.05	0.65	-0.46	6.51	5.10	9.96	8.02
Private Savings	0.10	-0.73	-10.90	-10.70	9.29	5.82	13.60	5.18
Exchange Rate	1.56	-0.22	-11.10	-10.33	-0.58	-1.57	-5.22	-5.67
CPI	1.36	-0.08	-11.05	-10.59	-0.28	-1.80	-4.05	-6.11
			2nd Model: Informal and Formal Syrians					
			MS		MSG		MSGT	
			SR	MR	SR	MR	SR	MR
GDP			-13.55	-14.19	1.37	0.27	3.82	1.75
Real GDP			1.99	0.35	5.15	5.41	8.27	9.54
Per Capita Real GDP*			-1.42	-4.19	1.64	0.64	4.65	4.59
Net Exports			-3.49	-1.00	2.95	4.63	0.89	0.12
Gov. Revenues			-13.45	-14.02	1.64	0.32	0.00	0.00
SSI Deficits			-16.75	-12.76	-25.93	-33.23	-34.53	-46.24
Debt Stock-to-GDP			19.84	4.10	-25.69	-22.53	-15.80	-8.31
Total Investment			-12.08	-13.65	5.51	0.45	12.50	3.86
Dist. Dividends			-13.07	-13.96	1.40	-0.10	5.89	2.45
Capital Stock			6.94	1.78	13.16	7.52	20.42	13.77
Private Savings			-10.17	-13.30	10.89	4.23	26.83	10.19
Exchange Rate			-16.59	-14.12	-5.24	-4.50	-6.79	-6.27
CPI			-15.24	-14.49	-3.60	-4.87	-4.11	-7.11

Note: SR and LR stand for the short- and medium-run and correspond to the 5^{th} and 20^{th} period of the model horizon, respectively.

***:** Per capita real GDP comprises the total Syrian population as well. Since there is no exogenous population growth rate, the growth rate of real GDP is equal to the growth rate of real GDP per Turkish citizen.

Table 6: Aggregate Labor Market Outcomes

	M		1st Model: Only Informal Syrians						2nd Model: Informal and Formal Syrians					
			MS		MSG		MSGT		MS		MSG		MSGT	
	SR	MR	SR	MR	SR	MR	SR	MR	SR	MR	SR	MR	SR	MR
Panel a: Aggregate Labor Market Outcomes*														
Capitalists	-1.58	-3.16	16.27	15.61	16.10	14.52	17.35	14.37	19.18	17.59	18.64	16.39	20.06	15.50
Rural Residents	-1.82	-5.01	5.22	5.84	4.48	4.21	4.70	3.63	7.49	8.62	6.60	7.03	6.66	5.73
Skilled Formals	-0.53	-1.57	-0.36	-0.20	2.69	3.33	2.48	2.81	2.01	2.34	5.22	6.04	4.71	4.65
Informal Workers	1.74	7.37	-15.09	-15.04	-15.37	-14.16	-14.89	-13.65	-12.08	-12.39	-12.69	-11.52	-12.09	-10.34
Unskilled Formals	0.09	1.41	2.42	1.93	3.24	4.63	3.93	5.53	-2.23	-2.98	-1.68	-0.57	-0.69	1.29
Total Employment	-0.66	-1.03	3.94	4.37	4.21	4.96	4.67	4.98	5.34	5.97	5.40	6.50	5.89	6.44
Informality**	2.41	8.48	-7.55	-4.98	-8.10	-4.48	-7.97	-3.91	-2.61	0.33	-3.39	0.86	-3.14	2.28
Panel b: Employment Generation														
Total Formal			3.03	2.40	3.25	2.60	3.49	2.55	2.59	2.09	2.70	2.22	2.88	2.09
Capitalists			1.36	1.02	1.35	0.94	1.44	0.92	1.22	0.88	1.20	0.81	1.28	0.75
Rural Residents			1.27	1.11	1.09	0.79	1.14	0.68	1.39	1.25	1.23	1.01	1.23	0.81
Skilled Formals			-0.03	-0.01	0.23	0.22	0.21	0.18	0.13	0.12	0.34	0.30	0.30	0.23
Unskilled Formals			0.44	0.27	0.58	0.65	0.70	0.77	-0.31	-0.32	-0.23	-0.06	-0.10	0.13
Informal***			-1.35	-1.06	-1.38	-0.98	-1.33	-0.94	-0.82	-0.66	-0.87	-0.61	-0.82	-0.54

Note: SR and LR stand for the short- and medium-run and correspond to the 5^{th} and 20^{th} period of the model horizon, respectively.

***** : The percentage change with respect to the base-run.

****** : The total informal employment is equal to sum of the native and the Syrian informal employments. Informality is the share of total informal employment in total employment. Along the path of M, since there is no any Syrians in the labor market, the indicator covers only the native informal workers.

*****:** The number of (de)generated employment per Syrian employee. Informal employment (de)generation is equal to the number of native informal workers displaced from the employment.

Table 7: Households' Shares in Total Disposable Income, %

Households		Base		M		1st Model: Only Informal Syrians					
						MS		MSG		MSGT	
		SR	MR	SR	MR	SR	MR	SR	MR	SR	MR
Ricardian	Capitalists	40.85	40.85	40.84	40.82	41.01	40.96	41.00	40.94	41.14	41.04
	Rural Residents	32.69	32.69	32.65	32.59	32.92	32.92	32.82	32.79	32.86	32.81
	Skilled Formals	12.31	12.31	12.31	12.28	12.36	12.36	12.55	12.59	12.51	12.55
non-Ricardian	Informal Workers	3.73	3.73	3.76	3.86	2.95	2.93	2.93	2.92	2.92	2.92
	Unskilled Formals	7.34	7.34	7.36	7.37	7.46	7.47	7.45	7.48	7.36	7.44
	Transfer Receivers	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.16	1.16
	Retirees	1.90	1.90	1.90	1.90	1.89	1.90	1.85	1.83	1.81	1.80
	Informal Syrians					0.24	0.28	0.24	0.28	0.24	0.28
	Formal Syrians										
						2nd Model: Informal and Formal Syrians					
						MS		MSG		MSGT	
						SR	MR	SR	MR	SR	MR
Ricardian	Capitalists					41.15	41.02	41.12	40.99	41.41	41.23
	Rural Residents					33.13	33.13	33.02	32.99	33.10	33.05
	Skilled Formals					12.50	12.52	12.72	12.78	12.63	12.67
non-Ricardian	Informal Workers					2.93	2.90	2.90	2.89	2.87	2.87
	Unskilled Formals					6.95	7.01	6.94	7.01	6.79	6.92
	Transfer Receivers					1.17	1.17	1.16	1.16	1.14	1.15
	Retirees					1.87	1.89	1.82	1.82	1.75	1.75
	Informal Syrians					0.29	0.33	0.28	0.33	0.28	0.33
	Formal Syrians					0.02	0.03	0.02	0.03	0.02	0.03

Note: SR and LR stand for the short- and medium-run and correspond to the 5^{th} and 20^{th} period of the model horizon, respectively.

Appendix A List of Equations of the Modified Model

1. Ricardian Households ($hh = CH,\ SF,\ RH$) - 1^{st} Stage

$$\frac{tc_{t+1}^{hh}}{tc_t^{hh}} = \left[\frac{PTC_t^{hh}}{PTC_{t+1}^{hh}} \ \frac{1+r_{t+1}}{1+\rho} \ \left(\frac{1-ls_{t+1}^{hh}}{1-ls_t^{hh}} \right)^{\mu^{hh}(1-\theta^{hh})} \right]^{\frac{1}{\theta^{hh}}} \tag{A.1}$$

$$\frac{1-ls_t^{hh}}{tc_t^{hh}} = \frac{PTC_t^{hh} \ \mu^{hh}}{w_t^{hh}(1-wagt^{hh}-ssp^{hh})} \tag{A.2}$$

$$sav_t^{hh} \ = \ inc_t^{hh} - PTC_t^{hh} \ tc_t^{hh} \tag{A.3}$$

2. Non-Ricardian Households ($hh = IW,\ USF,\ TRF,\ RET,\ ISYR,\ FSYR$) - 1^{st} Stage

$$\frac{1-ls_t^{hh}}{tc_t^{hh}} = \left[\frac{PTC_t^{hh}}{w_t^{hh}} \ \frac{1-util^{hh}}{util^{hh}} \right]^{\sigma_u^{hh}}, \quad hh \neq TRF, RET \tag{A.4}$$

3. Households - 2^{nd} Stage

$$PQ_{s,t} \ (cd_{s,t}^{hh} - sc_s^{hh}) = MCLES_s^{hh} \ \left(PTC_t^{hh} \ tc_t^{hh} - \sum_{s=1}^{S} PQ_{s,t} \ sc_s^{hh} \right), \quad hh \neq ISYR,\ FSYR \tag{A.5}$$

$$PQ_{s,t} \ cd_{s,t}^{hh} = CLES_s^{hh} \ PTC_t^{hh} \ tc_t^{hh}, \quad hh = ISYR,\ FSYR \tag{A.6}$$

$$PTC_t^{hh} \ = \ -frisch^{hh} \ \prod_{s=1}^{S} \left(\frac{PQ_{s,t}}{MCLES_s^{hh}} \right)^{MCLES_s^{hh}}, \quad hh \neq ISYR,\ FSYR \tag{A.7}$$

$$PTC_t^{hh} \ = \ \prod_{s=1}^{S} \left(\frac{PQ_{s,t}}{CLES_s^{hh}} \right)^{CLES_s^{hh}}, \quad hh = ISYR,\ FSYR \tag{A.8}$$

$$sls_{s,t}^{hh} \ = \ \left[\frac{w_t^{hh} \ sslm_s^{hh} \ (SLM^{hh})^{\rho_{slm}^{hh}}}{sw_{s,t}^{hh}} \right]^{\sigma_{slm}^{hh}} ls_t^{hh}, \quad hh \neq TRF, RET \tag{A.9}$$

4. Firms

$$VA_{s,t} \ = AX_s [sh_s^{va} \ K_{s,t}^{-\rho_s^{va}} \ + (1-sh_s^{va}) \ CLD_{s,t}^{-\rho_s^{va}}]^{-\frac{1}{\rho_s^{va}}} \tag{A.10}$$

$$WK_{s,t} \ K_{s,t} \ = \ PVA_{s,t} \ VA_{s,t} \ - \ CW_{s,t} \ (1+ssc_s) \ CLD_{s,t} \tag{A.11}$$

$$CLD_{s,t} \ = \ \left[\frac{(1-sh_s^{va}) \ PVA_{s,t}}{CW_{s,t} \ (1+ssc_s) \ AX_s^{\rho_s^{va}}} \right]^{\sigma_s^{va}} VA_{s,t} \tag{A.12}$$

$$LD^{hh}_{s,t} \;=\; \left[\frac{CW_{s,t}\; labsh^{hh}_{s}}{sw^{hh}_{s,t}}\right]^{\sigma^{cl}_{s}} \; CLD_{s,t} \tag{A.13}$$

$$VA_{s,t} \;=\; XS_{s,t}\; vash_{s} \tag{A.14}$$

$$INT_{s\prime,s,t} \;=\; iocoef_{s\prime,s}\, XS_{s,t} \tag{A.15}$$

5. Dividend Maximizer Firms ($s = AGR,\ FBT,\ TEX,\ SHE,\ TRP,\ OSER$)

$$DIV_{s,t} \;= (1-corptax)\; WK_{s,t}\; K_{s,t} \;-\; INV_{s,t} \tag{A.16}$$

$$INV_{s,t} \;=\; PI_{t}\; I_{s,t} + \; PVA_{s,t}\; ADJ_{s,t} \tag{A.17}$$

$$ADJ_{s,t} = \phi_{s}\frac{I^{2}_{s,t}}{K_{s,t}} \tag{A.18}$$

$$q_{s,t} \;=\; PI_{t} \;+\; 2\; PVA_{s,t}\; \frac{ADJ_{s,t}}{I_{s,t}} \tag{A.19}$$

$$q_{s,t}\;(1+r_{t}) \;=\; q_{s,t+1}\;(1-\delta_{s}) \;+\; PVA_{s,t+1}\frac{ADJ_{s,t+1}}{K_{s,t+1}} \;+\; (1-corptax)\; WK_{s,t+1} \tag{A.20}$$

6. Non-Dividend Maximizer Firms ($s = MCP,\ HDG,\ HNDG,\ CON$)

$$INV_{s,t} \;=\; invsh_{s}\; WK_{s,t-1}\; K_{s,t-1} \tag{A.21}$$

7. Enterprises

$$DISDIV_{t} \;= \sum_{s} WK_{s,t}\; K_{s,t} \;+ \overline{GTRENT_{t}}\; PINDEX_{t} - CORPTAX_{t} \tag{A.22}$$

8. Foreign Sector

$$QS_{s,t} = AX^{arm}_{s}\left[sh^{arm}_{s}QD^{-\rho^{arm}_{s}}_{s,t} + (1-sh^{arm}_{s})QM^{-\rho^{arm}_{s}}_{s,t}\right]^{\frac{-1}{\rho^{arm}_{s}}}, \;\; s \neq SHE, CON, PSER \tag{A.23}$$

$$\frac{QM_{s,t}}{QD_{s,t}} \;= \left[\frac{1-sh^{arm}_{s}}{sh^{arm}_{s}}\;\frac{PD_{s,t}}{PM_{s,t}}\right]^{\sigma^{arm}_{s}}, \;\; s \neq SHE, CON, PSER \tag{A.24}$$

$$XS_{s,t} = AX^{cet}_{s}\left[sh^{cet}_{s}QD^{\rho^{cet}_{s}}_{s,t} + (1-sh^{cet}_{s})QE^{\rho^{cet}_{s}}_{s,t}\right]^{\frac{1}{\rho^{cet}_{s}}}, \;\; s \neq SHE, PSER \tag{A.25}$$

$$\frac{QE_{s,t}}{QD_{s,t}} \;= \left[\frac{1-sh^{cet}_{s}}{sh^{cet}_{s}}\;\frac{PD_{s,t}}{PE_{s,t}}\right]^{\sigma^{cet}_{s}}, \;\; s \neq SHE, PSER \tag{A.26}$$

$$TRBAL_{t} \;=\; \sum_{s} PWE_{s}\; QE_{s,t} \;-\; \sum_{s} PWM_{s}\; QM_{s,t} \tag{A.27}$$

9. Social Security Institution

$$SSP_t^{hh} = ssp^{hh}\, w_t^{hh}\, ls_t^{hh}\, POP_t^{hh} \tag{A.28}$$

$$SSCONT_{s,t} = ssc_s\, CW_{s,t}\, CLD_{s,t} \tag{A.29}$$

$$str_t^{hh} = \frac{\gamma_s^{hh}\, \overline{SSTRHH_t}\, PINDEX_t}{POP_t^{hh}} \tag{A.30}$$

$$SSDEF_t = \overline{SSTRHH_t}\, PINDEX_t - \sum_{hh} SSP_t^{hh} - \sum_s SSCONT_{s,t} \tag{A.31}$$

10. Government

$$\begin{aligned} GOVREV_t = {} & \sum_s tariff_s\, PWM_{s,t}\, QM_{s,t} + \sum_s vat_s\, (PM_{s,t}\, QM_{s,t} + PD_{s,t}\, QD_{s,t}) + \\ & \sum_s prodtax_s\, PX_{s,t}\, XS_{s,t} + \sum_{hh} wagt^{hh} w_t^{hh}\, ls_t^{hh}\, POP_t^{hh} + corptax_s \sum_s WK_{s,t}\, K_{s,t} \end{aligned} \tag{A.32}$$

$$GTRHH_t = transs\, GDP_t \tag{A.33}$$

$$\begin{aligned} GOVEXP_t = {} & \overline{GOVCON_t}\, PINDEX_t + GTRSYR_t + \overline{GTRENT_t}\, PINDEX_t \\ & + GTRHH_t + SSDEF_t \end{aligned} \tag{A.34}$$

$$GSAV_t = GOVREV_t - GOVEXP_t - GFINT_t\, ER_t \tag{A.35}$$

$$GFINT_t = r^*\, GFDS_t \tag{A.36}$$

$$GFDS_{t+1} = GFDS_t - GSAV_t\, /ER_t \tag{A.37}$$

$$PQ_{s,t}\, CG_{s,t} = GLES_s\, (\overline{GOVCON_t}\, PINDEX_t + GTRSYR_t) \tag{A.38}$$

$$GTRSYR_t = \overline{PCE_t}\, POP_t^{SYR} \tag{A.39}$$

$$gtr^{hh} = \frac{\gamma_g^{hh}\, GTRHH_t}{POP_t^{hh}} \tag{A.40}$$

11. Investment by Origin

$$TOTINV_t = \sum_s INV_{s,t} \tag{A.41}$$

$$PQ_{s,t}\, QINV_{s,t} = TOTINV_t \tag{A.42}$$

12. Labor Market Equilibrium

$$LD_{s,t}^{hh} = sls_{s,t}^{hh}\, POP_t^{hh} \tag{A.43}$$

$$w_t^{hh}\, ls_t^{hh} = \sum_s sw_t^{hh}\, sls_t^{hh} \tag{A.44}$$

$$LSUP_t^{hh} = \sum_s sls_{s,t}^{hh}\, POP_t^{hh} \tag{A.45}$$

13. Savings-Investment Equilibrium

$$TOTPRSAV_t \;=\; \sum_{RIC} sav_t^{RIC}\; POP_t^{RIC} \tag{A.46}$$

$$TOTPRSAV_t + \overline{FSAV_t}\; ER_t \; + GSAV_t \;=\; TOTINV_t \tag{A.47}$$

14. Foreign Exchange Market

$$TRBAL_t + \overline{FSAV_t} \;=\; GFINT_t \tag{A.48}$$

15. Demographic Change

$$MIG_t \;=\; \left[\frac{\alpha\; rnw_t^{USF} \;+\; (1-\alpha)\; rnw_t^{IW} \;-\; rnw_t^{RH}}{rnw_t^{RH}}\right]^{migres} \; LSUP_{t-1}^{RH} \tag{A.49}$$

$$rnw_t^{hh} \;=\; \frac{w_t^{hh}\;(1 - wagt^{hh} - ssp^{hh})}{PTC_t^{hh}} \tag{A.50}$$

$$POP_{t+1}^{USF} \;=\; POP_t^{USF} \;+\; \alpha\; MIG_t \tag{A.51}$$

$$POP_{t+1}^{IW} \;=\; POP_t^{IW} \;+\; (1-\alpha)\; MIG_t \tag{A.52}$$

$$POP_{t+1}^{RH} \;=\; POP_t^{RH} \;-\; MIG_t \tag{A.53}$$

16. Steady State Conditions

$$I_s^{ss} \;=\; \delta_s K_s^{ss} \tag{A.54}$$

$$DIV_s^{ss} \;=\; r^{ss}\; q_s^{ss}\; K_s^{ss} \tag{A.55}$$

Appendix B List of Variables

Endogenous Variables

Households	$tc_{hh,t}$	Per capita composite consumption	**Government & Social Security Institution**	$GOVREV_t$	Government revenues
	$ls_{hh,t}$	Per capita composite labor supply		$GTRHH_t$	Government Transfers to households
	$sls_{s,hh,t}$	per capita sectoral labor supply		$CG_{s,t}$	Government consumption demand
	$cinc_{hh,t}$	Per capita capital/asset income		$TARIFS_{s,t}$	Tariff Revenues
	$winc_{hh,t}$	Per capita gross wage income		$VATREV_{s,t}$	Value added tax revenues
	$inc_{hh,t}$	Per capita disposable income		$PRODTAXS_{s,t}$	Taxes on production
	$wtax_{hh,t}$	Per capita wage tax payments		$CORPTAXS_t$	Corporate tax revenues
	$ssppay_{hh,t}$	Per capita social security premium payments		$GFDS_t$	Government foreign debt stock
	$sav_{hh,t}$	Per capita savings		$GFINT_t$	Interest payments of government on GFDS
	$cd_{g,hh,t}$	Per capita consumption		$SSDEF_t$	SSI deficits
	$gtr_{hh,t}$	Per capita transfer receipt from the government	**Quantities**	$QE_{s,t}$	Exports
	$str_{hh,t}$	Per capita transfer receipt from the SSI		$QM_{s,t}$	Imports
	$POP_{hh,t}$	Population		$QS_{s,t}$	Composite domestic supply
	$LSUP_{hh,t}$	Total labor supply		$QD_{s,t}$	Domestic supply of domestically produced com.
Prices	$PTC_{hh,t}$	Price of composite consumption		GDP_t	Gross domestic product
	$PVA_{s,t}$	Sectoral price of value added		$TRBAL_t$	Trade Balance (Net Exports)
	PI_t	Investment price		$TOTPRSAV_t$	Total private savings
	$WK_{s,t}$	Sectoral price of capital		$TOTPRCON_{s,t}$	Total private consumption
	$PX_{s,t}$	Price of Output		$QDD_{s,t}$	Total domestic demand
	$PM_{s,t}$	Import price in domestic currency		$QINT_{s,t}$	Total intermediate input demand
	$PE_{s,t}$	Export price in domestic currency		MIG_t	Migration
	$PQ_{s,t}$	Price of composite domestic commodity	**Firms & Production**	$DIV_{s,t}$	Sectoral dividends
	$PD_{s,t}$	Price of domestically produced commodities		$I_{s,t}$	Sectoral physical investment
	$CW_{s,t}$	Sectoral composite wage		$ADJ_{s,t}$	Sectoral adjustment cost
	$w_{hh,t}$	Composite wage		$INV_{s,t}$	Sectoral investment exp., inc. adjustment cost
	$rnw_{hh,t}$	Real net wage		$K_{s,t}$	Sectoral capital stock
	$sw_{s,hh,t}$	Sectoral wage		$XS_{s,t}$	Sectoral output
	$q_{s,t}$	Shadow price of sectoral capital stock		$INT_{st,s,t}$	Sectoral intermediate input demand
	ER_t	Nominal exchange rate		$VA_{s,t}$	Sectoral value added
	$PINDEX_t$	Price Index (CPI)		$CLD_{s,t}$	Sectoral composite labor demand
				$LD^{hh}_{s,t}$	Sectoral labor demand
				$SSCONT_{s,t}$	Sectoral social security contribution payments
				$DISDIV_t$	Total distributed dividends

Exogenous & Fixed Variables

	$GTRENT_t$	Transfer payments of government to enterprises		$FSAV_t$	Foreign Savings (Current Account Balance)
	$SSTRHH_t$	Transfer payments of SSI to households		$GOVCON_t$	Government Consumption Expenditures
	PCE_t	Per capita Government Spending on the SYR			

Households				**Firms**	
Ricardian	CH	Capitalists	**Dividend Maximizer**	AGR	Agriculture
	SF	Skilled Formal Wage Earner s		FBT	Food, Beverage, and Tobacco
	RH	Rural Residents		TEX	Textile
non-Ricardian	USF	Unskilled Formal Wage Earners		SHE	Shelter and Related
	IW	(Native) Informal Wage Earners		TRP	Transportation
	RET	Retirees		$OSER$	Other Services
	TRF	Transfer Receivers	**non-Dividend Maximizer**	MCP	Mining, Coal, and Petroleum
	$ISYR$	Informal Syrians UTP		$HNDG$	Household Non-Durable Goods
	$FSYR$	Formal Syrians UTP		HDG	Household Durable Goods
				CON	Construction
				$PSER$	Public Services

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