

Economics of Refugee Movements

by

Persiana Ivova Ignatova (Student ID: 160295146)

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Supervised by Dr. Francesco Fasani
School of Economics & Finance Queen Mary University of London

Abstract

Background: In the past three decades a large number of people have been displaced from their home countries. In particular, the Syrian Civil War caused the largest historical migration of people to Europe. In this context, the effectiveness of the existing asylum policies has been questioned and new models were proposed.

Methods: I conducted a literature review of the existing migration researches and identified studies that model refugees' migration choices; studies that investigate the factors affecting such decisions; and studies using game theory framework to analyse interactions between destination countries' legislative frameworks.

Drawing on the existing research, I designed a framework for modelling individual refugees' migration choices and used a game theory framework that accounts for the strategic interactions among the legislative settings of the destination countries.

Results: The decision model postulates that the reasoning of a forcibly displaced person-where and for how long to seek asylum- is based on a lifetime-utility optimization. Interesting result of the analysis is that the most affected people from the conflict are not seeking asylum in a distant economically developed country. The game theory analysis of the issue showed that when choosing a restrictive asylum policy, the countries are trading off the benefits of the lower refugee population for the higher investments for deterrence procedures.

Conclusions: The combination of the two approaches could be used by policy makers to achieve better understanding of the refugees' decision-making process and the results of the strategic interaction between countries providing asylum. If these two aspects are fully embraced more efficient outcomes will be achieved from the asylum legislations. Finally, I believe that the framework could be used in undergraduate university level to provide the students with an interesting application to the theoretical concepts studied in Micro, Macro and Game theory.

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1.Introduction

Introduction to the 2015 Refugees Crisis in Europe

“Nine-member states in the EU today receive 90% of all asylum applications annually but those nine states are starting, well, to become fed up. “(Tobias Billström, Sweden’s Immigration minister, 3rd March 2014)

The Syrian Civil War caused largest refugee migration to Europe since the Yugoslavian wars. Data from the European Parliament shows that in 2017 there were 728 470 applications for international protection in the EU, which is a 44% decrease compared to 2016, when the applications were around 1.3 million. During 2017 the European Union granted protection to more than 538 000 people that is less by 25% from 2016. Out of the total refugee flow 175 800 people were Syrians. The highest number of refugees granted protection in Europe were hosted by Germany and the Scandinavian countries (Europarl.europa.eu., 2017). Yet the countries hosting the largest refugee flows world-wide are Turkey, Pakistan, Lebanon, Uganda and Iran and 85% of the world’s refugees are hosted by developing regions (UNHCR, 2018). These figures point towards the highly unequal distribution of the refugees around the world and social inefficiency of the asylum policies.

The migration policies are now the most discussed topic from the EU policy agenda. The latest refugee crisis in Europe revealed the demanding need for reform in the “Common European Asylum System” (CEAS). The existing legislation failed to address the challenges created by the unexpected volumes of refugee flows. The problems are mainly two.

The first problem is that CEAS, also known as the Dublin-System, was created in the 1997, and was designed for different types of refugee crises. Under this system the asylum-seeker is mainly a responsibility of the country of first entry (Moraga and Rapoport, 2014). In practice this means that the border countries of Europe are the only responsible for the asylum seekers. For example, if a refugee who entered the EU illegally, through Bulgaria, was found by authorities in Slovakia, could be transferred back to Bulgaria.

The second major problem is the “burden sharing mechanism”. As explained in the previous paragraph the border countries of the European Union (e.g. Italy, Greece, Bulgaria, Croatia, Spain) are obliged to be responsible for almost all the refugees due to their geographical location. This situation puts under stress test the main functioning principles of the Treaty of Functioning of the European Union (TFEU), namely the solidarity and responsibility among the Member States.

Immediate actions were taken for harmonization of the CEAS. Some of the new institutions and mechanism that have been established are: the European Emergency Reallocation Scheme, the European agency as the European Asylum Support Office (EASO), creation of EU

funding through new Fund for Asylum, Migration and Integration. However, it can be stated that these actions had rather limited effect (Moraga and Rapoport, 2014). In order to address the limited effectiveness of the CEAS, Europe needs to strengthen the cooperation and to move beyond the mere demonstration of symbolic solidarity (Thieman, 2017).

Ultimately, the economic research can try to address the challenges for the design of a more unified refugee protection system and to save the core principles of the European integration. In this work I am trying to conceptualise an economic perspective for more efficient outcomes of the refugee protection systems. The challenges that stay in front of the economic research are mainly two:

- we need to better understand how refugees make their migration choices;
- the developed countries need to better understand the (in)efficiencies of their strategic interactions.

If these two challenges are overcome, the policy makers will be capable to devise mechanisms that allow for fairer sharing of the burden of hosting refugees.

The present project proposes a new perspective to the problem of the rising numbers of forcibly displaced people world-wide. Drawing on the existing research, I designed a framework for modelling individual refugees' migration choices and used a game theory framework that accounts for the strategic interactions among the legislative settings of the destination countries. The project builds upon the existing literature for micro and macro migration theory to create the stylized model of the individual refugees' destination choices. This framework accounts for the important exogenous factors that can affect the directions of the refugee movements. The game theory analysis of the issue showed that when choosing a restrictive asylum policy, the countries are trading off the benefits of the lower refugee population for the higher investments for deterrence procedures.

The structure of the dissertation is the following. In section 2, I discuss methodology and objectives of the project. Followed by section 3, where I review the related literature to the problem. Section 4 develops a stylized model of refugees' migration choices for destination and duration. In Section 5 I apply a framework from game theory to analyse the strategic interaction between 2 countries that are undertaking a deterrence procedure. In Section 6 I am concluding and discussing the advantages, limitations, development stages of this project and the possible uses.

2. Methodology and Objectives

The overall aim of the project is to create a framework for analysis of the refugee crisis from the perspective of the general economic theory. The specific objectives are two-fold:

1. To develop a mathematical model that could explain the specifics of the refugee movements and their durations.

2. Using the game theory framework and the Stackelberg duopoly model to show the outcome of the interaction between the States' asylum legislative policies.

In order to build the mathematical model, I conducted a literature review of studies conceptualising and modelling refugee movements. Drawing on the results from the review, I identified additional factors affecting refugees' decisions in terms of destination and duration of the migration. Building on previous models, I created a model that accounts for such factors and provides a more adequate description of the refugees' decision-making process.

To adapt the migration models to the refugee reality, I needed to conduct in-depth interviews with refugees. This approach allows for better understanding of the individuals decision making process. However, the nature and the deadline constraints of this undergraduate project did not allow me to conduct primary data collection. Instead I searched for a recent paper, where this approach was used. To define the variables altering the model I used a study from 2018, whose author was collecting in-depth interviews from 33 refugees. The questions of the interviews were structured to examine the reasons that made the refugees to migrate to particular destination- e.g. choosing Germany not Sweden; or choosing Europe not the Persian Gulf. This in turn, helped me to define the important factors that distinguish the economics of decision making of the economic migrants from the refugees. These factors defined are the following:

- 1) Level of affectedness of the conflict
- 2) Possibility for obtaining the expected neighbouring country earnings
- 3) Uncertainty of the outcome from the asylum application in economically developed country

I have conducted a review of the game-theory literature and identified a framework that is relevant for explaining the legislative battles that might arise among countries providing asylum to refugees.

Software used for the graphs and the formulas: Corel Draw

3. Literature review

The research on forced migration literature offers a limited image of how the various levels of war persecution affect the individual's choices for migration destination and its duration. The problem for the persecuted person is mostly a trilemma:

- Stay in the home country where the individual (and, more importantly, his/her family) has to live under the conditions of armed violence;
- Move to one of the nearest asylum countries which, in the case of the Syrian conflict, are Lebanon, Turkey and Jordan;
- Seek asylum in a distant from the conflict, economically developed European country.

In the nearest asylum country to the conflict the economic conditions are such that the migrants do not have the opportunity of earning income and sustaining themselves. On the other hand, the alternative way to Europe is costly, dangerous and the outcome is uncertain.

Most of the research in the field of forced migration is investigating the (in)effectiveness of the current European asylum policy, the design of alternative schemes for reallocation and integration of refugees and the economic costs and benefits of the crisis. However, there is a paucity of studies examining the micro theory of refugee's migrations. Namely, how the individuals make their choices for destination country and duration of the migration and what are the factors affecting them. In the neoclassical migration theories, micro theory arose as a response to the needs of the macro-level theories. According to Borjas (1990) the rational individuals migrate because after estimation of the costs and benefits of this action, they receive positive net return from the movement. Therefore, individuals migrate to the country where the expected net returns are greater than in the country of origin (Tomanek, 2011). The forcibly displaced people are rational individuals, but their choices are affected by other exogenous factors. Hence, the existing models of the economics of migration cannot be applied to the refugees' situation without some adaptation.

It is important to note, that the refugee movements do not reflect the nature of the voluntary temporary, permanent and return migrations, because people are escaping from a war conflict and are not leaving their country purely incentivised by economic factors, as the economic migrants. By definition the refugees are displaced individuals who have been forced to cross national boundaries and who cannot return home safely.

In my work I will be using earlier developed theoretical models on the temporary migration and destination choices, by accounting for some specific exogenous factors for the refugees' situation. The latter will distinguish the framework from the one used in the economic migration studies. I am drawing on the existing migration studies which investigate the international income differentials as an incentive for utility maximization. As in the neo-classical micro theory of migration, I am calculating the refugees net income by taking the observed income in the different destinations and multiplying it by exogenous variable that will allow to obtain the 'expected destination earnings'.

Early researchers in the area of neoclassical micro-theory are Todaro and Harris (1970). Their work states that the main driver of labour migration are the wage differentials between host and home country. The research concludes that the economic disparity between regions is the main factor influencing migratory flows (Tomanek, 2011). However, the neoclassical theory has often been found to be incompatible with empirical evidence. For example, Carrington and colleagues (1996) argue that the relation of the wage differential between countries does not hold fully, because of oversimplification.

A more relevant dynamic migratory framework was developed by Djajic and Milbourne (1988). Their work on voluntary return migration, is based on migrant's higher utility of consumption in the home country. Dustman (2003) researches the field of return migration and the optimal duration of migration based on a dynamic framework. The work appropriately analyses the rationalised decision of individuals for destination choices and the factors that affect the optimal duration and the magnitude of the migration. To structure their models, Djajic and Milbourne (1988) and Dustman (2003,2004) accounted for the special preferences towards home country consumption of groups of heterogenous individuals. In this setting the refugees are special case because their utility for home consumption

decreases, due to the oppression and violence they experience as a result of the war in the home country. Hence, a refugee will leave Syria even if the economic situation in Lebanon is worse and the expected consumption level will be lower. On the other hand, there is existing empirical evidence that refugees living in countries around the conflict zone, such as Lebanon and Jordan, under poor conditions will return to the home country despite the war Trucker (2018).

The refugees are also seeking asylum in Europe, where the economic perspectives are better, but the probability of rejection of the asylum applications creates a situation of choice under uncertainty. Empirical data for this scenario is provided by Djajic and Milbourne (1988) who tried to describe return migration return with the preferences for specific location and the choice under uncertainty.

In the model I am accounting for the exogenous variables:

- Level of affectedness of the conflict;
- Possibility for obtaining the expected neighbouring country earnings;
- Uncertainty of the outcome from the asylum application in economically developed country.

These variables were selected drawing on the research conducted by Trucker (2018). Trucker (2018) conducted 33 interviews with refugees in 2017. The interview questions are aiming to understand why the participants decided to seek asylum in different European countries and not in neighbouring to Syria countries or countries from the Persian Gulf. The exogenous variables that I am accounting for, are clearly standing out from the refugees' answers.

As consequence of the literature reviews, the framework that I am developing is defined by the following three characteristics:

- choice under uncertainty-uncertainty for the outcome of the asylum-seeking process
- dynamic model that analyses the intertemporal utility maximization
- possibility for return migration to the home country, where the conflict arises

The uncertainty factor around the refugees' migration is investigated in another strand of studies that examined the relation between the asylum recognition rates and the number of applications in different asylum destinations. Prominent researcher in the area is Hatton (2004,2009). Hatton (2009) looked at the endogenously set targets for recognition rates by the destination countries with respect to the number of arrivals. However, in this strand of studies the interdependences of the legislative responses among countries are not widely investigated. One of the few attempting to investigate this aspect of the problem are Gorlach and Motz (2017). They model the refugees' decisions, allowing the choice set to include a neighbouring country and two alternative destination countries and account for the strategic interactions among the destinations legislative setting. They find out the elasticity of the applications of Syrian refugees in Europe with respect to the recognition rates. One of their important findings is that the recognition rates of the different countries in Europe are strategic substitutes at equilibrium level. The innovativeness of their approach is that they are accounting explicitly for a potential strategic element in destination countries' asylum

policies. Previous literature was trying to estimate the importance of asylum recognition rates of refugee flows based only on cross-country variation (Gorlach and Motz, 2017). The results of previous literature might be biased because of the strategic interactions for policy choices. Stepping on this paper I further structured the analysis of my work.

The strand of studies described in the previous paragraph make possible the analysis of the strategic interactions between the destination countries legislative settings and the optimal number of individuals that can be granted international asylum. I will be using the game theoretical nature of the problem. I am analysing the efficiency of the resulting Nash equilibria in the strategic interactions between destination countries. For the purpose of the analysis I am following a simplified framework of non-cooperative equilibria in one-shot games by Eaton and Eswaran, (2002). The results of such analysis provide an opportunity to develop new methods for analysis and, hopefully, improvement in the legislative efficiency of the hosting countries.

In the previous paragraphs I identified the two main aspects that need to be taken into account for the achievement of efficient outcomes of the refugee crises. Continuing, I researched the literature that offers alternative policy designs in the context of the European refugee crisis, because it is important to see to what extent these aspects have been recognised. There are many works that are attempting to solve the political and legislative non-cooperative game between the states. A series of papers that has received particular attention beyond the academic circles are Moraga and Rapoport (2014a, 2014b, 2015) which are a theoretical attempt to solve the problem with asylum policies. The authors propose a system of tradable refugees' quotas based on the implementation of the matching theory and the treatment of the refugees as public goods. Their solution also prevents the possible strategic battle on asylum legislation between the Member States', known as "race to the bottom". They explain that the system of quotas for admitting refugees, might lead to a humanitarian dumping. However, the solution is that the two components of their system tradable quotas and matching allows a financial penalty to be imposed on the countries with restrictive policies. Alternative solutions that are addressing the refugee crisis in the political science are given by Thielemann et al. (2010) and, in the economics research, by Hatton (2012). Hatton (2012) is evaluating how a more efficient EU legislative outcome can be achieved, by comparing a harmonization of the member states' policies and a more centralised legislative process. In his model he considers the asylum as a public good and develops a joint policy, that ensures the 'burden' of providing asylum to refugees is optimally distributed among the member states. He defines two instruments that will allow for Pareto efficient outcome of the crisis in Europe: subsidy given to countries with excess supply of refugees and a redistribution mechanism. Thielemann and colleagues (2010) work on expansion of the existing European Asylum policy tools and are proposing an alternative way for calculating the redistribution of refugees to the Member States.

In the following sections, I am drawing on the existing migration literature by adapting theories and frameworks to the context of the refugees' reality. The objective is to build a model that takes into account some of the main factors affecting the refugee's decision to migrate to a particular destination. Understanding better the decision-making process of the

refugees will allow for more adequate response from the countries and more efficient management of the problem. Then the paper continues with the demonstration of the inefficiency in a non-coordinated game between two countries legislative responses. The decision making of the refugees combined with the legislative responses of the economically developed countries will define where the refugees actually end up.

4. Model of refugee destination choices

In this section I develop a simple model analysis for the understanding of the refugee's movements. This model will encompass a simultaneous decision making for the heterogenous individuals for migration to a neighbouring country, European country or no migration at all.

The model allows to illustrate the intertemporal utility maximization of the destination choice of the heterogenous individuals living in Syria. It represents the optimal duration of stay in different migration locations, based on the lifetime budget constraint and the exogenous variables, for individual that is making the decision to migrate at time $t=0$ and dies at time $t=1$. In the whole model I will be referencing: Syria as notation for home country of the displaced people, Lebanon as a notation for a neighbouring country and Europe as a notation for distant economically developed country. However, the framework can be used for the analysis of other than the current refugee crisis.

The individuals are heterogenous as each of them bears a different level of affectedness of the war. The variable that captures this factor is k . k is normalised $k \sim N \in [0,1]$. The migration options are:

- to migrate to neighbouring country- "N", in this case Jordan, Lebanon and Turkey, temporary or permanent;
- to stay in Syria- "H";
- to migrate to European country- "W"

The income that can be earned in the three destinations are respectively Y_N , Y_H and Y_W , where Y_W is larger than the Y_H and Y_N - possible incomes that can be obtained in Syria and the first asylum countries from the region.

Interesting finding from the interviews conducted by Trucker 2018 is that the income generation is restricted in Lebanon, Jordan and Turkey. In Lebanon for example, almost 90% of the refugees live below the poverty line (UNRWA, 2017), while in Jordan basic services are denied to the refugees and they face deportation to Syria (UNRWA, 2017c). This is also important characteristics of the neo-classical micro-theory of migration economics. In the context of migration economics, the migrants estimate expected future earnings by taking the observed earning in the migration destination and multiplying them by probability of obtaining a job in the destination country (Tomanek, 2011).

Base on the analysis of Trucker (2018) and Tomanek (2011), I am including an exogenous variable " m " that accounts for each individual's possibility to earn the optimal income in the country N. Therefore, the available income that can be obtained by refugees in countries like Lebanon, Jordan and Turkey is $m \times Y_N$, where $m \in [0,1]$.

To simplify the analysis there is no discounting in the model. The utility of consumption $U(.)$ is a Cobb-Douglas utility function. For the purpose of the analysis I am using Constant Elasticity of Substitution (CES) utility function, that arises as a utility function from the consumer theory and in which the

exponents sum to 1, $(\alpha + (1 - \alpha) = 1)$. I am also assuming that the individuals are risk-averse. The utilities of consumption are:

$$u(C_H) = k^{1-\alpha} \cdot c_H^\alpha$$

$$u(C_N) = c_N^\alpha$$

$$u(C_W) = c_W^\alpha$$

The analysis follows by a separate examination of the lifetime utility of consumption in each destination and the optimal duration of the stay.

Temporary or Permanent migration to Lebanon, Jordan or Turkey

All participants in Truckers (2018) interviews talked about the difficulties faced, when deciding to migrate to the neighbouring countries to Syria-Lebanon, Jordan and Turkey. The poverty in the area and the restricted labour access impacted the decisions of the interviewees to return back to Syria or to undertake the dangerous journey to Europe.

These are some of the experiences that the refugees shared:

“Even to get a visa to Lebanon wasn’t an easy thing. Choosing to go through Turkey to Sweden, was because I can’t get a visa to any Arab country. I was trying to get a visa for the UAE but it didn’t work out.” (12)

“I can’t go anywhere other than just being stuck in Syria.”(12)

“I’d go to Bahrain, to Britain or Germany. But then when I looked at my options, Sweden was the easiest and most secure way.” (13)

In the Lebanon movement option, the refugee can stay in Lebanon until the intertemporal budget constraint is not exhausted. The time spent in Lebanon is t , hence in Syria is $(1-t)$. Therefore, the refugee’s intertemporal utility function is given by:

$$U_N = t \cdot C_N^\alpha + (1 - t) \cdot C_H^\alpha$$

Subject to the Intertemporal budget constraint (IBC):

$$t \cdot m \cdot Y_N + (1 - t) \cdot Y_H - t \cdot C_N - (1 - t) \cdot C_H \geq 0$$

Follows a Lagrangian Utility optimization:

$$L = t \cdot C_N^\alpha + (1 - t) \cdot k^{1-\alpha} \cdot C_N^{1-\alpha} - \lambda(t \cdot m \cdot Y_N + (1 - t) \cdot Y_H - t \cdot C_N - (1 - t) \cdot C_H)$$

First Order Condition:

$$\frac{\delta L}{\delta C_H} = \alpha \cdot k^{1-\alpha} \cdot C_H^{\alpha-1} - \lambda = 0; \lambda = \alpha \cdot k^{1-\alpha} \cdot C_H^{\alpha-1} \quad (1)$$

$$\frac{\delta L}{\delta C_N} = \alpha \cdot C_N^{\alpha-1} - \lambda = 0; \lambda = \alpha \cdot C_N^{\alpha-1} \quad (2)$$

$$\frac{\delta L}{\delta t} = C_N^\alpha - k^{1-\alpha} \cdot C_H^\alpha + \lambda(m \cdot Y_N - Y_H + C_H - C_N) = 0 \quad (3)$$

$$\frac{\delta L}{\delta \lambda} = t \cdot m \cdot Y_N + (1 - t) \cdot Y_H - t \cdot C_N - (1 - t) \cdot C_H = 0 \quad (4)$$

After algebraic transformations of equations (1) and (2), I got:

$$k \cdot C_N = C_H \quad (5)$$

It can be stated that the consumption of a refugee in Lebanon, based on the level of affectedness from the conflict, is in linear relation with the consumption in Syria. Therefore, the utility of consuming one more unit in Syria is the same as the utility of consuming one more unit in Lebanon. Using this equation together with (1) and (3), after algebraic transformations, is derived the relationship between the income and consumption in Syria and Lebanon:

$$C_N = \frac{\alpha(Y_H - m \cdot Y_N)}{(1-k)(1-\alpha)} = \frac{C_H}{k} \quad (6)$$

This relationship can be interpreted in the following manner: the temporary migration of the refugee from Syria to Lebanon and back occurs, when the individual consumption levels in the neighbouring country exceeds the disposable income, and because of the IBC, the individual has to return to Syria. Further on, after substitution of equations (4) and (5) in (6), I find the duration of the migration in Lebanon is:

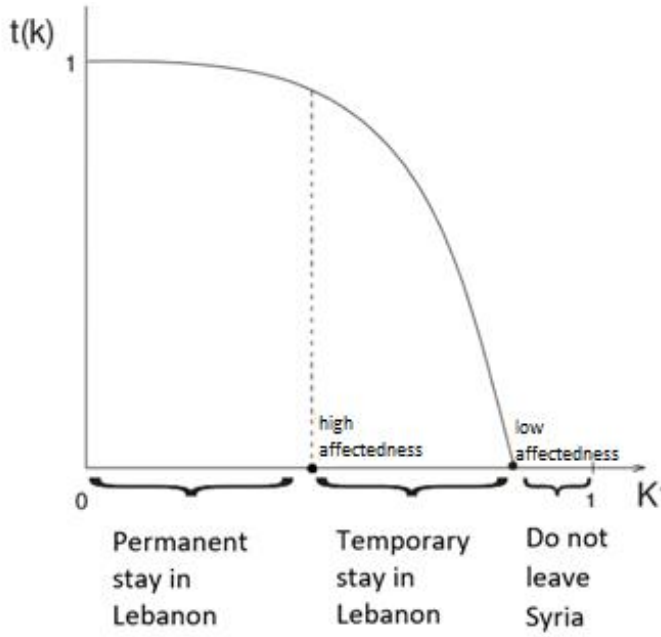
$$t(k) = \frac{\alpha \cdot k}{(k-1)} - \frac{Y_H}{m \cdot Y_N - Y_H} \cdot (1 - \alpha) \quad (7)$$

$$\text{First order condition: } \frac{dt}{dk} = \frac{-\alpha}{(k-1)^2} < 0$$

$$\text{Second order condition: } \frac{d^2t}{dk^2} = \frac{2\alpha}{(k-1)^3} < 0$$

Therefore, the time (t) is decreasing function of the individual's level of affectedness of the conflict. It can be concluded that the U_N will be convex with respect to the k. Fig. 1 shows the migration duration in the Syria's neighbouring countries, with respect to k_i .

Fig.1 Duration of the migration to neighbouring country and level of affectedness of the conflict



The level of affectedness of the conflict is normalised $k \sim N[0,1]$, hence, the lower the value of k for each individual the higher the level of affectedness and the longer the individual stays in Lebanon. The results of the graph in fig.1 can be interpreted as follows:

1. The individuals that do not leave Syria, or migrate for a limited amount of time, are the least affected from the conflict and their disposable income abroad $m.y_N$ is less than the one in Syria. This holds when $m.y_N \leq Y_H$.
2. The individuals that leave the home country permanently, do so because it is possible to earn the optimal disposable income in Lebanon ($m.y_N \approx Y_N$), that is higher than the expected income from the Syria. This holds when $m \geq \frac{\alpha.Y_H}{Y_N}$.

Asylum-seeking in Europe

The migration to highly developed European country is clearly a better option for a refugee, but the possibility for rejection of the asylum application can discourage the Syrians to undertake the journey or to direct them to other destination country within Europe. Moreover, the journey to Europe is costly and very dangerously. In order to go through the safest and the cheapest way, the refugees nowadays are using their smart phones as a valuable source of information. They are also highly aware of the asylum policies that the European counties have. They know which countries are liberal in their asylum procedures and which are more restrictive. Before undertaking the journeys they are conducting a wide research that will allow them to minimize the risk of unsucces. This is confirmed from the responses of the interviewees of Tucker (2018). Many of the participants in the interviews had detailed knowledge of the asylum system in the different European countries:

"I read a lot about the options I had, and I asked people I knew that were living here {Sweden}. People gave me good feedback in terms of life here, the treatment of refugees and migrants. That's how I made my decision. My first criteria was getting a permanent residency that would eventually get me citizenship and passport and will allow me to move freely around." (8)

“All my decisions since that day {of leaving the detention centre}- were taken with one issue in mind: what is the fastest way to get a citizenship and how can I get a passport?” (8)

In the model I am capturing the individual's uncertainty around the success of the asylum-seeking process in Europe with the variable r , as r is the possibility of success and $1-r$ is the possibility of failure of the asylum application. R is normalised $r \sim N \in [0,1]$. For migration to be realised, the Syrians must have substantial capital resources which I am capturing with the parameter Q , $Q \leq Y_H$. With respect to these factors the expected utility of consumption of the individual is given by:

$$U_w = r \cdot c_w^\alpha + (1 - r) \cdot k^{1-\alpha} \cdot C_H^\alpha \quad (8)$$

Subject to the Intertemporal Budget Constraint (IBC):

$$C_H = Y_H - Q$$

$$C_w = Y_w - Q$$

Hence, the expected utility of the individual with respect to his income and k is:

$$U_w = r \cdot (Y_w^\alpha - Q) + (1 - r) \cdot k^{1-\alpha} \cdot (Y_H^\alpha - Q) \quad (9)$$

First order condition:

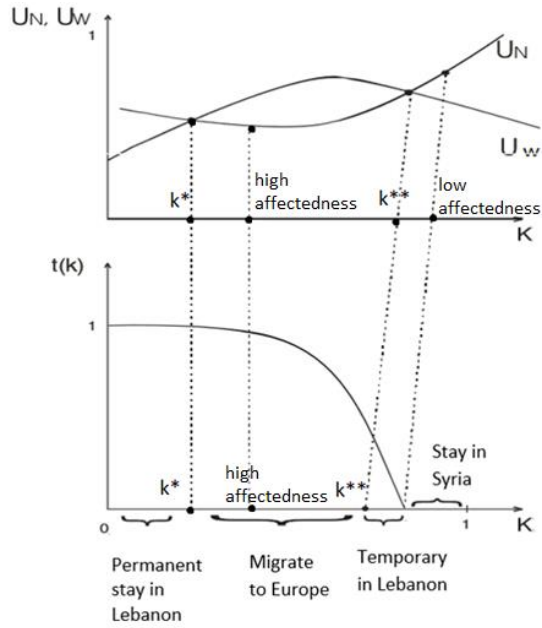
$$\frac{dU_w}{dk} = (1 - \alpha)(1 - r)(y_H - Q) \cdot k^{-\alpha} > 0$$

Second order condition:

$$\frac{d^2U_w}{dk^2} = -\alpha \cdot (1 - \alpha)(1 - r)(y_H - Q) \cdot k^{-\alpha-1} < 0$$

It can be concluded that the utility function of the individuals when immigrating to European country is concave. This is plotted in fig. 2 together with the convex utility function of the individuals that immigrated to Lebanon. The refugee takes the decision to seek asylum in Europe, every time when the utility of asylum seeking in the European destination is higher than the utility from the move to Lebanon (U_w is over U_n).

Fig. 2 Destination choice and level of affectedness of the conflict



Analogously to the comment for fig.1 on the optimal duration of stay in the neighbouring countries to Syria- Lebanon, Jordan and Turkey, Fig. 2 incorporates the optimal duration of stay in the 3 destination countries- Europe, Lebanon and Syria. Moreover, one can conduct an evaluation of the specific levels of affectedness of the conflict (K) that change the refugees' preferences towards an asylum destination. In the utility curvatures are also incorporated the exogenous factors that account for the possibility of an individual to economically sustain him/herself in Lebanon (m), the risk not to be granted asylum in the European country ($1-r$) and the endogenous investment that has to be made for the migration to Europe (Q). However, fig. 2 is not the only possible setting for migration decisions, as the curvatures for the utility maximizing individuals will be changing with the changes of the exogenous variables. Hence, the intersection points of the functions in the upper part of the graph are not necessarily two. In the trigonometric mathematics, a widely developed problem setting is where one examines all possible cases for the number of intersection points between changing trigonometric functions in a coordinate system. This approach is very applicable for the present situation, as by exhausting the possible number of intersections between the utility curves, one can receive mode information for the reference exogenous and endogenous factors that made an individual to choose a particular destination. For each case of one, two and no intersection points the upper part of the graph on fig.2 changes. In the following cases I am examining when a Syrian refugee will decide to seek asylum in Europe; an analogous examination can be carried out for Lebanon:

1. There are two intersection points of U_W and U_H as in fig.2: k^*, k^{**} and $k^* < k^{**}$

A Syrian refugee will seek asylum in Europe when:

-affectedness level of the conflict is the highest, $k=0$. Hence, the following condition must hold:

$$U_W(k=0) < U_N(k=0)$$

-affectedness level of the conflict is the lowest, $k=1$. Hence, the following condition must hold:

$$U_W(k=1) < U_N(k=1)$$

Inferences for the exogenous and endogenous factors: In this case the European asylum legislation is strict and not many individuals undertake the risk to invest in their journey to Europe, because they might be rejected and deported to a third asylum country. If the European legislation becomes stricter,

the utility curve of the asylum option in Europe (U_W) will move down. Hence, for the non-liberal countries in Europe, there is no intersection with (U_N).

2. There is one intersection point of U_W and U_H : k^{**}

A Syrian refugee will seek asylum in Europe when:

-affectedness level of the conflict is the highest, $k=0$. Hence, the following condition must hold:

$$U_W(k = 0) > U_N(k = 0)$$

-affectedness level of the conflict is the lowest, $k=1$. Hence, the following condition must hold:

$$U_W(k = 1) < U_N(k = 1)$$

Inferences for the exogenous and endogenous factors: The migration decision is undertaken, because the invested capital Q is low, and the European asylum legislation is not too strict. The individuals that experience $k < k^{**}$ are undertaking the journey to Europe. Some of the individuals with $k > k^{**}$ are migrating to Lebanon and some to Europe.

3. There is one intersection point of U_W and U_H : k^*

A Syrian refugee will seek asylum in Europe when:

-affectedness level of the conflict is the highest, $k=0$. Hence, the following condition must hold:

$$U_W(k = 0) < U_N(k = 0)$$

-affectedness level of the conflict is the lowest, $k=1$. Hence, the following condition must hold:

$$U_W(k = 1) > U_N(k = 1)$$

Inferences for the exogenous and endogenous factors: In this case the invested capital Q for the migration is high and the asylum legislations in Europe are rather restrictive. Interestingly the individuals with the highest level of affectedness of the war conflict are migrating only to the neighbouring country and individuals that are better-off are migrating to Europe. This can be explained with the fact that the income of strongly affected individuals is devalued and they are more risk-averse. Hence, cannot bear the risk of the asylum rejection in Europe, because their intertemporal budget constraint will be exhausted.

The above analysis suggests an interesting theoretical relationship between k and the destination choice of an individual. The less affected from the conflict individuals are seeking asylum in Europe and the most affected ones are migrating to refugee camps in the developing countries from the region around Syria. However, further empirical tests must be conducted to fully confirm this statement. This framework shows that the utility maximizing individuals that are living in a violent conflict region, such as Syria, are not making their decisions based purely on economic factors. It is clear that the refugee flows are affected by the asylum legislations in the European countries and the conditions in the neighbouring countries. The framework points towards the need of proactive engagement of the European states with the developing countries from the Syrian region, in order to achieve optimal management of the migratory flows. The framework also intuitively suggests the widely known goal for optimal coordination of the asylum legislations procedures in the European Member States.

In this line of thought, the analysis will follow with the game theoretical perspective of the problem for cooperation among asylum states, that also points toward the need for deeper integration the policy design of the European Member states.

5.A Game Theory Analysis

No coordination game among countries providing asylum: the importance of supra-national common action in Europe

More than one quarter of the Syrian population now lives as international refugees outside the Syrian borders (Gorlach and Motz, 2017). As reflected in the model described earlier, in the context of forced displacement, most of these refugees are hosted in camps in neighbouring countries, while some have moved to economically developed countries in the European Union. Drawing on the economics literature concerning the refugee movements and on game theory, I will try to explain why the level of restrictiveness of asylum legislation between two countries will not be pareto efficient, when they are having deterrence strategies. Gorlach and Motz (2017) proved that the asylum recognition rates are positively related to the application numbers. They developed and calibrated a dynamic model that focuses on the Syrian refugee migration to Europe and proves the strategic substitutability of the recognition rates in the different European destination countries (Gorlach and Motz, 2017). Bulow and colleagues define recognition rates as substitutes if an increase of the admission rates in one country causes tightening in the policies in the other countries (Bulow and colleagues, 1985).

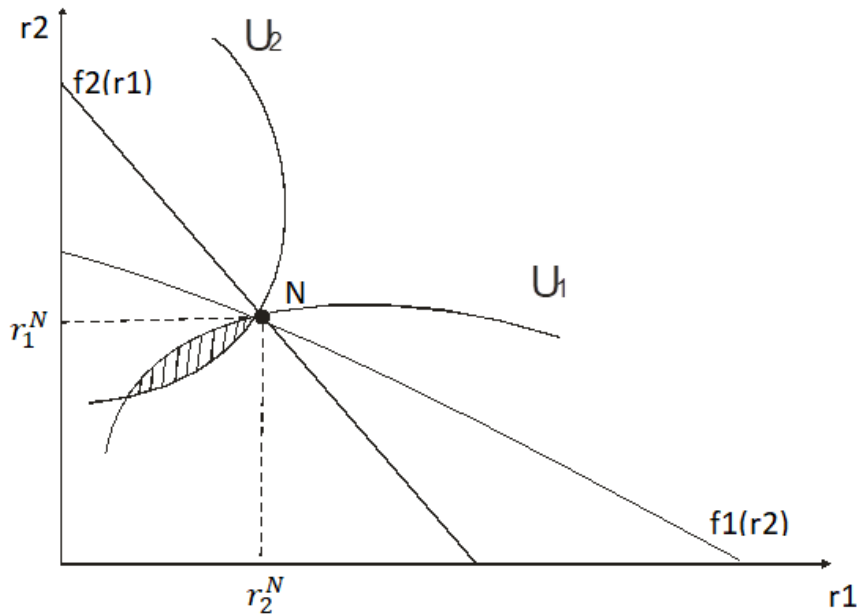
During the current refugee crisis Germany provided asylum to a significantly larger amount of asylum seekers. At the same time Poland, Hungary and the Czech Republic have not reallocated and pledged any refugee for two years since the beginning of the Emergency Relocation Scheme (European Commission, 2017). The scheme was established by the European Council decision in September 2015. These European member states' restrictive, non-liberal asylum policies and deterrence procedures were not compliant with the European legal obligations and were opposing to the fundamental European principles for solidarity and mutual commitments among the member states of the union. They were sanctioned for their actions, which is indirect cost of the restrictive policy line. It can be further stated that the greater the restrictiveness of one asylum policy, the higher the bureaucratic and border control costs that the country indirectly incurs. Adding to the indirect costs, the reputational bill is an important "cost object" for a European country. Based on this I will assume that it is costlier to maintain a restrictive policy than a liberal one. In other words, states like Poland, Hungary and the Czech Republic reduce their "burden" by deferring applicants, but are increasing the costs per asylum seeker that attempts to receive protection from them. On the other hand, these restrictive policies impose a negative externality to the other Member States, by redirecting the flows of asylum-seekers. The result is a prisoner's dilemma case, where each of the game participants will be involved in a "race to the bottom" legislative setting. This intensified legislative competition the field of asylum was observed in Europe from the 1980s to the current refugee crisis; the move was from generous national asylum policies to restrictive and deterrent legislations (Barbou des Places and Deffains, 2002). A coordination instrument in game theory for non-cooperative games like this one is the common legislation. Namely, the efficient design of a common legislation on asylum of refugees and migration is now the main goal of the European Commission.

The above development could be explained using a simplified framework of non-cooperative equilibria in one-shot games as described by (Eaton and Eswaran, 2002). They work on situations where the cardinal features of the game are applicable for outcome that is individually rational but collectively irrational, such as exploitation of commonly owned resources or public goods. They set a scenario of a Stackelberg leadership, where the action choices of the players are strategic substitutes, if the increase in the activity of one player lowers the marginal payoff of the other (Eaton and Eswaran, 2002).

For the purpose of the European asylum legislations games, I will assume an interaction between country 1 and 2 and a level of restrictiveness of the respective legislation r_1 and r_2 . Knowing that the asylum policies are competitive substitutes, the welfare state of the countries can be represented by $U_1(r_1, r_2)$ and $U_2(r_1, r_2)$. In the game theory framework Eaton and Eswaran (2002) prove that the indifference curve of each country is concave to the horizontal (vertical) axis of the coordination system. The reaction functions of the countries' best responses are $f_2(r_1)$ and $f_1(r_2)$. Therefore, the Nash equilibrium (N) is the intersection point of the reaction functions and the Nash equilibrium payoffs are (r_1^N, r_2^N) . Fig. 3 illustrates the competitive setting of the case. It is clear that the Nash equilibrium is not Pareto efficient. Because the indifference curves are concave, the outcomes that improve the situation for each country lie in the marked area between U_1 and U_2 in the south-west region from the Nash equilibrium. The Stackelberg duopoly, thus, proves that when choosing a restrictive asylum policy, the countries are trading off the benefits of the lower refugee population (the less funds allocated for asylum) for the higher investments for deterrence procedures and increased border protections.

This framework and the results of the above described application were fully applicable in the beginning of the refugee crisis in Europe. It can be argued that the number of refugees granted with asylum was below the social optimum. Germany and the Scandinavian countries were one of the few countries that opened their borders. Most of the Central and Eastern European countries invested in procedures for border guarding and deterred applicants by advertising the bad conditions that await them. A vivid example is the refuse of the Hungary, Poland and the Czech Republic to provide asylum to more than 10 000 refugees that were their legal commitment pledges under the 2015-2017 European Emergency Reallocation Scheme. There were strong disparities in the way that EU countries interpreted their legislative obligations, which lead to the highly unequal distribution of refugees across the EU countries.

Fig. 3 Non-cooperative equilibria in one shot game between 2 countries (Eaton and Eswaran, 2002)



Sections 3 and 4 together provide the theoretical grounding for the factors that prove the need for coordination and unification of the asylum systems across Europe and the importance of assistance in the countries from the Syrian region. Combining these frameworks, one can see the micro individual reasoning and the macro perspective of policy makers. The analysis conducted through this framework can point towards different improvement aspects for different refugee crises. It provides a deeper understanding for the factors that make the outcomes from the currently provided asylum protection- social or economically (in)efficient.

6.Discussion and Conclusions

Summary

Multiple ongoing displacement crises and several new ones characterised 2017. As a result, the global population of forcibly displaced people increased to 68.5 million, compared to 65.6 million in 2016 (UNHCR, 2017). The global long-term trends show an ever-rising number of displaced people by conflict, natural disaster or persecution. These people are seeking asylum either within the neighbouring countries to the region of conflict or far beyond the borders of their country to an economically and politically stable destinations. It is of no secret that the industrialised countries and the countries from the conflict areas have struggled with the rising number of asylum seekers. The asylum granting represents a key policy area for the major refugee-receiving countries. However, at international level there was failure for adequate solution and conceptualisation of the problem. The importance of asylum policies as a push factor for refugees became a highly debated topic (Gorlach and Motz, 2017).

In the current paper I have tried to put into a theoretical framework the choices that an individual refugee undertakes for duration and destination of migration, based on their life-time utility maximization. The literature review showed that this theoretical approach was widely available in the economic migration literature. However, the economic migrants differ significantly from the refugees. To account for this, I developed a simplified dynamic life-cycle model of refugees' destination choices and migration duration. I am arguing that the refugees are utility maximizing individuals that leave

their countries mainly due to non-economic reasons. They are also trying to minimize the disutility of living under the conditions of violent conflict. On the other hand, I am analysing the strategic interactions of the legislative settings of the destination countries'. This interdependence arises when the acceptance rate of one destination affects the applications number in another destination. The strategic interactions among asylum policies together with the choices made by the refugees, based on utility maximization and risk minimization, will define in where the refugees will end up and for how long.

An interesting finding that arises from the model for destination choices is that the highly affected individuals from the conflict are choosing to stay under severe encampment conditions in the neighbouring countries. These people are not immigrating to the industrialised country where they will be provided with adequate treatment and perspectives for integration. This can be explained by the assumption that the refugees are risk averse. The model also suggests that when an individual is highly affected, his/her life time income is devalued and he/she prefers to not take the risk of immigrating to a distant industrialized country.

Advantages and Limitations

The above contradiction points towards a limitation of the developed framework. I am using a Cobb-Douglas utility function, more specifically a Constant Elasticity of Substitution (CES) function, to depict the lifetime utility of consumption. However, it can be argued that for the present model other type of utility function might be more relevant. Adding to this the risk-aversity of the refugees has to be captured in a more conceptualised manner. The risk loving individuals will be reasoning in a different way from the risk-averse individuals. Other limitations of the developed model are that it is oversimplified, and no discounting factor and expectations operator are present in it. These two factors might bias the positionings of the utility curves in the affectedness ($0x$) -duration ($0y$) coordination system.

On the other hand, an advantage of the framework is the intuitive modelling of the refugee's decision-making process. This will contribute to a better understanding of their perspectives and the factors that guide their movements. The basis of this framework can be further expanded to enable analysis of asylum and integration policies in the different destination countries. Combining the game theory framework with the framework for destination choices provides an opportunity to investigate the interaction between refugees' decision making and the destination counties' legislation, which has not been fully considered in the existing literature.

Further development

The next steps in developing the model should be to obtain statistical and research data to populate the model (calibration) and test it in an independent data set. Other possible way for expanding the framework is through the introduction of and exploration of the concept affectedness. Affectedness could be defined as the degree to which the refugees' lives are affected by the war conflict, including the level of risk for them and their families (e.g. in terms of risk to their lives, physical and psychological health, cultural identity, economic prosperity etc.). These concepts can be further developed and qualified by empirical studies, such as surveys and qualitative research. Balcilar and Nugent (2018) are developing a similar empirical study that pays special attention to the consequences of the war (loss of home, property damage and casualties) and the duration of the stay and the quality services that the refugees are being provided in the neighbouring countries. According to them the results of the empirical study will offer insights into the design of efficient asylum policies.

Uses

The framework at this stage could be used for modelling prototypes of legislative policy settings and predictions of the direction of refugees' flows. It can be an instrument for anticipation of future changes. Last but not least, I believe that the framework could be used in undergraduate university level to provide the students with an interesting application to the theoretical concepts studied in Mico, Macro and Game theory.

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