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Free Movement of Persons – is regulation possible?

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I.   Introduction

Recent political efforts to regulate legal net immigration in terms of numbers or to physically build a border wall show migration as a relevant topic of worldwide public attention. This is especially the case in the United Kingdom, where in 2016 a slight majority of the electorate voted in favor of leaving the European Union (EU) as migration is a key topic in the realization of

this so-called Brexit.[1] In the aftermath of the 2016 referendum, the two-year process of the United Kingdom's separation from the EU was initiated on 29 March 2017. Now the political representatives of the United Kingdom and the EU have to find and negotiate a solution.

Among others, the British economic welfare depends on its access to the European Single Market, which in turn is based on the so-called four freedoms: four types of free movement – of goods, services, capital, and labor – across borders. Post-referendum analyses have shown migration's key influence on the outcome of the referendum; therefore, a domestically acceptable solution regulating the free movement of persons is of eminent necessity.[2] The EU has publicly expressed its position to keep the four freedoms inviolable.[3] The challenge is therefore to find common ground in negotiations. That is to say, a solution that does not abandon the principle of free movement but still allows for the regulation of net migration.

Here, we present a possible solution concept that, in our opinion, would satisfy these two conditions. We propose a formal model, which retains the free movement of persons generally but includes a safeguard clause, which allows for regulatory measures if statistically exceptionally high net migration numbers are encountered. Such a formal concept allows political representatives to turn the sometimes emotional or qualitative discussion into a sensible, quantitative negotiation.

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[1]   E.g. CLEGG NICK, Five steps for Theresa May's salvation, Financial Times of 11 June 2017, p. 9.

[2]   Cf. RACHMAN GIDEON, I do not believe that Brexit will happen, Financial Times of 28 June 2016, p. 11.

[3]   Informal meeting of the 27 heads of state or government, Brussels, 29 June 2016, Statement available at <http://www.consilium.europa.eu/en/press/press-releases/2016/06/29-tusk-remarks-informal-meeting-27/>.
STONE J., Economic woes trump mass migration fears, poll finds. The Independent, 9 July 2016, p. 7.

II. Solution Concept Developed at ETH Zurich

We use the "negotiation engineering" method[4] that divides a complex negotiation problem into scientifically solvable sub-problems. This specific solution concept has been developed for a similar case in Switzerland, where the adoption of the "Mass Immigration Initiative" in February 2014 has challenged an existing agreement with the EU on the bilateral free movement of persons.[5] As we will discuss later, the solution concept could be principally applicable to all EU member states and therefore in particular also to the United Kingdom. The content of this chapter builds on earlier work about this issue.[6]

1. Background

Even though scientific research shows migration's many positive economic and social effects, migration that is perceived as excessive will no longer be supported by some segments of the population.[7] The votes on the "Mass Immigration" initiative in Switzerland and on Brexit in the United Kingdom reflect this current fear (whether real or perceived) of being overwhelmed by immigrants.

Switzerland has a relatively high total share of foreigners, reaching 24% in 2015 (cf. table 1). Through the initiative, the Swiss constitution has been amended to limit the stay of immigrants through ceilings and quotas[8] while refugees are not affected. Any treaty in contradiction to this new article has

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[4] Developed at ETH, see LANGENEGGER TOBIAS W./AMBÜHL MICHAEL, Negotiation Engineering: A Quantitative Problem-Solving Approach to Negotiation, ETH Zurich: Negotiation and Conflict Management Research Paper No. 15-01 2016, available at SSRN: <https://ssrn.com/abstract=2685871>.

[5] AMBÜHL MICHAEL/ZÜRCHER SIBYLLE, Immigration and Swiss-EU free movement of persons: Question of a safeguard clause, Swiss Political Science Review 2015, Vol. 21, iss. 1, pp. 76-98.

[6] Ibid.

[7] Cf. OKKERSE LIESBET, How to measure labour market effects of immigration: A review, Journal of Economic Surveys 2008, Vol. 22, iss. 1, pp. 1-30.

[8] Swiss Constitution, Art. 121 and Art. 121a (new); Art. 197(9) (new).

to be renegotiated within a three-year period.[9] This means that the current bilateral agreement with the EU on the free movement of persons, which in its current form does not allow for quotas, will therefore have to be renegotiated. Since the EU has publicly expressed its unwillingness to negotiate modifications that include quotas, a solution for discussion should uphold the principle of free movement of persons and allow for a certain regulation of migration at the same time.[10]

	Total share of foreigners (2015)	Gross migration per year from EU/EFTA (2015)	Net migration per year from EU/EFTA (2015)
Switzerland	**24%**	**1.10%**	**0.40%**
Austria	13%	0.80%	0.50%
Belgium	11%	0.60%	0.20%
Germany	9%	0.60%	0.40%
UK	**8%**	**0.40%**	**0.30%**
Sweden	8%	0.30%	0.20%
Italy	8%	0.10%	0.10%
France	7%	0.40%	0.10%
Netherlands	5%	0.60%	0.20%

Table 1.   Situation of migration in Switzerland in 2015 compared with other EU and European Free Trade Association (EFTA) member states. Data from Eurostat.

2.   General Concept

Our proposed model aims to allow some flexibility in the practical implementation of the principle of free movement of persons while leaving the general concept intact. Thereby, the key tool is a safeguard clause that can be understood as an emergency brake in the event of serious economic or social

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[9]   Ibid.

[10]   Informal meeting of the 27 heads of state or government, Brussels, 29 June 2016, Statement available at: <http://www.consilium.europa.eu/en/press/press-releases/2016/06/29-tusk-remarks-informal-meeting-27/>.
STONE (footnote 3), p. 7.

difficulties. The exact circumstances in which this safeguard clause would become effective, as well as the appropriate measures, depend on the migration situation of the corresponding country relative to the rest of the EU member states.

This idea of a safeguard clause is not unprecedented; neither is the use of mathematical formulas in the EU agreements.[11] Our model is built on the existing safeguard clause [Art. 12(4)] in the bilateral agreement between Switzerland and the EU.[12,13] The abstract phrases "serious economic or so-

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[11] Examples of safeguard clauses: cf. Art. 10 of the Swiss-EU Agreement on Agriculture of 21 June 1999; Art. 7(5a) of the Swiss-EU Schengen Association Agreement of 26 October 2004; Art. 10(4) of the Swiss-EU Agreement on the Free Movement of Persons of 21 June 1999; Art. 112 of the EEA Agreement of 2 February 1992.
Examples of formulas: cf. Regulation (EU) No. 253/2014 of the European Parliament and of the Council of 26 February 2014; Commission Delegated Regulation (EU) No. 134/2014 of 16 December 2014; Proposal for a Regulation concerning a Distribution Key for Refugees of 9 September 2015; Commission Implementing Regulation (EU) No. 602/2014 of 4 June 2014.

[12] Agreement on the Free Movement of Persons Art. 14(2): "In the event of serious economic or social difficulties, the Joint Committee shall meet, at the request of either Contracting Party, to examine appropriate measures to remedy the situation. The Joint Committee may decide what measures to take within 60 days of the date of the request. This period may be extended by the Joint Committee. The scope and duration of such measures shall not exceed that which is strictly necessary to remedy the situation. Preference shall be given to measures that least disrupt the working of this Agreement."

[13] For the time being, Switzerland applies another safeguard clause in the form of Art. 10 (Transitional provisions and development of the Agreement) to limit the flow of Romanian and Bulgarian workers to Switzerland. The relevant paragraph of this article is Art. 10(4): "Notwithstanding the provisions of paragraph 3, the Contracting Parties have agreed on the following arrangements: if, after five years and up to 12 years after the entry into force of the Agreement, the number of new residence permits of either of the categories referred to in paragraph 1 issued to employed and self-employed persons of the European Community in a given year exceeds the average for the three preceding years by more than 10%, Switzerland may, for the following year, unilaterally limit the number of new residence permits of that category for employed and self-employed persons of the European Community to the average of the three preceding years plus 5%. The following year, the number may be limited to the same level."
See also SHIELDS MICHAEL/LAWSON HUGH, Swiss to limit Romanian, Bulgarian workers to stem migrant flow, Thomson Reuters of 10 May 2017, available at

cial difficulties" and "appropriate measures" are transformed into concrete terms in our model.

In other words, the safeguard clause would only be effective if the migration in a state is exceptionally high relative to the other EU member states. In this sense, it is a concept that builds on solidarity; each state makes its contribution to the European Single Market. However, this contribution is not unlimited. The specific difference between the migration in the corresponding state and those of the rest of the member states could depend on the current immigrant population, macroeconomic parameters of the job market, or other relevant factors that would have to be specified in a negotiation. Our model provides a quantitative, statistical framework, which serves as a negotiation basis in order to discuss what is considered excessive migration.

3.   Formal Model

According to the above-mentioned general concept, we now define the abstract phrases "serious economic or social difficulties" and "appropriate measures" in terms of the threshold (a) and the measures (b).

a)   Threshold

We define threshold d as the relative (i.e., per permanent resident) net migration, where a state is allowed to take measures to limit migration. This threshold depends on the mean value of the relative net migration of EU citizens to the other EU member states, denoted by m during a specific time interval τ (e.g., a specific year or a three-year series). Only if the net migration in the corresponding state is higher than $s = n\sigma$, which equals a multiple of standard deviation σ, can the safeguard clause become effective. Therefore, the underlying formula is

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<www.reuters.com/article/us-swiss-eu-east-idUSKBN1861RI>, and Rundschreiben Staatssekretariat für Migration SEM, Anrufung der Ventilklausel durch den Bundesrat im Rahmen der Personenfreizügigkeit. Wiedereinführung von Kontingenten bei den Aufenthaltsbewilligungen B EU/EFTA gegenüber Staatsangehörigen aus Bulgarien und Rumänien (EU-2) per 1. Juni 2017 of 10 May 2017, available at <www.sem.admin.ch/dam/data/sem/rechtsgrundlagen/weisungen/fza/20170510-rs-bulgarien-rumaenien-d.pdf>.

$$d = m + s.$$

aa)   Mean Value of the Relative Net Migration

The mean value of the relative net migration is defined as

$$m = \frac{1}{r} \sum_{i=1}^{r} \frac{I_i}{P_i},$$

where r denotes the number of states in reference area, I_i represents the absolute balance of the migration of citizens of the reference area to state i (excluding the reporting state), and P_i refers to the permanent resident population of state i—both I_i and P_i refer to a specific time interval τ. This definition as an unweighted mean is in accordance with the principle of sovereign equality since each state has the same weight, *independent* of its size or population.

Concerning the reference area, there are different options to define it, such as the following three:

– $r = 32$ if the reference area is the entire EU/European Free Trade Association (EFTA) area,

– $r = 28$ if the reference area is the entire EU, or

– $r = 25$ if the reference area is the EU without small states (less than one million residents).

We discuss these three options in Section III.2. for the case of the United Kingdom.

bb)   Excessiveness

When is the net migration in one state considered excessive? We propose using a common mathematical measure known as the standard deviation, as follows:

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$$\sigma = \sqrt{\frac{1}{r}\sum_{i=1}^{r}\left(\frac{I_i}{P_i} - m\right)^2} \; ,$$

which describes the spread of a distribution. In a perfect Gaussian or normal distribution, 15.9% of the cases lie above $m + 1\sigma$ (the mean value plus one standard deviation), and 2.3% lie above $m + 2\sigma$. Only 0.1% of the cases lie above $m + 3\sigma$. If we restrict our calculation to integer multiples, we propose working with the twofold standard deviation (i.e., $n = 2$) since the top 15.9% (onefold deviation) and the 0.1% (threefold deviation) seem neither exceptional enough nor too strong of a barrier to have any practical relevance (i.e., too unlikely). However, this choice could very well be part of the negotiation and purely technically, does not need to be restricted to integer multiples.

cc)   *Time Interval*

Threshold d relates to a certain time interval τ. For example, it relates to a specific year. Alternatively, it would also be possible to calculate the threshold of several consecutive years and work with their average. Consider the case of a sudden, relatively large increase in migration numbers in one state (but not the other member states) from one year to the next. If the threshold is calculated based on one year only, then the safeguard clause comes into effect, and the state is allowed to impose regulating measures in the following year. If this sudden influx of migrants is an anomaly, then the introduction of regulating measures does not make sense since the migration numbers normalize in the following year.

If the threshold is calculated based on a three-year average, then the influence of this anomaly will be less but will last for three years. Therefore, only longer lasting trends will have a sustainable impact on the threshold. This approach has the advantage of smoothing out sudden fluctuations, as well as providing a more stable and predictable situation for all involved parties.

dd) Extensions

So far, threshold d depends only on the relative net migration and the standard deviation. Extensions that fine-tune the determination of the threshold could include factors relevant to the corresponding state i, such as:

– the current immigrant population of the reference states, α_i,

– the current immigrant population of third countries (countries other than the states in the reference area), β_i, and

– the macroeconomic parameters of the job market, γ_i.

These factors can be included in the current formula as coefficients, which decrease threshold d as follows:

$$d_i = m + \alpha_i \beta_i \gamma_i s$$

where $\alpha_i, \beta_i, \gamma_i \leq 1$.[14] Notably, threshold d in its original form ($d = m + s$) is independent of the specific state i; in other words, it is the same for all states. As soon as further factors such as the three mentioned above are taken into account, threshold d_i will be different for the member states.

The idea behind the three coefficients is again similar to the overall idea of the model. We propose comparing the conditions in the corresponding state with the (unweighted) average of the conditions in all reference states.

For the first factor, the *current immigrant population of the reference states*, this means that we compare the unweighted average of the relative (i.e., per permanent resident) number of citizens of the reference states $\bar{a}$ to the current relative number of citizens of reference states in state i, a_i:

$$\alpha_i = \frac{\bar{a}}{a_i}, \text{ if } a_i > \bar{a}$$

$$\alpha_i = 1 \text{ otherwise.}$$

In other words, state i, which already has a high proportion of immigrants, should have a lower threshold than state j, which has the same immigration flux but a smaller current immigrant population. To ensure that states with

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[14] We discuss these constraints in the individual paragraphs about each factor.

fewer immigrants will not be at a disadvantage, the coefficient remains capped at 1.[15]

For the second factor, *the current immigrant population of third countries*, this means that we compare the unweighted average of the relative (i.e., per permanent resident) number of third-country immigrants, $\bar{b}$, to the current relative number of third-country immigrants in state i, b_i:

$$\beta_i = \frac{\bar{b}}{b_i}, \text{ if } b_i > \bar{b}$$

$$\beta_i = 1 \text{ otherwise.}$$

The idea behind this is again the same as for α_i. To ensure that states with fewer third-country immigrants will not be at a disadvantage, the coefficient also remains capped at 1.[16]

For the third factor, *the macroeconomic parameters of the job market*, this means that we calculate the difference between the current unemployment in state i, denoted as u_i, and the normal (long-term) unemployment in state i, denoted as $u_{l,i}$. This difference is then compared with the unweighted average of the cyclical unemployment in all reference states, $\bar{u}_k$:

$$\gamma_i = \frac{1}{1+(u_{k,i}-\bar{u}_k)}, \text{ if } u_{k,i} > \bar{u}_k$$

$$\gamma_i = 1 \text{ otherwise,}$$

where $u_{k,i} = u_i - u_{l,i}$, and $\bar{u}_k = \frac{1}{r}\sum_{i=1}^{r} u_{k,i}$. As with the other two factors, we propose capping the coefficient to 1 in order to avoid putting states with low cyclical unemployment at a disadvantage.

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[15] The comparability of the number of immigrants might be difficult due to different naturalization rules. In this context, it might be advisable to consider not the formal criteria of citizenship but a common threshold of years of residence in the host country (e.g., seven years).

[16] Ibid.

b)   Measures

We have defined a framework that allows quantifying a concrete threshold for each member state whose migration can be considered exceptionally high and therefore excessive.

If the net migration in a corresponding member state exceeds the threshold, this state will be allowed to adopt measures in order to:

–   temporarily limit immigration, and/or

–   reduce the incentives of immigration (e.g., limit the access to social security systems as already agreed between the EU and the United Kingdom on 19 February 2016).

The presented concept merely provides a framework, which defines the exact conditions that should be met to activate the safeguard clause. Naturally, the corresponding state is *free to abstain* from adopting measures to limit migration.

III.   The Model's Application to the United Kingdom Case

In this section, we apply the previously introduced model to the current case of the United Kingdom. We discuss the model's applicability and the necessary assumptions. Finally, we show the specific calculations for the United Kingdom at two time intervals. If certain conditions would be met, then this model might very well be applicable to the future bilateral relations between the United Kingdom and the EU.

1.   Switzerland and the United Kingdom: Parallels and Differences

In the United Kingdom, the electorate indirectly voted in favor of immigration regulation, thus assigning to their political representatives the challenge to find and negotiate a solution with the EU. We argue that the model, which was initially developed as a possible solution for the negotiations between Switzerland and the EU, is also applicable to the case of the United Kingdom. Even though the two countries differ in obvious aspects, such as size,

history, and current status of integration, they have three key elements in common. First, both countries value their *sovereignty reflex*, which they have shown not only with the latest votes but also historically. Second, both economies rely on a free-trade spirit but would struggle if their access to the European Single Market was not ensured. This leads to the third point; both countries are interested in a good, constructive cooperation with their main partner, the EU.

2. Assumptions

Our choice for the reference area [cf. Section II.3.a)aa)] in the case of the United Kingdom encompasses the 25 EU member states with more than one million residents each. We limit the reference area to these 25 states for two reasons. First, the United Kingdom should primarily find a solution regarding the way forward with the EU; therefore, the EFTA area is not a priority at this point. Second, in our model, the mean relative net migration is not weighted; in other words, all states contribute equally. Therefore, we exclude EU member states with less than one million residents.

The raw data is obtained from Eurostat, the statistical office of the EU. The latest data available is from 2015. We assume that this data set is coherent for the purpose of our model. The following calculations are merely illustrations and are not intended as immutable solutions.

We extend the formula to include coefficient α_i, which corresponds to the current immigrant population of the 25 EU states, as well as coefficient β_i, which corresponds to the current immigrant population of third countries. Due to data constraints, we exclude the coefficient related to the job market situation. For the calculations to determine the threshold for the United Kingdom, we work with the twofold standard deviation (i.e., in $s = n\sigma$, $n = 2$).

3. Calculations for a One-year Period (2015)

We apply the formal model presented in Section II.3 to the case of the United Kingdom, with the assumptions mentioned in the previous section and the following formula for the threshold value:

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$$d_{UK} = m + \alpha_{UK}\beta_{UK} \cdot 2 \cdot \sigma.$$

We create a histogram of the net migration in the 25 EU member states, as shown in Figure 1, to determine the relevant coefficients, m, α_{UK}, β_{UK}, and σ. Table 2 presents the resulting values of the relevant parameters.

What do the results mean for the United Kingdom? In 2015, the absolute net migration in the United Kingdom amounted to 183'618 persons, corresponding to the relative net migration of 2.83. We calculated the threshold to be 2.33 for the United Kingdom's relative net migration, considering the current immigrant population of the 25 EU states and third countries. This results in the absolute threshold of 151'129 persons for the net migration.

These findings mean that with the application of this framework, the safeguard clause would become effective. Consequently, the United Kingdom would have had the opportunity to limit its net migration in 2016 to 151'129 persons. The difference between the threshold and the net migration amounts to 32'489 persons, approximately 17.7%.

Net migration per 1'000 inhabitants in the United Kingdom	2.83
Mean value of the relative net migration (25 EU states), m	1.02
Standard deviation, σ	1.27
Current immigrant population of 25 EU states, α_{UK}	0.52
Current immigrant population of third countries, β_{UK}	1[17]
Threshold for the United Kingdom, d_{UK}	2.33

Table 2.   Results for the relevant parameters of the model, with data from 2015.

Notably, in 2015, the immigrant population of third countries in the United Kingdom was lower than the average of the immigrant population of third countries in the 25 EU states. This means that the respective coefficient, β_{UK}, was set to 1 to avoid increasing the threshold. At the same time, the immigrant population of the 25 EU states was about twice as high as the EU average. Obviously, this contributed significantly to a lower threshold.

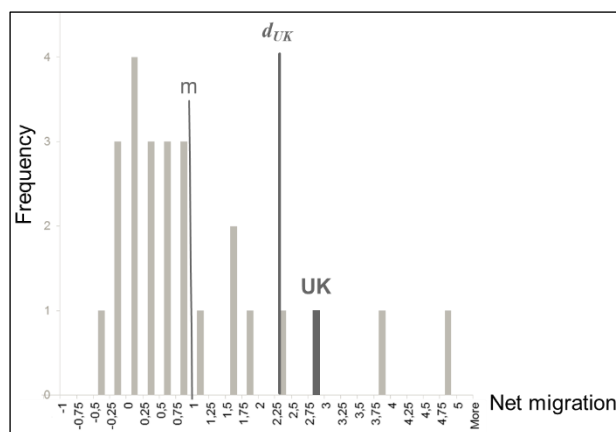[17]   Here, the capping of the coefficient becomes effective.

Figure 1. Histogram of net migration in the 25 EU member states per 1'000 inhabitants (2015). The mean value, m, and the resulting threshold, d_{UK}, are highlighted. The entry for the United Kingdom is shown in dark gray.

4. Calculations for a Three-year Period (2013-2015)

As mentioned in Section II.3.a)cc), fluctuations can be smoothed if we take the average of the threshold over a three-year period. This means that we calculate the threshold relating to 2015, not only with the data from that year but also with those from 2013 and 2014, and take the average. The approach for 2013 and 2014 is identical to the one discussed in the previous section for 2015.

Figure 2 shows the three-year period histogram, and Table 3 lists the calculated values. The average absolute net migration for the three-year period amounts to 160'421 persons, corresponding to a net migration of 2.49 per 1'000 inhabitants. With a threshold value of 2.31, the threshold in absolute numbers for the United Kingdom in the three-year period would have been 148'735 persons.

	2013	2014	2015	Ø
Net migration per 1'000 inhabitants in the United Kingdom	1.93	2.71	2.83	2.49
Mean value of the relative net migration (25 EU states), m	0.78	0.93	1.02	0.91
Standard deviation, σ	1.26	1.31	1.27	1.28
Current immigrant population of 25 EU states, α_{UK}	0.57	0.55	0.52	0.55
Current immigrant population of third countries, β_{UK}	0.99	1[18]	1[19]	1
Threshold for the United dom, d_{UK}	2.22	2.38	2.33	2.31
Absolute threshold for the United Kingdom	141'773	153'303	151'129	148'735

Table 3. Results for the relevant parameters of the model with data from 2013 to 2015. The corresponding three-year averages are listed under the last column.
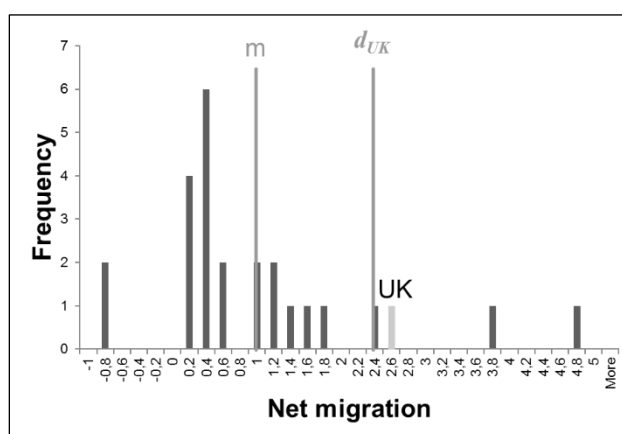

Figure 2. Histogram of net migration of the 25 EU member states per 1000 inhabitants (2013-2015). The mean value, m, and the resulting threshold, d_{UK}, are highlighted. The entry for the United Kingdom is shown in light gray.

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[18] Here, the capping of the coefficient becomes effective.

[19] Ibid.

5.   Discussion

The calculations show that the United Kingdom had a relatively high net migration over the three-year period (2013-2015). Based on 2014 and 2015, the safeguard clause could have been applied (in the following year), and the United Kingdom could have taken measures to regulate migration. However, in 2013, the net migration in the United Kingdom was significantly lower than in the following years, and a regulation of the migration was not indicated. This result also influenced the three-year average calculated for 2015 based on the years 2013, 2014, and 2015. The threshold slightly decreased (compared to the calculations of the one-year period) due to the substantially lower migration numbers in 2013. This specific example demonstrates the smoothing effect of a three-year average. The lower migration numbers in 2013 decreased the three-year average and therefore smoothed out the sudden increase in migration numbers from 2013 to 2014.

IV.   Summary and Conclusion

We have developed a solution framework to apply regulations in case of exceptional net migration without abandoning the concept of free movement of persons. Our approach is inspired by existing safeguard clauses and formulas that can be found in EU regulations. It builds on solidarity in the sense that every state contributes to the functioning of the Single Market up to a certain limit when migration becomes excessive.

With the framework at hand, a negotiation is reduced to well-defined quantitative factors; at the same time, the model leaves an ample score for the negotiating parties. Particularly, the design of additional factors, such as the job market situation or the current immigrant population as described in Section II.3.a.dd, contributes to this advantage. In fact, the model is not limited to the three factors presented in this paper. Any other quantifiable factors could be added in the same manner, which makes the model versatile and flexibly adjustable to specific circumstances.

We have shown that our solution framework can be applied to the case of the United Kingdom when negotiating their future relationship with the EU concerning one of the four freedoms, the free movement of persons. With the

chosen parameters (i.e., averaged over a three-year period from 2013 to 2015), we have found that the United Kingdom would have been allowed to reduce its net migration to 148'735 persons in 2016. Its three-year average net migration in absolute numbers amounted to 160'421 persons.

Thereby, we have considered the immigrant population of the reference states in 2015 (the 25 EU member states with more than one million residents), as well as the immigrant population of third countries and have compared these numbers to the rest of the 25 EU member states. The immigrant population of the 25 EU member states in 2015 had the greatest influence on the threshold. It was approximately twice as high as the average of the 25 EU member states. However, the immigrant population of third countries had no effect on the threshold since it was not higher than the average of the 25 EU member states. Our calculations show the United Kingdom's comparatively high average relative net migration from 2013 to 2015. However, it is not an exceptional one: Austria and Germany have had a substantially higher relative net migration over the same period.

In conclusion, we believe that the subtle nuances that define the threshold of excessive migration in our formal model allow the negotiating parties to find a *modus vivendi* where both parties accommodate each other. Contrary to the somewhat emotional discourse or the debate on principles that often prevails in the current political discussion, our framework allows for a sensible discussion of quantitative measures. This aspect could make it a promising candidate for future application in negotiations, especially in the current case of the United Kingdom and the EU.