Economics Bulletin

Volume 41, Issue 1

Long-run economic determinants of asylum applications

Deniz Dilan Karaman Örsal
Universität Hamburg

Abstract

This paper investigates the economic determinants of asylum applications in 22 OECD countries. The results of the econometric analysis demonstrate on the one hand, the long-run positive association between the gross domestic product per capita of the host country and the asylum applications, and on the other hand, the negative association between the unemployment rate of the host country and the asylum applications. Moreover, six global stochastic trends play also an important role in the determination of asylum applications.

Financial support by the German Research Foundation (DFG) through the project KA-3145/1-2 is gratefully acknowledged. The author thanks also an anonymous referee and the associate editor for helpful comments and suggestions.
Citation: Deniz Dilan Karaman Örsal, (2021) "Long-run economic determinants of asylum applications", *Economics Bulletin*, Vol. 41 No. 1 pp. 48-59
Contact: Deniz Dilan Karaman Örsal - deniz.oersal@uni-hamburg.de.
Submitted: February 04, 2020. **Published:** March 10, 2021.

1. Introduction

Involuntary population movements due to civil unrests, wars, and environmental changes have acquired an increasingly global dimension. Despite the urgency of the issue, our understanding of the dynamics of involuntary migration and whether it is different from voluntary migration, is highly fragmented. Dustmann et al. (2017) emphasize the fundamental differences between a refugee and a voluntary migrant being that refugees are forced to leave their own country because of external extreme events, whereas the economic migrants choose the country they want to reside in based on economic considerations. While an economic migrant could benefit from a gradual acclimatization to the new host country, with frequent trips to and ongoing ties with the country of origin, a refugee is often severed from their social ties, and arrives in the new country with minimal capital, and little prospect of returning to their homeland any time soon (c.f. Cortes, 2004).

Economic theory states that economic migrants are leaving their home country to reside in another country in which they can maximize their economic opportunities. Particularly, economic migrants want to maximize their economic gains with respect to the net migration costs. In other words, people are migrating to countries in which their income opportunities are higher. Therefore, countries with higher income levels are receiving more migrants from low-income countries (c.f. Borjas, 1999).

Ruhe et al. (2020) pointed out that in the involuntary migration literature the terms "refugees" and "asylum seekers" has been more or less used as if they have identical meanings, although the terms define two different population groups. According to the definition of the United Nations Refugee Agency (UNHCR) an asylum seeker is someone who is "seeking international protection" and "not every asylum seeker will ultimately be recognized as a refugee, but every refugee was initially an asylum seeker". When asylum is granted, this means that the person has been "fleeing from prosecution or serious danger" in home country. Therefore, in this paper we use the term asylum-related migrants to differentiate it from refugees and concentrate on the determinants of asylum-related migration, in order to find out whether the dynamics of asylum-related migration differentiate from voluntary migration. Also due to the definition of "asylum seeker", some scholars argue that it may be difficult to differentiate between the reasons why asylum seekers and economic migrants decide to immigrate (Kang, 2020; Cummings et al., 2015).

As highlighted by Hatton (2016), there is a discussion in the literature on whether asylum seekers in the developed countries are "economic migrants from poor countries seeking a better life" or "genuine refugees" (Hatton, 2016, p.442; c.f. Yoo & Koo, 2014; Kim & Cohen, 2010; Neumayer, 2005). This debate has intensified since the latest European migrant crisis, which began in 2015. It has been even argued that the asylum seekers are economic migrants in disguise, and some scholars claim that the main reason why asylum seekers flee from their home country is due to economic considerations, such as higher wages, improved standard of living, and better job opportunities in the destination country (see Yoo & Koo, 2014; Kim & Cohen, 2010; Neumayer, 2005).

The existing studies on asylum-related migration[1] mainly focus on the short-run dynamics, by concentrating on the push-pull factors (i.e. Neumayer, 2004; Neumayer, 2005). Violence, conflict, human rights violations, war or unrest, unemployment and poverty in the home country are accepted as the main political and economic push factors, whereas high income level, economic growth and low unemployment level of the destination country are recognized as the main economic pull factors of involuntary migration. Furthermore, asylum recognition rate, sharing the same language, existing migration groups, same colonial link, close geographical proximity are accepted as the leading pull factors to the destination country. While some studies concentrate only on the pull factors (Holzer et al., 2002; Keogh, 2013), some others investigate both push and pull factors (Vogler & Rotte, 2000; Neumayer, 2005; van Hear et al., 2018). Although some studies demonstrate the importance of economic pull factors (e.g. Rotte et al., 1997; Vogler & Rotte, 2000; Neumayer, 2005), others show that economic factors such as income level may have either negligible impact (c.f. Hatton, 2009; Keogh, 2013) on asylum applications or may not explain asylum applications, such as the unemployment rate of the host country (see Kang, 2020).

However, the methodology of these empirical studies have some shortcomings. They are neglecting the specific characteristics of cross-sectional time series variables (such as cross-sectional dependence, nonstationarity, persistency and structural breaks), and assume that refugee numbers or asylum applications are stationary variables, which might not be the case in reality. Mostly, the existing studies mainly use pooled ordinary least squares and fixed effects estimator for panel data (i.e. Vogler & Rotte, 2000; Neumayer, 2005; Hatton, 2004; Hatton, 2009) and a short time span for their estimations, which may lead to biased estimation results (see Neumayer, 2005). Furthermore, these studies neglect spatial features and cross-sectional dependence between the cross-sectional units (c.f. Keogh, 2013). Due to the spill-over effects, it may be unrealistic to assume cross-sectional independence. Hence neglecting the cross-sectional dependence may lead to wrong statistical inference. The persistent characteristic of the time series could be eliminated, by including the lagged dependent variable as an additional independent variable into the analysis. However, in that case the fixed effects estimator for panel data will not be an appropriate estimator (c.f. Davenport et al., 2003). Above all, these studies concentrate on the determinants of involuntary migration in the short or medium-run, but not in the long-run. According to Borjas (1994) "immigration has far reaching and long-lasting impact" than initially been projected, and therefore, it is important to investigate the dynamics in the long-run. Nevertheless, only a few studies in the economic (volun-

[1]A comprehensive literature review entitled "Significant push/pull factors for determining of asylum-related migration" published by European Asylum Support Office in 2016 is available online http://www.worldcat.org/oclc/1064286050.

tary) migration literature analysed the long-run economic determinants of immigration in general. For example Boubtane et al. (2013) investigated the relationship between net immigration rate, unemployment rate and gross domestic product (GDP) per capita for a panel dataset from 1980 to 2005. According to their analysis only in France, Iceland, Norway and the UK, the economic growth positively causes immigration, and only in Portugal, unemployment negatively causes immigration.

Our study differs from the past studies in many different ways: First, we use the most recent data, which is available, including the period with the European migrant crisis in 2015. Second, unlike the existing studies, which explore the short-run dynamics and determinants, in this study we investigate the long-run determinants of asylum applications. To achieve this goal, we apply particularly second-generation[2] panel cointegration techniques, which are appropriate to model long-run equilibrium relationships for panel data, when the variables are governed by stochastic trends (i.e. integrated of order one). Third, we focus on the economic pull-factors, to clarify whether the economic pull factors explain the asylum applications only to a certain degree, which is the main conclusion of some studies in the literature as mentioned above. Fourth, we apply unobserved common factors to model cross-sectional dependence between the geographical units in a panel data.[3] Furthermore, factor modelling helps to include unobserved common components which may vary over cross-sections. Besides structural breaks in the data would be captured by these common factors.

The paper is organized as follows: In the next section the data is introduced. Afterwards the econometric model along with the test and estimation results are presented, and finally the last section concludes.

2. Data

Due to these inconclusive outcomes in the literature, there is a necessity to analyse the economic determinants of asylum-related migration. Unemployment rate and the GDP per capita of the host economies are used as the economic variables, which may determine the asylum applications to the destination country. The analysis is based on a panel dataset[4] consisting of 22 OECD countries (i.e. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Luxembourg,

[2]The initial ("first-generation") panel cointegration techniques were developed under the assumption that the cross-sectional units are independent. However, it was soon clear, that this assumption would be unrealistic for macroeconomic applications, due to the international trade relations, globalisation and spill-over effects. Therefore, second-generation panel cointegration techniques were developed, which allow for dependence between cross-sectional units (i.e. countries, regions, cities).

[3]Unobserved common factors are a useful way to model cross-sectional dependence (c.f. Bai & Ng, 2004; Gengenbach et al., 2006; Karaman Örsal & Arsova, 2017; Arsova & Karaman Örsal, 2018) in nonstationary panel data framework.

[4]Supplemental data for this article can be accessed online.

the Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, the United Kingdom, the United States of America), and comprising the time period from 1999:Q1 until 2018:Q1. The data sources are summarized in Table I. Due to the right skewed distributions, both asylum applications and GDP per capita variables are transformed with natural logarithm. For simplicity, the natural logarithm of GDP per capita for country i and time period t is denoted by g_{it}, the unemployment rate by u_{it} and the natural logarithm of asylum applications is represented by a_{it}.

TABLE I. Data sources

Variable	Definition	Source
ASY_APP	Total asylum applications	UNHCR
GDP_CAP	GDP per capita in constant prices, seasonally adjusted (in US Dollars)	OECD.Stat
UNEMP	Harmonised unemployment rate (in percentage), seasonally adjusted	OECD.Stat

Notes: UNHCR denotes the United Nations High Commissioner for Refugees and OECD denotes the Organisation for Economic Co-Operation and Development.

3. Econometric Analysis

As an initial step, the degree of cross-sectional dependence should be determined in order to decide, which technique would be more appropriate to model the economic determinants of asylum applications. As pointed out earlier neglecting cross-sectional dependence may result in wrong statistical inference due to inefficient estimates (c.f. Hlouskova & Wagner, 2006). Therefore, first the degree of cross-sectional dependence is determined with the cross-sectional dependence (CD) test of Pesaran (2015). As the test results reveal, the null hypothesis of weak cross-sectional dependence is rejected against the alternative hypothesis of strong cross-sectional dependence (see Table II). The mean absolute cross-sectional correlation (ρ) is around 0.80 for g_{it}, 0.41 for u_{it} and 0.32 a_{it}. Therefore, to avoid wrong statistical inference, in the next step second-generation panel unit root tests are used to test whether the economic variables are integrated of order one (i.e. $I(1)$).

TABLE II. Cross-sectional dependence test of Pesaran (2015)

Variable	CD-test	p-value	mean ρ	mean abs(ρ)
g_{it}	104.89	0.000	0.79	0.80
u_{it}	31.16	0.000	0.23	0.41
a_{it}	23.07	0.000	0.17	0.32

Notes: Under the null hypothesis of weak cross-sectional dependence the CD-test statistic is standard normally distributed. ρ denotes cross-sectional correlation.

3.1. Panel unit root tests

If conventional regression models are used to model relationships between $I(1)$ variables, then this may result in spurious regression[5]. Therefore, it is important to detect the order of integration of the variables in advance. The results of the second-generation panel unit root tests of Pesaran (2007), which allow for cross-sectional dependence through common factors, are presented on Table III. For a_{it}, g_{it} and u_{it}, the null hypothesis of unit root for all countries can not be rejected. However, the null hypothesis of unit root for all countries is rejected at the 1% level , if the first differenced form of the individual variables is considered. As a result, it can be concluded that all the variables are integrated of order one. Since, the variables are $I(1)$ panel cointegration techniques should be applied, which are appropriate to test and model long-run equilibrium relationships between $I(1)$ variables.

TABLE III. Results of the panel unit root tests

Variable	Det. terms	Lag	t-bar	Z[t-bar]	p-value
a_{it}	constant, trend	2	-2.422	-0.404	0.343
		4	-2.409	-0.327	0.372
	constant	2	-1.866	-0.387	0.349
		4	-1.748	0.213	0.584
Δa_{it}	constant	1	-5.938	-21.150	0.000
		3	-4.421	-13.413	0.000
g_{it}	constant, trend	2	-1.793	3.109	0.999
		4	-1.531	4.573	1.000
	constant	2	-1.420	1.888	0.970
		4	-1.354	2.221	0.987
Δg_{it}	constant	1	-5.261	-17.696	0.000
		3	-3.773	-10.110	0.000
u_{it}	constant, trend	2	-1.810	3.013	0.999
		4	-1.639	3.971	1.000
	constant	2	-1.468	1.640	0.949
		4	-1.525	1.350	0.912
Δu_{it}	constant	1	-4.073	-11.641	0.000
		3	-3.262	-7.506	0.000

Notes: Critical values for the t-bar test with a constant and trend in the DGP are -2.590, -2.650 and -2.770 at 10%, 5% and 1% significance levels, respectively. Critical values for the t-bar test with only constant in the DGP are -2.080, -2.160 and -2.300 at 10%, 5% and 1% significance levels, respectively.

3.2. Panel cointegration tests

In the next step, we will determine whether a long-run equilibrium relationship between the nonstationary (i.e. I(1)) variables a_{it}, g_{it} and u_{it} exist. Hence, in this study, panel cointegration tests of Arsova & Örsal (2020) are employed to find the number of long-run equilibrium (cointegrating) relations for a system of variables. There are several reasons for using the likelihood-based tests of Arsova & Örsal (2020). First, the decision of

[5] Spurious regression is a phenomenon, which is observed when a significant relationship between $I(1)$ variables is found, although they are not related to each other.

likelihood-based cointegration test is invariant to the variable, which is used to normalize the cointegrating relation. Second, these tests are appropriate to find the number of cointegrating relations. Moreover, the p-value combination tests of Arsova & Örsal (2020) are robust to different types of cross-sectional dependence. Therefore, when the underlying dependence structure is not known, it is better to apply their robust test.

TABLE IV. Results of the Simes-SL test for dependent panel

Country	Lag Order	LR_r0	p-value	LR_r1	p-value	LR_r2	p-value	Simes' sig.
Finland	1	65.26	**0.000**	4.47	0.911	1.85	0.573	0.002
Hungary	1	37.54	**0.002**	11.98	0.189	1.58	0.640	0.005
France	1	37.43	**0.002**	3.35	0.970	2.17	0.501	0.007
Greece	2	34.19	**0.008**	4.07	0.937	0.18	0.983	0.009
Netherlands	2	31.03	0.023	6.02	0.773	1.53	0.653	0.011
Belgium	2	30.88	0.024	4.34	0.920	1.41	0.683	0.014
Australia	1	25.71	0.110	4.54	0.906	0.09	0.995	0.016
Portugal	2	24.00	0.170	11.32	0.232	1.57	0.642	0.018
Luxembourg	2	23.01	0.214	1.38	1.000	0.71	0.870	0.020
Spain	2	21.26	0.310	11.41	0.225	1.01	0.791	0.023
Norway	1	20.37	0.367	4.40	0.916	2.65	0.403	0.025
Ireland	2	20.09	0.386	6.38	0.733	0.78	0.850	0.027
Slovenia	2	19.92	0.399	4.22	0.928	0.93	0.811	0.030
Germany	2	16.39	0.666	8.24	0.520	0.12	0.992	0.032
Austria	2	16.36	0.668	2.50	0.991	0.77	0.853	0.034
Slovak Republic	2	16.31	0.672	5.06	0.865	0.69	0.875	0.036
Denmark	1	16.19	0.681	7.66	0.587	1.64	0.624	0.039
Canada	2	16.03	0.693	13.46	0.116	3.31	0.296	0.041
Sweden	2	15.25	0.749	3.31	0.971	3.24	0.307	0.043
Poland	2	14.75	0.783	4.05	0.938	1.20	0.738	0.045
UK	2	14.39	0.806	8.81	0.457	1.37	0.695	0.048
USA	2	13.01	0.883	6.04	0.770	2.13	0.508	0.050

Notes: Schwarz Criterion is used to select the optimal lag order with a maximum of 4 lags. A linear time trend is included to the DGP. LR_$r0$ denotes the likelihood-ratio statistic of Saikkonen & Lütkepohl (2000) for the hypothesized cointegrating rank of zero, LR_$r1$ stands for the likelihood-ratio statistic of Saikkonen & Lütkepohl (2000) for the hypothesized cointegrating rank of one and LR_$r2$ represents the likelihood-ratio statistic of Saikkonen & Lütkepohl (2000) for the hypothesized cointegrating rank of two.

The sequential test procedures of Arsova & Örsal (2020) are based on the individual p-values of the Johansen (1995) and Saikkonen & Lütkepohl (2000) cointegration tests for single geographical unit. After the application of the individual cointegration tests of Johansen (1995) and Saikkonen & Lütkepohl (2000) to each cross-section separately, the individual p-values are sorted in ascending way: $p_{(1)}, \dots, p_{(N)}$. The joint null hypothesis that the null hypothesis is true for all cross-sections is rejected by panel Simes' test of Arsova & Örsal (2020) at Simes' significance level α, if

$$p_{(i)} \leq \frac{i\alpha}{N}, \quad \exists i, \; i = 1, \dots, N. \tag{1}$$

In Table IV the panel cointegration test results based on the Saikkonen & Lütkepohl (2000) test are reported. At the individual country level, among the 22 countries only 6 of them (Finland, Hungary, France, Greece, Netherlands and Belgium) have one cointegrating relation at the 5% significance level. The remaining countries show no cointegrating relations. For the panel Simes' tests, the individual p-values are compared with the Simes'

TABLE V. Results of the Simes-Johansen test for dependent panel

Country	Lag	LR_r0	p-value	LR_r1	p-value	LR_r2	p-value	Simes' sig
Finland	1	94.92	**0.000**	20.88	0.188	6.58	0.401	0.002
France	1	71.15	**0.000**	20.34	0.213	8.63	0.210	0.005
Belgium	2	51.98	**0.004**	16.05	0.497	2.42	0.923	0.007
Norway	1	51.52	**0.005**	18.01	0.351	5.31	0.560	0.009
Hungary	1	49.40	**0.009**	23.28	0.101	7.73	0.283	0.011
Poland	2	48.67	**0.011**	24.46	0.073	5.67	0.513	0.014
Denmark	1	48.27	**0.012**	10.60	0.891	4.79	0.633	0.016
Greece	2	47.90	**0.013**	13.39	0.710	3.47	0.811	0.018
Netherlands	2	47.89	**0.013**	12.85	0.751	5.05	0.596	0.020
Luxembourg	2	43.71	0.040	19.88	0.237	6.51	0.409	0.023
Australia	1	42.53	0.053	14.86	0.593	3.56	0.799	0.025
Spain	2	42.41	0.055	17.87	0.360	5.85	0.490	0.027
USA	2	41.32	0.070	12.92	0.746	3.85	0.762	0.030
Sweden	2	38.98	0.117	16.27	0.479	3.50	0.807	0.032
Germany	2	37.78	0.149	15.58	0.535	6.33	0.430	0.034
Canada	2	37.22	0.167	17.07	0.418	6.06	0.463	0.036
UK	2	35.66	0.222	14.21	0.645	5.05	0.596	0.039
Austria	2	34.05	0.291	15.69	0.525	6.04	0.466	0.041
Portugal	2	31.10	0.445	18.02	0.350	8.18	0.244	0.043
Ireland	2	30.96	0.452	12.93	0.745	1.53	0.980	0.045
Slovenia	2	30.08	0.503	7.56	0.983	3.22	0.840	0.048
Slovak Republic	2	29.56	0.534	10.28	0.906	4.40	0.687	0.050

Notes: Schwarz Criterion is used to select the optimal lag order with a maximum of 4 lags. A linear time trend is included to the DGP. LR_$r0$ denotes the likelihood-ratio statistics of Johansen (1995) for the hypothesized cointegrating rank of zero, LR_$r1$ stands for the likelihood-ratio statistic of Johansen (1995) for the hypothesized cointegrating rank of one and LR_$r2$ denotes the likelihood-ratio statistic of Johansen (1995) for the hypothesized cointegrating rank of two.

significance level. When the condition in (1) is valid at least for one country, then the joint null hypothesis is rejected. The Simes' significance levels are computed using the significance level of 5%, i.e. $\alpha = 0.05$. This condition is fulfilled for Finland, Hungary, France, and Greece, which leads to the rejection of the joint null hypothesis of no cointegration. Therefore, the panel Simes' test illustrates that there is at least one cointegrating relation at the 5% level. In the next step, the joint null hypothesis of one cointegrating relation is tested for. However, none of the countries fulfils the condition in (1). In other words, it can be concluded that there is one cointegrating relation in the panel. The results of the panel Simes'-Johansen test also illustrate the existence of one cointegrating relation (see Table V). The joint null hypothesis of no cointegration is rejected, since 9 countries fulfil the condition in (1). When the test results on the individual country level are considered, almost half of the countries in the panel have one cointegrating relation at the 5% significance level.

3.3. Estimation Results

After detecting the existence of one cointegrating relation, the long-run relationship is estimated by the second generation panel data estimators of Bai et al. (2009), which are suitable for estimating long-run equilibrium relationships in cross-sectionally dependent panel data. Within the Bai et al. (2009) panel cointegrating relation estimation framework, the cross-sectional dependence is modelled by unobserved common factors. In this study, the estimation is based on the following cointegrating relation:

$$a_{it} = \alpha + \delta t + \beta_1 g_{it} + \beta_2 u_{it} + \lambda_i' F_t + e_{it}, \quad i = 1, ..., 22,\ t = 1999 : Q1, ..., 2018 : Q1. \quad (2)$$

In Equation (2) F_t refers to an $(m \times 1)$ vector of common factors and λ_i is an $(m \times 1)$ vector of factor loadings.

TABLE VI. Estimation of the cointegrating relation

Variable	LSDV	Cup_FM	Cup_BC
g_{it}	-1.466	3.467	3.093
	(-7.055)	(9.639)	(8.748)
u_{it}	-0.013	-0.054	-0.072
	(-1.789)	(-6.874)	(-9.207)

Notes: Dependent variable is the natural logarithm of asylum applications. Six common factors are included. Cup_FM and Cup_BC are the continuously updated fully modified estimator and continuously updated bias corrected estimators of Bai et al. (2009), respectively. LSDV stands for the least squares dummy variable estimator. LSDV estimates are reported only for comparison. The figures in parentheses are t-statistics.

The results of the continuously updated and fully modified (Cup_FM) and the continuously updated and bias corrected (Cup_BC) estimators of Bai et al. (2009) are reported in Table VI. Six common factors are included to the model, and these explain approximately 50% of the variation in the variables. Based on the Panel Analysis of Nonstationarity in Idiosyncratic and Common components (PANIC) approach of Bai & Ng (2004), the common factors are estimated by principal components. The estimated common factors are illustrated in Figure 1. The coefficient of u_{it} can be interpreted as semi-elasticity, which means that when the unemployment rate increases one percentage point, the asylum applications decrease on average by 5.5% to 7%. The coefficient of g_{it} can be interpreted as elasticity with respect to income. According to the estimates a 1% increase in the GDP per capita increases the asylum applications by 3.1% to 3.5%.

TABLE VII. Result of the panel unit root tests of Bai & Ng (2010)

Variable	P_a	P_b	PMSB
asy_idio	-0.026	-0.026	0.012
gdp_idio	1.233	1.533	1.887
unemp_idio	0.205	0.213	0.259

Notes: P_a, P_b and PMSB tests are under the null hypothesis standard normally distributed.

Proceeding the estimation, the panel unit root tests of Bai & Ng (2010) are employed to check whether the estimated idiosyncratic components are nonstationary. The idiosyncratic components are estimated by extracting the estimated common components (i.e. $\hat{\lambda}_i' \hat{F}_t$) from the observed data. Based on the results in Table VII the null hypothesis of a unit root cannot be rejected for none of the estimated idiosyncratic components. In

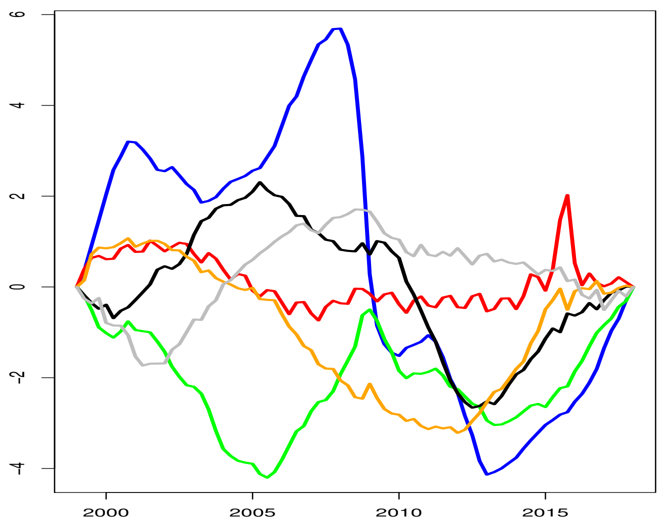

Figure 1. Estimated Common Factors

Notes: Blue line is the first factor (f1), the red line is the second factor (f2), the green line is the third factor (f3), the black line is the fourth factor (f4), the orange line is the fifth factor (f5) and the gray line is the sixth factor (f6).

other words, all three idiosyncratic components (i.e defactored or cross-sectionally independent components) are nonstationary. Moreover, to check the order of integration of the estimated factors the unit root test with structural breaks of Saikkonen & Lütkepohl (2002) is employed (see Table VIII). The unit root test with structural breaks will allow us to determine both the order of integration of the common factors, and also whether structural breaks are present in the common factors. For all the factors at the 1% significance level, the null hypothesis of a unit root cannot be rejected. In other words, all the six common factors are $I(1)$ variables as well. Under these conditions, —when both the idiosyncratic components and the common factors are I(1) —the Cup_FM and Cup_BC estimators of Bai et al. (2009) are consistent and should be preferred instead of a pooled OLS estimator.

4. Conclusions

The main aim of this study was to detect the long-run economic determinants of asylum applications. The results show that in the long-run indeed the unemployment rate of the host country is negatively associated with the asylum applications and the GDP per capita is positively associated with asylum applications. In other words, the conclusions drawn from the economic (voluntary) migration literature could be also valid for asylum-related migration in developed countries. This could be mainly as a result of the

TABLE VIII. Results of the Saikkonen & Lütkepohl (2002) unit root test for the factors

Factor	Break Date	Lag	statistic
f1	2009 Q1	2	-1.883
f2	2016 Q1	2	-0.715
f3	2008 Q4	1	-1.833
f4	2009 Q2	3	-2.438
f5	2015 Q4	4	-2.365
f6	2001 Q1	3	-2.682

Notes: Akaike Information Criterion with a maximum of 4 lags is used for lag order selection. Only a constant has been added to the data generating process (DGP). At the 1% level the critical value is -3.48 for the DGP with a constant.

composition of the asylum seekers group, in which both refugees seeking international protection due to prosecution in their home country, and economic migrants, who applied for asylum are present. Same conclusions may not be valid if only the number of refugees are investigated. Furthermore, six unobserved global stochastic trends (i.e. nonstationary factors) were also detected which determine the long-run relationship for asylum applications. One of these unobserved global stochastic trends could be the technological progress. With the increase in digitalization new communication forms (social media, blogs, chats), important innovations have emerged. It is most likely that technological progress may impact the dynamics of migration.

References

Arsova, A. & Karaman Örsal, D. (2018). Likelihood-based panel cointegration test in the presence of a linear time trend and cross-sectional dependence. Econometric Reviews, **37**, 1033–1050.

Arsova, A. & Örsal, D. D. K. (2020). Intersection tests for the cointegrating rank in dependent panel data. Communications in Statistics - Simulation and Computation, **49**, 918–941.

Bai, J. & Ng, S. (2004). A PANIC attack on unit roots and cointegration. Econometrica, **72**(4), 1127–1177.

Bai, J. & Ng, S. (2010). Panel unit root tests with cross-sectional dependence: A further investigation. Econometric Theory, **26**, 1088–1114.

Bai, J., Kao, C., & Ng, S. (2009). Panel cointegration with global stochastic trends. Journal of Econometrics, **149**, 82–99.

Borjas, G. (1999). Economic research on the determinants of immigration. Technical report, World Bank.

Borjas, G. J. (1994). The economics of immigration. Journal of Economic Literature, **32**, 1667–1717.

Boubtane, E., Coulibaly, D., & Rault, C. (2013). Immigration, unemployment and GDP in the host country: Bootstrap panel Granger causality on OECD countries. Economic Modelling, **33**, 261–269.

Cortes, K. (2004). Are refugees different from economic immigrants? Some empirical evidence on the heterogeneity of immigrant groups in the United States. **86**, 465–480.

Cummings, C., Pacitto, J., Lauro, D., & Foresti, M. (2015). Why people move: Understanding the drivers and trends of migration to Europe. Working Paper 430, Overseas Department Institute.

Davenport, C. A., Moore, W. H., & Poe, S. C. (2003). Sometimes you just have to leave: Domestic threats and forced migration, 1964-1989. International Interactions, **29**, 27–55.

Dustmann, C., Fasani, F., Frattini, T., Minale, L., & Schönberg, U. (2017). On the economics and politics of refugee migration. Economic Policy, **32**, 497–550.

Gengenbach, C., Palm, F., & Urbain, J. (2006). Cointegration testing in panels with common factors. Oxford Bulletin of Economics and Statistics, **68**, 683–719.

Hatton, T. J. (2004). Seeking asylum in Europe. Journal of Economic Policy, **19**(1), 5–62.

Hatton, T. J. (2009). The rise and fall of asylum: What happened and why? The Economic Journal, **119**(535), F183–F213.

Hatton, T. J. (2016). Refugees, asylum seekers, and policy in OECD countries. American Economic Review, **106**(5), 441–445.

Hlouskova, J. & Wagner, M. (2006). The performance of panel unit root and stationarity tests: Results from a large scale simulation study. Econometric Reviews, **25**, 85–116.

Holzer, T., Schneider, G., & Casey, S. (2002). Hirschmann auf dem Prüfstein: 'Voice' und 'Exit' als widerstreitende Fluchtursachen. In Asylpolitik auf Abwegen, page 114–139. Opladen: Leske und Budrich.

Johansen, S. (1995). Likelihood-Based Inference in Cointegrated Vector Autoregressive Models. Oxford University Press: Oxford.

Kang, Y.-D. (2020). Refugee crisis in Europe: Determinants of asylum seeking in European countries from 2008–2014. Journal of European Integration, pages 1–16.

Karaman Örsal, D. & Arsova, A. (2017). Meta-analytic cointegrating rank tests for dependent panels. Economics and Statistics, **2**, 61–72.

Keogh, G. (2013). Modelling asylum migration pull-force factors in the EU-15. The Economic and Social Review, **44**(3), 371–399.

Kim, K. & Cohen, J. E. (2010). Determinants of international migration flows to and from industrialized countries: A panel data approach beyond gravity. International Migration Review, **44**(4), 899–932.

Neumayer, E. (2004). Asylum destination choice. European Union Politics, **5**(2), 155–180.

Neumayer, E. (2005). Bogus refugees? The determinants of asylum migration to Western Europe. International Studies Quarterly, **49**(3), 389–410.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. Journal of Applied Econometrics, **22**, 265–312.

Pesaran, M. H. (2015). Testing weak cross-sectional dependence in large panels. Econometric Reviews, **34**, 1089–1117.

Rotte, R., Vogler, M., & Zimmermann, K. (1997). South-north refugee migration: Lessons for development cooperation. Review of Development Economics, **1**, 99–115.

Ruhe, C., Martin-Shields, C., & Groß, L. M. (2020). The asylum hump: Why country income level predicts new asylum seekers, but not new refugees. Journal of Refugee Studies.

Saikkonen, P. & Lütkepohl, H. (2000). Trend adjustment prior to testing for the cointegrating rank of a vector autoregressive process. Journal of Time Series Analysis, **21**, 435–456.

Saikkonen, P. & Lütkepohl, H. (2002). Testing for a unit root in a time series with a level shift at unknown time. Econometric Theory, **18**, 313–348.

van Hear, N., Bakewell, O., & Long, K. (2018). Push-pull plus: Reconsidering the drivers of migration. Journal of Ethnic and Migration Studies, **44**(6), 927–944.

Vogler, M. & Rotte, R. (2000). The effects of development on migration: Theoretical issues and new empirical evidence. Journal of Population Economics, **13**, 485–508.

Yoo, E. & Koo, J.-W. (2014). Love thy neighbor: Explaining asylum seeking and hosting, 1982–2008. International Journal of Comparative Sociology, **55**(1), 45–72.