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Long-run economic determinants of asylum applications

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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.

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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 forced migration is highly fragmented.

Very different from voluntary migration, forced migration due to civil wars or conflicts in one's home country has particular dynamics and characteristics. 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).

According to the economic theory, economic migrants are leaving their home country to reside in another country in which they can maximize their economic opportunities. Particularly, these migrants want to maximize their income 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).

As also criticized by Davenport et al. (2003), the empirical literature on the causes of forced migration are scarce. The existing studies mainly focus on the causes, which force individuals to leave their country (such as wars and conflicts), but not on the causes which attract them to leave their home country to reside in another one. A few studies in the forced migration literature analysed the determinants of either refugee stocks or asylum applications. Unlike the studies focusing on the determinants of the refugee numbers (e.g. Schmeidl, 1997; Davenport et al., 2003), the studies on the determinants of asylum applications found evidence for the significant role of economic factors during decision to apply for asylum (e.g. Vogler & Rotte, 2000; Rotte et al., 1997).

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 use pooled ordinary least squares and fixed effects estimator for panel data, which neglect the dependence between the cross-sectional units. Due to the spill-over effects, it may not be realistic to assume cross-sectional independence. The persistent characteristic of the time series could be eliminated, by including the lagged dependent variable as an additional independent variable into the analysis. Then, 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 causes of forced migration in the short or medium-run, but not in the long-run.

A few studies in the voluntary migration literature analyzed 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 economic growth positively causes immigration, and only in Portugal, unemployment negatively causes immigration.

To close the gap in the literature, the main aim of this study is to investigate the long-run economic determinants of asylum applications. To achieve this goal particularly panel cointegration techniques will be applied, which are appropriate to model long-run equilibrium relationships, when the variables are governed by stochastic trends.

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 determinants of forced 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 host country. The analysis is based on a panel dataset[1] consisting of 22 OECD countries, and comprising the time period from 1999:Q1 until 2018:Q1. The data sources

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

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: 22 OECD Countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, United States.

3. Econometric Analysis

In the next step, the degree of cross-sectional dependence is determined with the CD-test of Pesaran (2015). 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 is around 0.79 for g_{it}, 0.44 for u_{it} and 0.36 a_{it}. So therefore, to avoid wrong statistical inference (cp. Hlouskova & Wagner, 2006), second-generation panel unit root and cointegration tests are used.

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

Variable	CD-test	p-value	mean ρ	mean abs(ρ)
g_{it}	98.864	0.000	0.78	0.79
u_{it}	29.789	0.000	0.24	0.44
a_{it}	22.995	0.000	0.18	0.36

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

3.1. Panel unit root tests

The order of integration of the variables is determined by the application of panel unit root tests. 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. Therefore, it can be concluded that all the variables are integrated of order one.

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	-0.404
		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 -2.660, -2.750 and -2.920 at 10%, 5% and 1% significance levels, respectively. Critical values for the t_bar test with only constant in the DGP are -2.150, -2.250 and -2.420 at 10%, 5% and 1% significance levels, respectively.

3.2. Panel cointegration tests

In this study, the panel cointegration tests of Arsova & Örsal (2019) are employed to find the number of cointegrating relations for a system of variables. There are several reasons for using the likelihood-based tests of Arsova & Örsal (2019). First, the decision of 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 (2019) 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. A linear time trend is included to the DGP

The tests of Arsova & Örsal (2019) are based on the individual p-values of the Johansen (1995) and Saikkonen & Lütkepohl (2000) tests. 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: $p_{(1)}, \ldots, p_{(N)}$. The joint null hypothesis that the null hypothesis is true for all cross-sections is rejected by Simes' test at significance level α, if

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

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**	2.45	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. A linear time trend is included to the DGP

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 fulfills 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 fulfill the condition in (1). When the tests 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 following cointegrating relation is estimated by the estimators of Bai et al. (2009):

$$a_{it} = \alpha + \delta t + \beta_1 g_{it} + \beta_2 u_{it} + \lambda_i' F_t + e_{it}, \tag{2}$$

$$i = 1, ..., 22, \text{ and } \ t = 1999 : Q1, ..., 2018 : Q1. \tag{3}$$

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 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. 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 theses 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 decreases 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%.

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 from the observed data. Based on the results in Table VII the null hypothesis of a unit root cannot be rejected for

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.

none of the estimated idiosyncratic components. In other words, all three idiosyncratic components are non-stationary. Moreover, to check the order of integration Saikkonen & Lütkepohl (2002) of the estimated factors unit root test with structural breaks is employed (see Table VIII). 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 integrated of order one. Under these conditions, the Cup_FM and Cup_BC of Bai et al. (2009) are consistent and should be preferred instead of a pooled OLS estimator.

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	2	-1.833
f4	2009 Q2	3	-2.438
f5	2015 Q4	4	-2.365
f6	2001 Q1	2	-2.682

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

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 rates of the host country is negatively associated with the asylum applications and the GDP per capita is positively associated with asylum applications. Furthermore, six unobserved factors are also playing an important role.

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 yellow line is the fifth factor (f5) and the gray line is the sixth factor (f6).

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