Patterns of scholarly migration by democratic performance: evidence from bibliometric data

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Abstract

As the migration policies of major migrant-receiving countries change and favor high-skilled migration with points-based systems, the UK and Germany being the most recent examples, understanding the determinants of high-skilled migration gains importance. In this study, we focus on a specific group of high-skilled migrants, namely scholarly migration. We seek to understand whether and how democratic performance in a country may have a relationship with the decisions of scientists and researchers to move abroad. We leverage the bibliometric data by Scopus to estimate the country-level scholarly emigration and immigration rates and question if a decline or an improvement in the democratic performance of a country may create a push or pull factor for scholars, respectively. Our study aims to contribute both to the migration literature on the determinants of scholarly migration as a subgroup of high-skilled migration and to policy-making efforts addressing the same group.

Keywords: bibliometric data, scholarly migration, democracy

1 Introduction

As the migration policies of major migrant-receiving countries change and favor high-skilled migration with points-based systems, the UK and Germany being the most recent examples, understanding the determinants of high-skilled migration gains importance. Classical migration theories on migrant flows into the developed countries assume an inverted U-shaped relationship between international migration and economic development, where the emigration rate initially increases with the economic development, then reaches an equilibrium and begins to decline (Zelinsky, 1971). More recent studies focusing on the determinants of high-skilled migration show that economic conditions (Okeke, 2013) as well as corruption (Cooray and Schneider, 2016) can be push-factors for high-skilled migrants to move abroad.

This study focuses on scholarly migration as a specific group of high-skilled migrants. We seek to shed light on whether and how democratic performance in a country may be correlated with the decisions of scientists and researchers to move abroad. We leverage the bibliometric data by Scopus to estimate the country-level scholarly emigration and immigration rates and question if a decline or an improvement in the democratic performance of a country may create a push or pull factor for scholars, respectively. We aim to contribute both to the migration literature on the determinants of scholarly migration as a subgroup of high-skilled migration and to policy-making efforts addressing the same group.

Our study builds upon two hypothesis. Hypothesis 1 (*H1*) assumes that a decline in the democratic performance of a country may act as a push factor for scientists and researchers, who may arguably be more capable of relocating abroad (Sen, 1999) and more sensitive to a democratic decline. Thus, we assume a negative correlation, where the scholarly emigration rate increases as the democratic performance decreases. In response, Hypothesis 2 (*H2*) assumes that high democratic performance in a country may be a pull factor for scientists and researchers who are considering moving abroad due to economic reasons and, possibly, a deficiency in the democratic performance of the academic origin. We assume a positive correlation, where scholarly immigration increases with better democratic performance.

2 Data and Methods

2.1 Data

This study uses two main data sources to test our hypotheses; the Scopus database of bibliometric records and the most recent Democracy Index published by the Economist Intelligence Unit (EIU). The democracy index by EIU evaluates the annual performance of 165 countries in five categories; electoral process and pluralism, functioning of government, political participation, political culture, and civil liberties (EIU, 2023). For each category, countries are given a score on the range 1-10. The overall democracy score is then calculated based on the scores achieved in these five categories. In our study, we use the overall democracy scores for the period of 2010-2018 [1].

[1] Although the democracy index by EIU was first published in 2006, democracy scores for consecutive years are available starting with 2010. Between 2006-2010 they were published biannually.

The bibliometric data in this study is obtained through Scopus, which comprises of detailed meta-data on scientific publications indexed by Elsevier. The bibliometric data, therefore, refers to the meta-data of publications, such as the individual author ID, publication year, and affiliation country per publication and author ID. The Scopus database includes 50 million articles by over 9000 publishers and 17 million individual authors. We were given institutional access to the data, through the *German Competence Centre for Bibliometrics*. Using this database, we first identified the country of residence and migration events for each individual author (as detailed under 2.2 Methods). Then, we aggregated the individual-level data at the country level and calculated the annual estimates of scholarly population size as well as out-migration, immigration, and net migration rates for the period from 1998-2017. The aggregated data are anticipated to become public soon within the framework of *Scholarly Migration Database* (Akbaritabar et al., 2023). The analyses in this study leverage these country-level aggregate data and migration estimates. To match the data on scholarly migration with the data on democracy scores, we limit our study to the period between 2010-2018.

In addition to the two primary data sources mentioned above, we use GDP per capita (current US $) data from World Bank (World Development Indicators, 2023). The dataset we prepare for the empirical analysis includes 48 countries [2]. We restricted our sample to OECD member countries, candidate countries, and key partners in order to be able to observe the relationship between democracy and scholarly migration in a context where we might assume relatively more global connections and capabilities to migrate (Sen, 1999).

2.2 Methods

2.2.1 Quantifying Scholarly Migration

The raw bibliometric data that we use in our study consists of the information one would typically see on the first page of a scientific publication, such as the title, journal name, anonymous author ID, affiliation addresses, abstract etc. For each individual author ID, we identify first the year of first publication and the affiliation country of the first publication, which are labeled as the year of academic birth and academic origin, respectively. The algorithm then follows the timeline of each individual author's academic life to identify any changes in the country of residence and, thus, the (international) scholarly migration events. In cases where the authors do not publish every year, the algorithm fills the time gaps where there is no apparent change in the country of residence. If there are gaps in the timeline of publications, followed by a change in the country of residence, the algorithm applies backward filling with the new country information for two years, considering the preparation time for the move and time needed to start publishing with the new affiliation (Akbaritabar et al., 2023).

[2] Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

2.2.2 Empirical Analysis

At this very early stage of our study, we seek first to explore whether there is a relationship between democratic performance and scholarly migration, as assumed in our hypotheses. We apply simple OLS regression with country-level fixed effects to observe the association between scholarly migration and democracy, as well as the GDP per capita. Our initial model for *H1* is as follows;

$$OutMigrationRate_{it} = \alpha_{it} + \beta_1 DemocracyScore_{it} + \beta_1 log(GDP)_{it} + u_i + \epsilon_{it} \quad (1)$$

In the above equation, our dependent variable is the scholarly out-migration (emigration) rate for the country i and year t. Our main explanatory variables are the democracy score and GDP per capita. u_i denotes the country-specific fixed effects and ϵ_{it} denotes the error term.

We replicate the model above four times with time-lagged variables for democracy score and GDP per capita, assuming that if a decline in the democratic performance of a country is a factor for scholars' emigration, one needs time between making the decision to move and the migration event that we are able to observe in the bibliometric data. Therefore, we test the above model, replacing the explanatory variables with their versions one to four years before. The time-lags are denoted as *t-1*, *t-2*, *t-3* and *t-4*

Equation 1 above addresses the *H1*, which assumes a negative association between the democratic performance of a country and scholarly emigration. To address the *H2* that assumes a positive correlation between the democratic performance of a country and scholarly immigration, we rewrite the model as below.

$$ImmigrationRate_{it} = \alpha_{it} + \beta_1 DemocracyScore_{it} + \beta_1 log(GDP)_{it} + u_i + \epsilon_{it} \quad (2)$$

In Equation 2 our dependent variable is the scholarly immigration rate for the country i and year t. Our main explanatory variables are again the democracy score and GDP per capita. u_i denotes the country-specific fixed effects and ϵ_{it} denotes the error term.

2.3 Preliminary Results

This study is still in its early stages. In Table 1 (in the Appendix), we present the preliminary results for the analysis of scholarly emigration (out-migration), focusing on the *H1*. The results of our preliminary analyses demonstrate that there is a negative and statistically significant correlation between the democracy score and the scholarly emigration rates. This correlation grows stronger as we look at the time-lagged democracy scores instead of the democracy score of the same year. These preliminary results confirm the *H1* and provide ground for the further steps of the study.

2.4 Future Steps

In the future steps of the study, we will first replicate the empirical analysis for Hypothesis 2 and look into the association between scholarly immigration rates and democratic

performance. Approaching the relationship between democratic performance and scholarly migration from emigration and immigration sides separately are complementary to observe the global patterns, but may not necessarily be the two sides of the same story. A democratic decline may be easier to observe and take action about when one lives in the country. However, observing the democratic performance of another country may be trickier.

Once we establish the overall picture and global patterns of democratic performance and scholarly migration, we would like to support our analyses by focusing on some specific countries that may provide case studies for a closer look, in terms of scholarly emigration and immigration from the perspective of democratic performance. By doing so, we aim to shed more light on scholars' migration decisions that may help policymakers.

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2.5 Appendix

Table 1: Preliminary Results

	Dependent variable: out-migration rate				
	(1)	(2)	(3)	(4)	(5)
Democracy Score	−0.003**				
	(0.001)				
GDP pc	−0.002				
	(0.002)				
Democracy Score (t-1)		−0.003**			
		(0.001)			
GDP pc(t-1)		−0.003			
		(0.002)			
Democracy Score (t-2)			−0.005***		
			(0.001)		
GDP pc(t-2)			−0.004**		
			(0.002)		
Democracy Score (t-3)				−0.007***	
				(0.001)	
GDP pc(t-3)				0.001	
				(0.002)	
Democracy Score (t-4)					−0.007***
					(0.001)
GDP pc(t-4)					−0.00000
					(0.001)
Observations	432	384	384	336	336
R^2	0.940	0.945	0.951	0.952	0.952
Adjusted R^2	0.932	0.937	0.944	0.944	0.944
Country FE	YES	YES	YES	YES	YES

*p<0.1; **p<0.05; ***p<0.01

Note: Robust standard errors are reported in parantheses.