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Investigating the effects of gender inequality on brain drain in developing countries

Ali Moftakhari*, Mohammad Jafari **, Esmaiel Abounoori***, Younes Nademi****

** Ph.D. in Economics, Department of Economics, Faculty of Economics and Administrative Sciences, Lorestan University, Khorramabad, Iran.*
Email: *alimoftakhari66@gmail.com*

*** Associate Professor of Economics, Department of Economics, Faculty of Economics and Administrative Sciences, Lorestan University, Khorramabad, Iran (Corresponding Author).*
Email: *Jafari.moh@lu.ac.ir*
0000-0001-5237-0941
****Professor of Economics, Department of Economics, Faculty of Economics, Management and Administrative Sciences, Semnan University, Semnan, Iran.*
Email: *esmaiel.abounoori@profs.semnan.ac.ir*
*****Associate Professor of Economics, Department of Economics, Faculty of Humanities, Ayatollah Boroujerdi University, Boroujerd, Iran.*
Email: *younesnademi@abru.ac.ir*

Postal address*: Iran, Lorestan Province, Khorramabad, Lorestan University, Faculty of Economic and Administrative Sciences, Department of Economics, Postal Code: 68151-44316*

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EXTENDED ABSTRACT

INTRODUCTION

Brain drain is a widespread issue in the context of developing economies. However, the gender dimension of brain drain has received relatively little attention, and gender as an influential factor in migration decisions has been understudied. In particular, the role of women's rights in determining migration decisions among highly skilled women has been largely overlooked. The rate of brain drain among women from developing countries is significantly higher than that of men. In most non-OECD countries, female migration rates exceed male rates, with this trend more pronounced among highly skilled individuals. On average, the migration rate of women with postgraduate education is 17% higher than that of men. Moreover, the migration of highly skilled individuals—i.e., brain drain—is relatively higher among women across all developing regions.

This raises an important question: Why is the rate of female brain drain relatively high in developing countries?

While the loss of human capital is generally alarming, the outflow of female human capital is particularly costly. Therefore, this study seeks to investigate the implications of this important phenomenon

METHODOLOGY

The methodological approach of this research is econometric and relies on an analytical–applied framework. The econometric model is designed based on economic theories, and after data collection from official sources, it is estimated using statistical techniques. The study's statistical population consists of 40 developing countries during the period 2002–2018, using data obtained from the World Bank and migration statistics to developed countries.

Both descriptive and inferential statistics are employed, and the econometric method used is the Generalized Method of Moments (GMM). Accordingly, the following general model is specified based on the research objective and theoretical foundations.

$$BD_{it} = \beta_1 BD_{it-1} + \beta_2 GII_{it} + \beta_3 GII^2{}_{it} + \beta_4 Corruption_{it} + \beta_5 Political_{it} + \beta_6 Voice_{it} + \varepsilon_{it} \quad (1)$$

Where:

- BD_{it}: Brain drain index, measured using migration rates of highly educated individuals to the United States (OECD.Stat and IAB data).
- BD_{it-1}: First lag of brain drain.
- GII_{it}: Gender Inequality Index (GII).
- GII_{it}^2: Squared term to capture nonlinear effects.
- $Corruption_{it}$: Control of corruption index.
- $Political_{it}$: Political stability index.
- $Voice_{it}$: Voice and accountability index.

The dynamic GMM estimator proposed by Blundell and Bond (1998) is applied.

FINDINGS

Table 1. Estimation Results for Developing Countries

Variable	Coefficient	P-Value
Lagged Brain Drain	0.698512	0.000
Gender Inequality Index	-4122.239	0.000
Squared Gender Inequality Index	3330.620	0.000
Control of Corruption	-9.690558	0.000
Political Stability	-1.296764	0.000
Voice and Accountability	15.36521	0.000
Sargan Test (J-Statistic)	35.60696	0.39

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Interpretation of Key Results:

- **Lagged brain drain** positively and significantly affects current brain drain, indicating strong network effects: as more skilled individuals migrate, they motivate others by sharing information about academic, social, and welfare benefits abroad. This is consistent with Ahadi et al. (2019).
- **Gender inequality exhibits a nonlinear (threshold) effect** on brain drain.
    - At **low levels** of gender inequality, its effect is *negative* on brain drain.
    - After exceeding a threshold **(GII > 0.618)**, rising gender inequality leads to **increased brain drain**, especially among women.

Countries exceeding this threshold at some point include: Algeria, Egypt, UAE, India, Iran, Iraq, Jordan, Kyrgyzstan, Morocco, Pakistan, and Saudi Arabia.

- **Control of corruption** has a **negative** and significant effect on brain drain, meaning better governance reduces incentives for skilled emigration. This aligns with Mostafazadeh & Arabmazar (2017).
- **Political stability** negatively influences brain drain, implying that stable institutional environments promote knowledge retention and innovation. Similar findings appear in Doria-Aria et al. (2017) and Ahadi et al. (2019).
- **Voice and accountability** has a **positive** effect on brain drain. While freedom is essential for development, increased openness can facilitate migration by exposing skilled individuals to opportunities in advanced societies, thus encouraging relocation.
- The **Sargan test** confirms the validity of instrumental variables, and the **Arellano–Bond autocorrelation test** validates the dynamic model and confirms absence of higher-order serial correlation.

CONCLUSION

Human resources play a critical role in economic growth and development. Highly skilled individuals represent a valuable asset and a competitive advantage in today's knowledge-based economies. Despite their importance, developing countries face substantial outflows of talented individuals who prefer residing in developed nations.

Due to the lack of previous studies addressing the impact of gender inequality on brain drain, this research examined the effect of gender inequality on skilled migration from developing countries to the United States between 2002 and 2018 using the GMM method.
The results demonstrate that:

- Lagged brain drain, squared gender inequality index, and voice and accountability **increase** brain drain;
- Control of corruption, political stability, and gender inequality **below its threshold reduce** brain drain.

These findings highlight the crucial role of gender equality, governance quality, and political stability in mitigating the outflow of human capital from developing countries

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