

Female Brain Drains and Women's Rights Gaps: Analysis of Bilateral Migration Flows



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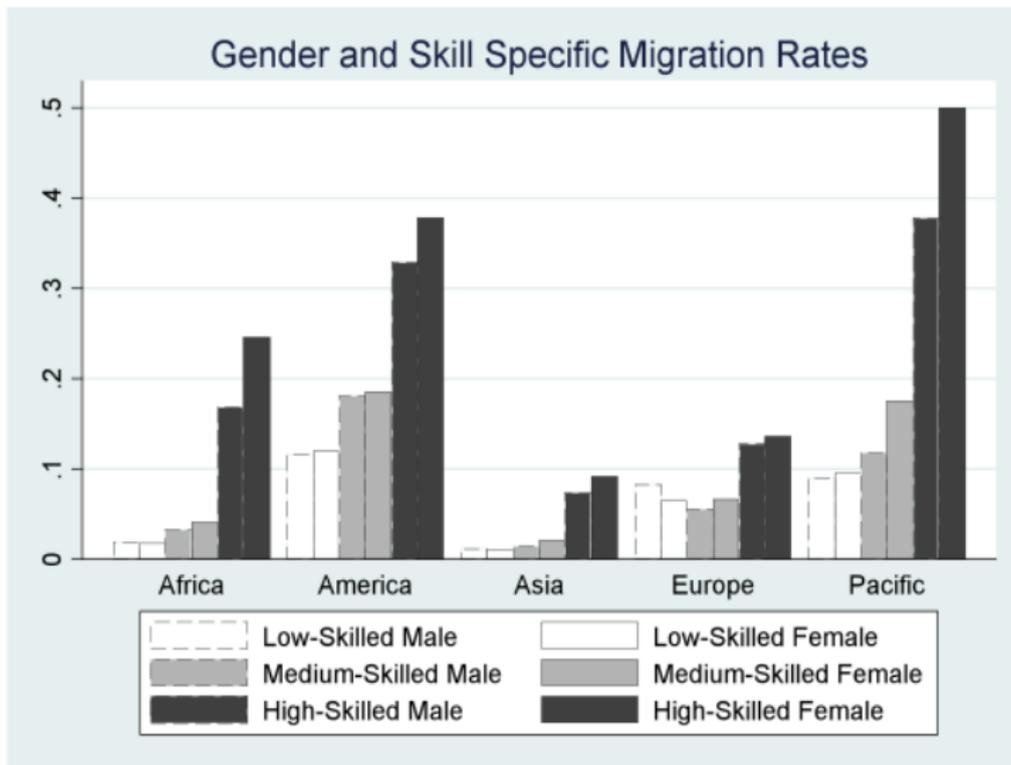
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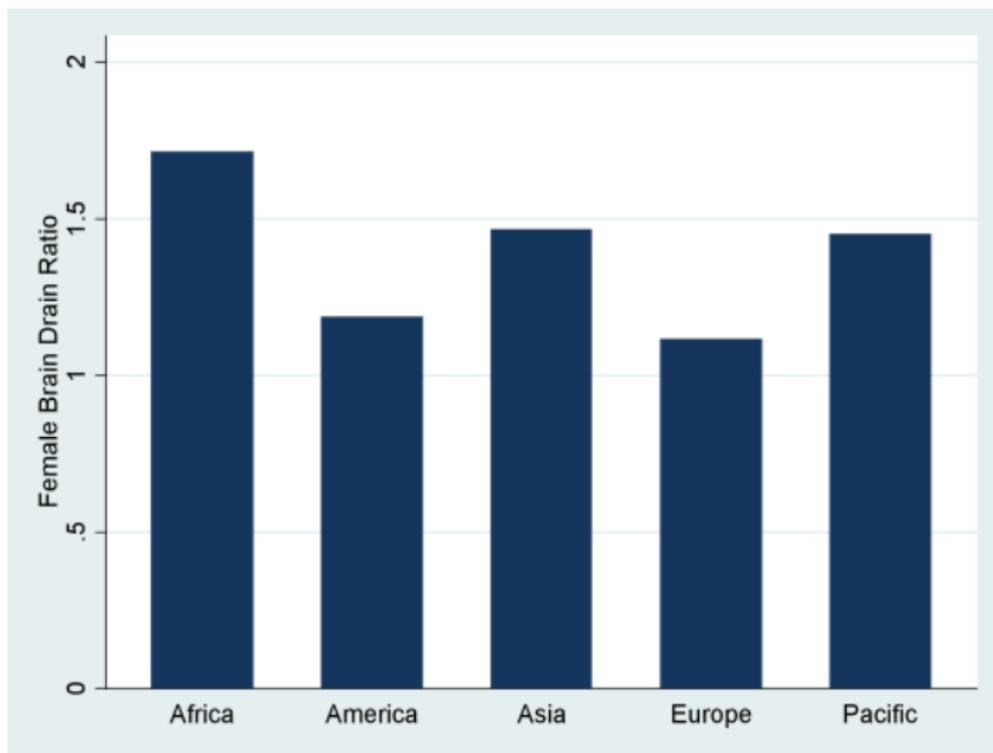
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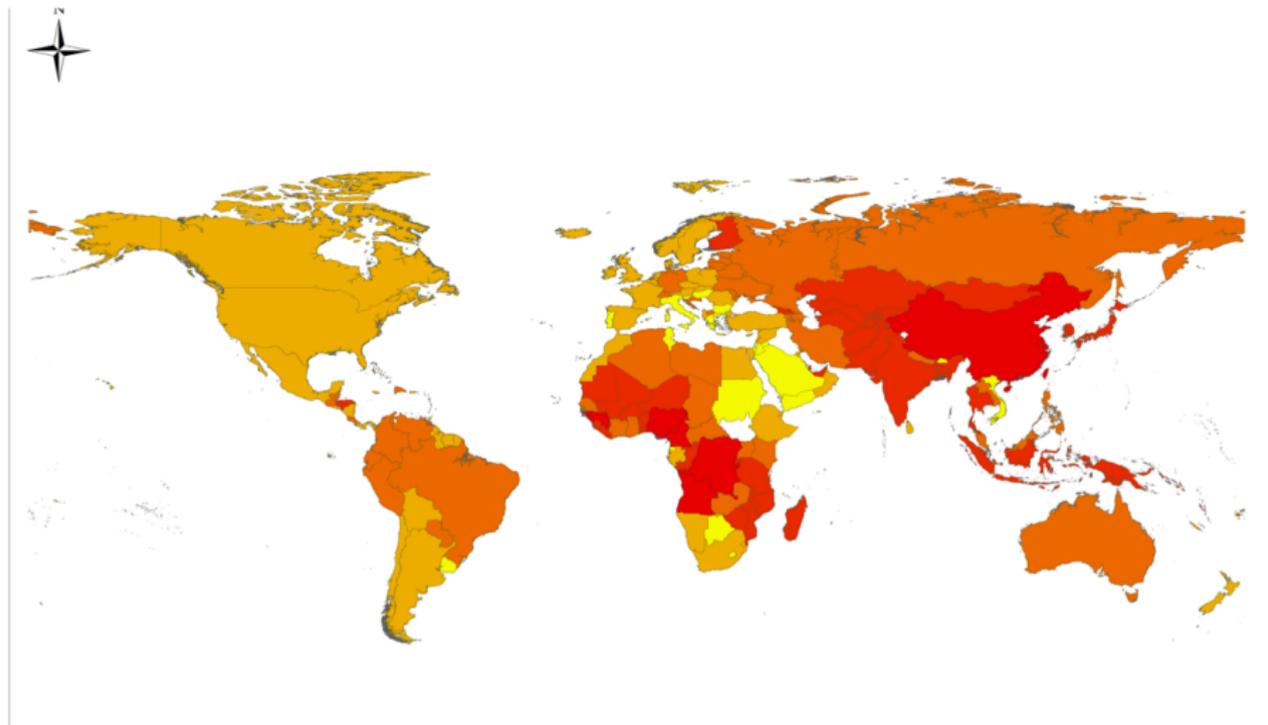
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- 1 Motivation
- 2 Previous work on female brain drain
- 3 Theoretical framework
- 4 Empirical Findings
- 5 Conclusion

- Female migration rates are higher than male in 88% of non- OECD countries.
- This difference is the most pronounced in the case of high-skilled migrants. (Figure 1)
- The female brain drain rates are on average 17 percent higher than those of males
- The ratio of female to male migration rates is higher in non- OECD countries. (Figure 2)







Effects of high-skilled migration on development:

- Loss of human capital.
- Positive effects through remittance: Lower in case of high-skilled migrants (Niimi, Zden, and Schiff, 2008), Even lower in case of women.
- Positive effects through high human capital formation in the presence of potential of migration. (Docquier (2006) only when rates are between five to ten percent.)

Positive effects of high-skilled women on development:

- Reduced fertility, infant mortality, improved health and increased educational attainment for children (Schultz (1988), Behrman and Deolalikar (1988), Haveman & Wolfe (1995), and Subbarao and Raney (1995).
- Abu-Ghaida and Klasen (2004) estimate the lost social gains from gender inequality in education 0.1 and 0.3 in income growth per capita.
- Knowles, Lorgelly, and Owen (2002) increases in female education positively affect labor productivity, not the same for men

"Few farming women in developing countries have title and control of land in their own names. In many areas of sub-Saharan Africa, widows lack even basic rights to inherit marital property [.]. In south Asia, women have gained greater legal inheritance rights over time, but inequitable restrictions continue to keep women at a disadvantage, and women's property rights in practice are much less than in the legal code[.] Women may also have less access [to] productive assets such as labor-saving technologies, credit, and extension services" (Mammen and Paxson, 2000, p. 161).

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Limited work on female brain drain mainly due to lack of data:

- Dumont, Martin and Spielvogel (2007)
 - First data on gender-specific brain drain for 109 origin countries.
 - High-skilled women respond differently to traditional push factors.
- Docquier, Lowell, and Marfouk (2009)
 - More complete dataset from 195 origin countries in 2000 and 174 countries in 1990.
 - High-skilled women respond differently to traditional push factors
- Docquier, Marfouk, Salomone, and Sekkat (2012)
 - Suggest that the difference in female & male response to traditional push factors might be due to gender discrimination.

- Bang and Mitra (2011)
- Baudasse and Baziller (2011)
- Ferrant and Tuccio (2013)
- Naghsh Nejad (2013)
- Lodigiani and Salamone (2012)

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- Following the work of Borjas(1987) and Grogger and Hansen (2011):
- The expected utility function of an individual that lives in country i and decides to stay:

$$u_{ii,g} = \gamma (W_i + E_i - D_{i,g}) + \epsilon_{ii,g} \quad (1)$$

- $D_{i,g}=0$ if $g=m$ and $D_{i,g}>0$ if $g=f$ (gender discrimination)
- W_i : Wages in country i ; E_i : Characteristics of country i

- The expected utility function of an individual that lives in country i migrating to country j :

$$u_{ij,g} = \gamma (W_j + E_j - C_{ij,g} - D_{j,g}) + \nu_{ii,g} \quad (2)$$

- $C_{ij,g}$: Cost of migrating from i to country j

$$C_{ij,g} = C (T_{ij,g}, D_{i,g}, D_{j,g}) \quad (3)$$

- Where $C_{ij,g}$ is strictly increasing convex function of $D_{i,g}$
- Net gain of migrating from i to country j :

$$NG_{ij,g} = \gamma (W_j - W_i) + \gamma (E_j - E_i) + \gamma (D_{i,g} - D_{j,g}) - \gamma C_{ij,g} + \epsilon_{ii,g} \quad (4)$$

- The likelihood of a high-skilled individual from group g migrating from i to country j :

$$\ln \frac{M_{ij,g}}{M_{i,g}} = \gamma (W_j - W_i) + \gamma (E_j - E_i) + \gamma (D_{i,g} - D_{j,g}) - \gamma C_{ij,g} \quad (5)$$

- Where $\frac{M_{ij,g}}{M_{i,g}}$ is the population share of gender group g in i that migrates to j . $M_{i,g}$ is the population
- By subtracting the log odds of male from female migration rates:

$$\ln \frac{M_{ij,f}}{M_{i,f}} - \ln \frac{M_{ij,m}}{M_{i,m}} = -\gamma (C_{ij,f} - C_{ij,m}) + \gamma (D_{i,g} - D_{j,g}) \quad (6)$$

$$\frac{\partial}{\partial D_{i,g}} \left(\ln \frac{M_{ij,f}}{M_{i,f}} - \ln \frac{M_{ij,m}}{M_{i,m}} \right) = -\gamma \left(\frac{\partial C_{ij,f}}{\partial D_{i,g}} \right) + \gamma \quad (7)$$

$$\frac{\partial}{\partial D_{j,g}} \left(\ln \frac{M_{ij,f}}{M_{i,f}} - \ln \frac{M_{ij,m}}{M_{i,m}} \right) = -\gamma \left(\frac{\partial C_{ij,f}}{\partial D_{j,g}} \right) - \gamma \quad (8)$$

$$d \left(\ln \frac{M_{ij,f}}{M_{i,f}} - \ln \frac{M_{ij,m}}{M_{i,m}} \right) = \gamma (dD_{i,f} - dD_{j,f}) - \gamma \left(\frac{\partial C_{ij,f}}{\partial D_{i,f}} dD_{i,f} + \frac{\partial C_{ij,f}}{\partial D_{j,f}} dD_{j,f} \right) \quad (9)$$

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- Dependent Variable:

$$FBR_{ij} = \frac{\text{female brain drain rate}_{ij}}{\text{male brain drain rate}_{ij}} \quad (10)$$

$$\text{brain drain rate}_{ij,g} = \frac{\text{stock of migrant}_{ij,g,h,2000} - \text{stock of migrant}_{ij,g,h,1990}}{\text{population of nationals}_{i,g,h,1990}} \quad (11)$$

- women's rights (Cingranelli & Richards, 2010)
women's rights = women's social rights + women's economic rights + women's political rights
 - Women's social rights: considers gender inequalities in inheritance, marriage, and divorce as well as the women's rights to travel, obtain education, and choose a residence. Varies between 0 and 3. Examples: Saudi Arabia:0, Ethiopia:1, Spain:2, Germany:3. Mean:1.31.
 - Women's economic rights: focuses on the right to get and choose a job without husband or male relatives consent. It also includes the equalities in hiring, pay, promotion, and job securities in workplace. Varies between 0 & 3. Examples: Saudi Arabia:0, Ethiopia:1; Italy:2; United States:3 Mean:1.31.

- Women's political rights: includes the right to vote and engage in political activities such as running a political office, hold government positions, join political parties, and petition government officials. Varies between 0 & 3. Examples: Saudi Arabia:0, Ethiopia:1; Spain:2; Norway:3 Mean:1.72.

Independent Variables:

$$\text{Women's rights gap}_{ij} = \frac{\text{Women's economic rights}_j + \text{Women's political rights}_j + \text{Women's social rights}_j}{\text{Women's economic rights}_j + \text{Women's political rights}_j + \text{Women's social rights}_j}$$

$$\text{Women's economic rights gap}_{ij} = \frac{\text{Women's economic rights}_j}{\text{Women's economic rights}_j} \quad (13)$$

$$\text{Women's political rights gap}_{ij} = \frac{\text{Women's political rights}_j}{\text{Women's political rights}_j} \quad (14)$$

$$\text{Women's social rights gap}_{ij} = \frac{\text{Women's social rights}_j}{\text{Women's social rights}_j} \quad (15)$$

The gravity models that we estimate are each of one of three forms:

$$\log(FBR_{ij}) = \beta_0 + \beta_1 (\text{Women's rights gap}_{ij}) + \beta_2 (\text{Women's rights gap}_{ij})^2 + \bar{\beta}_z Z_{ij} + \epsilon_{ij} \quad (16)$$

$$\log(FBR_{ij} + 1) = \beta_0 + \beta_1 (\text{Women's rights gap}_{ij}) + \beta_2 (\text{Women's rights gap}_{ij})^2 + \bar{\beta}_z Z_{ij} + \epsilon_{ij} \quad (17)$$

$$FBR_{ij} = \beta_0 + \beta_1 (\text{Women's rights gap}_{ij}) + \beta_2 (\text{Women's rights gap}_{ij})^2 + \bar{\beta}_z Z_{ij} + \epsilon_{ij} \quad (18)$$

	(I)	(II)	(III)	(IV)	(V)
Estimation Method	(OLS)	(OLS)	(Heckman)	(PPML)	(PPML)
Dependent Variable	Log(FBR)	Log(FBR+1)	Log(FBR)	FBR	FBR>0
Women's Rights Gap	1.620***	0.970***	1.617***	1.477***	1.198***
(Women's Rights Gap) ²	-0.336***	-0.190***	-0.323***	-0.286**	-0.234*
Dest-loggdp	0.003	0.047***	0.039	-0.003	-0.059**
Dest- unemployment	0.013	-0.002	0.002	-0.014*	-0.013 **
Common 1st language	-0.142***	-0.019	-0.146	-0.127	-0.171
Common 2nd language	0.334***	0.230***	0.384***	0.324***	0.217*
Mills Test			1.516**		
Origin fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	2841	3239	3449	3239	2841
R2	0.282	0.207		0.124	0.157

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Controls for contiguity, colonial relationship, and log distance are included but never significant.

- Hump-shaped relationship peaks at a womens rights gap of about 2.411 .
- 2.411 is more than a sample standard deviation greater than the sample mean (1.193).
- Common sense result: Starting bellow womens rights gap 2.411 , more desirable destination effect (benefits of migration), US womens rights index to that of Nigeria 1.636
- Costs of migration effects kicks in starting from womens rights gap 2.411.
- This corresponds to Saudi Arabia, Lesotho, and Sudan as origins relative to the US.

	(I)	(II)	(III)	(IV)
Estimation Method	(OLS)	(OLS)	(Heckman)	(PPML)
Dependent Variable	Log(FBR)	Log(FBR+1)	Log(FBR)	FBR
Women's Econ Rights Gap	1.651***	1.005***	1.750***	0.977***
Women's Econ Rights Gap ²	-0.278***	-0.146***	-0.276***	-0.120*
Dest-loggdp	-0.027	0.025**	-0.001	-0.000
Dest- unemployment	0.013***	0.006**	0.019***	-0.001
Common 1st language	-0.136*	0.004	-0.121	-0.098
Common 2nd language	0.275***	0.190***	0.320***	0.251**
Mills Test			0.824***	0.157
Origin fixed effect	Yes	Yes	Yes	Yes
Observations	2998	3439	3692	3439
R2	0.282	0.215		0.137

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Controls for contiguity, colonial relationship, and log distance are included but never significant.

	(I)	(II)	(III)	(IV)	(V)
Estimation Method	(OLS)	(OLS)	(Heckman)	(PPML)	(PPML)
Dependent Variable	Log(FBR)	Log(FBR+1)	Log(FBR)	FBR	FBR>0
Women's Pol Rights Gap	2.369***	1.497***	2.261***	2.844***	2.496***
Women's Pol Rights Gap ²	-0.758***	-0.482***	-0.714***	-0.955***	-0.841***
Dest-loggdp	0.068***	0.087***	0.108***	0.056***	-0.017
Dest - unemployment	-0.000	-0.003	0.002	-0.015**	-0.015**
Common 1st language	-0.164**	-0.036	-0.163*	-0.144	-0.185
Common 2nd language	0.306***	0.214***	0.337***	0.297**	0.200*
Mills Test			0.746***		
Origin fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	2873	3274	3492	3274	2873
R2	0.286	0.212		0.151	0.190

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Controls for contiguity, colonial relationship, and log distance are included but never significant.

	(I)	(II)	(III)	(IV)	(V)
Estimation Method	(OLS)	(OLS)	(Heckman)	(PPML)	(PPML)
Dependent Variable	Log(FBR)	Log(FBR+1)	Log(FBR)	FBR	FBR>0
Women's Soc Rights Gap	0.980***	0.547***	1.034***	0.874***	0.779***
Women's Soc Rights Gap ²	-0.166***	-0.081***	-0.167***	-0.130***	-0.125***
Dest-loggdp	-0.005	0.043***	0.023	-0.013	-0.075**
Dest- unemployment	0.006	0.001	0.006	-0.012*	-0.013**
Common 1st language	-0.203***	-0.112**	-0.199**	-0.288***	-0.305***
Common 2nd language	0.230***	0.198***	0.234***	0.331***	0.241**
Mills Test			1.286***		
Origin fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	2779	3172	4006	3172	2779
R2	0.282	0.207		0.124	0.157

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Controls for contiguity, colonial relationship, and log distance are included but never significant.

Estimation Method	(I) (OLS)	(II) (OLS)	(III) (Heckman)	(IV) (PPML)	(V) (PPML)
Dependent Variable	Log(FBR)	Log(FBR+1)	Log(FBR)	FBR	FBR>0
Women's Pol Rights Gap	1.204***	0.876***	0.963***	2.174***	1.955***
Women's Pol Rights Gap ²	-0.040	-0.047	-0.038	0.166**	0.307***
Women's Econ Rights Gap	0.530*	0.535***	0.586**	0.537	1.323***
Women's Econ Rights Gap ²	-0.040	-0.047		-0.038	0.166**
0.307***					
Women's Soc Rights Gap	0.538***	0.165**	0.600***	0.687***	0.912***
Women's Soc Rights Gap ²	-0.092***	-0.021	-0.095***	-0.092***	-0.138***
Dest-loggdp	0.009	0.051*	0.018	0.009	-0.057**
Dest- unemployment	0.005	0.002	0.005	-0.014*	-0.017**
Common 1st language	-0.210***	-0.130**	-0.206**	-0.312***	-0.305***
Common 2nd language	0.231***	0.198***	0.237***	0.347***	0.258**
Origin fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	2779	2970	3733	2970	2617
R2	0.282	0.207		0.124	0.157

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$



Estimation Method	(I)	(II)	(III)	(IV)
Dependent Variable	(PPML)	(PPML)	(PPML)	(PPML)
	FBR	FBR	FBR	FBR
Women's Rights Gap	1.790**			
Women's Rights Gap ²	-0.222*			
Women's Pol Rights Gap		2.444		
Women's Pol Rights Gap ²		-0.674		
Women's Econ Rights Gap			3.182**	
Women's Econ Rights Gap ²			-0.364*	
Women's Soc Rights Gap				0.589
Women's Soc Rights Gap ²				-0.016
Common 1st language	0.031	-0.037	0.015	0.019
Origin fixed effect	Yes	Yes	Yes	Yes
Destination fixed effect	Yes	Yes	Yes	Yes
Origin nest fixed effect	Yes	Yes	Yes	Yes
Observations	3128	3354	3171	3340
RSq	0.430	0.422	0.418	0.426

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- develop a model of migration where both women's expected costs and benefits of migration are a function of women's rights in the origin country relative to those of the destination (the women's rights gap).
- when women's rights levels are higher in the destination country in comparison with the origin country, high-skilled women are more likely to migrate (compared to men), unless the low levels of women's rights in origin manifest as increased cost of migration for women.
- Using a panel of over 5,000 bilateral migration flows across OECD and non-OECD countries and the women's rights indices from the CIRI Human Rights Dataset, we report evidence consistent with the theory.

Thank you



Your opinion, suggestions and comments are highly appreciated.

Thank You

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