

Can Health Foreign Assistance Break the Medical Brain Drain

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Plan

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- Brain Drain
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- Aim of the paper

2 Review of Litterature

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- Consequence of medical brain drain

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- In 1965, the world counts 75 millions of migrants (2% of world population), and in 2000 the number of migrants is around 175 millions which is correspond to 3% of world population (Simon, 2002).
- In 2000, the number of migrant with tertiary education living in the OECD countries amounted to about 20.4 millions which represent 34.6% among immigrants (Docquier & Marfouk, 2005).

- In 1965, the world counts 75 millions of migrants (2% of world population), and in 2000 the number of migrants is around 175 millions which is correspond to 3% of world population (Simon, 2002).
- In 2000, the number of migrant with tertiary education living in the OECD countries amounted to about 20.4 millions which represent 34.6% among immigrants (Docquier & Marfouk, 2005).

Early Contributions: Skilled migration has a **negative effect on growth and welfare** in source country (Grubel and Scott 1966, Bhagwati and Hamada 1974, Miyagiwa 1991, Haque and Kim 1995).

⇒ A migrant tax system have to be implement to compensate the lost for source countries.

New Contributions: Skilled migration has a **positive effect on sending country**(Mountford 1997, Beine et al 2001, Stark and Wang 2002).

- A positive effect on human capital accumulation (Mountford 1997, Beine et al 2001, Stark and Wang 2002). The perspective of migration increases the return on education, so more people invest in education and positive externalities even though part of them migrate.
- Remittances (Adams 2006, Mansuri 2006, Nicole Hildebrandt and David J. McKenzie 2005).
- Positive feedbacks of return migration (Dos Santos and Postel-Vinay 2005 , Dustmann and Kirchkamp 2002).
- Role of diaspora externalities (Kugler and Rapoport 2007).

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Emigration of physicians from developing countries:

- 23% of physicians in Canada were trained abroad, 23.5% in USA (Astor et al, 2005).
- The number of new doctor arriving from overseas in UK was 2763 in 2000 (32% of the total number of new registrants). It was around 40% in 1990's (Winter, 2002).
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- Goal 4: Reduce by two thirds, between 1990 and 2015, the under-five mortality rate.
- Goal 5: Improve maternal health by reducing by three quarters, between 1990 and 2015, the maternal mortality ratio.
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- New database on bilateral medical brain drain (Bhargava and Docquier, 2007). It covers the bilateral physicians' emigration of 192 developing countries (even in Sub-Saharan Africa) to 16 OECD countries over 14 years (1991-2004).
- Are international labor and foreign aid in health sector complements or substitutes? Substitutes means that aid is a great tool to reduce physicians emigration by improving medical working conditions whereas complements means that aid give incentives to South physicians to migrate.

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As general emigration, medical brain drain is affecting by several factors:

- 91% of physicians interviewed are attracted by higher income (Astor & al 2005 , Awases & al 2006).
- Working conditions are important in migration decision (Vujicic & al 2004) and lack ressources in health services (Awases & al 2006).
- HIV-AIDS prevalence rate increase the emigration of medical staff because of transmission risk (Awases & al 2006, Vujicic & al 2004, Bhargava and Docquier 2008).
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Medical brain gain:

- As the "Brain gain" theory, the incentive to migrate should have an impact on the education process, or on the medical training. Winters & al (2007) do not find fact in that way because migrants is too strongly screened.
- Brain drain must be limited to benefits to sending countries (threshold of 15% of emigration) (Docquier 2007).
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Quality and delivery of health services:

- Awases & al (2004) show the problem of replacement and quality into the teaching in medical school.
- In Pakistan, Nigeria and Phillipines more than 50% of physicians interviewed are agree to said that large emigration has led to insufficient physicians in source countries (Astor & al (2005)).
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- Pro-poor channel: Improve poor's chance or health to exceed the threshold of migration cost.
- Environment channel: A substantial improvement in working conditions by providing medical equipments.
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- Health foreign assistance can have an indirect effect via the combat against diseases to retains health emigration. We try to approximate epidemics prevalence rate (malaria, HIV-AIDS and tuberculosis) as the death rate crude per 1000 people. Death rate includes death due to these big pandemics but also other death due to less fatal diseases such as measles, diphtheria, tetanus and pertussis.

- Bilateral Physicians' Emigration Dataset (Bhargava and Docquier, 2007) on 192 source countries to 16 OCDE countries during the period of 1991 to 2004.
- Doctor Emigration = Physicians educated in their countries but working abroad.

Empirical issues

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Emigration rate

- $MBD_{i,j,t} = M_{i,j,t} / (P_{i,t} + \sum_{j=1}^{16} (M_{i,j,t}))$

- $M_{i,j}$ is defined as the stock of physicians from country i working abroad in country j

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Table: Physicians Distribution accross country group

1995	Physicians Emigration Rate	Nb Physicians per 1000 people
Population Size		
small (pop<2.5m)	12%	0.88
lower middle (2.5m<pop<10m)	8%	1.50
upper middle (10m<pop<25m)	6%	1.52
large (pop>25m)	2%	1.35
Income group (WB Classification)		
Low Income	6.2%	0.08
lower middle income	2.1%	0.78
upper middle income	3.1%	1.39
high income	3.8%	1.82
Geography		
East Asia - Pacific	1.1%	0.65
Europe - Central Asia	0.7%	2.95
Latin America - Carribean	2.4%	1.18
Middle East - North Africa	5.5%	1.25
OECD	3.9%	2.64
South Asia	8.5%	0.27
Sub-Saharan Africa	16.8%	0.15

Notes: Author Computations from Bhargava and Docquier (2007) dataset.

Table: Physicians Distribution across country group

2003	Physicians Emigration Rate	Nb Physicians per 1000 people
Population Size		
small (pop<2.5m)	14%	0.99
lower middle (2.5m<pop<10m)	7%	1.61
upper middle (10m<pop<25m)	5%	1.64
large (pop>25m)	2%	1.48
Income group (WB Classification)		
Low Income	14.1%	0.99
lower middle income	6.6%	1.61
upper middle income	5.0%	1.64
high income	2.4%	1.48
Geography		
East Asia - Pacific	1.0%	0.72
Europe - Central Asia	1.1%	2.90
Latin America - Carribean	2.3%	1.37
Middle East - North Africa	5.7%	1.52
OECD	3.6%	2.94
South Asia	7.7%	0.36
Sub-Saharan Africa	16.4%	0.16

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Official Development Assistance(ODA) database on health sector is extracted from:

- The Country Reporting System (CRS) database which is provided from Development Assistance Committee(DAC) of the Organisation for Economic Co-operation and Development (OECD).
- Health sector includes assistance to hospitals and clinics, assistance to specialised institutions such as those for tuberculosis, maternal and child care, other medical and dental services, disease and epidemic control, vaccination programmes, nursing, provision of drugs, health demonstration, public health administration and medical insurance programmes.
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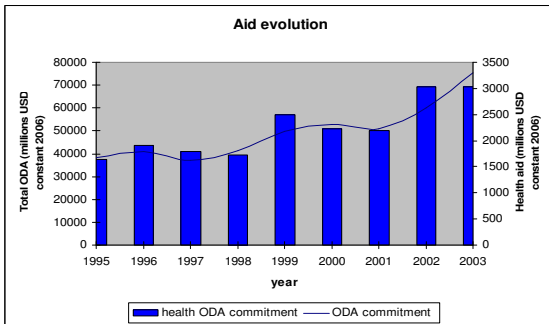
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Figure: Aid evolution



Source OCDE-CAD-CRS

- OLS estimation
- IV estimation for controlling endogeneity bias
- 3SLS estimation has many characteristics:
 - Decomposition of causality between direct impact and reverse causality
 - Endogeneity bias is corrected
 - Theoretical relationships between variables are taken into account
 - Limited to appropriate for cross-sectional or panel data. It requires huge programming
- Only pooled analysis.

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- Simultaneous equation gravity model:

- $MBD_{ij,t} = \alpha_0 + \beta_1 Y_{i,t} + \beta_2 Healthaid_{ij,t} + \beta_3 X_{mbd,t} + u_{ij,t}$

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- $Y_{i,t}$ = common variables which appear into both equations : GDP per capita, Population, distance, colony, contiguity, langue commune, ICRG Political risk.
- $X_{mbd,t}$: Physicians per 1000-d and Pop65-d.
- $X_{h,t}$ = the ICRG economic and financial index and finally the budget of the donors.

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Table: OLS and IV Estimation - Direct Impact

	(1) OLS physician-mig	(2) 2SLS physician-mig	(3) 2SLS health-aid
gdp _{it}	-0.42024 (0.05341)***	-1.00917 (0.15395)***	-0.30583 (0.08065)***
gdp _{it}	-0.48422 (0.27849)*	2.8195 (0.89208)***	1.45669 (0.43473)***
pop _{it}	-0.48999 (0.02632)***	-0.2325 (0.07284)***	0.44876 (0.06460)***
pop _{it}	0.64571 (0.03011)***	1.17032 (0.12580)***	-0.62479 (0.18179)***
dist	-0.38044 (0.06379)***	-0.3723 (0.12845)***	0.17938 (0.09608)*
common language	1.48927 (0.10225)***	1.4983 (0.18616)***	-0.57063 (0.23536)**
colony	1.32781 (0.15156)***	3.40958 (0.53071)***	0.99299 (0.23526)***
politic	-0.51446 (0.21415)**	-0.2546 (0.41904)	0.58362 (0.32287)*
physicians1000 _{it}	0.32906 (0.16764)**	-0.68048 (0.36330)*	
pop65 _{it}	-4.44184 (0.37354)***	-4.47486 (0.70369)***	
economic			-0.61382 (0.29718)**
financial			0.45702 (0.30837)
budget			1.00668 (0.14982)***
health-aid	0.05107 (0.01619)***	-1.15972 (0.25667)***	
physician-mig			0.47777 (0.11738)***
Constant	15.73766 (3.60605)***	-27.9888 (11.90340)**	-18.44178 (5.37710)***
Observations	2179	2179	2179
R-squared	0.56	0.81	0.25
endogeneous variable		healthcst	physician-mig
instruments		economic financial budget	physicians1000 _{it} pop65 _{it}
F-Test		10.33***	66.25***
Hansen test		0.9304	0.8748

Table: 3SLS Estimation - Direct Impact

	(1) 3SLS physician-mig	(2) 3SLS health-aid	(3) 3SLS physician-mig	(4) 3SLS health-aid
gdp _o	-1.0038 (0.14501)***	-0.31317 (0.07856)***	-1.27031 (0.17196)***	-0.33963 (0.07649)***
gdp _d	2.77765 (0.79080)***	1.44538 (0.39727)***	3.08218 (0.88900)***	1.62037 (0.37992)***
pop _o	-0.23482 (0.06725)***	0.44411 (0.06185)***	-0.12458 (0.07892)	0.4062 (0.05916)***
pop _d	1.16466 (0.11468)***	-0.62509 (0.16780)***	1.21248 (0.12947)***	-0.51403 (0.15689)***
dist	-0.37113 (0.12258)***	0.18343 (0.08893)**	-0.32913 (0.14282)**	0.16229 (0.08662)*
contiguity			4.756 (1.60616)***	-0.28233 (1.02346)
common language	1.49638 (0.19042)***	-0.57257 (0.23915)**	1.57596 (0.21978)***	-0.41719 (0.22576)*
colony	3.39864 (0.48934)***	0.99258 (0.22987)***	4.36577 (0.58777)***	1.10114 (0.22155)***
politic	-0.25573 (0.41777)	0.54764 (0.31814)*	-0.19552 (0.48533)	0.50897 (0.30880)*
physicians1000 _d	-0.64214 (0.30270)**		-1.16721 (0.33740)***	
pop65 _d	-4.52228 (0.62786)***		-3.8987 (0.67965)***	
health-exp _d			2.03727 (0.48557)***	
economic		-0.58835 (0.27005)**		-0.48639 (0.23418)**
financial		0.54231 (0.26103)**		0.42181 (0.22450)*
budget		1.00599 (0.13730)***		0.93642 (0.13140)***
health-aid	-1.1483 (0.23322)***		-1.65668 (0.27535)***	
physician-mig		0.47817 (0.11163)***		0.39279 (0.10363)***
Constant	-27.37493 (10.30506)***	-18.44866 (4.92912)***	-37.92488 (11.35439)***	-20.93793 (4.67195)***
Observations	2179	2179	2179	2179

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- Health aid is distributed to regions where the emigration rate is high.

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- $\sum_{j=1}^{16} (M_{ij,t}) = \alpha_0 + \beta_1 Y_{i,t} + \beta_2 \text{Death} - \text{rate}_{i,t} + u_{i,t}$

- Death-

$$\text{rate}_{i,t} = \alpha_0 + \beta_1 Y_{i,t} + \beta_2 \sum_{j=1}^{16} \text{Healthaid}_{ij,t} + \beta_3 X_{z,t} + u_{i,t}$$

- $\sum_{j=1}^{16} \text{Healthaid}_{ij,t} = \alpha_0 + \beta_1 Y_{i,t} + \beta_2 X_{h,t} + u_{i,t}$

où

- $\sum_{j=1}^{16} (M_{ij,t})$ is the emigration rate of physicians whatever the destination countries.

$\sum_{j=1}^{16} \text{Healthaid}_{ij,t}$ is the health aid received by recipient countries whatever the donors.

$\text{Death} - \text{rate}_{i,t}$ is the death rate crude per 1000 people.

$X_{z,t}$ exclusions variables of death rate: ICRG financial risk and tuberculosis prevalence rate.

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Table: 3SLS Estimation - Indirect Impact

	(1)	(2)	(3)
	physicians-mig-tot	death-rate	health-aid-tot
gdp	0.15228 (0.19716)	-0.25169 (0.03097)***	-0.6908 (0.12243)***
pop	-0.04403 (0.05665)	-0.08819 (0.85624)	0.28061 (0.07017)***
politic	-0.91345 (0.58604)	-0.13389 (0.11041)	0.64258 (0.54417)
death-rate	0.78117 (0.42730)*		
health-aid-tot		-0.04164 (0.01579)***	
tuberculosis		0.22049 (0.01946)***	
financial		-0.3168 (0.10836)***	
budget-gbr			0.30224 (0.04213)***
budget-fra			0.21935 (0.05002)***
Constant	-1.78727 (4.12390)	4.87912 (0.45072)***	-1.03778 (2.30844)
Observations	357	357	357

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Thank you for your
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