

Migration, Foreign Direct Investment and Vulnerability: Panel-Based Evidence

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- Economic vulnerability (EV) in small island developing states (SIDS) is mainly caused by weak economic structure, vulnerable natural resource structure and spill overs from external community
- EV can be mitigated through multiple efforts, one of which is migration stock development.
- Increasing concentration of economic activities, physical infrastructure and greater population densities exacerbates vulnerability of SIDS to hazards

- In this perspective, labour migration and its associated remittances inflow become a double-edged sword, on the one hand, they can lessen vulnerability through reduced risk of social instability like protests and violence by reducing the demand for public services
- According to altruism hypothesis, individual and families migrate to spread household risk and protect household against unexpected changes in income due to natural disasters and/or economic shocks.
- On the other hand, labour migration can make the country more vulnerable by causing the loss of highly skilled workers and affect food supply, create dependency, unsecure income source.

- However, migration stock's mitigation effect on EV may be subject to changes in macroeconomic environment such as the development of foreign investment
- Foreign direct investment (FDI), acting as a source of foreign reserve and capital input, on one hand helps promote economic development and on the other hand may cause more EV due to its property of being an external source of fund
- Foreign investment's role as a source of foreign reserve may substitute that of migration stock, given the limited capacity of absorption of a SIDS

- On the other hand, more FDI being directed to strengthen economic structure would provide a better environment for migration stock's role in mitigating EV.
- This hypothesis is tested in a threshold model in the current study, and it is found that migration stock's mitigation effect on EV is less at a higher level of migration stock respect to FDI in 32 SIDS over 2002-2018

Aim

- Examine factors that contribute to economic vulnerability in SIDS
- More specifically to examine the effects of FDI and Migration on Economic vulnerability in SIDS

In this study, Economic vulnerability index, composed of shocks (scale and possibility of natural or external shocks) and exposure (structural exposure to those shocks), is a weighted average index of population, export concentration, agriculture, forestry and fisheries, natural disasters, and exports of goods and services.

Methodology

The model is settled with the following fixed-effects structure:

• $ev_{it} = \alpha_{0i} + \alpha_1 mig_{it} + \alpha_2 f di_{it} + \alpha_3 mig_{it} \times f di_{it} + \alpha_4 g ni_{it} + e_{it}$

Variable	Data Source
$ev_{i,t}$ is the economic vulnerability index (measured out of 100)	FERDI. (
$mig_{i,t}$ natural logarithmic migration stock,	United Nations Department of Economic and Social Affairs.
(<i>fdi_{i,t}</i>) Foreign Direct Investment	World Bank's World Development Indicators database.
GNI – Gross National Income	World Bank's World Development Indicators database.

To test our proposed hypothesis that the effect of migration on economic vulnerability is subject to changes in FDI, a fixed-effect panel threshold model is further adopted as follows:

$$\begin{cases} ev_{it} = \beta_{0i} + \beta_1^{lower} mig_{it} + \beta_2^{lower} gni_{it} + u_{it}, & mig_{it} < \gamma \\ ev_{it} = \beta_{0i} + \beta_1^{upper} mig_{it} + \beta_2^{upper} gni_{it} + u_{it}, & mig_{it} \ge \gamma \end{cases}$$
(2)

• where mig_{it} is the proposed threshold variable, and γ is the proposed single threshold level.

Data description

The current study utilizes the data on 32 small island developing countries over the period 2002-2018,

Country	Country	Country
Antigua and Barbuda	Grenada	Solomon Islands
Bahrain	Guyana	Sao Tome and Principe
Bahamas	Haiti	Suriname
Belize	Jamaica	Seychelles
Barbados	Kiribati	Tonga
Comoros	Saint Kitts and Nevis	Trinidad and Tobago
Cape Verde	Saint Lucia	Τυναίυ
Dominica	Maldives	Saint Vincent and the Grenadines
Dominican Republic	Mauritius	Vanuatu
Fiji	Papua New Guinea	Samoa
SGP	Singapore	

Results

• Trends of economic vulnerability index over 2002-2018





Trends of migration stock (natural logarithm) over 2002-2018



Graphs by country

Trends of FDI inflows to GDP ratio over 2002-2018





year

. Trends of real gross national income (natural logarithm) over 2002-2018





year

. Scatter diagram between migration stock (natural logarithm) and FDI ratio



Unit Root Test

- Karavias and Tzavalis (2014) panel unit root test is used to test for the null hypothesis that all panel time series are unit root processes
- The null hypothesis is not rejected for all series at level but rejected in their first differences, leading to the conclusion that all series are integrated of order one.

Variable	minZ-stat	p-value	Variable	minZ-stat	p-value
$ev_{i,t}$	-1.4734	0.4700	$\Delta e v_{i,t}$	-18.6971	0.0000
mig _{i,t}	-2.0168	0.4048	$\Delta mig_{i,t}$	-1.8595	0.0315
gni _{i,t}	-0.0002	0.6700	$\Delta gni_{i,t}$	-0.2288	0.0300
fdi _{i,t}	-1.1057	0.1344	$\Delta f di_{i,t}$	-10.8365	0.0000

Panel unit root tests

Cointegration Test

Kao (1999), Pedroni (1999, 2004), and Westerlund (2005) tests employed to test for the null hypothesis of no panel cointegration.

Panel cointegration tests

Test	stat	p-value	Test	stat	p-value
Kao (1999) tests			Pedroni (1999, 2004) tests		
Dickey-Fullert	-1.6766	0.0468	Modified Phillips-Perron t	3.8960	0.0000
Modified D-F t	-0.3330	0.3696	Phillips-Perron t	-2.0077	0.0223
Augmented D-F t	-1.3131	0.0946	Augmented D-F t	-1.4040	0.0802
Unadjusted modified D-F t	-0.4814	0.3151	Westerlund (2005) test		
Unadjusted D-F t	-1.7744	0.0380	Variance ratio	1.9264	0.0270

Cross-Sectional Independence

Frees (1995, 2004), Friedman (1937) and Pesaran (2004) tests.

Test	stat	5% critical value	p-value
Frees (1995)	5.030	0.1996	
Friedman (1937)	19.635		0.9433
Pesaran (2004)	0.168		0.8665

Table 5. Regressions of economic vulnerability $ev_{i,t}$

Variables	(1)	(2)	(3)	(4)	(5)
$gni_{i,t}$	-5.24***	-3.68***	-7.24***	-4.82***	-3.93***
	(-4.76)	(-2.98)	(-5.14)	(-4.76)	(-2.81)
$mig_{i,t}$	-3.38*	-3.94**	-4.15	-3.40**	-2.69
	(-1.93)	(-2.09)	(-1.54)	(-2.16)	(-1.30)
$f di_{i,t}$	-				
$mig_{i,t} imes fdi_{i,t}$					
_cat#c.fdi _{i,t}					
0	-1.89***	-2.26***	-3.25***	-1.79***	-2.02***
	(-4.28)	(-4.44)	(-5.00)	(-4.53)	(-4.18)
1	07***	11***	05	04**	07***
	(-2.68)	(-3.00)	(-1.49)	(-1.85)	(-2.53)
constant	194.7***	168.1***	247.0***	184.2***	158.1***
	(12.03)	(8.54)	(12.92)	(12.35)	(8.25)
γ	7.8153	7.7017	7.6073	7.9133	7.7017
Sigma_u	9.7940	9.8882	13.2074	8.0262	8.8894
Sigma_e	2.9056	3.0262	3.0133	2.6006	2.8710
rho	.9191	.9143	.9505	.9049	.9055
Sample	All continents	Exc. Africa	Exc. North & Central America	Exc. South America	Exc. Pacific
# countries	32	26	19	30	24
Ν	544	442	323	510	408
R ² (between)	0.5257	0.5218	0.4822	0.6522	0.3127

- that findings are consistent to a large degree across different regressions. According to Columns (1)-(5), GNI plays a significant role, both statistically and quantitatively, in reducing economic vulnerability in the sample SIDS. Migration stock's mitigation effects are significant in most regressions.
- Larger magnitudes of migration stock are found when natural logarithmic migration stock is below the estimated threshold level
- Such effects are found highly significant in all FETH regressions.

- This suggests that at the lower levels of migration stock, FDI has been directed more towards strengthening economic structure, and hence migration stock is more significant in stabilizing household livelihood and contributes more to mitigate economic vulnerability
- For migration stock higher than the estimated threshold level, magnitudes of migration stock's effects are smaller but remain statistically significant in SIDS of most continents. Such effects are found highly significant in all FETH regressions.
- This suggests that at higher levels of migration stock, FDI is less directed towards building resilience capacity, and as a result it will ease economic vulnerability less and hence migration stock's mitigation effect on economic vulnerability diminishes.

Implications

Migration

- Findings imply that worker migration can lessen the effects of internal exogenous shocks, e.g. Sea level rise, and external ones which are crisis and sudden short-term disturbances.
- Migration can provide opportunities to nationals in SIDS to improve the welfare of their families and relatives back home.. Thus migration reduces vulnerability of households and economies to exogenous shocks (Howell, 2017).
- In absence of migration opportunity, families could have been trapped in location where food security and opportunities to make a liveable income are scarce (Bharadwaj et al., 2021 and Silchenko and Murray2023).
 - The findings is similar to Bouoiyour, Selmi and Miftah (2016) who noted that remittance reduce economic volatility in case of Marocco. Chami et al (2008) and Bugamelli and Paterno (2009) also noted that remittances reduce growth volatility using cross-section of 70 and 60 countries respectively.

Foreign Direct Investment (FDI)

- SIDS (Small Island Developing States) are increasingly relying on Foreign Direct Investment (FDI) in industries such as mineral, petroleum, tourism, finance, and utilities. However, studies suggest that over-concentration of FDI in few industries can amplify inequality and contribute to economic vulnerability (Suane and Roca-Sagales, 2015; Wu and Hsu, 2012). This is because FDI can lead to dumping of outdated technologies, over-exploitation of natural resources with little local valueadded production, and increased dependence on the global economy (Nguyen and Le, 2021).
- Moreover, multinationals may prioritize profit over local ecology, leading to ecological vulnerability and socio-economic exposure (Gibson, Ostrom and Ahn, 2000; Siegel et al., 2019). The increasing acquisition of houses and properties by foreigners in SIDS has also led to rising housing prices and social tensions (CEPAL, 2000). Thus, the reliance on FDI in SIDS may have adverse effects on economic vulnerability, inequality, and social dynamics (Adams and Klobodu, 2017; UNCTADSTAT, 2016; Alvarado, Iniguez and Ponce, 2017; Beckfield, 2006; Rash, 2017; Ryder, 2017; Kentor, 2001).

Conclusion & Policy suggestion

- our findings reveal that migration can reduce economic vulnerability in SIDS, while FDI may increase economic vulnerability.
- Our research suggests that worker migration can help mitigate the effects of internal and external shocks, such as sea level rise and crises. During the COVID-19 pandemic, remittance flows to SIDS significantly increased.
- However, the productive structure of SIDS indicates that FDI focused on natural resource extraction can contribute to economic volatility and limit technological absorption capacity for productive linkages.

Policy Suggestion

- Therefore, we recommend that SIDS continue to invest in human capital to mitigate any negative effects of migration and labor shortages.
- Additionally, governments should consider redirecting FDI towards high valueadded sectors such as manufacturing, ICT, and food processing, and prioritize more sustainable projects such as eco-tourism and inclusive development initiatives for the society.

Thank you