

Connecting the Dots: Using Social Network Analysis to Untangle the Factors Driving International Migration



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Abstract

- Numerous case studies have analyzed the factors that cause people to move between specific countries or within certain regions of the world
- Empirical research has yet to consider whether theories of international migration can be generalized to a global scale
- Applying techniques from social network analysis represents a unique perspective for analyzing patterns of migration
- I apply methods from statistical network analysis to test several theories of international migration simultaneously
- I find evidence for several macro-level theories of migration, as well as evidence that international migration is a complex, hierarchical structure

Why Do People Move?

- Several social, economic, and demographic theories have been developed to explain why people move such as neoclassical economics, new economics of labor, segmented labor markets, world systems, social capital theories [1,2,3]
- Most previous work that considers why people move focuses on unidirectional streams of migration [3]
- Value in considering what causes people to move at a global scale:
 - Many theories are inherently focused on macro-level contexts
 - Can help us make predictions about where future flows will develop and inform policy makers

By conceptualizing patterns of international migration from 2010 to 2015 as a social network, do we find evidence for the generalizability of several classic migration theories?

Patterns of International Migration from 2010-2015



Edges represent migration flows from 2010 to 2015. Edges are weighted and shaded according to the number of migrants taking each path. For the purpose of visualization, only flows of 1,000 or more migrants are plotted.

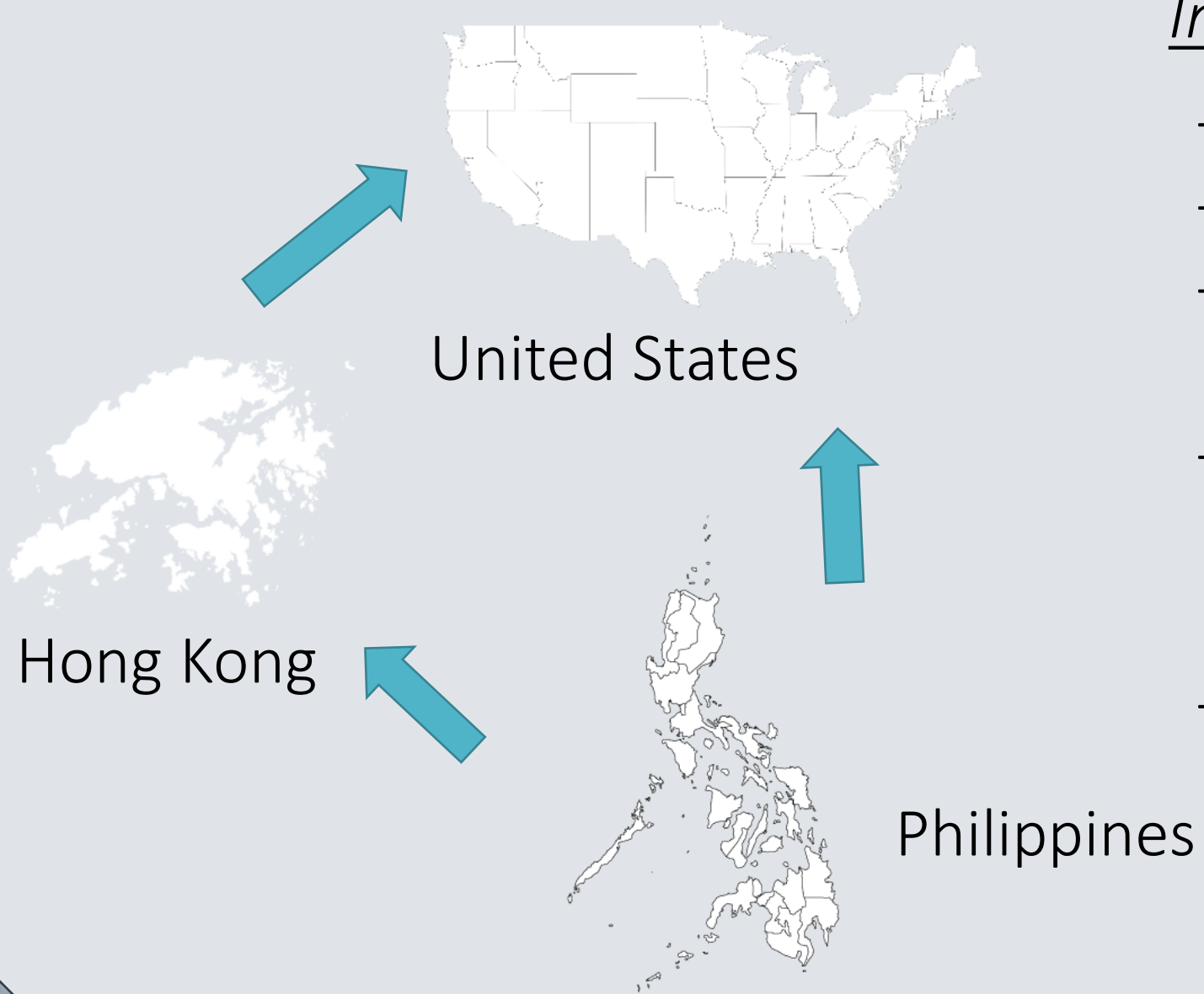
Valued ERGM Results

Structural Processes	b	S.E.	
Sum	-1.715	(0.060)	***
Nonzero	-3.28	(0.064)	***
Transitivity	1.429	(0.067)	***
Reciprocity	-0.142	(0.058)	*
Economic Factors			
Difference in GDP	0.016	(0.001)	***
Sender GDP	0.018	(0.001)	***
Sender Inflation	-0.002	(0.003)	
Receiver Employment Growth	-0.006	(0.007)	
Social Factors			
Remittances	0.0002	(0.0001)	*
Previous Migrants	0.0008	(0.0002)	***
Global Factors			
Sender Foreign Investment	-0.003	(0.002)	*
Colonial History	0.802	(0.100)	***
Environmental Factors			
Sender Experienced Disaster	-0.008	(0.007)	
Sender Change in Agriculture	0.001	(0.005)	
Attribute-Based Controls			
Distance	0.255	(0.083)	**
Shared Border	-0.068	(0.005)	***
Receiver Population	0.453	(0.100)	***

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, $n = 173$ countries, includes additional controls for language homophily

A Social Network Perspective

- International migration is a highly interconnected social system where many countries operate as senders and receivers, simultaneously
- When studying this process, the focus should be on the streams of migrants connecting countries, rather than the individual countries themselves



International migration as a weighted social network:

- Countries as **nodes**
- Migration flows as **edges**
- **Weights** are values assigned to each tie that represent the number of migrants
- A social networks perspective enables us to account for the interdependence of different migration streams
- We can also account for process that are endogenous to the network:
 - **Reciprocity**: The tendency for mutual edges to connect pairs of nodes
 - **Transitivity**: The tendency to be “friends with your friends’ friends,” resonates with the notion of step-wise migration [4]

Example of Transitivity in International Migration

Data

- **Migration flows**: 2015 United Nations Population Division data on migrant stock in 232 countries from 2010-15
 - Estimate iterative proportional fitting algorithms (with birth, death rates) [5]
 - Divide flow by sender’s population
- **Independent variables**: World Bank World Development Indicators Dataset, World Bank’s 2016 Migration and Remittances Fact Book, Ethnologue Dataset, and others

Methods

- Exponential Random Graph Models (ERGMs) for weighted network data [6]
- ERGMs compared the dyadic, or pairwise, patterns observed in the actual network to what would be expected by random chance, while controlling for all included parameters
- Focus is on the migration stream, not the individual country

Descriptive Results

	Mean	Min	Max
<i>Dyad-Level</i>			
2010-2015 Migrant Flow	916.1 (15042.5)	0	1,518,110
Migrant Stock	5,302.3 (84,743.4)	0	11,566,960
Remittances (millions, USD)	11.2 (205.92)	0	21,693
<i>Individual-Level</i>			
GDP per capita (USD)	12,780.2 (17,891.2)	89	104,772
Unemployment Rate (%)	8.6 (6.1)	0.4	32.0
Employment Growth (%)	0.1 (2.6)	-5.3	30.4
Inflation Rate of Change (%)	0.3 (4.3)	-34.2	10.8
Foreign Investment (% GDP)	1.2 (8.7)	-18.9	88.9
<i>Independent variables measured at 2010. Dyad-level measures based on 29,756 migration flows and individual-level based on 173 countries</i>			

Discussion

- Applying a social networks perspective to international migration patterns enables us to test the generalizability of migration theories
- Represents a promising avenue for studying macro-level perspectives
- International migration is defined by transitivity and an aversion to reciprocity.
- The system of international migration should be understood as a complex, hierarchical structure of ranked destinations
- Several economic and social factors are associated with migration flows
 - Strongest support for social capital and neoclassical economics

References

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