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## Discussion\*

# Learning Externalities in Opaque Asset Markets: Evidence from International Commercial Real Estate

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# Outline

- Motivation & Idea
- Main results
- Methodology & Data
- Discussion



# Motivation & Idea

- The international commercial real estate **market** (ICREM) is **big** ( $\approx 18\%$  of world GDP global stock in 2014).
- **Opaque and illiquid** (OTC) market with limited transparency (efficient prices are unobservable).
- Business and banking linked to international commercial real estate of the **credit and collateral channel**.
- Evidence of **co-movement** of property values and investment behaviour of firms.

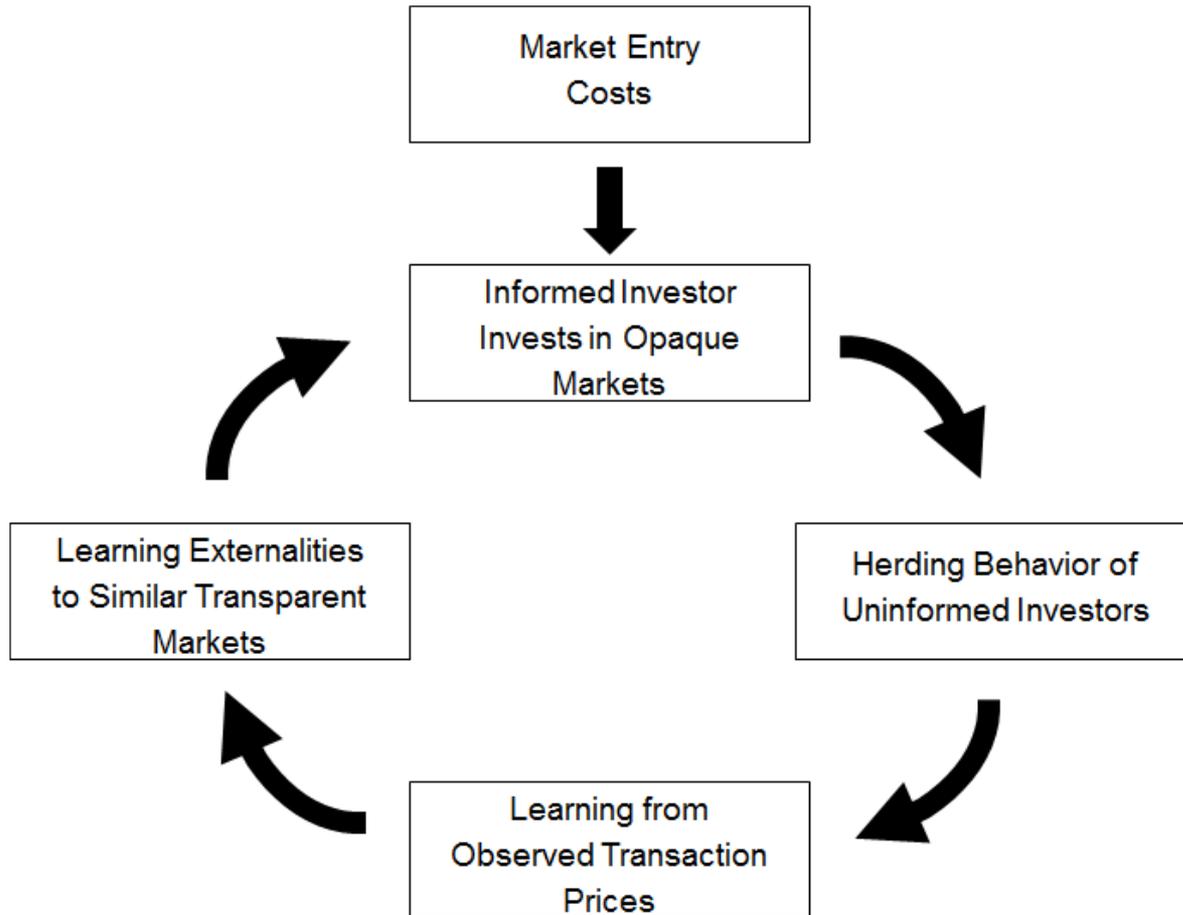


# Motivation & Idea II

- ICREM as a laboratory to **measure spill-overs** in an opaque market (not easy).
- **Transparency differentials** between markets as transmission channel (trading friction, inefficient allocation of capital).
- Spill-overs associated with **herding behaviour** and market co-movements (loss of risk diversification benefits).
- Estimations: **Spatial lag model** with non-linear cross-sectional dependency term (spill-overs).
- **Micro foundation**: Local interaction game of informed and un-informed investors in the face of limited transparency, leading to learning externalities.



# Micro-foundation: Learning externalities in opaque markets



# Main results

- **Spill-overs matter**: spatial lag term strongly positive and significant related with excess returns in ICREM.
- Cross-dependencies enhance the description of excess returns.
- Meaning: higher expected returns in one market, imply higher returns in connected markets (co-movement, ...).
- **Results consistent for multiple “transparency measures”** (other than ICREM-related).
- Results point to the **importance of market opacity** for the formation of price bubbles.
- Policy recommendation: **establishment of international transparency standards** in ICREM.



# Methodology & Data: Model

- Spatial lag model for excess returns in ICREM

$$Y_t = \lambda W Y_t + X_t \beta + \epsilon_t$$

**W: spill-over/coupling matrix**, given by transparency differentials between markets.

- Solution: 
$$Y_t = (I_n - \lambda W)^{-1} (X_t \beta + \epsilon_t)$$

- Non-linear feedback loops:

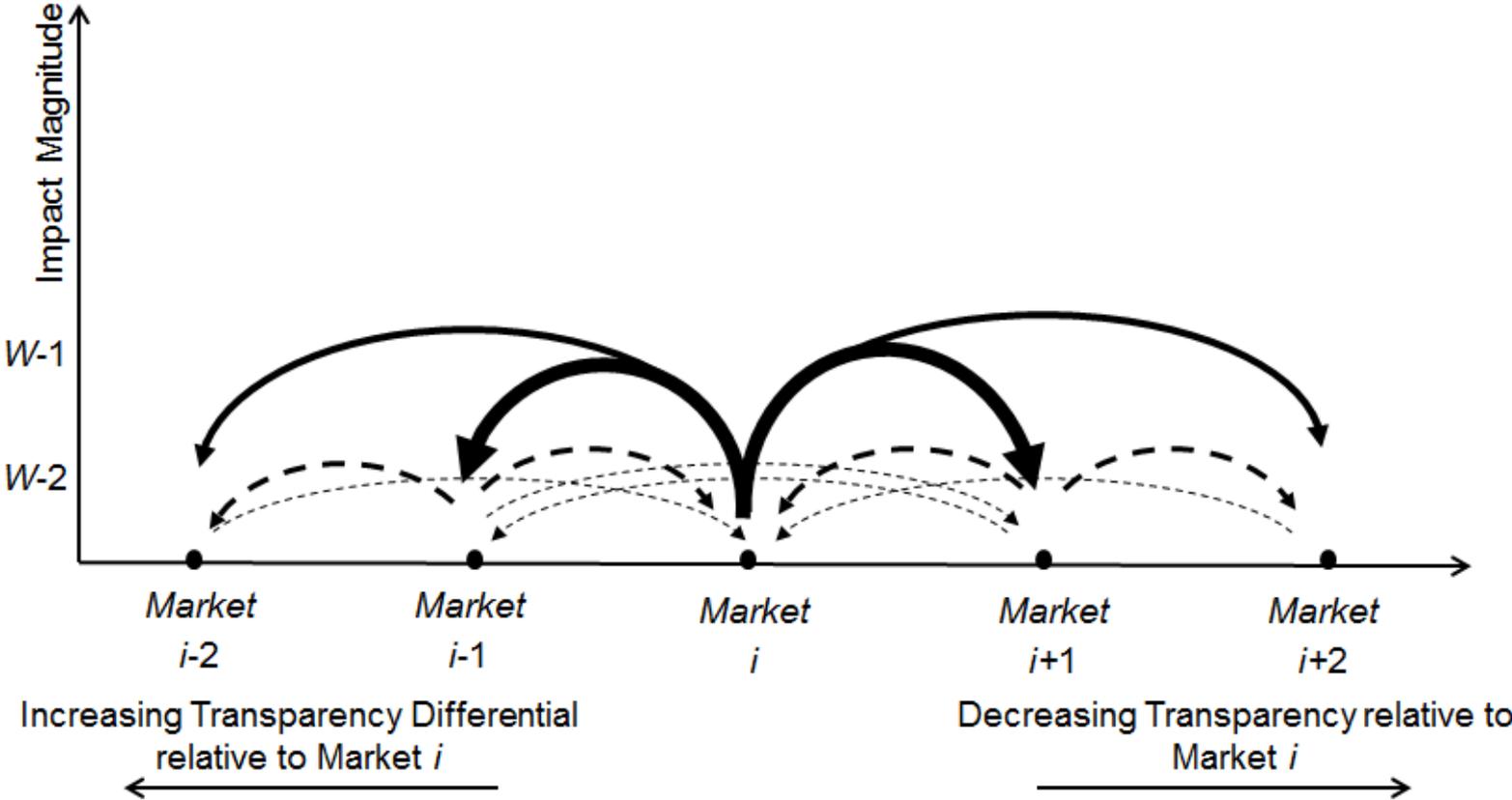
$$(I_n - \lambda W)^{-1} = I_n + (\lambda W) + (\lambda W)^2 + (\lambda W)^3 + \dots$$

Similar to **feedback centralities in complex networks** (eigenvector centrality, Katz centrality, pageRank, ...)

( $Y$ : return,  $W$ : weighting matrix,  $X$ : covariates  $\epsilon$ : error term,  $\lambda, \beta$ : coefficients  $I$ : identity matrix,  $t$ : time index)



# Spill-over effects and feedback loops via transparency differentials



# Methodology & Data II: Procedure

- Estimation techniques: Generalised method of moments (GMM), non-linear least squares (NLS), 2-stage least squares (2SLS).
- Fixed effects, tests, alternative specifications, data comparisons, etc.
- Impulse response simulations.
- Controls:
  - Country-specific fundamentals (stock market, consumption, unemployment, etc.).
  - Global risk factors (stock market, consumption, liquidity, credit risk, etc.).
- Robustness checks:
  - Alternative weighting matrices.
  - Sector specific heterogeneity (offices, industry, retail).
  - Alternative property market transparency dataset.



# Methodology & Data III: Main data (much more)

- **26 countries** (city level).
- **3 sectors:** industry, retail, offices.
- **Sources:** Property Market Analysis (PMA, 2001-2013), Investment Property Databank (IPD, 1998-2013).
- **Property market excess returns:** Difference to annualised US three-month Treasury Bill.
  
- **Weighting matrix:** Global Commercial Real Estate Index (JLL). Composite index accounting for information and performance measurement, market fundamentals, governance, legal framework, fairness and efficiency in transaction processes.



# Discussion I: General

- **Micro-foundation plausible, but not well-grounded:** learning externality is a possible, but not a necessary conclusion.
- **Symmetry of spill-overs:** One can always return to any more transparent market (safe haven).
- Construction of **weighting matrix not clear:** index “continuous or discrete” (semi-transparent, transparent, highly-transparent).
- Returns measured in **local currency** (isolation from the impact of common exchange rate movement), but **only one risk-free rate**.
- Some common **systemic risk factors equally good** in describing spill-overs?
- Narrative highly **repetitive**, but descriptions not always clear.
- **Descriptive** statistics missing.



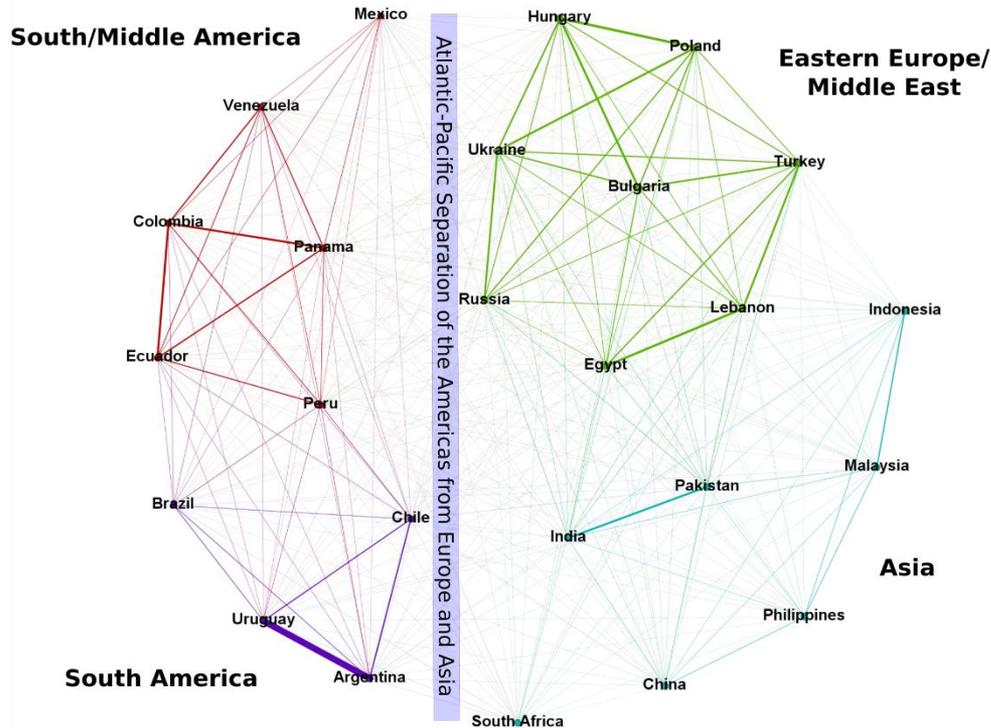
## Discussion II: Economic weighting matrices

- **Exclusion of economic weighting/distance matrices** (endogeneity).
- **Geographical distance insignificant** for spill-overs (seems not plausible), especially as cultural proximity matters.
- But, it has been shown that **geographical and economic proximity matter** for spill-overs (Baldacci et al, IMF WP/11/221, 2011).

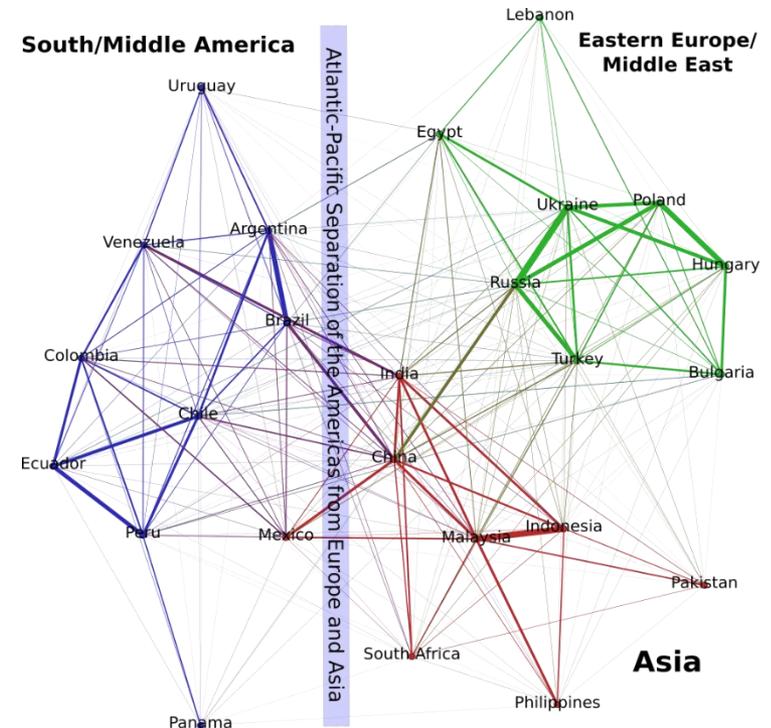


# Discussion III: Distance, international trade ...

## Inverse distance



## Int'l trade



Both networks have **similar organisational structure** in terms of communities and their separation.



## Discussion IV: ... and spill-overs.

Regressing spread correlations on geo-distance, trade and investment for short-, medium-, long-range and feedback measures on networks (centralities), where **feedback centralities are conceptually similar to spatial lags**, shows that

- Longer-range and feedbacks matter
- Distance is an important proxy for economic interconnectedness.

Y	centrality	N obs	b1 (trade)	p1	b2 (investment)	p2	b3 (distance)	p3	Rsquared adj
spreads	strength	263	0.278	0	0.054	0.026	0.469	0	0.524
spreads	cluster	263	0.1	0.113	-0.148	0	0.8	0	0.626
spreads	closeness	263	0.01	0.915	0.173	0	0.702	0	0.599
<b>spreads</b>	<b>pageRank</b>	<b>263</b>	<b>0.246</b>	<b>0</b>	<b>0.024</b>	<b>0.413</b>	<b>0.579</b>	<b>0</b>	<b>0.741</b>



**Thanks a lot!**



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