Geography and Realty Prices: Evidence from International Transaction-Level Data

Hitotsubashi-RIETI International Workshop on Real Estate Market, Productivity, and Prices October 24, 2016 @RIETI

Daisuke Miyakawa (Hitotsubashi Uni.) Chihiro Shimizu (National Uni. of Singapore / Nihon Uni.) Iichiro Uesugi (Hitotsubashi Uni.)

1. Introduction

International money flow ⇒ Local real estate prices

- Global saving glut" (Bernanke 2005)
- "(F)oreigners snap up half of London's priciest dwellings, according to Savills, an estate agent." (The Economist April 2, 2016)

Mixed empirical results based on aggregated data

- Aizenman & Jinjarak (JUE 2009), Justiniano et al. (JIE 2014), Jordà et al. (NBER 2014)
- × Ferrero (JMCB 2014), Favilukis et al. (NBER 2013)

Disaggregated data?

Only a few...

• Badarinza & Ramadorai (WP 2015): Transmission through "proximity"

1. Introduction

Information asymmetry caused by geographical distance

□ Kurlat & Stroebel (*RFS* 2015)

- Focus on domestic real estate transactions (LA)
- Buyers who live in the same ZIP code or used to live in the same county as invested property obtain higher capital gains
- \rightarrow Indicating...
 - Information asymmetry resulted from distance matters for realty prices
 - "Experience" resolves the information asymmetry to some extent

Q. What if buyers are from foreign countries?

Q. Any impact of such foreign investment on local realty price?

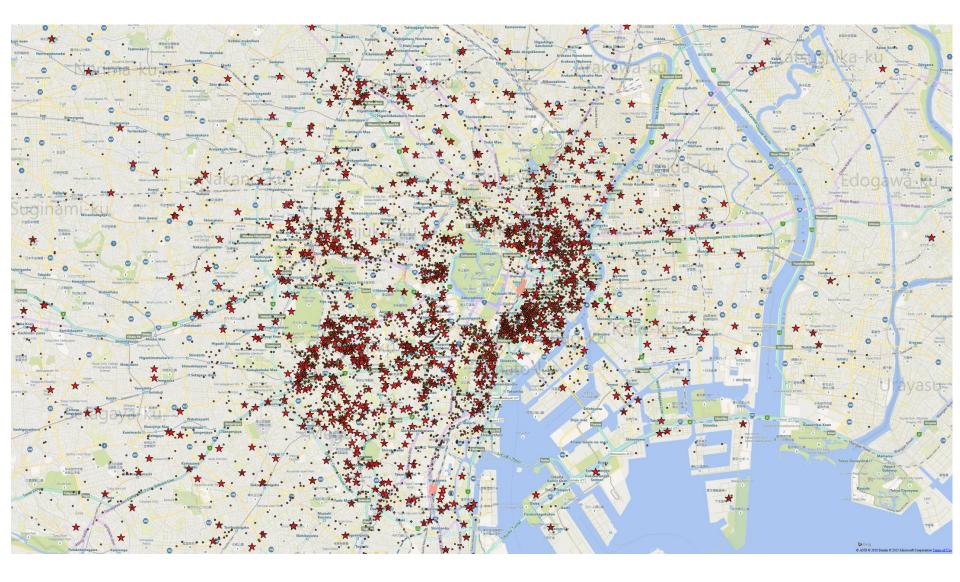
2. This paper

Using...

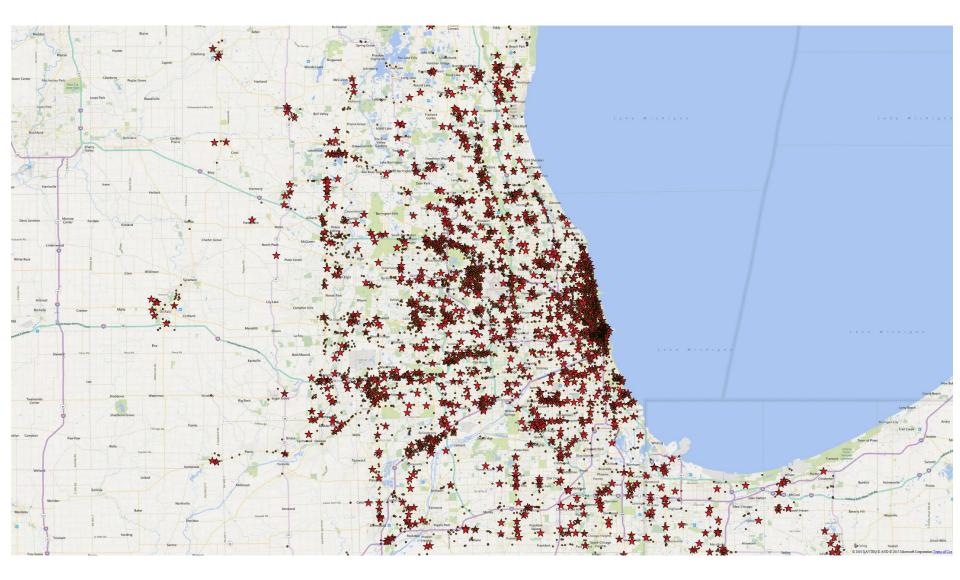
□ Transactions-level data from Real Capital Analytics Inc.

- About 30,000 transactions covering 8 countries/economy (i.e., AUS, CAN, FRA, HK, JPN, NED, UK, and US) for property location
- Covering more than 100 countries for investors' location
- We study...
 - □ With controlling for a comprehensive list of..
 - Property characteristics, investors' geographical characteristics, aggregate shock, and (in some specifications) property-fixed effect
 - How investors' geographical characteristics (esp. foreign buyer or not) are related to the property prices they pay
 - How the impact is interacted with investment experience
 Spillover to the prices of adjacent domestic transactions

<Tokyo: **★**Foreign, **•**Domestic>



<Chicago ★Foreign, •Domestic >



3. Key takeaways

- Foreigners pay significantly higher prices than domestic investors
 - □ Such a price difference↓ as foreign investors' experience↑
 - Robust to "matched-sample" estimation (i.e., geographically nearby or repeated sales)
 - ⇒ "<u>Overpricing</u>" by foreigners is observed when investors are <u>less informed</u> of local markets and <u>resolved</u> as experience↑
- Yet, the spillover effect from such overpricing to adjacent property prices paid by domestic investors is not significant
 - Not large difference b/w the prices paid by domestic investors (i) after foreigners' investment & (ii) before foreigners' investment
 - ⇒ <u>Support for</u> Ferrero (*JMCB* 2014), Favilukis et al. (*NBER* 2013)

4. Literature: Money flow and realty prices

Positive relationship

□ Aizenman and Jinjarak (*JUE* 2009)

- Aggregate-level data accounting for 43 countries over 1978 to 2008
- Current account deficits bring positive impacts on the realty prices
- □ Justiniano et al. (*JIE* 2014)
 - US house prices preceding the 2008-09 financial crisis
 - Foreign capital flows account for a sizable portion of price increase

Negative or no significant relationship

□ Favilukis et al. (NBER 2013)

• Impact associated with international money flow is limited

□ Ferrero (JMCB 2014)

- US and in several other countries
- Several domestic factors such as credit and preference are dominant

Our paper: Revisits this issue with disaggregated data

4. Literature: Distance & info-asymmetry

Information asymmetry b/w insiders & outsiders

□ Theory: Kurlat (ECMT 2016)

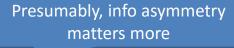
D Empirics-1: Kurlat & Stroebel (*RFS* 2015)

Realty transactions for LA county in the US

Geographical characteristics matter for stock investment Coval & Moskowitz (JPE 2001)

Empirics-2: Garmaise & Moskowitz (RFS 2004)

- Realty transaction data in U.S.
- Median distance b/w buyers & property becomes shorter as the dispersions of evaluated value and transaction prices become larger (result is less apparent for older property)



Our paper: Extends to international transactions

4. Literature: International realty transactions

- Badarinza & Ramadorai (WP 2015)
 - Housing transactions in the UK
 - UK Land Registry, Nationwide Building Society, and Office for National Statistics in UK (for resident information)
 - Time-series indexes of country-level economic and political risk measures
 - Exogenous shock in home country (i.e., outside of UK) is transmitted to the realty prices in the areas where many residents from the country are living

Our paper: Utilizes many pairs of buyer countries and the host counties where properties are located

5. <u>Data (i)</u>: <u>Data</u> overview

- Real Capital Analytics Inc. (New York, US) data
 - One of the most influential data vendors specialized in real estate investments and produces real estate price indices
 - □ Transaction-level data for the period 2005-2015

BRICs (+8,300 obs) also available...

- Original data we obtained from RCA cover 71,000 realty transactions in eight countries
 - Australia, Canada, France, Hong Kong, Japan, Netherlands, UK, and US

Data cover relatively large investment transactions

- Lower bound for transaction price about one million USD
- Focuses on the large cities: Amsterdam, Chicago, Kyoto, LA, London, New York, Osaka, Paris, San Francisco, Sydney, Tokyo, Toronto, and Vancouver 10

5. Data (ii-a): Variables

Information about the property

Transaction price measured in USD: LN_PriceUSD

Property's size measured by square feet: LN_Floor

Size of land where property is located: LN_Land

□ Age of the property: *Age*

Type of the property

• Eight dummy variables for property types: apartment, development site, hotel, industrial, office, other, retail, and seniors & care

Property type

5. Data (ii-b): Variables

Transaction-related information

Countries invested property locates: *Property location country*

Countries buyer locates: Buyer country

Countries seller locates: Seller country

⇒ 8 dummy variables for Property location country, and at most 102 dummy variables for Buyer country and Seller country

<Table 1>

Panel (c): Property location country Panel (a): Property type Percent Cum. Category Freq. Percent Cum. Category Freq. 568 1.97 1.97 Australia 10,352 35.83 35.83 Apartment Canada 393 1.36 3.33 Dev Site 36 50 0.17 France 180 0.62 3.95 Hotel 655 2.27 38.27 Hong Kong 0.21 4.16 62 Industrial 5,537 19.16 57.43 Japan 6,162 21.33 25.49 Office 7,021 24.3 81.73 Netherlands 26 0.09 25.58 Other 120 0.42 82.15 United Kingdom 274 0.95 26.53 Retail 4,966 17.19 99.34 Seniors Housing & Care 192 0.66 100 **United States** 21,228 73.47 100 Total 28,893 100 Total 28,893 100

Panel (b): Year

Tune				
	Category	Freq.	Percent	Cum.
	2005	1,719	5.95	5.95
	2006	2,308	7.99	13.94
	2007	2,817	9.75	23.69
	2008	1,867	6.46	30.15
	2009	1,164	4.03	34.18
	2010	1,832	6.34	40.52
	2011	2,282	7.9	48.42
	2012	3,283	11.36	59.78
	2013	3,771	13.05	72.83
	2014	4,409	15.26	88.09
	2015	3,441	11.91	100
	Total	28,893	100	

5. Data (ii-c): Variables

Investor-related information

Buyer/Seller capital type:

Detailed characteristics of investment funds

Corporate, developer/owner/operator, investment manager, REIT, etc.

⇔ May have an impact on bargaining power b/w buyer and seller and on their funding environment

<Table 1 cont'd>

Large part of the observation:

Buyer: Corporate, Seller: Developer/Owner/Operator

Panel ((e): Seller	capital type
---------	-------------	--------------

Panel (d): Buyer capital type				Panel (e): Seller capital type			
Category	Freq. I	Percent	Cum.	Category	Freq.	Percent	Cum.
<unknown></unknown>	533	1.84	1.84	<unknown></unknown>	710	2.46	2.46
Bank	191	0.66	2.51	Bank	726	2.51	4.97
Cooperative	1	C	2.51	CMBS	1	C	4.97
Corporate	1,563	5.41	7.92	Cooperative	2	0.01	4.98
Developer/Owner/Operator	16,819	58.21	66.13	Corporate	2,040	7.06	12.04
Educational	112	0.39	66.52	Developer/Owner/Operator	16,813	58.19	70.23
Equity Fund	1,611	5.58	72.09	Educational	40	0.14	70.37
Finance	281	0.97	73.07	Endowment	3	0.01	70.38
Government	151	0.52	73.59	Equity Fund	1,395	4.83	75.21
High Net Worth	548	1.9	75.49	Finance	602	2.08	77.29
Insurance	192	0.66	76.15	Government	157	0.54	77.84
Investment Manager	1,322	4.58	80.73	High Net Worth	669	2.32	80.15
Listed Funds	35	0.12		Insurance	245	0.85	81
Non Traded REIT	389	1.35	82.19	Investment Manager	1,766	6.11	87.11
Non-Profit	131	0.45	82.65	Listed Funds	36	0.12	87.24
Open-Ended Fund	103	0.36		Non Traded REIT	120	0.42	87.65
Other	23	0.08		Non-Profit	113	0.39	
Other/Unknown	2	0.01		Open-Ended Fund	116		
Pension Fund	106	0.37	83.46	Other	13		
REIT	3,613	12.5		Pension Fund	120		
Religious	34	0.12		REIT	1,723	5.96	94.87
REOC	1,066	3.69	99.77	Religious	61	0.21	95.08
Sovereign Wealth Fund	67	0.23	100	REOC	1,400	4.85	99.92
Total	28,893	100		Sovereign Wealth Fund	22	0.08	100
	- 7			Total	28,893	100	

5. Data (ii-d): Variables

Foreign_Buyer:

Taking value of one if the buyer's country and the country where the property is located are different

- INVACC:
 - Represents a buyer country's investment experience
 - Accumulated investment amount from the buyer's country to the country where the property is located
 - In each data point (monthly), country-level variable.
 - Information sharing within a country (Badarinza and Ramadorai 2015).
 - Divided by the total sum of investment amount from the buyer's country
- INV_OTHERS:

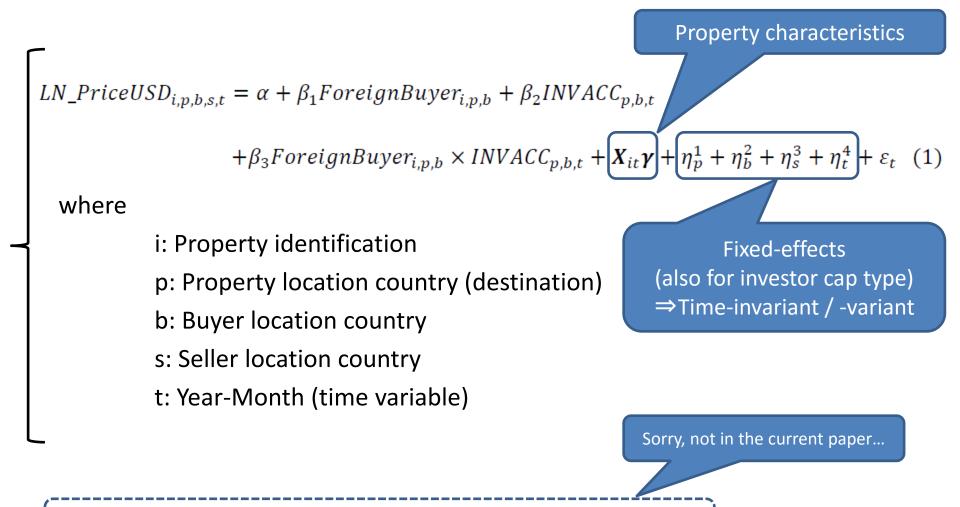
Accumulated investment amount from the countries except for the country of the buyer

<Table 2>

Variable	Definition of variables	Obs	Mean	Std. Dev.	Min	Max
LN_PriceUSD	Log of transaction price measured in USD	28893	16.03	1.21	0.00	21.41
INVACC	The ratio of (i) the accumulated investment amounts from buyer country to property location country until the previous month to (ii) the accumulated investment amounts from buyer country until the previous month	28893	0.78	0.18	0.00	1.00
ForeignBuyer	Dummy variable taking value of 1 if buyer country is different from property location country	28893	0.05	0.21	0	1
LN_Floor	Log of the property size measured by square feet	28893	10.54	1.20	-0.87	19.02
LN_Land	Log of the land size measured by acres	28893	-0.45	1.83	-13.09	13.76
Age	Property age measured as the difference between the year corresponding to each data point and recorded developed year	28893	42.78	31.83	-5	360
INV_OTHERS	Log of the flow investment amounts from all the countries other than the buyer country to property location country during the current month measured in USD	28893	19.82	0.97	13	23

6. Empirical Methodology

Panel estimation with multi-level fixed effects



We also run the model allowing time-variant β₁

7. Empirical results (i): Baseline

<u>Using only ForeignBuyer</u>

□ Significantly positive in all the specifications

- Foreign buyers tend to pay about 11% to 12% more than domestic buyers on average
- Using ForeignBuyer, INVACC, and its interaction

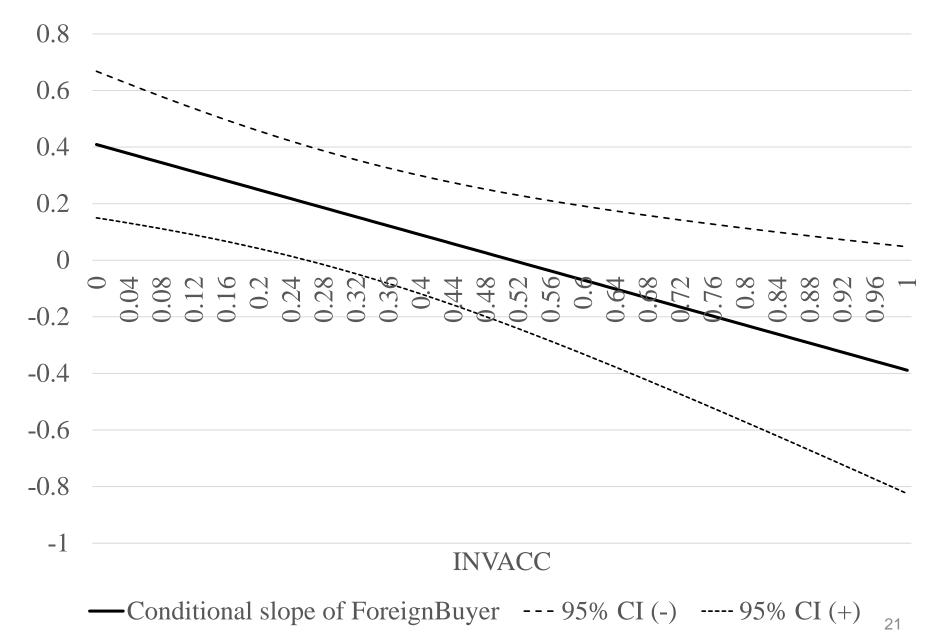
Coeffs on *ForeignBuyer* & *INVACC* still positive

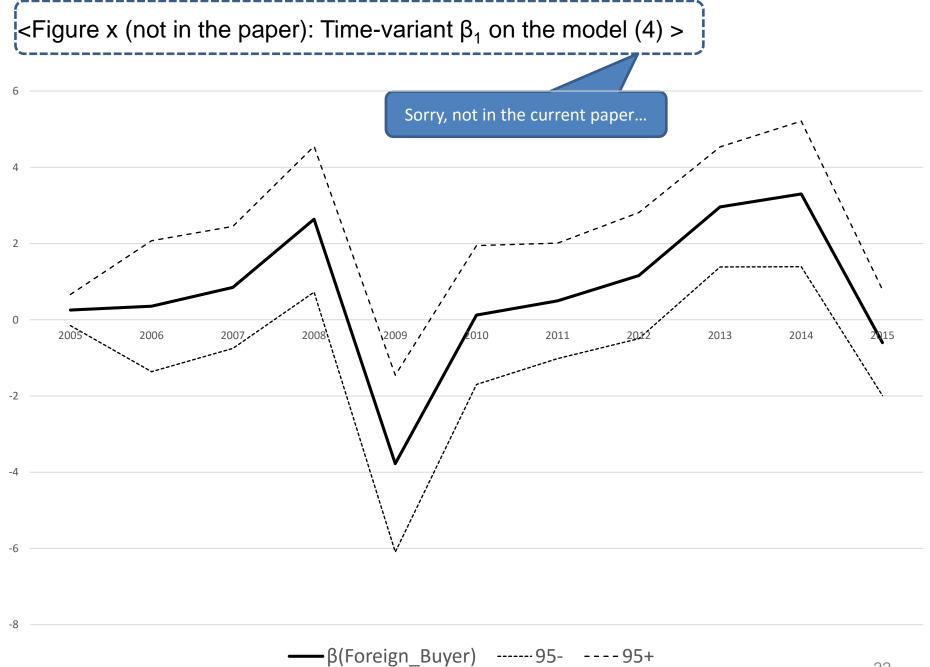
- The impact of foreign investment declines as investment experience of the foreign country in the host country increases
 - The impact is significantly positive over low INVACC
- Other variables have coefficients whose signs are mostly consistent with our priors

7. Empirical results (i): Baseline

Dependent vor		(1)		(2)		(3)	(4)		
Dependent var = LN_PriceUSD	Coef.	Robust Std. Err.							
<independent variables=""></independent>									
ForeignBuyer	0.122	0.038 ***	0.409	0.122 ***	0.110	0.038 ***	0.163	0.042 ***	
INVACC			0.325	0.145 **					
ForeignBuyer × INVACC			-0.798	0.260 ***			-0.835	0.246 ***	
LN_Floor	0.701	0.007 ***	0.701	0.007 ***	0.697	0.007 ***	0.696	0.008 ***	
LN_Land	-0.040	0.004 ***	-0.040	0.004 ***	-0.036	0.004 ***	-0.037	0.004 ***	
Age	-0.001	0.000 ***	-0.001	0.000 ***	-0.001	0.000 ***	-0.001	0.000 ***	
INV_OTHERS	0.016	0.005 ***	0.014	0.005 ***					
<fixed-effect></fixed-effect>									
Property type		yes		yes					
Year		yes		yes					
Property host country		yes		yes					
Buyer country		yes		yes					
Seller country		yes		yes					
Buyer capital type		yes		yes					
Seller capital type		yes		yes					
Property type \times Year						yes	yes		
Property host country×Year						yes		yes	
Buyer country×Year						yes		yes	
Seller country×Year						yes		yes	
Buyer capital type×Year					yes		yes		
Seller capital type×Year					yes		yes		
Constant term		yes		yes		yes		yes	
No. Obs.		28934		28893		29397		29090	
R-squared		0.70		0.70		0.73		0.73	
Root MSE		0.6623		0.6621		0.6389		0.6393 2	







7. Empirical results (ii): Robustness

Background

- Controlling for country fixed effects may not be enough
- Property fixed effects need to be precisely controlled for
- **U**We employ two methods:
 - i. For each property purchased by <u>domestic buyers</u>, matching <u>nearby</u> (no more than 1km or 500m) property purchased by foreign buyers
 - ii. Focusing on properties that are <u>repeatedly transacted</u> by both of domestic and foreign buyers (i.e., controlling for property fe)
- ⇒ <u>Results</u>

Qualitatively same as in the baseline with one exception
 Coefficient on *ForeignBuyer*: 500m < 100m < repeat sales

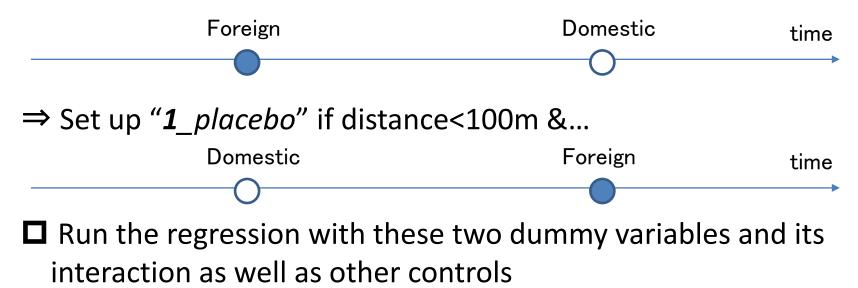
7. Empirical results (ii): Robustness

		(1)		(2)		(3)		(4)	
Dependent var	Matched samples					Repeat sales samples			
$=$ LN_PriceUSD	Dista	ince<500m	Dista	Distance<100m		with property-level fixed-effect			
	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.	
<independent variables=""></independent>									
ForeignBuyer	0.377	0.133 ***	0.645	0.237 ***	0.040	0.044	0.734	0.219 ***	
INVACC	0.308	0.158 *	0.666	0.283 **			0.842	0.262 ***	
ForeignBuyer×INVACC	-0.881	0.268 ***	-0.863	0.355 **			-1.037	0.292 ***	
LN_Floor	0.711	0.009 ***	0.773	0.013 ***					
LN_Land	-0.036	0.005 ***	-0.043	0.011 ***					
Age	-0.001	0.000 ***	0.000	0.000	-0.003	0.001 ***	-0.003	0.001 ***	
INV_OTHERS	0.014	0.006 **	0.000	0.011	0.046	0.016 ***	0.030	0.017 *	
<fixed-effect></fixed-effect>									
Property type		yes	yes			yes		yes	
Year		yes	yes		yes		yes		
Property host country		yes	yes		yes		yes		
Buyer country		yes	yes		yes		yes		
Seller country		yes		yes		yes		yes	
Buyer capital type		yes	yes		yes		yes		
Seller capital type		yes		yes		yes		yes	
Property						yes		yes	
Constant term		yes	yes		yes		yes		
No. Obs.		20605		5435		4586		4549	
R-squared		0.72		0.77	0.19		0.20		
Root MSE	0).6674		0.6647		n.a.		n.a.	

<u>Methodology</u>

- Focus on the property prices paid by domestic buyers
- □ Find the geographically nearest transaction (foreign buyer)
- ⇒ Set up "1_spillover" if distance<100m &...

8. <u>Spillover? (i): Placebo test</u>



⇒ <u>Results</u>

Spillover effect is not observed

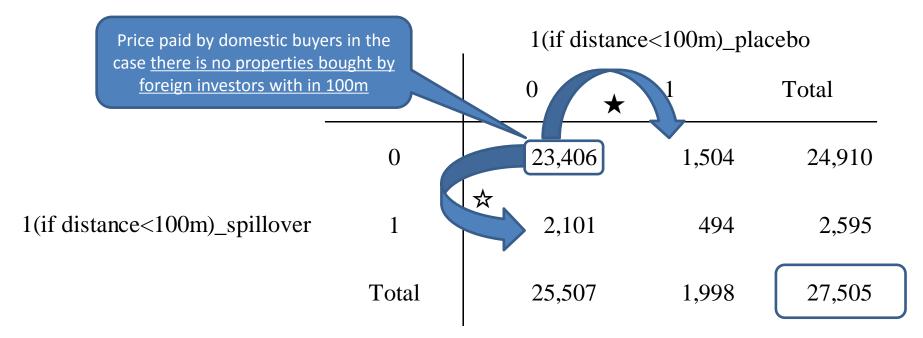
Data used for this exercise

Property prices paid by domestic buyers

 $\Rightarrow \beta(\mathbf{1}_{spillover})$ accounts for \bigstar

8. <u>Spillover? (ii): Illustration</u>

 $\Rightarrow \beta(\mathbf{1}_{placebo})$ accounts for \bigstar



8. <u>Spillover? (iii): Estimation results</u>

Dependent var = LN_PriceUSD	Coef	Robust Std. Err.	Sorry, not in the current pap
<independent variables=""></independent>			
1_spillover	0.189	0.016 ***	
1_placebo	0.186	0.018 ***	
1_spillover×1_placebo	0.038	0.038	
LN_Floor	0.693	0.008 ***	Compared to the cases that domestic buyers' transaction w/o nearby foreign
LN_Land	-0.046	0.004 ***	investors, these two cases show higher price levels
Age	-0.002	0.000 ***	But
INV_OTHERS	0.018	0.006 ***	There is no difference between these two
<fixed-effect></fixed-effect>			cases (i.e., spillover effect is not confirmed
Property type		yes	
Year		yes	
Property host country		yes	Note: Still, foreign investors pay higher
Seller country		yes	
Buyer capital type		yes	prices compared to domestic buyers. This
Seller capital type		yes	exercise compares domestic buyers' price
Constant term		yes	
No. Obs.	2	27505	
R-squared		0.68	2
Root MSE	0	.6637	2

r...

9. Conclusion and future works

Summary

- "Overpricing" of less-experienced foreign investors is confirmed in a variety of alternative analyses
- Yet, spillover from the foreign investors' transaction to adjacent domestic investors' transaction is not confirmed
- (Immediate) future studies
 - Distance b/w property location and buyer in order to differentiate within *ForeignBuyer*
 - Price spillover and impact on domestic buyers (e.g., lean on or crowded out) is really not observed?

Thank you and comments are welcome!

<Contact Information> <u>Daisuke Miyakawa</u>: Associate Professor Graduate School of International Corporate Strategy, Hitotsubashi University 2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo, 101-8439 Japan E-mail: <u>dmiyakawa@ics.hit-u.ac.jp</u> Web: <u>https://sites.google.com/site/daisukemiyakawaphd/</u>

Chihiro Shimizu:

Professor

Institute of Real Estate Studies, National University of Singapore 21 Heng Mui Keng Terrace, #04-02, Singapore 119613 E-mail: <u>cshimizu@nus.edu.sg</u>

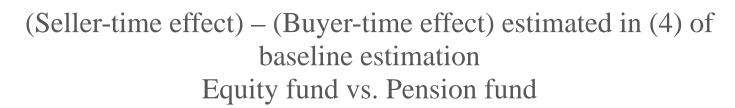
lichiro Uesugi:

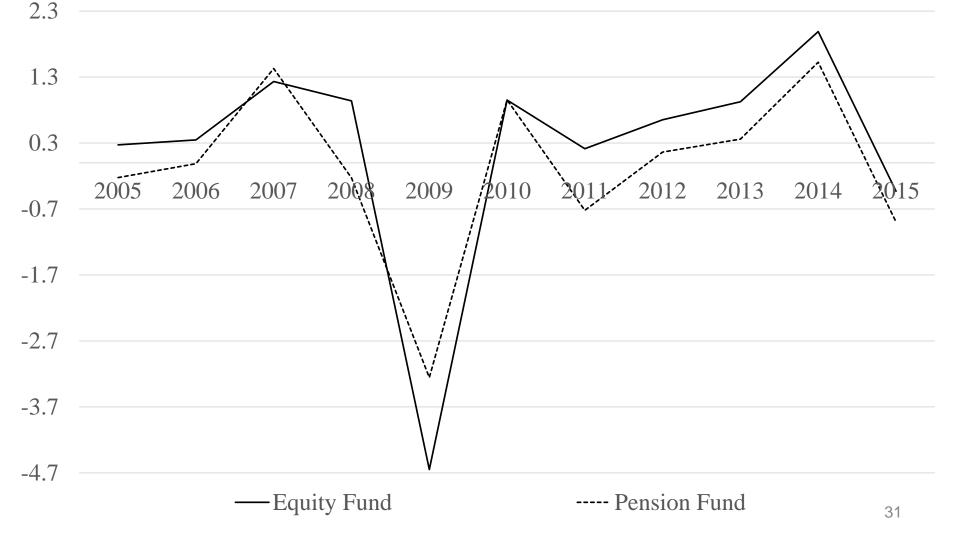
Professor

Institute of Economic Research, Hitotsubashi University 2-1 Naka, Kunitachi, Tokyo, 186-8603 Japan E-mail: <u>iuesugi@ier.hit-u.ac.jp</u> Web: <u>http://www.ier.hit-u.ac.jp/English/faculty/uesugi.html</u>

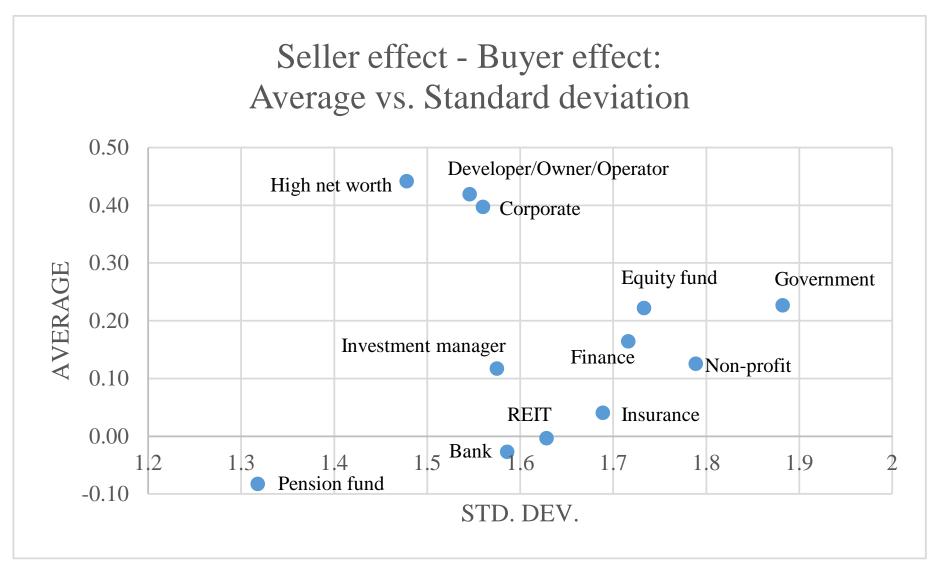
Appendix

Time-variant effects of specific investor types





Risk-return profile for different capital types



Subsamples and additional variables

Subsample analysis

□ Stronger for the recent periods

• Real estate markets revived from the global financial crisis

Statistically significant coefficients on the variables we focus for industrial and office properties

Additional controls

Robust to the inclusion of (i) investment motive, (ii) buyer countries' domestic return, and (iii) property location countries' domestic return

(i). Before and after the crisis

	(1)		(2)		(3)		(4)		
Dependent var	Year<=2010		Year>=2011		Year<=2008		Year>=2009		
= LN_PriceUSD	Coef.	Robust	Coef.	Robust	Coef.	Robust	Coef. Robust		
	Coel.	Std. Err.		Std. Err.		Std. Err.	Coel.	Std. Err.	
<independent variables=""></independent>									
ForeignBuyer	0.449	0.161 ***	1.478	0.353 ***	0.026	0.176	1.418	0.290 ***	
INVACC	0.346	0.187 *	1.750	0.434 ***	-0.126	0.207	1.525	0.353 ***	
ForeignBuyer × INVACC	-1.190	0.370 ***	-1.163	0.489 **	-0.442	0.348	-2.201	0.477 ***	
LN_Floor	0.720	0.010 ***	0.694	0.010 ***	0.745	0.011 ***	0.688	0.009 ***	
LN_Land	-0.039	0.007 ***	-0.040	0.005 ***	-0.049	0.009 ***	-0.039	0.005 ***	
Age	-0.003	0.000 ***	0.000	0.000	-0.003	0.000 ***	0.000	0.000	
INV_OTHERS	0.017	0.009 *	0.005	0.007	0.022	0.011 **	0.007	0.006	
<fixed-effect></fixed-effect>									
Property type		yes	yes		yes		yes		
Year		yes	yes		yes		yes		
Property host country		yes	yes		yes		yes		
Buyer country		yes	yes		yes		yes		
Seller country		yes		yes		yes		yes	
Buyer capital type		yes		yes		yes		yes	
Seller capital type		yes		yes		yes		yes	
Constant term	yes			yes		yes		yes	
No. Obs.		11707	17186		8711		20182		
R-squared		0.73		0.70		0.75		0.69	
Root MSE		0.6259	0.	.6715	0.5940		0.6799		

(ii). By property types

	(1)		(2)		(3)		(4)		(5)		
Dependent var	Apartment			Hotel		Industrial		Office		Retail	
= LN_PriceUSD	Coef.	Robust	Coef.	Robust	Coef	Robust	Coef.	Robust	Coef. Robust		
	0001.	Std. Err.	0001.	Std. Err.		Std. Err.	0001.	Std. Err.	0001.	Std. Err.	
<independent variables=""></independent>											
ForeignBuyer	0.274	0.283	2.867	1.539 *	0.506	0.180 ***	0.849	0.219 ***	0.465	0.497	
INVACC	0.114	0.322	2.835	1.912	0.490	0.221 **	1.023	0.256 ***	0.231	0.628	
ForeignBuyer × INVACC	-1.191	1.147	-2.961	2.312	-4.071	0.737 ***	-0.865	0.322 ***	-0.107	0.982	
LN_Floor	0.690	0.019 ***	0.771	0.039 ***	0.562	0.013 ***	0.853	0.011 ***	0.584	0.015 ***	
LN_Land	0.018	0.008 **	-0.047	0.029	-0.016	0.007 **	-0.065	0.008 ***	-0.033	0.009 ***	
Age	-0.005	0.000 ***	0.001	0.001	0.003	0.000 ***	0.000	0.000	0.000	0.000	
INV_OTHERS	0.007	0.008	0.041	0.046	0.010	0.012	0.018	0.010 *	0.003	0.015	
<fixed-effect></fixed-effect>											
Year		yes		yes		yes		yes		yes	
Property location country		yes	yes		yes		yes			yes	
Buyer country		yes		yes	yes		yes		yes		
Seller country		yes		yes	yes		yes		yes		
Buyer capital group		yes		yes	yes			yes		yes	
Seller capital group		yes		yes	yes		yes		yes		
Buyer capital type		yes		yes	yes		yes		yes		
Seller capital type		yes		yes		yes		yes		yes	
Constant term	istant term yes			yes		yes		yes		yes	
No. Obs.		10352		655	5537		7021		1966		
R-squared		0.65		0.76		0.60	0.77			0.66	
Root MSE		0.5652		0.6618	0	0.6044	(0.6554		0.6977	

(iii). Additional controls

Dependent var		Robust
$=$ LN_PriceUSD	Coef.	Std. Err.
<independent variables=""></independent>		
ForeignBuyer	0.291	0.142 **
INVACC	0.168	0.154
ForeignBuyer × INVACC	-1.786	0.590 ***
LN_Floor	0.715	0.010 ***
LN_Land	-0.051	0.005 ***
Age	-0.001	0.000 ***
INV_OTHERS	-0.003	0.007
ValueAdded	0.116	0.037 ***
Core	0.055	0.034
Buyer_YoY_Return	1.836	0.218 ***
Host_YoY_Return	0.000	0.000
<fixed-effect></fixed-effect>		
Property type	yes	
Year	yes	
Property host country	yes	
Seller country	yes	
Buyer capital type	yes	
Seller capital type	yes	
Constant term	yes	
No. Obs.	19276	
R-squared	0.70	
Root MSE	0.6771	