

Motivation

- ▶ A nontraditional, opaque form of international capital flows has become prevalent: **Residential Housing Capital Flows.**
 - ▶ Ranges from 3%-11% of gross capital inflows in the US between 2010-2018. (National Association of Realtor, IMF BOP).
 - ▶ Prompted macroprudential policies: taxes on non-resident real estate purchases imposed in Singapore (2011), Hong Kong (2012), Australia (2015), Canada (2016), New Zealand (2019).
- ▶ Existing literature: housing purchases by foreigners, as measured by discrete proxies, push up local home prices. (Badarinza and Ramadorai 2018 on the London housing market)

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- ▶ **This paper:**
 - ▶ Provides the first formal quantification of the foreign capital inflows into the U.S. (California) residential housing market.
 - ▶ Analyzes the real economic effect of these inflows and its channels.

Main Results

- ▶ We document a >30 -fold surge in housing capital inflows from China after 2008—a **China shock in the U.S. housing market.**
- ▶ Housing capital inflows from China significantly increase local employment.
- ▶ The employment effect is largely driven by a housing net worth channel, as evidenced by a strong housing price effect and concentration of the employment effect in the non-tradable sectors.
- ▶ These inflows also displaced low-income local residents, suggesting adverse distributional consequences.

Outline

Introduction

Quantifying Foreign Housing Purchases

Conceptual Framework

Empirical Methodology

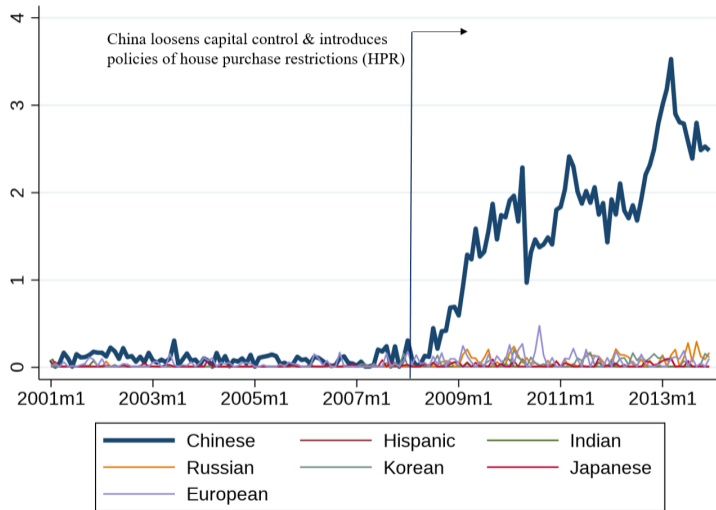
Results and Implications

Data

- ▶ Goal: construct measures of residential home purchases by foreigners, *foreign housing transaction value (fHTV)* and *foreign housing transaction count (fHTC)*.
 - ▶ Challenge: lack of data to identify buyers' country of origin due to legal restrictions.
 - ▶ Solution: transactional-level data and three-step imputation algorithm.
- ▶ Housing Transaction Data from DataQuick.
 - ▶ Universe of purchase records from County Register of Deeds and Assessor Offices.
 - ▶ Variables: sales price, closing date, address of the home, home characteristics, information on home financing, and names of buyers and sellers.
- ▶ Sample.
 - ▶ Single family residential transactions in 3 largest core-based statistical areas (CBSA) in California (17 counties and 773 ZIP codes).
 - ▶ 1.8 million residential housing transactions over the period 2001-2013.

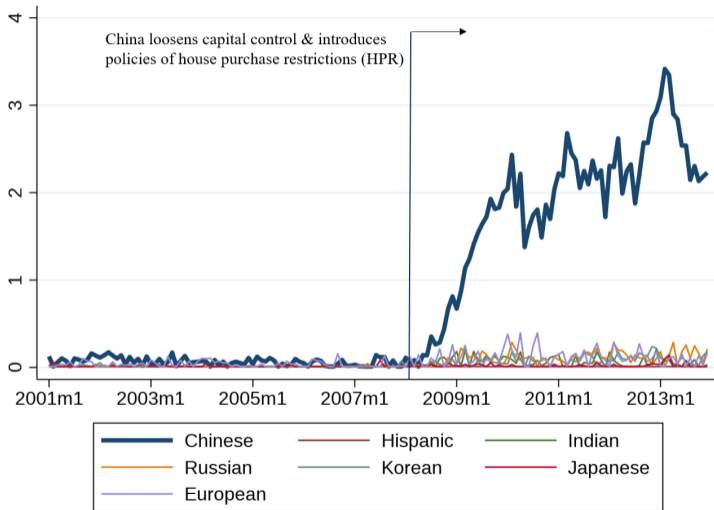
Fact 1: A China Shock in the US Real Estate Market

Share of Housing Purchases (\$) by Foreigners in CA



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Share of Housing Purchases (Count) by Foreigners in CA



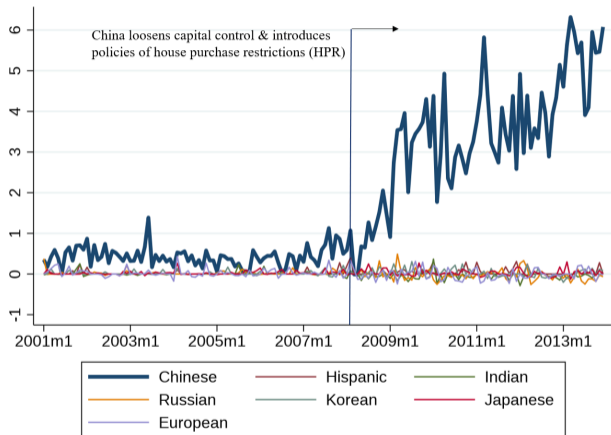
Why was there a China Shock?

- ▶ Loosening of capital control policy in late 2017:
 - ▶ Government relaxed capital outflow regulation from USD \$20,000 to \$50,000 annually.
 - ▶ Aid “smurfing”: a group of people (family, friends, and neighbors) lending foreign currency quotas to a single individual by wiring money to one overseas bank account.
- ▶ A series of housing purchase restrictions (HPR) by Chinese government to curb excessive home price inflation since late 2017.
 - ▶ “National Six” (guoliutiao) real estate market regulation: tax for homes resold within five years of purchase, down payment for first (second) homes restricted to greater than 30% (40%), maximum monthly payment-to-income ratio capped at 50%, etc.
 - ▶ “National Ten” (guoshitiao) real estate market regulation: two house limit for city residents and one house limit for non-residents.

Fact 2: Home Bias of Foreign Chinese Housing Purchases

Share of Housing Purchases (\$) by Foreigners in CA:

ZIP Codes in the top two deciles vs. other deciles of the historical ethnic Chinese population



Foreign Chinese tend to be concentrated in areas historically populated by ethnic Chinese.

Conceptual Framework

- ▶ Two regions: Regions 1 and 2.
- ▶ Two goods: tradable good freely traded across regions, non-tradable good must be consumed in the local region; fixed housing stock.
- ▶ Full mobility in cross-regional commuting and cross-sector job switching.
- ▶ Workers have Cobb-Douglas preferences over the two goods and housing.
- ▶ Production governed by constant returns technology with labor as input.

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Predictions based on equilibrium solutions when Region 1 faces an exogenous increase in foreign housing demand.

1. A positive shock in foreign housing demand \uparrow total employment in Region 1.
2. The employment effect is partly driven by a housing net worth channel: increase in foreign housing demand \uparrow local housing prices.
3. ... partly by a displacement channel: increase in foreign demand \uparrow displacement of local residents.
4. The housing net worth channel is the dominant force, resulting in concentration of the employment effect in the non-tradable sector.

Empirical Strategy

$$\ln(Y_{zt}) = \alpha + \theta \ln(CHT_{zt}) + \beta \ln(CHT_{zt}) \times \mathbb{I}\{t \geq 2008\} + \gamma X_{z,0} + \eta_{ct} + \varepsilon_{zt}$$

- ▶ Y_{zt} : outcomes (employment, house price) in ZIP code z at time t .
- ▶ CHT_{zt} : $CHTV_{zt}$ or $CHTC_{zt}$.
- ▶ X_z : ZIP-code-level population, population density, and education (share of population with bachelor degree) in 2000, proximity to university, pre-sample period trend of income (1998-2001) and respective outcomes variable (1996-2000).
- ▶ η_{ct} : county*year FE.

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IV approach given concern of omitted variables bias, using Stylized Fact 2:

- ▶ Instrument CHT with (Aggregate foreign Chinese housing transaction) x (historical ethnic Chinese population share in z).
- ▶ **Identifying assumption**: conditioning on ZIP code-level characteristics and county-year fixed effects, the historical ethnic Chinese population shares do not systematically influence changes in local economic conditions including employment and house prices except through higher Chinese housing capital inflows.

Local Employment Effects

	Total Employment		Number of Establishments	
	(1)	(2)	(3)	(4)
$\ln(\text{CHTV})^*\text{Post}$	0.140*** (0.066)		0.144*** (0.050)	
$\ln(\text{CHTV})$	0.026 (0.103)		-0.031 (0.078)	
$\ln(\text{CHTC})^*\text{Post}$		0.236*** (0.094)		0.238*** (0.074)
$\ln(\text{CHTC})$		-0.015 (0.112)		-0.083 (0.086)
Controls	Yes	Yes	Yes	Yes
County-year FE	Yes	Yes	Yes	Yes
First-stage F-stat.	41	27	42	28
Obs.	4272	4336	4272	4336

- ▶ A 1-SD increase in $\ln(\text{CHTV})$ explains 21% of cross-sectional variation in total employment.
- ▶ Marginal effect of one unit of foreign Chinese purchase > one dollar → effect not driven by purchases of higher-end homes.

Housing Net Worth & Displacement Channels

	Home Prices (Zillow)		Home Prices (Transactions)		Number of Tax Returns	
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(\text{CHTV})^*\text{Post}$	0.111*** (0.022)		0.151*** (0.021)		-0.038*** (0.014)	
$\ln(\text{CHTV})$	-0.031 (0.029)		-0.065** (0.026)		0.024 (0.019)	
$\ln(\text{CHTC})^*\text{Post}$		0.195*** (0.041)		0.250*** (0.044)		-0.060*** (0.022)
$\ln(\text{CHTC})$		-0.082** (0.039)		-0.125*** (0.038)		0.038 (0.024)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
County-year FE	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-stat.	42	23	45	24	36	20
Obs.	3995	4053	4258	4322	4021	4075

- ▶ A 1-SD increase in $\ln(\text{CHTV})$ explains 27% of cross-sectional variation in home prices, raises the home price in a ZIP code by 17%, on average.
- ▶ Increase in foreign Chinese purchases significantly ↓ number of local residents, as proxied by number of tax filings.

Housing Net Worth vs. Displacement Channel

	Nontradable		Tradable		NT excl. Const.		Average Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(CHTV)*Post	0.190** (0.066)		0.008 (0.149)		0.129* (0.067)		0.082*** (0.025)	
ln(CHTV)	-0.085 (0.104)		0.370* (0.223)		-0.037 (0.106)		-0.094** (0.039)	
ln(CHTC)*Post		0.284*** (0.090)		0.085 (0.209)		0.210** (0.088)		0.111*** (0.032)
ln(CHTC)		-0.137 (0.108)		0.372 (0.248)		-0.083 (0.110)		-0.120*** (0.043)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-stat.	40	27	40	27	40	27	36	20
Obs.	4270	4334	4203	4267	4270	4334	4021	4075

- ▶ Housing purchases by foreign Chinese significantly \uparrow local non-tradable-sector employment \rightarrow housing net worth channel is a more dominant mechanism.
- ▶ Higher foreign Chinese purchases \uparrow average local income, suggesting displacement \rightarrow endogenous adjustment of neighborhood amenities.

Robustness: Financial Crisis Confound

Are neighborhoods populated by more ethnic Chinese affected by the GFC differently?

Total Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(CHTV)*Post	0.152** (0.075)		0.183*** (0.069)		0.131* (0.069)		0.148** (0.066)	
ln(CHTV)	0.030 (0.112)		-0.017 (0.098)		0.041 (0.110)		0.009 (0.104)	
ln(CHTC)*Post		0.218** (0.100)		0.287*** (0.104)		0.226** (0.094)		0.240** (0.094)
ln(CHTC)		0.029 (0.117)		-0.081 (0.115)		0.005 (0.118)		-0.030 (0.111)
Standard Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	-	-	Foreclosure	Foreclosure	All-cash Transactions	All-cash Transactions	Financial Sector	Financial Sector
County-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post period	2012–13	2012–13	2008–13	2008–13	2008–13	2008–13	2008–13	2008–13
First-stage F-stat.	34	28	40	22	44	27	41	28
Obs.	2482	2510	3974	4038	4272	4336	4269	4333

Additional Identification Validity and Robustness

- ▶ Event study to test parallel trend assumption.
 - ▶ Coefficients significantly different from zero only for the post-China shock years.
- ▶ Balance test to test potential violation of exclusion restriction in the cross sectional variation of IV.
 - ▶ Pre-period ethnic Chinese population distribution uncorrelated with pre-period outcomes.
- ▶ Alternative specifications:
 - ▶ Standard difference-in-differences.
 - ▶ IV regression without time interaction.
- ▶ Measurement error in CHTV and CHTC.
- ▶ External validity:
 - ▶ Results imply elasticities of employment to housing net worth of 0.2–0.8, consistent with Mian and Sufi (2014).

Conclusion

- ▶ Provide the first quantification of foreign housing capital inflows to the United States.
- ▶ Document a China Shock in the U.S. housing market.
- ▶ Foreign Chinese residential housing capital inflows
 - ▶ significantly increase local employment.
 - ▶ ... driven by both a housing net worth channel and a displacement channel, with the former playing a more dominant role.
 - ▶ induce gentrification.

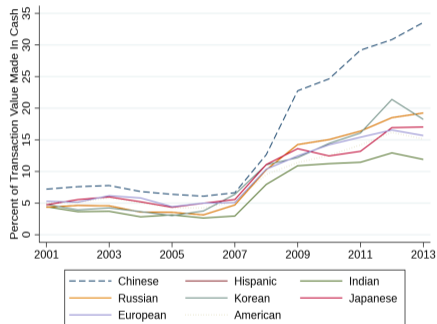
Broader contributions

- ▶ Provide new perspective on real and distributional consequences of (housing) capital flows.
- ▶ Quantify the effects of international capital inflow on the real economy using cross-sectional & time-series strategy on local economies.
- ▶ Point out a “China shock” on the finance side: the surge of real estate capital inflows from China.

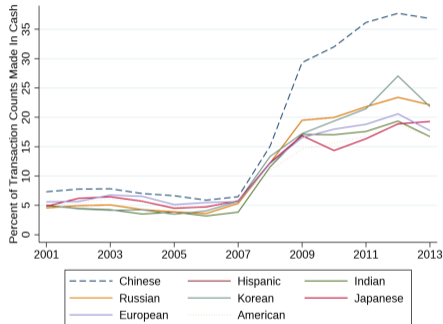
Thank you!

Propensity of Making All-cash Housing Purchases

Transaction Value



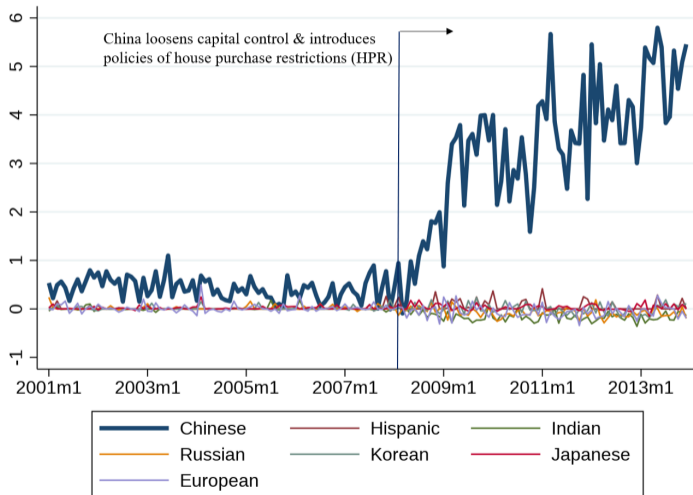
Transaction Count



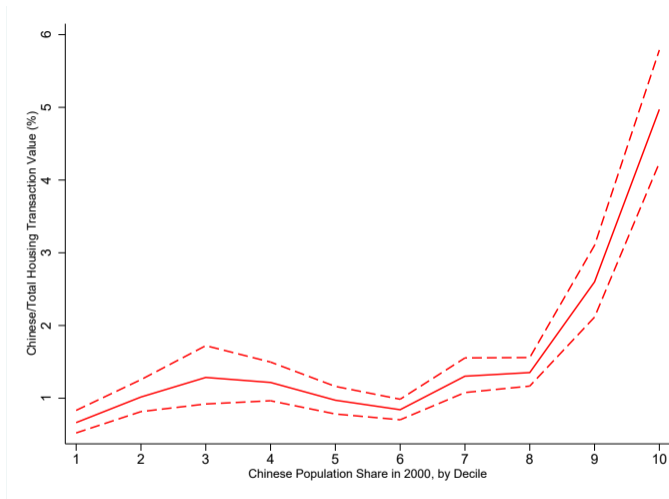
Non-Chinese ethnic groups behave similarly as Anglo-Americans in the propensity of making all-cash real estate purchases.

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Fact 2: Home Bias of Foreign Chinese Housing Purchases



ZIP codes that historically had a higher concentration of ethnic Chinese population witnessed significantly more housing purchases by foreign Chinese.

Summary Statistics

	All periods (2001–13)		Pre-shock period (2001–07)					Post-shock period (2008–13)				
	Mean	SD	Mean	SD	p(10)	p(50)	p(90)	Mean	SD	p(10)	p(50)	p(90)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign Chinese trans.												
Value (\$)	1.92M	4.82M	1.01M	1.51M	0.12M	0.52M	2.22M	3.05M	5.78M	0.19M	1.25M	7.30M
Log value	13.71	1.42	13.19	1.16	11.73	13.17	14.61	13.98	1.47	12.17	14.04	15.80
Counts	4.45	10.33	1.60	2.21	0.36	0.96	3.17	7.25	12.45	0.60	2.73	17.93
Log counts	0.71	1.34	0.11	0.88	-0.75	-0.83	1.18	1.13	1.34	-0.44	1.04	2.90
Total Housing trans.												
Value (\$)	140.96M	99.58M	189.23M	120.06M	57.54M	166.90M	344.73M	113.60M	73.84M	33.65M	98.50M	211.44M
Counts	302.83	221.40	371.60	247.50	121.00	310.00	690.00	270.13	203.00	77.00	226.00	498.00
Log total emp.	9.21	0.94	9.30	0.90	8.03	9.40	10.37	9.15	0.96	7.90	9.28	10.23
Log non-tradable emp.	8.11	0.89	8.20	0.85	6.92	8.33	9.24	8.06	0.97	6.83	8.19	9.09
Log tradable emp.	5.96	1.93	6.16	1.94	3.50	6.48	8.47	5.84	1.92	3.18	6.03	8.18
Log establishment num.	6.53	0.76	6.59	0.70	5.63	6.69	7.42	6.51	0.79	5.53	6.64	7.40
Zillow SF home price	0.55M	0.36M	0.62M	0.38M	0.26M	0.54M	1.02M	0.67M	0.48M	0.25M	0.55M	1.18M
Log SF home price	13.05	0.58	13.20	0.55	12.47	13.20	13.83	13.22	0.61	12.44	13.22	13.98
Household income	77,517	67,124	73,450	56,400	34,374	59,862	115,003	78,410	71,901	35,145	61,048	133,592