Homes Incorporated

Offshore Ownership of Real Estate in the U.K.

Niels Johannesen\textsuperscript{1}, Jakob Miethe\textsuperscript{2}, Daniel Weishaar\textsuperscript{2}

\textsuperscript{1}University of Copenhagen, \textsuperscript{2}University of Munich (LMU)

UNU WIDER – Revving up revenue for development
Motivation

Anecdotal evidence about foreign investors in the real estate market in large cities like London and New York (e.g. Vanity Fair, 2013; Financial Times, 2020).

Why should societies be concerned about it?

- Money laundering, capital flight, and offshore tax evasion.
- Broader effects on real estate markets.
- Store of value motives conflict with housing objectives.

Despite substantial attention, quantitative evidence on the (i) the importance of offshore real estate investment, (ii) its causes, and (iii) its consequences is scarce.
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- Broader effects on real estate markets.
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Despite substantial attention, *quantitative* evidence on the (i) the importance of offshore real estate investment, (ii) its causes, and (iii) its consequences is scarce.
Top 10 investing countries in British real estate

- British Virgin Islands
- Jersey
- Guernsey
- Isle of Man
- Luxembourg
- Gibraltar
- Singapore
- Hong Kong
- Ireland
- Netherlands
Main Research Questions

- What is the role of offshore investors in U.K. real estate? Who are these investors?
- Why are they active in the market and do they affect market outcomes?
In a Nutshell

Main Research Questions

- What is the role of offshore investors in U.K. real estate? Who are these investors?
- Why are they active in the market and do they affect market outcomes?

Data & Method

- Unique combination of admin, commercial, and leak data (e.g. Pandora Papers).
- Explore policy variations to estimate causes and consequences.
In a Nutshell

Main Research Questions

- What is the role of offshore investors in U.K. real estate? Who are these investors?
- Why are they active in the market and do they affect market outcomes?

Data & Method

- Unique combination of admin, commercial, and leak data (e.g. Pandora Papers).
- Explore policy variations to estimate causes and consequences.

Main Results

1. Offshore ownership is important in high price segments.
2. A substantial share of offshore investment has U.K. beneficial owners.
3. Offshore owners have tax motives and secrecy motives.
4. Offshore investment affects real estate prices significantly.
Contributions

1. **Real Estate**: Mishkin (2011), Knoll et al. (2017); Martínez-Toledano (2019)
   ⇒ Add foreign ownership to the picture.

   ⇒ Can follow single assets over time.

   ⇒ Extend analysis to real estate assets.

4. **Foreign Real Estate**: Sá (2016), Badarinza and Ramadorai (2018), Agarwal et al. (2020), Cvijanović and Spaenjers (2021), Collin et al. (2022), Bomare and Le Guern Herry (2022), Alstadsæter et al. (2022), Alstadsæter and Økland (2022), Bourne et al. (2022)
   ⇒ Comprehensive picture looking through four questions including price effects.
Data
Residential Transactions

35 Miles Drive,
London (SE28 0NE)
£ 250,000
2017-09-15

34-37 Nursery Road,
Hockley,
Birmingham (B19 2XN)
£ 975,000
2019-07-01
Data — Domestic Ownership Data

Residential Transactions

35 Miles Drive, London (SE28 0NE)
£ 250,000
2017-09-15

34-37 Nursery Road, Hockley, Birmingham (B19 2XN)
£ 975,000
2019-07-01

Domestic Companies (CCOD)

29 to 39 (odd) Miles Drive, London (SE28 0NE)
Obscura One GR Limited
United Kingdom
2017-11-28
## Data — Foreign Ownership Data

<table>
<thead>
<tr>
<th>Residential Transactions</th>
<th></th>
<th>Domestic Companies (CCOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 Miles Drive, London (SE28 0NE)</td>
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<table>
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<tr>
<th>Overseas Companies (OCOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>34-37 Nursery Road, Hockley, Birmingham (B19 2XN)</td>
</tr>
<tr>
<td>ASBJ International Limited</td>
</tr>
<tr>
<td>British Virgin Islands</td>
</tr>
<tr>
<td>2019-07-01</td>
</tr>
</tbody>
</table>

**Note:** Direct, tax haven properties, and domestic and non-haven investments.
### Residential Transactions

<table>
<thead>
<tr>
<th>Address</th>
<th>Price</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
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### Domestic Companies (CCOD)

<table>
<thead>
<tr>
<th>Address</th>
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</thead>
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<tr>
<td>29 to 39 (odd) Miles Drive, London (SE28 0NE)</td>
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<td>United Kingdom</td>
<td>2017-11-28</td>
</tr>
</tbody>
</table>

**Orbis**

- Obscura One GR Limited ultimate owner: British Virgin Islands

**Overseas Companies (OCOD)**

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</tr>
</tbody>
</table>

- **7k indirect tax haven**
- **2,3k n.h.**
- **464k properties domestic**
Data — Overview

Data Availability

- Corporate ownership: 2015-2019 real time, some going back to 1890.
- FOI: Foreign corporate purchases since 1990.
Descriptive Evidence
Take-Aways:

- Tax havens dominate foreign real estate investment.
- 8 out of the top 10 investing countries are tax havens.
- 93 percent of foreign investment comes from tax havens.
**Take-Aways:**

- Offshore real estate investment concentrated at the top price segments (more than 15 percent of stock volume).

- Total market share all England and Wales: 1.25%.
Take-Aways:

- Tax haven market share increased substantially from 0.15 percent in 1995 to 1.25 percent in 2019.
Beneficial Ownership
ICIJ leaks
- 810k shell companies
- OffshoreLeaks, BahamasLeaks, PanamaPapers, ParadisePapers, PandoraPapers
- Company name, country
  + beneficial ownership
Beneficial Ownership — Randomization

- Match 9,035 individuals to 12,835 properties
- Assumption: Sample of matched properties is randomly drawn from all properties owned by foreign companies.
- Randomization tools: Bootstrap sample (1000 iterations).
- Over all iterations, calculate bottom quartile, mean, and top quartile.
Take-Aways:

- Around 15 percent of nominal offshore investment is ultimately coming from home.
- Tax haven secrecy can be pierced for part of the sample.
Beneficial Ownership by Region - British Real Estate vs. Swiss Private Banking

Take-Aways:

- Regional distribution of real estate investment quite different from financial assets.
- Role of Asia, Africa, and Middle East much higher for tax haven real estate investment.
Evidence on Causes
1. We find reactions to a capital gains tax exemption for investments from Luxembourg, evidence of a tax planning motive.

2. We find reactions to a transparency announcement for investments from the Crown Dependencies, evidence of a secrecy motive.

3. Reactions are sizable and take place without much delay.
Evidence on Consequences
Does offshore ownership affect market outcomes, i.e. prices?

- Challenge: Endogeneous selection into particular market segments.
⇒ Does offshore ownership affect market outcomes, i.e. prices?

- Challenge: Endogeneous selection into particular market segments.
- Policy Shock: Surprising Brexit referendum, followed by sharp increase in property sales by foreign companies.
Does offshore ownership affect market outcomes, i.e. prices?

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- Treatment Variation: pre-Brexit offshore market share
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We compare the within property price evolution between areas in London that are differentially affected.
Take-Aways:

- Offshore Penetration (OP) varies at 983 output areas middle.
- 79,029 unique addresses available for within price change analysis.
Estimation

\[ \log(price_{it}) = \hat{\mu}_i + \sum_t \Gamma^t d_t \times x_i + \sum_t \beta^t d_t \times \text{Offshore}_a + \epsilon_{it} \]

- \( price_{it} \): Price paid for of property \( i \) in year \( t \)
- \( \hat{\mu}_i \): property fixed effects
- \( d_t \): time dummies, omitted category 2015
- \( x_i \): a vector of time-invariant controls, baseline: 100 pre-Brexit price bins
- \( \text{Offshore}_a \): is the share of the residential real estate market
Results — Price effects of offshore real estate

Take-Away:

- Prices in areas with high offshore penetration show comparatively lower prices after Brexit.
- Effect is immediate and persistent.

quarterly specification monthly specification
Results — Economic size of the effect

- An output area with a one standard deviation higher OP experiences a 2% stronger relative price decline of within property prices after Brexit.

- Examples under linearity & sticky supply assumptions:
  - Westminster without offshore capital: at least 16% lower prices.
  - Liverpool with Westminsters’ offshore market share: at least 13% higher prices.
## Results — Robustness

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post × Offshore</td>
<td>-1.91***</td>
<td>-1.91***</td>
<td>-2.34***</td>
<td>-1.91***</td>
<td>-1.6***</td>
<td>-1.26***</td>
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<tr>
<td></td>
<td>(0.216)</td>
<td>(0.221)</td>
<td>(0.266)</td>
<td>(0.376)</td>
<td>(0.162)</td>
<td>(0.221)</td>
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<tr>
<td>Post × Corporate</td>
<td>-0.013</td>
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<td>(0.109)</td>
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<tr>
<td>Post × Foreign Population</td>
<td></td>
<td></td>
<td>-0.039**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>(0.019)</td>
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<td>Property FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>100 price bins × year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Property type × year FE</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Tenure type × year FE</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Clustering</td>
<td>Property</td>
<td>Property</td>
<td>Property</td>
<td>Property</td>
<td>983 areas</td>
<td>Property</td>
<td>Property</td>
<td>Property</td>
</tr>
<tr>
<td>Winsorization</td>
<td>2x0.5%</td>
<td>2x0.5%</td>
<td>2x2%</td>
<td>2x2%</td>
<td>2x2%</td>
<td>2x2%</td>
<td>2x2%</td>
<td>2x2%</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.9356</td>
<td>0.9356</td>
<td>0.9356</td>
<td>0.9353</td>
<td>0.9355</td>
<td>0.9356</td>
<td>0.9788</td>
<td>0.9366</td>
</tr>
</tbody>
</table>

Details domestic corporate | ES domestic corporate | Details migration | ES migration
## Results — Mechanism and Spill-overs

<table>
<thead>
<tr>
<th></th>
<th>(1) Baseline</th>
<th>(2) Mechanism</th>
<th>(3) Spill-overs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post x Offshore</td>
<td>-1.91***</td>
<td>-1.01</td>
<td>-2.23***</td>
</tr>
<tr>
<td></td>
<td>(0.216)</td>
<td>(2.01)</td>
<td>(0.610)</td>
</tr>
<tr>
<td>Post x Offshore, Expected British</td>
<td></td>
<td></td>
<td>-1.98***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.545)</td>
</tr>
<tr>
<td>Post x Offshore, Expected Foreign</td>
<td></td>
<td>-2.10***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.545)</td>
<td></td>
</tr>
<tr>
<td>Post x Offshore, Low Price</td>
<td></td>
<td>-2.10***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.545)</td>
<td></td>
</tr>
<tr>
<td>Post x Offshore, High Price</td>
<td></td>
<td>-1.98***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.545)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>99,565</td>
<td>99,565</td>
<td>68,868</td>
</tr>
</tbody>
</table>

- **Property FE**: Yes, Yes, Yes
- **100 price bins x year FW**: Yes, Yes, Yes
- **Adjusted R^2**: 0.9356, 0.9356, 0.9421

Ultimate Ownership  
⇒ Price reactions driven by ultimately foreign investors.

Spill-overs  
⇒ Evidence for spillovers across market segments.
Conclusion
Top 10 investing countries in British real estate

- British Virgin Islands
- Jersey
- Guernsey
- Isle of Man
- Luxembourg
- Gibraltar
- Singapore
- Hong Kong
- Ireland
- Netherlands

percent of foreign corporate held real estate titles
Conclusion

Combine administrative and commercial data with information on ownership chains and leak data on beneficial ownership and show descriptively:

- **Predominance of tax havens** among foreign held real estate.
- Importance in **high price segments** and **increasing importance** over time.
- **UK citizens** relevant beneficial owners.

Exploit unique (policy) experiments and show:

- **Secrecy** as well as **tax motives** present, reactions timely.
- **Price effects** of offshore real estate investments.
- Some evidence for **spillovers** across price segments.
Questions and comments highly welcome!

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daniel.weishaar@econ.lmu.de


Appendix: Concentration by market segments

Market Shares, Stock 2019

<table>
<thead>
<tr>
<th>Price Category (£)</th>
<th>Market Share, Stock Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>below 100k</td>
<td>Non Haven</td>
</tr>
<tr>
<td>100k−500k</td>
<td>Tax Haven</td>
</tr>
<tr>
<td>500k−1m</td>
<td></td>
</tr>
<tr>
<td>1m−5m</td>
<td></td>
</tr>
<tr>
<td>above 5m</td>
<td></td>
</tr>
</tbody>
</table>

The diagram shows the concentration of market shares by price category for Non Haven and Tax Haven in Stock 2019.
Appendix: Concentration by market segments

Market Shares, Transaction Number

Price Category (£)

Market Share, Transaction Count (%)

Non Haven
Tax Haven

Below 100k
100k−500k
500k−1m
1m−5m
Above 5m

Back
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Market Shares, Stock Number

Price Category (£) | Market Share, Stock Count (%)
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below 100k | 
100k–500k | 
500k–1m | 
1m–5m | 
above 5m | 
Non Haven | 
Tax Haven | 

Back
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Market Shares, Stock 2019

![Graph showing market shares and stock values by price category for Non Haven and Tax Haven.]
Appendix: Evolution over time — Absolute Values

Foreign market value in residential market

![Graph showing the evolution of foreign market value in the residential market over time. The graph compares Non Haven and Tax Haven stock volume (in billion £). The value for Non Haven remains relatively flat, while Tax Haven shows a steady increase, particularly after 2010.](image)
Appendix: Evolution over time — Validation
Take-Aways:

- Offshore real estate investment **concentrated in urban areas**, but not exclusively.
- Large variation within urban areas.
Appendix: Geographic concentration

London Stock Volume Shares, Dec. 2019
Tax Haven Share - British Real Estate vs. British Bank Deposits

Take-Aways:

- Offshore real estate more recent phenomenon compared to bank deposits.
- Substantial growth since 2008.
- Total share of real estate market around a 10th of all bank deposits.
CGT particularities for foreign investors

- UK took steps to abolish CGT exemption for foreigners
- November 2017: government announced an extension of CGT to non-residents
- Implemented in April 2019

→ We exploit a temporary loophole for investments from Luxembourg to which the CGT extension did not apply until April 2019.
Capital gains tax (CGT) - Empirical specification

\[ \log (y_{i,t}) = \sum_{t \neq \text{Oct 2017}} d_t \times d_{LUX} + \gamma_t + \alpha_i + \epsilon_{i,t} \]

- \( y_{i,t} \): number of properties held from jurisdiction \( i \) at time \( t \)
- \( d_t \times d_{LUX} \): treatment indicator
- \( \gamma_t \): time fixed effect
- \( \alpha_i \): country fixed effect
- \( \epsilon_{i,t} \): error term

→ Sample: all tax haven countries
Capital gains tax (CGT) - Results

Reactions to CGT Policy - Luxembourg vs. Other Tax Havens

![Graph showing the difference in holdings (log) over time.](image)

- Unit of Analysis
- Outcome Variable Transformation
- Flows
Beyond tax advantages, offshore jurisdictions provide secrecy

April 2018: Parliamentary initiative to mandate the *Overseas Territories* (OTs) to set up public registers of beneficial ownership

UK parliament acted under advice that cannot directly mandate the *Crown Dependencies* (CDs) to do so

CDs voluntarily announced the adoption of the policy in June 2019

→ hypothesis: OTs became less attractive compared to other tax havens and the CDs if secrecy motive is present.
Transparency shock - Empirical specification

\[
\log (y_{i,t}) = \sum_{t \neq \text{Mar 2018}} d_t \times d_{OT} + \gamma_t + \alpha_i + \epsilon_{i,t}
\]

- \(y_{ij,t}\): number of properties held from jurisdiction \(i\) at time \(t\)
- \(d_t \times d_{OT}\): treatment indicator (changed in robust tests)
- \(\gamma_t\): time fixed effect
- \(\alpha_{ij}\): country-district fixed effect
- \(\epsilon_{i,t}\): error term

→ Sample: CD & OT tax haven countries
Transparency shock - Results

Transparency Shock - OTs vs. CDs.

![Graph showing the difference in holdings (log) over time with data points at selected time intervals from 2017 (Jul) to 2020 (Jan).]
1. **Administrative Price Paid Transaction Data:**
   - Universe of transactions in the *residential* real estate market 22 million transactions, 13 million properties.
   - Main Variables: address of property, price paid, date of purchase.

2. **Administrative Ownership Data:**
   - All corporate held real estate.
   - Real time data 2015 - 2019, some ownership information going back until 1890.
   - FOI request: foreign purchases since 1990.
   - Main Variables: address of property, company name, country of incorporation.
3. Leak Data from ICIJ:
   - Ultimate ownership information for 810,000 shell companies.
   - Main Variables: company name, country of incorporation, beneficial ownership.

4. ORBIS Company Data:
   - Global ownership structure of companies (around 400 million).
   - Time Coverage: varying quality since 1990s.
   - Main Variables: company name, country of incorporation, shareholder chains, global ultimate owner.
Information on corporate owner(s): up to 4 corporate proprietors including addresses & countries

Country information for each, we categorize non-havens and tax havens (high secrecy, low tax rates, based on union of Johannesen and Zucman (2014) and Gravelle (2015)), among which:

1. Crown Dependencies (3): Guernsey, Jersey, Isle of Man
2. Overseas Territories (14): Anguilla, Bermuda, British Antarctic Territory, British Indian Ocean Territory, British Virgin Islands, Cayman Islands, Falkland Islands, Gibraltar, Montserrat, Pitcairn Islands, Saint Helena Ascension and Tristan de Cunha, South Georgia and the South Sandwich Islands, Sovereign Base of Akrotiri and Dhekelia, Turks and Caicos Islands
3. ‘other’ tax havens (46): includes Bahamas, Maldives, Cook Islands, Cyprus,
### Panel A: Corporate ownership

<table>
<thead>
<tr>
<th>Data Source</th>
<th>All properties</th>
<th>Residential properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial and Corporate Ownership Data (CCOD)</td>
<td>2,283,212</td>
<td>471,522</td>
</tr>
<tr>
<td>Overseas Company Ownership Data (OCOD)</td>
<td>95,847</td>
<td>21,503</td>
</tr>
<tr>
<td>Freedom of Information (FOI)</td>
<td>90,224</td>
<td>8,261</td>
</tr>
<tr>
<td><strong>Total with corporate ownership</strong></td>
<td><strong>2,469,283</strong></td>
<td><strong>501,286</strong></td>
</tr>
</tbody>
</table>

### Panel B: Offshore corporate ownership

<table>
<thead>
<tr>
<th>Owner Type</th>
<th>All properties</th>
<th>Residential properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct owner is corporation in tax haven (OCOD + FOI)</td>
<td>181,463</td>
<td>27,375</td>
</tr>
<tr>
<td>Indirect owner is corporation in tax haven (Orbis)</td>
<td>121,069</td>
<td>7,238</td>
</tr>
<tr>
<td><strong>Total involving offshore corporate owners</strong></td>
<td><strong>302,532</strong></td>
<td><strong>34,613</strong></td>
</tr>
</tbody>
</table>

### Panel C: Ultimate owners (natural persons)

<table>
<thead>
<tr>
<th>Source</th>
<th>All properties</th>
<th>Residential properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pandora Papers</td>
<td>1,086</td>
<td>283</td>
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<tr>
<td>Paradise Papers</td>
<td>1,211</td>
<td>348</td>
</tr>
<tr>
<td>Panama Papers</td>
<td>3,817</td>
<td>968</td>
</tr>
<tr>
<td>Offshore Leaks</td>
<td>306</td>
<td>77</td>
</tr>
<tr>
<td><strong>Total with identified ultimate owners</strong></td>
<td><strong>7,310</strong></td>
<td><strong>1,918</strong></td>
</tr>
</tbody>
</table>
FPI inflows into the UK

Counterfactuals for real estate share over time

Brexit referendum announced

Foreign Held Stock

Exponential Counterfactual

2015 2016 2017 2018 2019

Stock (billion £)
Counterfactuals for real estate share over time

Brexit referendum announced

Foreign Held Stock

Exponential Counterfactual

Stock (%)

Probability of Selling / Buying

![Graph showing probability of sale relative to 2015 for different buyer and seller types over the years 2010 to 2019. The graph includes data points for Offshore Seller, Domestic Buyer and Domestic Seller, Offshore Buyer. The y-axis represents the probability of sale relative to 2015, ranging from -0.2 to 0.1.]
Estimation of Stock Volume (1)

1. **After Oct. 2015**: extract stock volume from monthly snapshots.
2. **Before Oct. 2015**: use flow data to carry stocks backward from first snapshot.

**Example, Stock of Real Estate held by Foreign Owners in District i**

\[
S_{t,i}^F = (1 + g_{t-1,i}) \underbrace{S_{t-1,i}}_{\text{Previous Stock}} - \underbrace{F_{t-1,i}^{F-NF}}_{\text{Flows from foreign to non-foreign}} + \underbrace{F_{t-1,i}^{NF-F}}_{\text{Flows from non-foreign to foreign}} + \underbrace{F_{t-1,i}^{New-F}}_{\text{New properties}}
\]

HPI adjustment
Challenge: for some flows, we only observe the destination, but not the origin of the flow (flow data only starts in 1995). Example, Flow from Foreign Owners to Non-Foreign Owners in District $i$

\[ \hat{F}_{t-1,i}^{F-NF} = \hat{F}_{t-1,i}^{F-NF} + \hat{F}_{t-1,i}^{F-NF} \]

→ Estimation of unknown flow origins based on the origins of observed flows.

\[ \hat{F}_{t-1,i}^{F-NF} = \hat{F}_{t-1,i}^{U-NF} \times \frac{\hat{F}_{F-NF}^{t-1}}{\hat{F}_{F-NF}^{t-1} + \hat{F}_{NF-NF}^{t-1}} \]

flows to non-foreign, unobserved origin

share of flows to non-foreign that come from foreign
Leaked data from the ICIJ

Leaks (International Consortium of Investigative Journalists):

- Offshore Leaks: 105,114 companies, current through 2010
- Panama Papers: 206,526 companies, current through 2015
- Bahamas Leaks: 175,514 companies, current through 2016
- Paradise Papers: 286,094 companies, through 2014/2016
- Pandora Papers: 27,501 companies, through 2020

Information:

- entity name, intermediary, ‘officers’: incl. address & country
- we distinguish ‘officers’
- we use entity names, extensively treat company types (so far > 30 different types of LLC’s), and country information
- we link company name + type + country with Land Registry
Matching Statistics

OCOD

- 20423 (8.7%) prepared addresses, max is 18.3% in 2018
- 15236 (14.9%) unique original titles, max is 24.92% in 2018

CCOD

- 415079 (5.3%) prepared addresses, max is 18.4% in 2019
- 366149 (15.3%) unique original titles, max is 24.8% in 2019

ratio

- raw data $\text{CCOD} = 33.5 \times \text{OCOD}$; match: $\text{CCOD} = 20.3 \times \text{OCOD}$
- But: unique original property titles: factor 23.4 raw, 24 match

PP

- 1.76% of transactions, max is 8.3% in 2019
Data — Matching Challenges

- No unique identifier that links transaction data and ownership data
- Inconsistent recording of addresses
- Transactions / Ownership entries can contain multiple postal addresses

Example Record:

“FLATS 1-27 WALLACE COURT, 54 TIZZARD GROVE, LONDON (SE3 9EE), FLATS 103-128 WALLACE COURT, 44 TIZZARD GROVE, LONDON (SE3 9EQ) AND FLATS 129-157 WALLACE COURT, 52 TIZZARD GROVE, LONDON (SE3 9FE), 1-48 GRAYSTON HOUSE, 21 ASTELL ROAD LONDON (SE3 9FN), 49-110 GRAYSTON HOUSE, 1 OTTLEY DRIVE, LONDON (SE3 9FP), 1-62 MALTBY HOUSE, 2 OTTLEY DRIVE, LONDON (SE3 9FJ), 63-105 MALTBY HOUSE, 18 TUDWAY ROAD, LONDON (SE3 9FL), 5-12 OTTLEY DRIVE, LONDON (SE3 9FT), 2-16 (EVEN) TUDWAY ROAD, LONDON (SE3 9FR)”
This entry is made up of 313 unique addresses:

<table>
<thead>
<tr>
<th>postcode</th>
<th>street</th>
<th>...number</th>
<th>unit</th>
<th>...number</th>
<th>locality</th>
<th>...number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE3 9EE</td>
<td>TIZZARD GROVE</td>
<td>54</td>
<td>FLAT</td>
<td>1</td>
<td>WALLACE COURT</td>
<td></td>
</tr>
<tr>
<td>SE3 9EE</td>
<td>TIZZARD GROVE</td>
<td>54</td>
<td>FLAT</td>
<td>2</td>
<td>WALLACE COURT</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>SE3 9EE</td>
<td>TIZZARD GROVE</td>
<td>54</td>
<td>FLAT</td>
<td>27</td>
<td>WALLACE COURT</td>
<td></td>
</tr>
<tr>
<td>SE3 9EQ</td>
<td>TIZZARD GROVE</td>
<td>44</td>
<td>FLAT</td>
<td>103</td>
<td>WALLACE COURT</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>SE3 9FP</td>
<td>OTTLEY DRIVE</td>
<td>1</td>
<td></td>
<td></td>
<td>GRAYSTON HOUSE</td>
<td>94</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

of which for example 94 GRAYSTON HOUSE, 1 OTTLEY DRIVE, SE3 9FP shows up in the transaction price paid data and is matched within our 4 months matching tolerance.
Objective: find ultimate owners of British real estate

- Match is based on name, incorporation type, and incorporation country
- Match 9,035 “officers” to 12,835 properties of which 7,310 pass quality checks
- Different officer types:
  - 3,629 legal entities — corporate structures connected to the investing firm
  - 5,406 natural persons — 1,250 beneficiaries and 3,186 shareholders.
Stylized facts — Ultimate ownership: 50 countries

- looking through leaks updates ownership substantially
- top 3 countries move from being tax havens to non-havens
- Crown Dependencies and British Virgin Islands much further down the list
- version: matched ownership with price paid data
- market: corporate held residential real estate market
- plotting total unique natural persons (beneficiaries and shareholders)
- three versions of unique owners: no change, each property only once, each owner-property pair only once
- this changes importance of properties held by more than one company and companies connected to more than one individual
Reactions to CGT, Transformation of Outcome Variable

(a) Absolute Number

(b) Inverse Hyperbolic Sine
Appendix: Capital Gains Tax, Unit of Analysis

(a) Property Titles

(b) Unique Investors
Appendix: Reactions to Transparency, Transformation of Outcome Variable

(a) Absolute Number

(b) Inverse Hyperbolic Sine
Appendix: Reactions to Transparency, Unit of Analysis

(a) Property Titles

(b) Unique Investors
Appendix: ICIJ data example

Find "Roldugin" anywhere it appears.
Results — Baseline quarterly

- time period: year-quarter
- baseline quarter: 2016 Q2
Results — Baseline monthly

- time period: year-month
- baseline month: Jun 2016
Other Channels — Domestic Corporate Market Share

Baseline OP

Domestic Corporate Market Share


**Intuition:** If we have identified a causal effect of foreign investment, the same approach should show a 0 effect in an identical setup using domestic corporate real estate.

- We construct a second measure of market penetration: corporate “domestic penetration” (DP)
- This is introduced alongside OP such that:

\[
\log (\text{price}_{it}) = \sum_{\bar{t}=2010}^{\bar{t}=2019} \beta^t \theta_t \times OP_a + \sum_{\bar{t}=2010}^{\bar{t}=2019} \beta^t \theta_t \times DP_a + \sum_{b=2}^{b=100} \gamma^b \bin_i \times \theta_t + \mu_i + \epsilon_{it}
\]
• Potentially a slight break in trend for domestic corporate price effects
• However: main results are not driven by the spatial distribution of corporate investment
**Intuition:** If we have causally identified are foreign capital effect, it should not be driven by migratory responses.

- We use the ratio of foreign population (by country of birth) from the British ‘Annual Population Survey’ per local authority area (LAA)
- This is introduced alongside OP such that:

\[
\log (price_{it}) = \sum_{t=2010}^{t=2019} \beta^t \theta^t \times OP_{laa} + \sum_{t=2010}^{t=2019} \beta^t \theta^t \times ForPop_{laa} + \sum_{b=2}^{b=100} \gamma^b \bin_i \times \theta^t + \mu_i + \epsilon_{it}
\]
Other Channels — Outward Migration

- OP defined at 33 local authority districts
- both re-scaled to be between 0 and 1

using baseline OP
Results — Outliers

-2.5 0.0 2.5

deviation from 2015

at most +/-50% − baseline
at most +/-100% yearly price growth
at most +/-1000% yearly price growth
no adjustment (max g: +13.8 million %)

back to main results
Results — Below/Above price 500,000

One estimation with two OP x time interactions

deviation from 2015

-10
-5
0

OP: props above 500k pre Brexit
OP: props below 500k pre Brexit

back to main results
Results — Migration

- tests if our results are driven by outward migration
- uses share of foreign population in 33 local authority districts as alternative treatment
Our ultimate owner match shows that not all “foreign” investment is foreign. Does the effect of round-trip investment and true foreign investment differ?

- we assign “true British” probabilities
- property from, Jersey, enters with its price * TrueBrit into true British OP, with 1-TrueBrit into true Foreign OP
- if not possible, third category: OP “uncertain”
- all three offshore penetration measures are then used in one regression to compare effects.
Variation — 3 OP measures

- **Hong Kong**: 93% of ultimate owners foreigners → 0.93x Price Paid in numerator of "true foreign OP"
- **Bermuda**: 7% of ultimate owners British → 0.07x Price Paid in numerator of "true British OP"
- **...**: No British ultimate owners matched → 1x Price Paid in numerator of "uncertain OP"

...
Estimation — Spillovers across price segments

**Intuition:** Do these results only matter for high end real estate?

- we construct a measure of offshore penetration exclusively built using properties with a pre-Brexit price of more than 500,000 pounds $OP_{a>500}$
- the denominator is still the entire residential real estate market
- sample is reduced to properties worth less then 500,000 pounds

$$\log (price_{it}) = \sum_{\substack{t=2010 \\ t\neq 2015, t=2019}} \beta^t \times OP_{a>500}^t + \theta^t \times OP_{a<500}^t + \gamma^b \text{bin}_i + \mu_i + \epsilon_{it}$$
Robustness — OP level

- 19545 output areas
- 4747 lower layer super output areas
- 983 middle layer super output areas

Deviation from 2015
Robustness — OP timing

-6
-3
0
3
deviation from 2015
OP_Jan2010
OP_Jan2011
OP_Jan2012
OP_Jan2013
OP_Jan2014
OP_Jan2015
## Coefficient Stability of Diff-in-Diff Brexit result

<table>
<thead>
<tr>
<th>treatment variation:</th>
<th>log(transaction price)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>983 soa middle</td>
<td>4747 soa low</td>
<td>19545 oa</td>
</tr>
<tr>
<td>$^t&gt;=^2016$ * OP calculated at 983 middle output areas</td>
<td>-1.88***</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(0.227)</td>
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</tr>
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<td>$^t&gt;=^2016$ * OP calculated at 4747 lower output areas</td>
<td></td>
<td>-0.950***</td>
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<tr>
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<td>(0.202)</td>
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<tr>
<td>$^t&gt;=^2016$ * OP calculated at 19545 output areas</td>
<td></td>
<td></td>
<td>-0.481***</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(0.151)</td>
</tr>
<tr>
<td>observations</td>
<td>71,195</td>
<td>36,094</td>
<td>13,681</td>
</tr>
<tr>
<td>effect of one s.d. increase in %</td>
<td>-2.99</td>
<td>-3.34</td>
<td>-3.23</td>
</tr>
<tr>
<td>effect from 25th to 75th OP percentile in %</td>
<td>-1.28</td>
<td>-1.21</td>
<td>-1.37</td>
</tr>
<tr>
<td>property f.e.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>100 bins by year f.e.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.9368</td>
<td>0.9385</td>
<td>0.9164</td>
</tr>
</tbody>
</table>