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Matthew Collin
EU Tax Observatory, Paris School of Economics, NMBU

Florian M. Hollenbach
Copenhagen Business School

David Szakonyi
George Washington University

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Matthew Collin, Florian M. Hollenbach & David Szakonyi*

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Abstract

This paper studies the impact of beneficial ownership transparency in the British real estate market. In an effort to reduce illicit investment following the invasion of Ukraine, the UK government announced a new law in 2022 requiring offshore companies that owned domestic real estate to identify their ultimate owners in a public register. Using a difference-in-difference framework, we find that new property purchases by companies registered in tax havens fell relative to those made via non-havens, a result consistent with transparency raising the costs of illicit investment. These declines persist even after dropping tax havens favored by Russians, suggesting that the reform drove the decline, rather than sanctions. We do not find strong evidence of price effects nor substitution into ownership through suspicious domestic companies. While the policy does appear to have been effective at deterring some anonymous investment into the British property market, incomplete implementation led some clients to still successfully shield their ownership information, implying scope for better design and enforcement in the future.

Keywords: Illicit financial flows, tax havens, real estate, transparency, hidden wealth

JEL Codes: D73, F21, K42, R30

*Matthew Collin: EU Tax Observatory, Paris School of Economics and NMBU, mattcollin@gmail.com, http://www.matthewcollin.com. Florian Hollenbach: Copenhagen Business School, fho.egb@cbs.dk, fhollenbach.org. David Szakonyi: George Washington University, dszakonyi@email.gwu.edu, URL: http://www.davidszakonyi.com/. We thank Jeanne Bomare for her comments and suggestions in navigating of the Overseas companies that own property in England and Wales dataset, Bob Rijkers for helpful comments, as well as participants from the UNU-Wider Illicit Financial Flows workshop in July 2022. We thank Thomas Saunders from The Times for providing us with a cleaned copy of the Persons of Significant Control data from the Register of Overseas Entities. We also thank UNU-Wider for its generous support of this work. This study is reproduced here with full acknowledgement of UNU-WIDER, Helsinki. It was originally prepared under the project Detecting and countering illicit financial flows that was implemented in collaboration with the University of Copenhagen. The project was part of the Domestic Revenue Mobilization programme, which is financed through specific contributions by the Norwegian Agency for Development Cooperation (Norad). Matthew Collin also thanks the Norwegian Research Council, grant no. 341289 for support. This analysis paper was pre-registered on Open Science Framework: https://osf.io/c3ue8 prior to the authors analyzing data from February 2022 and after. All errors are our own.

1 Introduction

Financial crime experts consider real estate to be a popular destination for the proceeds of foreign corruption, money laundering, and tax evasion (FATF, 2007). While recent anti-money laundering and tax transparency measures have made it significantly harder to hold financial assets anonymously, this has led to an observable shift of anonymous wealth into real estate (De Simone, 2015; Bomare and Herry, 2024; Johannesen, Miethe, and Weishaar, 2022; Alstadsæter et al., 2022), where transactions are rarely subject to the same level of scrutiny (HM Treasury, 2020). Anecdotally, high-value property markets in cosmopolitan cities are thought to be rife with dirty money, with investigators and the media frequently reporting on properties connected to individuals suspected of engaging in corruption and crime (Gabriel, 2018; White, 2020; OCCRP, 2021; Transparency International, 2024).

Real estate offers a stable, difficult-to-track asset class for those looking to store illicit wealth. It is also relatively easy to hold anonymously: using an offshore shell company is often sufficient to ensuring ownership cannot be traced to a natural person. To curtail the anonymous ownership that enables financial crime, many governments have begun to mandate some form of *beneficial ownership transparency*: the requirement that a legal entity should report the natural persons who are its ultimate owners, either because the entity is registered in or owns assets in a country that requires it to do so (World Bank, 2020). As of February 2025, nearly 100 countries have set up beneficial ownership registries, and collectively, 80% of the UN member states have implemented or are currently implementing this reform.[1]

Despite its popularity among transparency advocates and law enforcement, beneficial ownership transparency interventions have not been subject to much empirical scrutiny, opening up space for significant debate as to whether the (unquantified) public benefit outweighs the purported privacy concerns around collecting confidential ownership data. In what the *Financial Times* termed a "gift to oligarchs under sanctions," the European Court of Justice struck down unrestricted public access to registries in the EU on concerns over individual privacy and lack of evidence of public benefit.[2] Similarly, an effort by US Treasury to gather centralized beneficial ownership information as part of the Corporate Transparency Act in 2022 has come under multiple legal challenges, sparked outrage among some Congressional Republicans, and is not presently being enforced by the current US administration over purported concerns around the cost of compliance by small businesses.[3]

To investigate the effectiveness of beneficial ownership transparency, in this paper we undertake an impact evaluation of a recent law imposing beneficial ownership transparency for all UK properties held by overseas companies. The UK property market is an ideal test case for this intervention, given its notoriety for hosting illicit proceeds. In a recent report, Transparency International UK identified £11.1 billion of questionable funds invested in over 1,600 UK properties since 2016.[4] Lon-

[1] Open Ownership map: Worldwide action on beneficial ownership transparency

[2] The ECJ's gift to oligarchs under sanctions (Financial Times)

[3] The Corporate Transparency Act Means Jail Time for Small Business Owners (Newsweek)

[4] https://www.transparency.org.uk/news/new-analysis-reveals-role-overseas-territories-pumping-almost-ps6-billion-dirty-money-uk

don, in particular, has been singled out as a popular market, so much so that journalists are running a guided *Kleptocracy Tour*, showing off London properties owned by kleptocrats.[5]

The law we study was fast-tracked as part of the UK government's response to Russia's invasion of Ukraine in February 2022, the Economic Crime Bill (ECB) (passed as the Economic Crime Act) established a public and retrospective 'Register of Overseas Entities' which lists offshore companies that own real property in the UK as well as their beneficial owners (those that hold 25 per cent or more of voting rights). Combining several UK administrative datasets on land ownership and company registration, we adopt a difference-in-differences design around the announcement and implementation of the ECB to analyse whether the policy impacted purchases and sales of property by companies based in specific overseas jurisdictions known for their ownership opacity and facilitation of illicit flows in the past: tax havens. Our main analysis was pre-specified in a pre-analysis plan we filed before assembling our post-treatment dataset, as well as in a afunding proposal submitted a few weeks after in the invasion of Ukraine.

We find that following the introduction of the ECB in February 2022 (and its eventual passing in March of that year), purchases of UK property made by companies based in tax havens fell significantly, and remain lower today. Sales do not appreciably decline over time, indicating that the policy did not lead to an exodus of existing ownership through tax havens, possibly due to anti-forestalling provisions in the ECB legislation or due to lack of coverage of the Register for certain ownership structures (such as those involving tursts). Overall stocks held via tax havens fell around 5% relative to the control group. However, in contrast to other work showing that exogenous changes in demand can affect house prices in the UK (Sá, 2016; Badarinza and Ramadorai, 2018; Johannesen, Miethe, and Weishaar, 2022), we do not find evidence that the policy led to changes in the average price of properties in neighborhoods with a significant amount of offshore investment.

When we compare purchases by companies from tax havens that are more likely to be used by Russians, we find a more immediate drop following the invasion. However, purchases from havens known to be used by individuals from highly corrupt countries and those participating in automatic tax information exchange (AEOI) agreements also fall in the long term. In all cases, the decline in property transactions involving tax havens continues following the implementation of the ECB in August, at which point the reporting requirements for companies became a prerequisite for the registration of ownership of title. We do not find any evidence of diversion of investment in suspicious domestic companies. In the final part of our analysis, we show that a significant share of companies that own UK property have managed to shield their ultimate beneficial owners from appearing on the Register of Overseas Entities, and that jurisdictions with more anonymity-preserving companies saw lower declines in real estate stocks following the invasion. Our interpretation of this result is that incomplete enforcement and coverage of beneficial ownership reporting reduce the incentive of existing owners to divest their holdings.

We make several contributions to the empirical literature on beneficial ownership transparency and efforts to combat cross-border money laundering. First, it is one of the first evaluations of a

[5]The Guardian: Kleptocracy Tours Expose State Failure to Stop Dirty Money Buying up London'

policy intended to counter illicit financial flows by increasing transparency within a single property market, joining work by Agarwal, Chia, and Sing (2020) which shows how sectoral regulation can reduce prices of real estate assets bought by persons linked to offshore shell companies. It also follows our own work studying a pilot program of beneficial ownership reporting in US real estate, where we found found no evidence that investment in high-value markets declined (Collin, Hollenbach, and Szakonyi, 2021). Poor enforcement and validation of the beneficial owner data may have reduced the rule's effectiveness, suggesting that implementation is a crucial factor in the success of these policies. We argue that the observed effectiveness of the ECB is due to the public-facing nature of the beneficial ownership registry being introduced, which stands in contrast to the program we studied the United States.

We also contribute to a growing body of work documenting both the stock of foreign ownership of property in coveted markets, such as Dubai (Alstadsæter et al., 2022), France (Cvijanović and Spaenjers, 2021), Norway (Alstadsæter, 2022), and the UK (Sá, 2016; De Simone, 2015; Johannesen, Miethe, and Weishaar, 2022), as well as the determinants of foreign and anonymous investment. For example, Bomare and Herry (2024) show that a significant amount of wealth flowed into the UK property market following the introduction of AEOI reporting, as property fell outside of the beneficial reporting regime (which was relegated to financial accounts). Their paper shows that in addition to taxes (Gorback and Keys, 2020), policy tools centred around transparency can affect investment inflows and prices paid for real estate. Similarly, a recent paper by Johannesen, Miethe, and Weishaar (2022) finds that the (unsubstantiated) threat of beneficial ownership registers in a number of tax havens may have reduced the incentive to hold UK property through companies in these jurisdictions. As we show slight differential effects on Russia-preferred tax havens, we also contribute to the literature on how political risk abroad affects local real estate markets (Badarinza and Ramadorai, 2018).

Finally, our work builds on a literature on how policies aimed at revealing ultimate ownership can drive anonymous or illicit wealth out of targeted markets. This includes research documenting the significant, negative impact that transparency initiatives have on various forms of offshore wealth (Casi, Spengel, and Stage, 2020; Menkhoff and Miethe, 2019; Beer, Coelho, and Leduc, 2019; O'Reilly, Ramirez, and Stemmer, 2019) and a number of studies showing that increasing the chance of discovery by authorities can force those who have previously enjoyed anonymity to begin complying (Bethmann and Kvasnicka, 2016; Londoño-Vélez and Ávila-Mahecha, 2021).

The rest of the paper is structured as follows: Section 2 describes how the UK has become known for being a haven of illicit money over the past few decades, the introduction of the Economic Crime Bill and its expected impacts. Section 3 describes the datasets we will be using to examine the impact of the ECB, Section 3.5 describes our empirical approach, and Section 4 our main findings. We discuss the results and our interpretation and conclusions in Sections 6 and 7.

2 Background and analytical framework

2.1 The rise of 'Londongrad'

Prior to the invasion of Ukraine, the British economy has earned a reputation for being attractive to kleptocrats, criminals, tax evaders, and other fraudsters. First, the UK has strong historic links with the Crown Dependencies and Overseas Territories, notorious tax havens and secrecy jurisdictions that require relatively little information from wealthy individuals looking to hide their cash.[6] Second, prior to the introduction of a beneficial ownership register for domestic UK companies in 2016, anonymous UK corporate entities were simple to establish, with low costs of filing and infrequent audits, providing those looking to open accounts a sheen of respectability that could easily be abused.[7] Filing company documents does not require identity verification, requiring less than getting a library card.[8] Following the financial crisis, the British government also actively courted wealth from highly-corrupt countries through its Tier 1 'golden visa' program, which offered a path to residency in exchange for investments of at least 2 million pounds.[9] In total, more than 12,000 such visas were granted, around half of which went to Russian and Chinese investors. The influx of illicit capital has sparked concerns that Britain serves as 'butler to the world' and has earned London the nickname 'Londongrad' (Bullough, 2022).

The UK real estate market - currently worth around 8 trillion pounds - is particularly attractive for illicit investment. This has been driven in part by the fact that for years individuals could purchase properties using a multi-layered, international schema of shell companies, with minimal effort or expense needed to conceal their true beneficial ownership from authorities. For example De Simone (2015) find that out of all properties connected to owners under investigation in the UK for corruption, over 75 percent were purchased using a company based in an offshore jurisdiction with high levels of financial secrecy.

To date there are no definitive estimates of the amount of illicit money that has made its way into the UK property market. The investigation of leaked files in the Pandora Papers uncovered roughly £4 billion in secret UK property transactions linked to 'heads of government, oligarchs, business tycoons, ruling families and a Middle Eastern monarch.'[10] Transparency International has estimated that since 2016, £11 billion of suspicious purchases have been made, with roughly £1.5 billion being bought by Russians with ties to the Kremlin (TI UK, 2022*b*). Recent academic studies suggest a large share of offshore-owned real estate may be in part financed through tax evasion: Bomare and Herry (2024) estimate that between 2013 and 2016 up to $45 billion was invested in the UK property market via offshore companies in an effort to evade the OECD's Common Reporting Standard (CRS) reporting requirements, which mandated that offshore banks begin transmitting information on their customers' financial accounts to tax authorities around the world.

[6] 'Dirty Money in the UK Is Harming More than Our Reputation' (Financial Times)
[7] "Londongrad': The Real-Life Fight against Dirty Money Flowing into London from Foreign Countries' (ABC News)
[8] 'Companies House is dysfunctional and facilitating fraud, MPs told' (The Guardian)
[9] "London laundromat': how golden visa scheme created UK haven for dirty money' (The Guardian)
[10] Revealed: Pandora papers unmask owners of offshore-held UK property worth £4bn (The Guardian)

Even without exact estimates, many believe the scope for illicit investments in UK real estate to be large, given that offshore companies own between £70-90 billion in residential real estate in England and Wales (Bomare and Herry, 2024; Johannesen, Miethe, and Weishaar, 2022), totaling close to 200,000 properties. Inner London in particular has seen huge inflows of money from overseas companies, as demonstrated in Figure 1.

2.2 The 2022 Economic Crime Act and the Register of Overseas Entities

By the mid-2010s, the UK's unsavoury reputation as a hub for money laundering finally forced politicians into considering taking action. During the 2016 Anti-Corruption summit, then-Prime Minister David Cameron announced that the UK would implement a registry of beneficial ownership covering all overseas firms that owned UK property. Introducing transparency, it was believed, would deter bad actors from exploiting the real estate sector. Those plans were derailed a few months later when the Brexit Referendum led to Cameron's resignation. Subsequent Conservative Party leadership deprioritized the initiative, which languished for nearly seven more years. UK Minister for Efficiency and Transformation Lord Theodore Agnew even resigned from his post in frustration that the government was stalling on the reform.[11]

The winds shifted following Russia's invasion of Ukraine on 24 February 2022, when the size and scale of the misuse of the UK's economy by illicit actors—including many Russian oligarchs—rose to the top of media agendas and became politically intolerable. Cracking down on Putin's wealthy allies was seen as a way to dissuade him from pushing further militarily into Ukraine. As a result, the ECB was fast-tracked. It was introduced in Parliament on 1 March and received Royal Ascent just over two weeks later; upon becoming law, the policy became known as the Economic Crime Act (ECA).[12]

A key component of the ECB was to introduce a Register of Overseas Entities that required all overseas companies that own land in the UK to report the identity of their beneficial owner(s). Any overseas firms that had existing holdings or acquired new holdings prior to 1 August 2022 would be subject to a transitional period, and would have until 31 January 2023 to submit beneficial ownership information to the register.[13] As a backstop, the new law also required that any overseas firm that wished to sell property it already owned after 28 February 2022 would have to register with Companies House; otherwise a property could not be sold.[14] The register would be released publicly on 1 August 2022. From then on, all foreign companies that purchased UK property would have to submit beneficial ownership information to the register in order to obtain legal title from

[11] 'Government Denies Claims It Has Scrapped Crucial Economic Crimes Bill' (The Guardian)

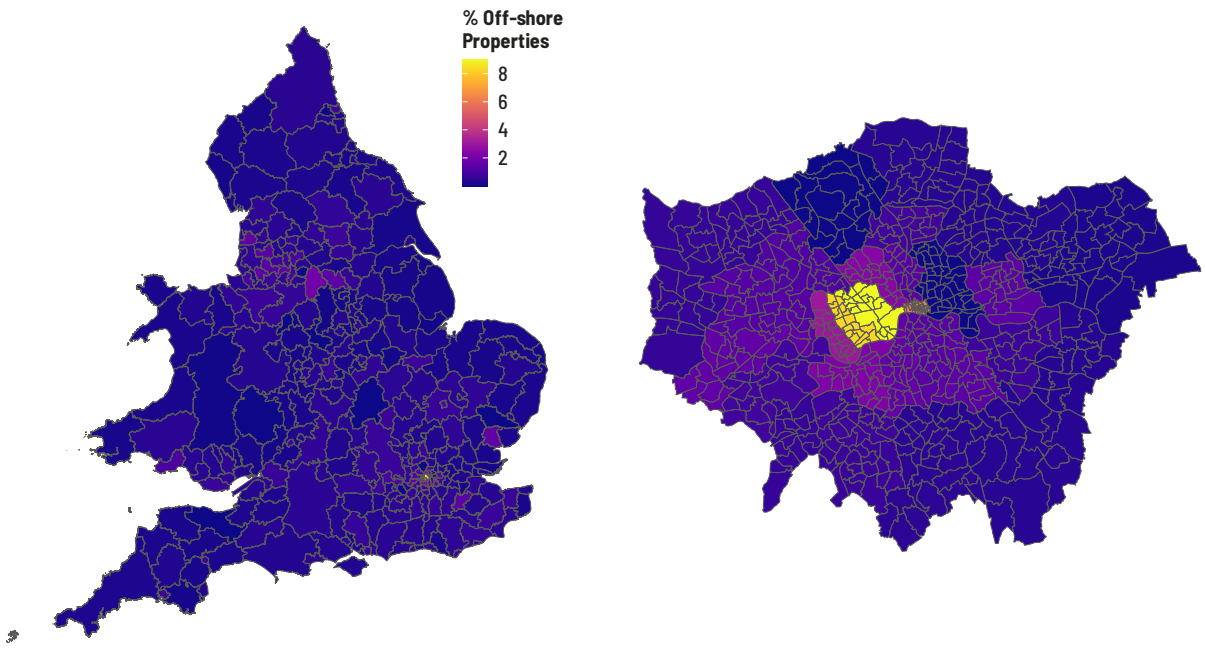
[12] The first reporting of the bill's resurrection came on 27 February ('Government Brings Forward Bill to Tackle UK's "Dirty Money"' (Financial Times)).

[13] Existing holdings were defined as any properties acquired since January 1999. Transparency International UK identified 1,892 properties purchased by overseas companies prior to this date that would be declared exempt under the bill.

[14] Concerns were raised that an extended grace period might enable overseas owners to dispose of or transfer real estate assets without ever revealing their connection. The provision that transactions cannot occur unless ownership information is submitted somewhat allayed that fear.

Figure 1: Overseas property ownership across England and Wales

(a) England and Wales **(b) London only**



Note: the map shows the estimated proportion of all properties (residential + commercial) in each local authority owned by overseas companies at the start of 2020. The data on property ownership are described in Section 3.

the UK Land Registry.

As envisioned by the bill, the Register of Overseas Entities shares several key similarities with other corporate registries implemented by the UK government. First, the register is public, retrospective, and updated regularly, a remarkable step that distinguishes the UK from several of its counterparts in the OECD currently trying to combat illicit financial flows. For example, in late 2020, the beneficial ownership register established by the United States as part of the Coporate Transparency Act did not attempt to make the data publicly available, instead only being released to authorized government agencies and some financial institutions. Even though many European countries still maintain publicly accessible registers following the recent court ruling in favor of privacy, access is restricted to those who can demonstrated a 'legitimate' interest. Second, the UK register adopts the same 'broadly sufficient' definition of beneficial ownership as that applied to UK companies (TI UK, 2022*a*). Finally, the bill laid out out serious punishments for non-compliance, from daily fines to a maximum sentence of five-year imprisonment.

However, it should be noted that there Register of Overseas does have a number of limitations which could allow illicit investment to continue. First, as we describe in Section 5.2, there are different ways to legally circumvent being included in the register. Activists have sounded alarm that

the ECB contained loopholes allowing companies to simply deny having any qualifying beneficial owners (TI UK, 2022*a*). Another statute allows companies to report nominee owners and directors, oftentimes arranged in agreement with professional service firms, rather than their true beneficial owners (Beioley and Hughes, 2022). It is also still possible to remain off the register if the beneficial owner controls less than 25% of the company in question, raising the possibility that owners may obscure their identity through dilution (Advani et al., 2023). Finally, the underlying legislation exempted those who are the settlor or beneficiaries of trusts that own the underlying companies. While this information is instead reported by Companies House to the UK tax authority HMRC, it remains out of the public eye.

The success of the Register itself also depends on institutional capacity to police the quality of information and enforce compliance. Companies House, the government entity tasked with maintaining the Register as well as the UK corporate registry, does not have a great track record for spotting fraudulent submissions in its existing beneficial ownership register. A series of investigative reports have uncovered deep problems in existing Companies House registries, from fraudsters using fake names to register companies,[15] to a substantial number of companies refusing to file reports altogether (GW, 2013).[16] While submissions to the Register of Overseas Entities must have an identity verification conducted by a regulated third party to ensure that the beneficial owner is a real person, it is still possible that the information submitted does not describe the real beneficial owner. Companies House's ability to challenge potentially misleading information was expanded with the passing of the Economic Crime and Corporate Transparency Act 2023, with new powers coming into effect in 2024.[17]

2.3 Expected impact and analytical framework

Our prior is that those investing in the UK property market illicitly prefer to make those investments anonymously, as it reduces the probability of detection and punishment. At the time of its announcement, we expect that the Register of Overseas Entities posed a credible threat to that anonymity, and thus would decrease new investment in UK real estate via previously-anonymous channels, much in the way that policies threatening anonymous ownership of financial assets have changed behavior over time (Casi, Spengel, and Stage, 2020).

In short, we expect both new purchases and the stock of properties held by *tax havens*, jurisdictions known for providing ownership secrecy, to either fall (if the ECB was a credible threat) or remain unchanged (if it was not), relative to other foreign jurisdictions in the sample. We also expect new sales by offshore companies to increase (if existing owners decided to sell prior to the introduction of the Register, ignoring the stopgap reporting requirements put in place), stay the same if the ECB was not treated as a credible threat, or decrease in the event that it was. We expect most effects to be immediate and persistent, given the salience of the policy when it was introduced, but expect

[15] Some of the most egregious examples included Jesus Christ, Donald Duck, and 'Adolf Tooth Fairy Hitler'.
[16] 'UK May Ditch Plans to Stop Fraudsters Using Fake Names to Run Businesses' (Open Democracy)
[17] 'Can the new Economic Crime Bill really tackle the UK's dirty money problem?' (Open Democracy)

them to grow after the Register becomes active and companies are asked to comply before their right to register property with the Land Registry would be honored. We filed a pre-analysis plan, detailing our main hypothesis and approach, prior to conducting any analyses. Any deviations from the PAP are described in Appendix Section D.

There are a number of reasons, however, ex-ante to be pessimistic about the effectiveness of the Register of Overseas Entities. First, in a related paper, Collin, Hollenbach, and Szakonyi (2021) find that beneficial ownership reporting did not lead to a reduction in investment in US real estate. However, in contrast to that program, the UK's Register of Overseas Entities is fully public, allowing many more interested parties to search for cases of corruption and crime, as well as ascertain the veracity of the underlying data. Second, as described above, the Register as being currently implemented still has a number of a loopholes that could potentially be exploited.

To investigate the effectiveness of the ECB and the ROE, we analyze changes in purchases, sales and the stock of properties owned by overseas companies following its introduction. To further pinpoint a possible effect, we also separate overseas buyers by types of tax havens. We expect any causal effect of the ECB to be particularly visible for overseas companies registered in havens known to be popular with groups with a strong incentive to obscure their ultimate ownership. We also do this in order to isolate the behavior of Russians - who may have decreased their investment in the UK purely due to the introduction of sanctions as well as the temporary collapse in the value of the ruble.

We also investigate possible substitution by examining whether purchases made by UK companies with high-risk characteristics (i.e., those displaying signs of being shell companies) will increase, as individuals look for new means of maintaining anonymous ownership. The drop in purchases by overseas companies may be attenuated by suspicious money finding its way to the same properties using alternative mechanisms. To test this potential mechanism, we investigate whether more suspicious domestic firms increase property purchases in areas targeted by overseas investors in the past.

3 Data and main empirical framework

Our main focus is on estimating the impact that the reintroduction of the ECB and the eventual establishment of the Overseas Register has had on anonymous offshore investment in the UK property market. To do so, we estimate a series of difference-in-difference models, where treated units are jurisdictions that are more likely to be facilitating completely anonymous investment (tax havens) and thus lose their relative advantage in secrecy with the introduction of the ECB and control units are those where the transparency introduced by ECB is less likely to have an effect (non-havens). In this section, we describe how we construct the analysis dataset, as well as the main empirical strategy we rely on.

3.1 Measuring foreign property transactions over time

To measure property purchases and sales made by offshore companies, we rely on two sources of data published by the UK Land Registry. The first is the 'Overseas Companies that own property in England and Wales database' (OCOD).[18] The OCOD has been updated monthly since October 2015 and contains a list of title registrations in England and Wales 'where the registered legal owner is an overseas company (a company incorporated outside of the UK).[19]' We combine OCOD with the 'UK Companies that own property in England and Wales database' (CCOD), which includes information on all properties bought by companies registered in the UK since March 2014.[20] In this current version of the paper we use data from September 3, 2024 release.

Although the OCOD and CCOD registries capture all title registrations involving overseas and domestic companies, they both have several limitations that must be handled carefully. First, the OCOD and CCOD only contain information on the overseas and domestic companies involved in the transaction, and not other parties. For example, if an overseas company sells a property to a natural person, that only appears as an entry in the OCOD with information on the seller, but as these databases did not collect data on individuals, we have neither information on who the buyer is nor, in many instances, when the property was bought. If a domestic company sells a property to an overseas company, the sale is registered as an entry in the CCOD data, while the purchase is registered in the OCOD data.

Therefore, we combine the OCOD and CCOD databases into a single 'corporate property sales register' of all property sales since 2018 that involved either an overseas or domestic company. We merge the two based on the title change date and the title number. For all transactions where the counterparty (buyer or seller) information is missing, we code these counterparties as being natural persons. Table 1 presents the distribution of sales from January 2018 through December 2023 between overseas companies, domestic companies, and natural persons. By combining the OCOD and CCOD registries, we increase our coverage of transactions involving foreign companies by roughly 25 per cent. Compared to domestic companies, foreign companies trade more intensely with other foreign companies: around 16% of all transactions with at least one overseas company involve another overseas company as the counterparty. By contrast, only 1.5% of transactions with at least one domestic company involve an overseas company as a counterparty.

Second, we only observe the exact property sales date if the buyer is an overseas or domestic company, and thus information was included in our combined OCOD/CCOD registry. For all sales to natural persons, we only know the date the title registration was changed in either the OCOD or CCOD registry, which can lag the actual sales data by an average of 81 days.[21] Because of this imprecision, in any analyses in which we use monthly data, we drop all sales to individuals prior to aggregating. We still use the full sales data to construct our measure of quarterly stock, as this

[18] The previous name for this database was Overseas Companies Ownership Data, hence the acronym.

[19] https://www.gov.uk/guidance/hm-land-registry-overseas-companies-that-own-property-in-england-and-wales.

[20] Editions were issued quarterly for the first three years, and then monthly since 2017.

[21] Appendix Section C shows that the lag in reporting does not vary based on the jurisdiction of company buyers or sellers.

Table 1: Property Sales by Buyer and Seller Type

Buyer - Seller	N	%
Domestic Company - Domestic Company	481,753	24.40
Domestic Company - Natural Person	1,011,840	51.26
Domestic Company - Overseas Company	17,574	0.89
Natural Person - Domestic Company	413,187	20.93
Natural Person - Overseas Company	16,393	0.83
Overseas Company - Domestic Company	11,020	0.56
Overseas Company - Natural Person	15,310	0.78
Overseas Company - Overseas Company	7,043	0.36
Total	1,974,120	

Notes: This table shows the distribution of property sales (residential, commercial and land) between different types of buyers and sellers. We cannot observe transactions between Natural Persons.

should be less prone to being affected by the lag. However, given that we cannot precisely measure the date sales to natural persons, which make up nearly 45% (see Table 1) of all sales by overseas companies, we will not be able to rule out temporary, positive sale shocks. These might occur if, for instance, there was a large scale sell-off of property specifically to natural persons the month after the announcement of the ECB, because we would not be able to - with confidence - identify that those transactions occur in that month. We will however be able to rule out long term changes in overall sales that occur in the period after the announcement of the policy.

Third, entries include all changes in the property title information, including both transfers of ownership between different actors and modifications made to address and legal name fields. To focus on actual sales, we exclude all title registrations where the actual owner (as indicated by either name or unique alphanumerical company ID) does not change.

Fourth, our combined 'corporate property registry' includes information at the property title level, which may contain multiple physical properties. To identify instances where titles contain multiple properties, we apply a set of algorithms developed by Bourne, Ingianni, and McKenzie (2022) to enhance the corporate property registry by first tidying the data so that individual properties are listed on each line, and then standardizing the address and locating the local authority for the property based on the system from the Office of National Statistics.[22]

Finally, since there is typically a delay in the registration of a transaction, any given edition of the OCOD and CCOD will have incomplete coverage for transactions for the months most proximate to the release of the database. To account for this, we only consider transactions logged before January 1, 2024, nine months before the last edition of the OCOD/CCOD (September 2024) we use. In Appendix Section C, we also explore how stable our results are to recent changes of the data.

[22] Because the algorithms were designed for the OCOD, we adapted them to also process the CCOD data.

3.2 Measuring price at the transaction level

One outcome we wish to observe is the total value of real estate acquired via companies registered in a given jurisdiction. Unfortunately, price data is not available for all transactions in our data: in our combined sample of real estate transactions from the OCOD and CCOD databases, 38 per cent of observations contain information on the prices paid by buyers.[23] We complement the OCOD/CCOD data with price information in the UK Land Registry Price Paid dataset,[24] which contains title-level information on all property sales in England and Wales, including the price paid and address of the property. Merging in the additional price data, however, only reduces the share of missing values by around 0.7 percentage points.

To estimate prices for the remaining 62 per cent of transactions without such information, we follow Bomare and Herry (2024) and rely on a simple price prediction model: we estimate a linear regression model with prices paid (natural log) as the dependent variable and transaction-specific covariates, property-type (domestic, business or land) fixed effects, as well as including quarter and postcode district fixed effects.[25] Based on a test set, excluded from the estimation, our price prediction model has a root-mean-squared error (RMSE) of 1.01 and a mean absolute error (MAE) of 0.64.[26] We then use the estimated model to generate predictions for all transactions without price information. Summary statistics for all purchases, sales, and stock information across both tax havens and non-havens are available in Table A2 in the Appendix.

Combining data on the value of purchases from both the CCOD and OCOD, we observe that leading up to the invasion of Ukraine and introduction of the bill, monthly corporate purchases of property in England and Wales comprised approximately £7.5b on average, with £1.2b (17%) of that being by overseas companies. As we show in Figure 2, that proportion has been falling steadily since the ECB was introduced, declining from around 20% before the introduction of the ECB to around 10% today, an initial sign that overall offshore investment may have slowed following the introduction of the ECB (similarly, the residential real estate share has fallen from beteween 40-50% to around 20%). However, not all offshore investment is the same: in the next section, we describe the jurisdictions we expect to have been more affected by the introduction of the Register of Overseas Entities.

3.3 Identifying jurisdictions that are tax havens and selecting those with different risk profiles

We begin by identifying overseas jurisdictions that are more commonly associated with the desire for secrecy of ownership, illicit money flows and tax evasion. We primarily draw on a list of tax havens used in Menkhoff and Miethe (2019). For robustness, in the Appendix we also present our

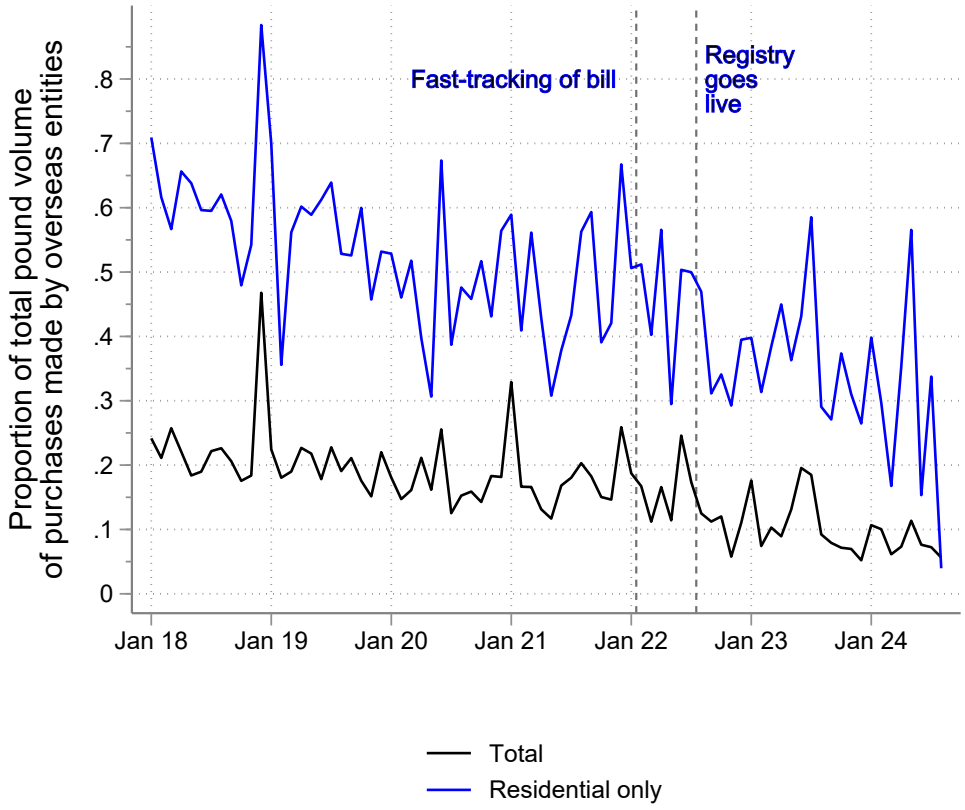
[23] This is quite similar to the missingness in price information reported by Bomare and Herry (2024), who note that only 36 per cent of transactions in their data include price information.

[24] https://www.gov.uk/government/statistical-data-sets/price-paid-data-downloads.

[25] For those transactions without postcodes, we estimate the postcode district fixed effect based on a 'missing' category, but we add additional fixed effects at the local authority level.

[26] For comparison, Bomare and Herry (2024) report an out-of-sample RMSE of 1.128 and MAE of 0.683.

Figure 2: Offshore investment as a share of all corporate purchases is falling



Note: this figure shows the proportion of the total GBP value of all monthly purchases made by offshore companies in England and Wales as a proportion of all corporate (offshore and onshore) purchases. It is calculated using purchases logged in either the OCOD or CCOD public databases, both for all purchases and those identified as being residential real estate.

headline results using lists used by Johannesen and Zucman (2014) and a 'consensus list' used by both Menkhoff and Miethe (2019) and Bomare and Herry (2024).

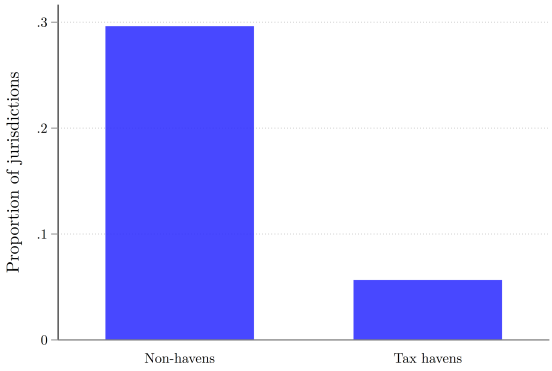
Why are purchases made via tax havens more likely to be motivated by the desire to maintain secrecy? Historically, havens have been been popular destinations for both offshore wealth and for the creation of anonymous shell companies. For example, in Figure 3 we show that the proportion of tax havens that have created centralized, publicly-accessible beneficial ownership registries is substantially lower than in other jurisdictions, and that the preponderance of offshore companies that appear in large-scale leaks is higher.

Next, within the set of tax havens we consider, we identify those that are more popular among three sets of groups who are likely to have responded to the Ukraine invasion and passing of the ECB differently. To do so we rely on data from the ICIJ Offshore Leaks Database,[27] which com-

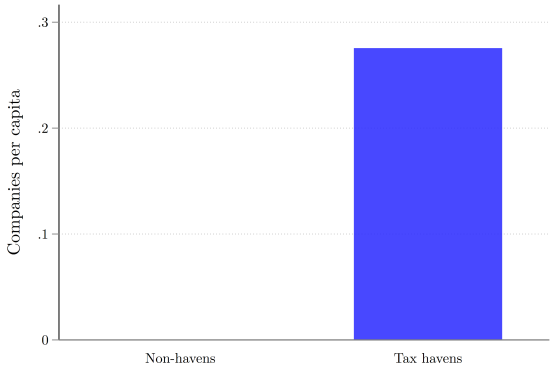
[27] https://offshoreleaks.icij.org/.

Figure 3: Ownership opacity and shell company popularity, by tax haven status

(a) Probability of having a public register of beneficial ownership of companies



(b) Number of companies featured in large-scale financial leaks, per capita



Notes: Figure 3 shows (a) the probability that a jurisdiction has a live, centralized, publicly-accessible register of the beneficial ownership of companies in place as of 2023 (as reported by Open Ownership) and (b) the number of companies per capita that appear in the ICIJ's Offshore Leaks database. For tax haven status we use the same list as in Menkhoff and Miethe, 2019. Sample restricted to jurisdictions where companies that purchased property in England and Wales during our study period are registered.

prises multiple leaks of offshore financial information (including both the Panama and Pandora Papers), including beneficial ownership information for over 500,000 individuals. Following a similar methodology to that of Bomare and Herry (2024),[28] for a given group g and tax haven jurisdiction j, we calculate the total percentage of all identified beneficial owners, owners, and shareholders of companies based in jurisdiction j that are from group g, that is:

$$s_{gj} = \frac{n_{gj}}{\sum_{j=1}^{k} n_{gj}}$$

We focus on three groups of beneficial owners or shareholders:

- **Russian nationals**: for the purpose of disentangling the degree to which any changes observed in offshore ownership are driven by an attempt to evade sanctions, independent of the effect of beneficial ownership transparency.
- **People from corrupt countries**: as measured by those who score below the 25th percentile in Transparency International's Corruption Perceptions Index, under the assumption that these individuals are more likely to be using offshore companies to hide their beneficial ownership information, in line with evidence from studies such as Andersen, Johannesen, and Rijkers (2022) demonstrating that tax havens deposits increase following aid disbursements in low-capacity states.
- **People from non-haven countries engaging in automatic-exchange of tax information**: those

[28] We deviate from Bomare and Herry (2024) in that we use havens with a higher relative proportion of beneficial owners from a given group, rather than setting an absolute threshold.

Table 2: Tax havens with the highest share of different high-risk groups

	CPI 25th percentile		Russian		CRS/AEOI signatories	
Rank	Haven	% BOs	Haven	% BOs	Haven	% BOs
1	Liberia	25.00%	Gibraltar	12.50%	Grenada	100.00%
2	Saint Kitts and Nevis	23.08%	Cyprus	10.91%	Turks and Caicos Islands	100.00%
3	Gibraltar	18.75%	Bahamas	5.41%	Guernsey	88.06%
4	Cyprus	14.55%	Hong Kong	4.54%	Anguilla	72.33%
5	Guernsey	9.70%	Mauritius	3.53%	Isle of Man	71.14%
6	Hong Kong	8.55%	British Virgin Islands	2.52%	Cyprus	60.91%
7	Belize	8.47%	Seychelles	1.86%	Costa Rica	58.68%
8	Bahamas	7.56%	Belize	1.72%	Jersey	56.62%
9	Mauritius	7.53%	Jersey	1.53%	Gibraltar	56.25%
10	Malta	5.41%	Labuan	1.25%	Belize	55.42%

Notes: Table shows tax havens (using the list in Menkhoff and Miethe (2019)) ranked by the total % of beneficial owners and shareholders present in the ICIJ Offshore Leaks database from each category: countries that score in the bottom quartile of the Corruptions Percention's index, Russians, and non-tax haven countries that are signatories to the OECD's Common Reporting Standard for AEOI.

from countries currently engaging in the OECD's CRS, as there is significant evidence that the introduction of the CRS led to a flight of financial wealth from tax havens into UK property (Bomare and Herry, 2024).

For each group, we identify the upper quartile of havens with the highest absolute level of popularity for each of the three groups. The resulting breakdown for each group is shown in Table 2. There is overlap between the three lists. However, the share of beneficial owners from corrupt countries has no (or in the case of the bottom 25th percentile, a negative) correlation with the share from AEOI countries. The share of Russians is weakly correlated with both. These differences will allow us to investigate the degree to which avoiding anti-corruption efforts or tax evasion behavior are at play, or whether Russians are being pushed out of the market by concurrent sanctions.

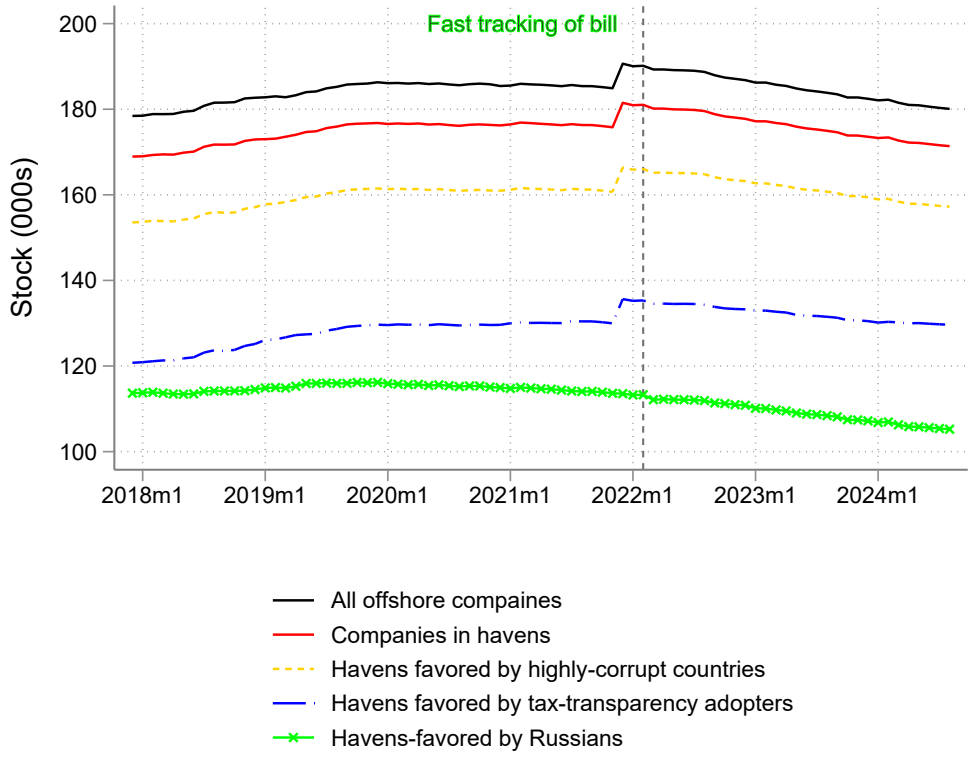
3.4 Overall trends in offshore and tax haven ownership

At the beginning of 2022, there were approximately 188,000 offshore-owned properties in England and Wales (Figure 4).[29] Throughout the analysis, roughly 95 per cent of these properties are owned by companies registered in tax havens. Ownership is also highly concentrated among tax havens: three havens comprise around 54% of the stock of all offshore holdings: Guernsey, Jersey and the British Virgin Islands. Overall stocks of offshore ownership, tax haven ownership, as well as ownership by different types of tax havens have all declined since early 2022.[30]

[29] There were approximately 100,000 offshore-owned titles at this point. Titles can encompass multiple properties.

[30] There is a significant spike at the end of 2021, entirely driven by a few large scale purchases made via Guernsey. Our main results reply winsorsizing to smooth extreme swings in purchases or stocks.

Figure 4: Trends in the stock of offshore ownership (2018 until mid-2024)



Note: this figure shows the estimated total number of properties (domestic, commercial and lands) in England and Wales owned by (1) offshore companies, (2) offshore companies based in tax havens, (3) offshore companies in havens that are preferred by those from countries at the 25th percentile or lower on the Corruption Perceptions Index, (4) havens preferred by Russians, and (5) havens preferred by residents of countries participating in automatic-exchange-of-information.

3.5 Main empirical framework

Our main focus is on estimating the impact that the reintroduction of the ECB and the eventual establishment of the Overseas Register has had on anonymous offshore investment in the UK property market. First, we explore whether investment by offshore companies declined following the re-announcement of the policy in February 2022.

We do so by estimating a standard difference-in-differences model. Consider the following specification:

$$P_{it} = \beta \times Haven_i \times Post_t + \theta_i + \gamma_t + \varepsilon_{it} \tag{1}$$

where P_{it} is the purchase/sale of properties (either the number or the total GBP value) at time t made via companies registered in jurisdiction i or the total stock owned by companies from that jurisdiction. The dummy $Haven_i$ is equal to 1 if the jurisdiction is a tax haven and $Post_t$ is an

indicator equal to 1 on and after February 2022 (or Q1 2022 for quarterly specifications). The parameters θ_i and γ_t are jurisdiction and period fixed effects, respectively. The coefficient β indicates the relative difference in the stock of properties owned through havens versus non-havens in the period following the invasion of Ukraine and the announcement of the ECB. Note that our estimate β will not pick up on the impact on overall investment in UK property, but only the difference in investment between companies that are based in tax havens (under the presumption that the primary motivation for this route of investment is its lack of transparency) and those that are not. We will also estimate the above both using an inverse hyperbolic sign function transformation (or logs, in the case of the stock regressions), and the probability of any purchase as an outcome.

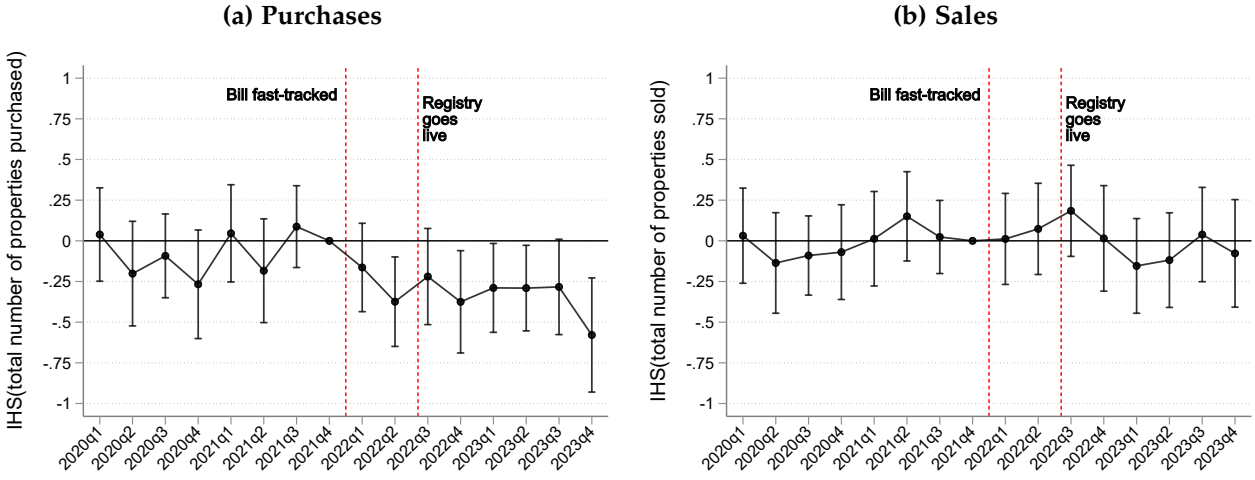
Our assumption is that, absent the introduction of the ECB, differences in the trends in the level of new purchases, sales, and ultimately the stock of properties held via tax havens would have evolved the same relative to non-havens. This may have been violated if there were any concurrent shocks which affected tax haven investments deferentially. Other than the invasion of Ukraine itself, which may have had a separate effect on Russian investments absent the introduction of the ECB due to sanctions, we could identify no other shocks. Below, we will show that our main results hold even when we separate out the potential influence of Russian investors.

To investigate both parallel trends and how effects evolve over time, we also estimate the event-study version of equation (1), which is:

$$P_{ie} = \beta \times \sum_{k=-24}^{8} Haven_i \times I[e = k] + \theta_i + \gamma_e + \varepsilon_{ie} \tag{2}$$

Finally, we investigate how these effects change when our treatment group is, respectively, havens that are favoured by Russians, those from highly corrupt countries, and AEOI-participating countries, as described in Section 3.3. This is to investigate whether one of these groups has been particularly disincentivized to invest in UK property. In each case, we repeat specifications (1) and (2) while restricting the treatment group to each of these favored-havens (but keeping the control group of non-havens fixed). Additionally, we conduct a within-haven analysis in which we compare havens that are favored by a particular group to *all other havens*, in order to observe whether one group's incentives are significantly stronger than the rest.

Figure 5: Event study estimates of impact of ECB on on transactions involving tax havens



Notes: Figure 5 shows the impact of the Russian invasion + the announcement of the ECB on the inverse hyperbolic sign of (a) the quarterly number of property purchases and (b) the quarterly number of property sales in England and Wales by companies based in tax havens (the list used by Menkhoff and Miethe, 2019) versus companies not based in tax havens. Our sales estimates exclude sales to natural persons. Confidence intervals shown are at the 95% level.

4 Results: investment and divestment through offshore companies

In this section, we present our main results on the impact of the introduction of the Economic Crime Bill and the establishment on the Register of Overseas Entities on property transactions made via tax havens.

4.1 Purchases and sales made through tax havens

Figure 5 shows the event-study estimates from equation (2), the impact of the reintroduction of the ECB on the inverse hyperbolic sign of the total number of quarterly purchases made through tax havens. While trends in the transformed number of purchases between havens and non-havens run in parallel in the two years leading up to the policy, they diverge significantly in the first quarter of 2022 after the ECB was re-prioritized and the Russian invasion of Ukraine began. By contrast, we do not see evidence of an overall reduction sales, nor a large-scale sell-off of property by companies registered in tax havens. We find a similar pattern when we repeat this exercise using untransformed outcomes (Figure A1 in the Appendix): significant declines in new purchases following the re-tabling of the ECB, but no strong evidence of either a decline in sales or a significant sell-off of property.

Table 3 presents our main difference-in-difference estimates for the impact of the ECB introduction on new monthly purchases or sales, both in their number and value. To account for recent work demonstrating the challenges in interpreting inverse hyperbolic sign transformed outcomes (Chen and Roth, 2024), we include all outcomes in their untransformed form, winsorized at the 99th percentile to account for extreme values. We also include the probability any purchase or sale took place, in order to capture the impact of the policy on the extensive margin for havens where

Table 3: Difference-in-difference estimates of impact on land transactions involving tax havens versus other overseas entities

	Binary outcome	Untransformed			Inverse Hyperbolic sign		
	(1) Any transaction?	(2) # properties	(3) # transactions	(4) £ volume	(5) # properties	(6) # transactions	(7) £ volume
(A) Purchases							
Treatment = tax haven* × post-Feb 2022	-0.057***	-3.61**	-1.79***	-4.81**	-0.22***	-0.18***	-0.97***
	(0.020)	(1.46)	(0.65)	(2.36)	(0.055)	(0.046)	(0.29)
(B) Sales †							
Treatment = tax haven* × post-Feb 2022	0.00036	-0.63	-0.42	-1.80*	-0.0037	-0.0057	0.0029
	(0.014)	(0.44)	(0.26)	(1.04)	(0.026)	(0.023)	(0.20)
R^2	0.584	0.760	0.782	0.765	0.763	0.781	0.630
Observations	6,432	6,432	6,432	6,432	6,432	6,432	6,432
# jurisdictions	134	134	134	134	134	134	134
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

Notes: Table presents different-in-difference estimates of new property purchases and new property sales by offshore companies. The unit of analysis is a jurisdiction , and treated jurisdictions are tax havens (* as classified by Menkhoff and Miethe (2019)), with treatment beginning on February 2022, the month of the Russian invasion and the re-tabling of the Economic Crime Bill. Standard errors clustered at the jurisdiction level. † Our measure of sales in our monthly specification only covers sales to other companies (see Section 3.1). $^{*}p < 0.10$,** $p < 0.05$,*** $p < 0.01$

transactions are less frequent. We find a consistent, negative impact on new property purchases: the probability of a new purchase in any given month falls by about 5.7 percentage points. The total number of new property purchases falls by about 3.6 per month, or roughly £4.8m in value per month per haven. While all the coefficients are negative in sign, we do not observe significant decreases in property sales by companies in tax havens across any of the different outcomes we observe. We interpret this as evidence that those that held existing property via tax havens did not rush to sell following the introduction of the ECB, a sign that the stopgap provisions requiring people to register their beneficial ownership information if they sold prior to the implementation of the Register may have been effective.[31]

Our main result, a decrease in new property purchases made through tax havens, is robust to many different variations to our main specification, including alternative tax havens lists, different levels of winsorizing, dropping specific transactions with an unusually large number of properties, and dropping the largest havens when ranked by their market share of new purchases.[32] Figures A2-A5 in the Appendix display a range of specification curves which show our main results are robust across a large number of different specifications. Our results are also robust to different assumptions about the reporting lag, which we investigate in Section **??** in the Appendix.[33]

There are two dimensions to the robustness of main results that we want to highlight. The first

[31] In our sales results in Figure A1, we see an elevated coefficient in the first period following the passing of the ECB. In order to more carefully test if there was an immediate sell-off of property, in Table A4 we test whether the average effect in the three months following the invasion (March-May) were positive and significant. We find no evidence of a detectable surge.

[32] Our results for any purchase lose statistical significance in our quarterly specifications, but the majority of the estimates remain at the same order of magnitude.

[33] There is one robustness check that we pre-specified in our PAP that we are unable to implement as presented (entropy balancing). We discuss in detail why this is the case and why we think that check no longer in Section D in the Appendix.

is that the size–but not the statistical significance– of the impact of the ECB is sensitive to both winsorizing the sample as well as the the exclusion of five havens that comprise roughly 80% of the value of all property purchases: the three Crown Dependencies (Guernsey, Jersey and the Isle of Man), Luxembourg and the British Virgin Islands. For example, our estimate for the impact of the ECB on monthly purchases, when we keep all jurisdictions and refrain from winsorizing, is roughly 3.58 fewer properties per month (the equivalent effect for IHS transformed outcomes is -0.22). In contrast, when we winsorize at the 99th percentile and drop these 'big five,' the effect is a more modest 0.5 fewer properties per month (with a coefficient of -0.16 when the outcomes is IHS transformed).

This sensitivity is driven by the fact that our observed effect is a composite of two different margins: an *intensive margin* response where some havens reduce the amount of property they purchase in a given period, and an *extensive margin* response, where havens that do not purchase property every month or quarter becomes less likely to make any purchases following the introduction of the ECB. The intensive margin is largely driven by the big five, who saw large declines in reported purchases, even when we make simple adjustments for reporting delays (discussed in Section **??** in the Appendix). By contrast, the intensive margin appears to be driven by jurisdictions that play a smaller role in the market, as while dropping the big five reduces our absolute and our inverse hyperbolic sign transformed outcomes, our binary outcome results become stronger, moving from a 5.7 percent decline following the treatment to a 6.5 percent decline.

Overall, we find a substantial decline in new purchases of properties by tax havens following the introduction of the ECB. To investigate whether these declines were more common for different types of property, we repeat the same analysis but differentiating between the three types of property in our sample: residential, commercial, and land. While all three are likely targets of anonymous investment, most anecdotes and reporting concerned with illicit investment in the UK property market have centered around the role of residential property. This is supported by our results: in Table A3 in the Appendix, we show that our results are strongest for residential property, and weakest for land.[34]

How big was the decline in purchases overall? Our main estimates in Table 3 suggest a decline of £4.82 million per month per haven (or roughly £480,000 when we drop the big five havens). As there are 53 havens in our main sample, this is equivalent to a £255 million per month decline, or around £5.6 billion decline over the entire post-treatment period we consider (through 2023). Without the big five, the result is substantially smaller: a decline of around £25 million per month, or £550 million over the post-treatment period.

4.2 Changes in offshore stocks

What was the aggregate impact on the total stock of properties held through tax havens? Between the beginning of the invasion of Ukraine, and the last month we consider, the total stock of properties held through tax havens has declined from around 179,000 to 173,000 properties, a decline of around

[34]This analysis goes beyond that which we pre-registered in our pre-analysis plan.

Table 4: Difference-in-difference estimates of impact on stock of properties owned via tax havens versus other overseas entities

	Untransformed			Log()		
	(1) # properties	(2) # residential properties	(3) # titles	(4) # properties	(5) # residential properties	(6) # titles
Tax haven* × post-ECB re-tabling	-226.1*	-201.4**	-91.3	-0.054*	-0.056**	-0.048*
	(114.6)	(99.0)	(58.1)	(0.030)	(0.026)	(0.028)
R^2	1.000	1.000	1.000	0.998	0.998	0.998
Observations	1,890	1,890	1,890	1,722	1,582	1,722
# jurisdictions	135	135	135	123	113	123
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Quarter	Quarter	Quarter	Quarter	Quarter	Quarter

Notes: Table presents different-in-difference estimates of the impact of the ECB retabling on the log(stock) of properties held by overseas companies. The unit of analysis is a jurisdiction , and treated jurisdictions are tax havens (* as classified by Menkhoff and Miethe (2019)), with treatment beginning on February 2022, the month of the Russian invasion and the re-tabling of the Economic Crime Bill. Standard errors clustered at the jurisdiction level. Jurisdictions that ever have zero stock are omitted from the above specification. $^{*}p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

3.3 percent.

To investigate whether the decline was higher for tax havens than for non-havens following the introduction of the ECB, we repeat our above specification in Table 4, i.e. equation (1), using the total estimated stock of properties as an outcome, both in absolute number and in logs. We find only a small effect on the total stock of properties held in a given quarter (at around 226 fewer properties), a decline of around around 4.8-5.5%, based on our results using the log of total properties as an outcome.[35] When we separate the result out by property type, we also find a significant decline for residential properties.

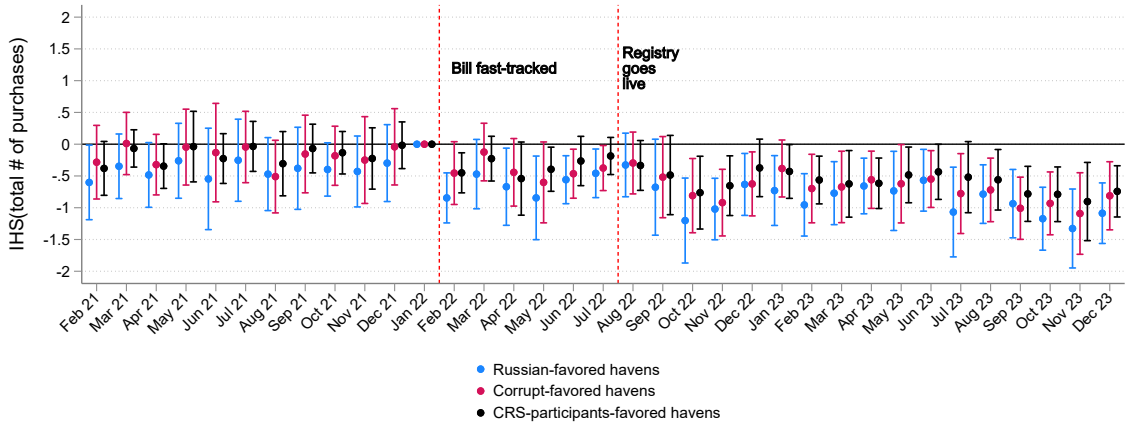
4.3 Investment through different types of tax havens

We next investigate whether our effects are stronger when we consider havens that are more popular with three different groups: Russians, those from highly-corrupt countries, and those from countries participating in automatic information exchange.

As discussed above, we first estimate specifications (1) and (2) using each of these groups of tax havens as the treatment group and all non-havens as the control group (dropping all haven jurisdictions that do not belong to the treatment group haven jurisdictions). The results, shown in Figure 6 and Table 5, indicate that both Russian-favored havens and those favored by clients from more corrupt countries show a long term decline in new property purchases. Following the introduction of the ECB, Russian or corrupt-favored havens were around 10-12 percentage points less likely to make a purchase in any given month, and saw reductions in both the number and value of purchases. We find smaller, but significant results for CRS/AEOI-favored havens as well. However, when we repeat the same analysis comparing each type of favored haven to all other havens, we find that the declines in Russian and corrupt-favored havens were significantly greater

[35] For our log-outcome results, we drop 11 jurisdictions that ever have zero properties during the sample period

Figure 6: Impact on investment through havens with different risk profiles



Notes: Figure 6 shows event study estimates of the impact of the Russian invasion + the announcement of the Economic Crime Bill on the inverse hyperbolic sign of the monthly number of property purchases in England and Wales made through tax havens most favored by (a) Russians, (b) residents of countries at the 25th percentile of the Corruptions Perceptions Index and (c) residents of non-haven countries that participate in the OECD CRS. The selection of havens - described in more detail in Section 4.3 - is determined by the relative preponderance of beneficial owners in ICIJ's Offshore Leaks Database. The control group are tax havens (the list used by Menkhoff and Miethe, 2019) which are *less* favored by these individuals. Confidence intervals shown are at the 95% level.

than the rest (Table A5 in the Appendix). As before, we do not find a similar decline in sales (Table A6 in the Appendix).

As can be seen in Figure 6, which plots the event study coefficients from (2), the decline in purchases by Russians occurs immediately following the introduction of the ECB. Our interpretation of this result is that - for Russians - the initial decline in bew investment may be partially driven not by a reaction to the introduction of the ECB, but a reduction in Russian investment either in initial anticipation of, or following the sanctions that took place in late February. However, the fact that we see an continued decreae in purchases following the introduction of the Overseas Register in August of 2022 does suggest that the ECB is likely also playing a role in deterring additional investment from all three groups.

In the next section, we investigate the decline in purchase associated with Russia more thoroughly, to rule out that it may be driving the more general declines in purchases we find above.

4.4 Accounting for the 'Russia effect'

The invasion of Ukraine resulted in a significant effort by the UK, the US and the European Union to sanction both the Russian government and oligarchs associated with the Putin regime. It also reportedly led to a chilling effect, where financial institutions and the private sector more generally may have become unwilling to do business with Russian clients, even those who were not the target of sanctions (Guthrie, 2022). These factors, combined with the initial depreciation of the ruble in the initial post-evasion months, is at least one of the drivers of a decline in offshore investment in British real estate made via tax haven popular with Russians. Thus our main result comprises both

Table 5: Difference-in-difference estimates of impact on land purchases involving tax havens of different risk-profiles

	Binary outcome	Untransformed			Inverse Hyperbolic sign		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Any transaction?	# properties purchased	# transactions	£ volume	# properties purchased	# transactions	£ volume
(1) Treated = Russian-favored havens							
Control = non-havens	-0.11***	-6.90**	-4.16***	-7.84**	-0.46***	-0.39***	-1.89***
	(0.037)	(2.73)	(1.55)	(3.53)	(0.080)	(0.074)	(0.55)
(2) Treated = Corrupt-favored havens							
Control = non-havens	-0.12**	-10.3*	-4.89**	-9.18*	-0.48***	-0.39***	-2.05***
	(0.041)	(4.25)	(1.71)	(3.58)	(0.078)	(0.061)	(0.56)
(3) Treated = CRS/AEOI-favored havens							
Control = non-havens	-0.090**	-7.62*	-3.22**	-6.27*	-0.35***	-0.28***	-1.43***
	(0.037)	(4.02)	(1.41)	(3.34)	(0.091)	(0.068)	(0.53)
R^2	0.608	0.811	0.858	0.856	0.807	0.821	0.660
Observations	4,608	4,608	4,608	4,608	4,608	4,608	4,608
# jurisdictions							
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

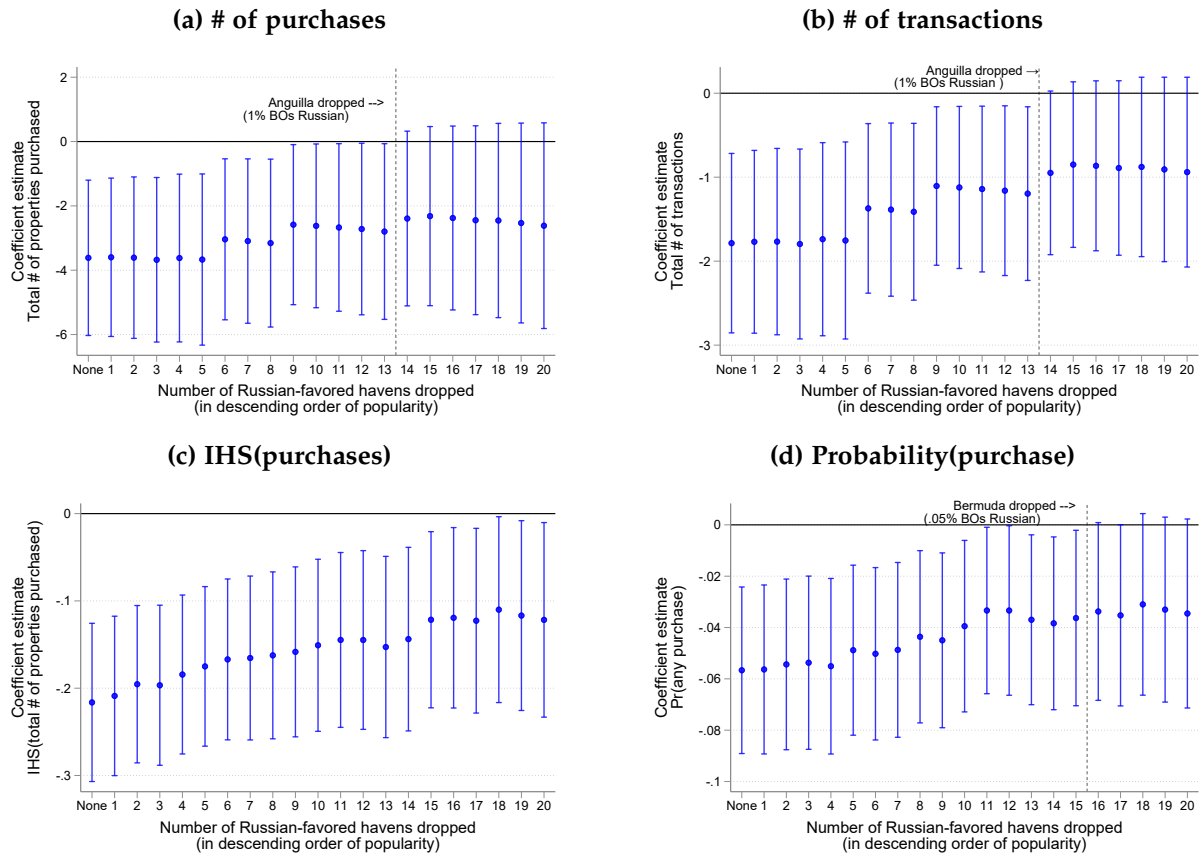
Notes: Table presents different-in-difference estimates of new property purchases by companies from jurisdictions of different risk profiles. The unit of analysis is a jurisdiction , all of which are tax havens (* as classified by Menkhoff and Miethe (2019)), whith treatment beginning on February 2022, the month of the Russian invasion and the re-tabling of the Economic Crime Bill. In (1) the treatment group are the top 25% of havens that are most-favored by Russian beneficial owners as described in the ICIJ Offshore Leaks Database, with all other havens acting as the control group. The treatment group in (2) are havens favored by individuals from countries that score in the bottom 25% on TI's Corruption Perception's Index. (3) are havens that are most favored by beneficial owners from CRS/AEOI participating countries. The control group in each case are Standard errors clustered at the jurisdiction level. $^{*}p < 0.10$,** $p < 0.05$,*** $p < 0.01$

a 'ECB effect,' driven by offshore investors who are responding to a shock to expectations over their ability to stay anonymous as well as a 'Russia effect,' driven by Russians who may be choosing to invest in more hospital markets that do not enforce sanctions, like that of Dubai (Alstadsæter et al., 2024), irrespective of the threat of beneficial ownership transparency in the UK.

To ensure that our main result is thus not being chiefly driven by the 'Russia effect,' we implement the following exercise: we re-run our main specification, first dropping the most popular Russian haven, then the next, and so on. We do this until we push our main effect into statistical insignificance. This is a somewhat arbitrary point to stop, but is at least informative as to whether we are able to still observe a significant decrease in purchases even after dropping a substantial number of Russian-favored havens.

The results are displayed in Figure 7 for four different outcomes, across most of which which we are able to drop between 10-13 havens before our results are no longer significant. Even when all Russian-favored havens are dropped, most coefficient estimates are of the same order of magnitude, and none display a change in sign. We take this as evidence that even though Russian-favored havens see a faster and stronger reduction in investment, our main results are not driven by this. This adds to the evidence that it is the ECB itself, rather than Russian sanctions driving much of the observed behavior.

Figure 7: Main results after dropping Russian-favored havens



Notes: Figure 5 shows the main difference-in-difference estimates presented in Table 3, re-estimated for four outcomes, this time after dropping Russian-favored havens, sequentially starting with the most favored haven to the 20th most favored haven. The dotted line indicates the point at which this robustness exercise pushes the main result into insignificance at the 90% level. Estimates are from regressions at the monthly level, with non-binary outcomes winsorsized at the 99th percentile. Tax havens are those in the list used by Menkhoff and Miethe, 2019.

5 Impact on prices and high-risk domestic transactions

5.1 Results: price (non)effects

Transparency advocates have often claimed that illicit foreign investment leads to higher domestic property prices, and thus interventions like beneficial ownership transparency would act as a counterveiling force. While there has been a robust academic literature examining the impact that foreign or offshore investment has on local property prices, no study to date has found a policy impact linking beneficial ownership transparency to subsequent price declines, although the number of existing studies examining the impact of beneficial ownership reporting on real estate is small (Sá, 2016; Badarinza and Ramadorai, 2018; Gorback and Keys, 2020; Cvijanović and Spaenjers, 2021; Johannesen, Miethe, and Weishaar, 2022). As we have found evidence of a modest decline in new investment in UK property via tax havens, we next investigate whether these declines have led to detectable declines in property prices in England and Wales.

Our prior is that the impact of the ECB may be more pronounced in places that have historically been a destination for anonymous wealth. We proxy this by identifying local authorities that had a high proportion of tax-haven ownership prior to the introduction of the ECB. Specifically, we calculate the total number of residential properties held by tax havens using the OCOD as of January 2020 and divide it by the total residential property stock in 2020 for every local authority in England and Wales. As shown in Figure 8, many areas of England and Wales had a high propensity towards offshore ownership. In the case of the City of Westminster, roughly than 1 in 12 properties are owned by a company based in a tax haven. We flag local authorities as having a high level of tax haven ownership if they are in the top quartile for ownership as a percentage of the total residential stock.

We also consider heterogeneous effects across Local Authorities that were popular with our three high risk groups discussed above. To identify areas with a high level of demand from each group, we use data from the Centre for Public Data (CPD) on ownership by natural persons of UK properties (Powell-Smith, 2021). Obtained through a Freedom of Information (FOI) request, these data calculate the number of property titles registered to individuals with an overseas correspondence address, aggregated by the district where the property is located, as well as the name of each overseas country.[36] The data cover the period 2010–21 at two-year intervals. Similar to the above exercise with tax havens, we identify local authorities as having a (relative) high level of demand from each of the three groups if they are in the top quartile for ownership as a percentage of the total stock.

We then combine this information with price data at the local authority level which we take from HM's Land Registry's House Price Index database as of September 3, 2024 , which produces a monthly House Price Index, which includes both the geometric mean of property prices at the local authority level as well as a house price index value (out of 100). Summary statistics for local authority-level outcomes are available in Table A1 in the Appendix.

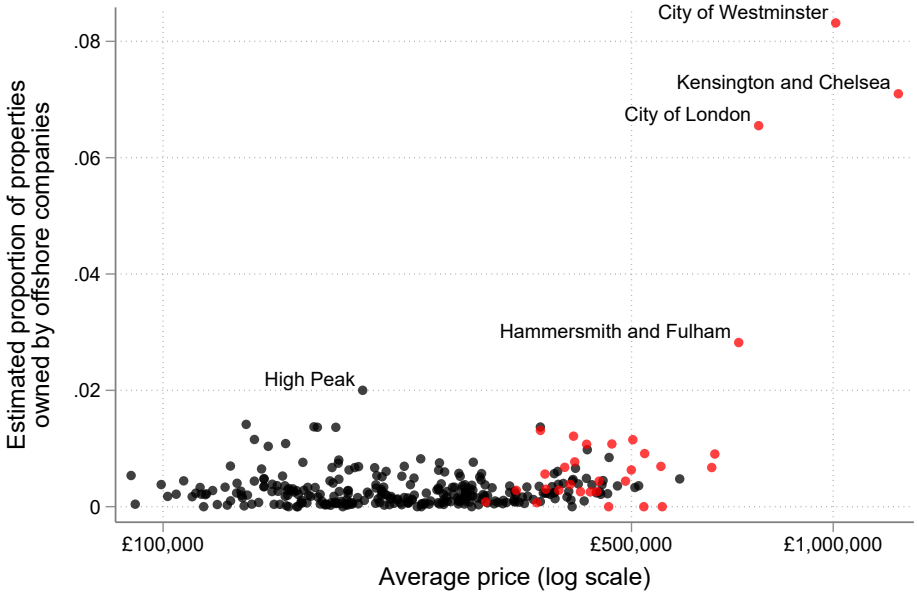
The question we ask is: do local authorities with a higher pre-treatment level of exposure to tax haven ownership (or Russian ownership, etc) see a fall in property prices following the reintroduction of the ECB. Consider the following difference-in-difference specification:

$$P_{rt} = \delta \times X_r \times Post_t + \theta_r + \gamma_t + \varepsilon_{rt} \tag{3}$$

where the price level in local authority r at time t is allowed to differ for local authorities with different characteristics (X_r). In this case, X_r is a dichotomized measure of pre-treatment local attractiveness for tax haven property ownership based on the same variables as described above (local authorities at or above the 75th percentile for the percentage of properties owned through tax havens). Equation (3) estimates whether prices in local authorities with a high percentage of tax haven ownership fall following the introduction of the ECB relative to those with a low proportion of tax haven ownership. We also do this using our three other measures of foreign demand described above.

[36]These data were corrected in July 2023 after mistakes in the original FOI reply were detected. This version of the paper uses the corrected figures provided by the Center for Public Data.

Figure 8: Proportion of each local authority's residential housing stock owned by a company based in a tax haven, by average residential price level (January, 2020)



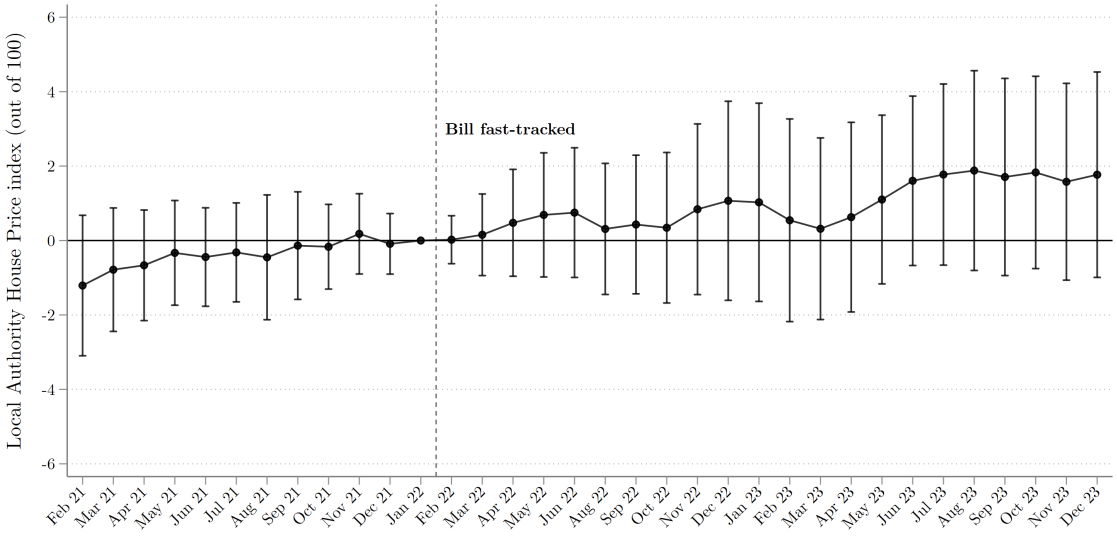
Notes: Figure 8 plots the proportion of all residential properties in a local authority that are owned by an offshore company based in a tax haven at the start of 2020 by the log of average property prices. Local authorities in the London region are highlighted in red.

There are two concerns about this approach. First, pre-treatment offshore ownership rates are correlated with local property prices, particularly when comparing across regions in the UK, as shown in Figure 8. While time invariant differences in price levels should be accounted for in equation (3), in practice we find that price levels also predict changes in prices across time. As a result, we find that there are substantial differential trends in both the natural log of average property prices but also the House Price Index.

To account for this, we estimate the results using entropy balancing methods to re-weight the sample (Hainmueller, 2012; Cefalu et al., 2020). We do this using the following characteristics measured at the start of 2020: the average price paid for properties in the local authority, the local authority's population density, and which of five regions the local authority falls under (one of these being London, which is particularly favoured by offshore ownership). We rely on a conditional parallel trends assumption: that for local authorities of a similar density, region, and pre-treatment price, those with differing levels of shell company penetration would have seen similar levels of price growth following the introduction of the ECB if the bill had never been introduced. This is more plausible, as at this point we are comparing local authorities with similar housing markets pre-treatment, except for their level of tax haven ownership.

Our main outcomes are the Land Registry's House Price Index (relative to a base value of 100) and the natural log of the geometric mean of residential house prices, also reported by the Land Registry. Figure 9 and Table 6 display the event-study and difference-in-difference estimates from

Figure 9: Event study estimates of (non)impact of fast-tracking of Economic Crime Bill on the UK House Price Index in local authorities with high level of tax haven ownership



Notes: Figure 9 shows event study estimates of the impact of the fast-tracking of the ECB on the UK House Price Index (relative to a base of 100), calculated by HM Land Registry. The unit of observation is the Local Authority, with treated local authorities being those at or above the 75th percentile for proportion of all properties in 2020 owned by companies based in tax havens (using the Menkhoff and Miethe, 2019 definition). Confidence intervals shown are at the 95% level.

specification (3), the impact of the reintroduction of the ECB on prices in local authorities with a higher level of exposure to tax haven ownership or higher relative levels of Russian/highly corrupt demand. Across the board we do not find any significant price effects for any of these groups. We also find null results when we replace our tax haven share measure with a "share of all pre-treatment purchases made by tax havens" measure.

Why did the introduction of the ECB fail to affect domestic house prices? We think a number of factors may be at play. First, the overseas market still makes up a small fraction of overall housing stock, even in local authorities with high levels of offshore ownership. Second, price effects are likely to be contained at the very top of the market, the effects of which are harder to pick up using average property prices, particularly in local authorities without a significant luxury market. Third, as we have discussed above, there has not been a substantial sell-off of the existing housing stock owned by the very largest tax havens, so there are neither sufficient supply nor demand pressures at play that might affect prices. Finally, our period of analysis comes at the start of a significant slowdown in the housing market, driven by increased interest rates, which may leave less room for the effects of the policy to appear.

Regardless, although we find that public beneficial ownership transparency - as implemented - is likely to affect new investment on the margin, in practice it is unlikely to lead to substantial changes in the price of housing faced by the domestic population.

Table 6: Difference-in-difference estimates of impact on land prices

	LAs with High % tax haven ownership		Russian-favored LAs		Corrupt-favored LAs		CRS-favored LAs	
	(1) Price index	(2) Log(average price)	(3) Price index	(4) Log(average price)	(5) Price index	(6) Log(average price)	(7) Price index	(8) Log(average price)
DiD estimate	2.27	0.017	1.25	0.0097	1.49	0.011	1.85	0.014
	(1.53)	(0.011)	(1.36)	(0.0093)	(2.17)	(0.015)	(1.25)	(0.0087)
R^2	0.902	0.994	0.908	0.995	0.897	0.994	0.903	0.993
Observations	18,154	18,154	18,154	18,154	18,154	18,154	18,154	18,154
# Local Authorities	313	313	313	313	313	313	313	313

Notes: Table presents different-in-difference estimates of the impact of the fast-tracking of the Economic Crime Bill on (1) the UK House Price Index (relative to a base of 100) and (2) Log(Geometric Mean of Property Prices) as calculated by HM Land Registry. The unit of observation is the Local Authority, with treated local authorities being those at or above the 75th percentile for (i) the proportion of all properties in 2020 owned by offshore companies based in tax havens (as defined by (Menkhoff and Miethe, 2019)) (ii) the proportion of properties owned by Russian individuals (as measured by CPD) and (iii) the proportion of properties owned by individuals from highly-corrupt countries (as measured by the Corruption Perceptions Index). Treatment begins in February 2022. Sample is re-weighted using entropy balancing (Hainmueller, 2012; Cefalu et al., 2020), balanced on the following 2020 characteristics: average price, log(population density) and region. Standard errors clustered at the jurisdiction level. $^{*}p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

5.2 Changes in the high-risk domestic market

In the initial wake of Russia's invasion, no additional transparency measures were applied to UK domestic companies, which since 2016 have had to submit beneficial ownership information to Companies House. However, the Companies House system has come under withering criticism for failing to combat fake, shell, and fly-by-night UK companies which serve as conduits for major illicit financial transactions.[37] Following the introduction of the Overseas Register, criminal and corrupt actors might rethink using overseas companies to manage their real estate, and instead use domestic shell companies to hold property portfolios. These companies are potentially quicker and cheaper to register, and given the substantial failings in Companies House capacity, easy to abuse for illicit activity.[38] They also may have received relatively less attention in the wake of the Russian invasion of Ukraine, even if the information they had to submit to Companies House was largely identical to that of offshore companies.

Capturing this potential substitution requires data not just on properties acquired by domestic companies (the CCOD data), but also a measure to distinguish more and less suspicious purchases. If the ECA indeed compelled bad actors to rely more on domestic companies, we should see the effect concentrated among those with "high risk" characteristics that have been repeatedly connected to money laundering. We develop two red flags for identifying suspicious domestic companies drawing on methodology developed by Global Witness, the UK NGO which first assessed the coverage and quality of the Companies House corporate registries (GW, 2013).

The red flags aggregate across a list of 12 characteristics, shown in Table A7, common to suspicious companies. We code a 'narrow' red flag based on only characteristics of company owners and officers, including whether they are located in tax havens or even reported at all.[39] Our 'broad' red flag includes all companies under the narrow red flag, but adds those that are registered at a

[37] 'Companies House Is Dysfunctional and Facilitating Fraud, MPs Told'. *The Guardian*

[38] Companies House was eventually given more power by parliament to check the legitimacy of companies being registered in the UK, but these powers did not come into effect into early 2024, and were not complemented with significant changes in resources for the agency.

[39] This data comes from the Register of People with Significant Control (PSC) related by Companies House: `https://download.companieshouse.gov.uk/en_pscdata.html`.

mass address, were incorporated less than three months before the property purchase, or declared that it had no beneficial owners.[40] We use these red flags to calculate the number of properties in each local authority each month that have been purchased by a shell company likely facilitating suspicious flows into the UK.

However, we cannot infer much from aggregate changes in the number of purchases by high-risk domestic companies. To unpack whether purchases by high-risk companies are substituting for purchases by companies based in tax havens, we will exploit the same heterogeneity used in Section 5.1: we would expect an increase in high-risk purchases to be concentrated in areas of England and Wales that were popular with companies based in tax havens prior to the introduction of the ECB, under the assumption that international investors would not want to change the location of their investments, only the structure of ownership.

To do this, we first we estimate purchases by UK companies that are (1) flagged as suspicious and (2) not flagged as suspicious, in every UK local authority. We then estimate a triple difference-in-difference specification of the following form:[41]

$$ihs(S_{crt}) = \lambda \times Suspicious_c \times X_r \times Post_t + \gamma_{cr} + \sigma ct + \theta_{rt} + \varepsilon_{crt} \tag{4}$$

where S_{crt} is the stock of UK property held by companies of either type $c = [Notsuspicious, suspicious]$ in local authority r at time t. The dummy $Suspicious_c$ is equal to 1 for local authority-level purchases by suspicious companies. The parameter X_r takes on the same categories as in the price regression above, focusing on local authorities with a higher proportion of tax haven ownership, popularity among Russians, etc.

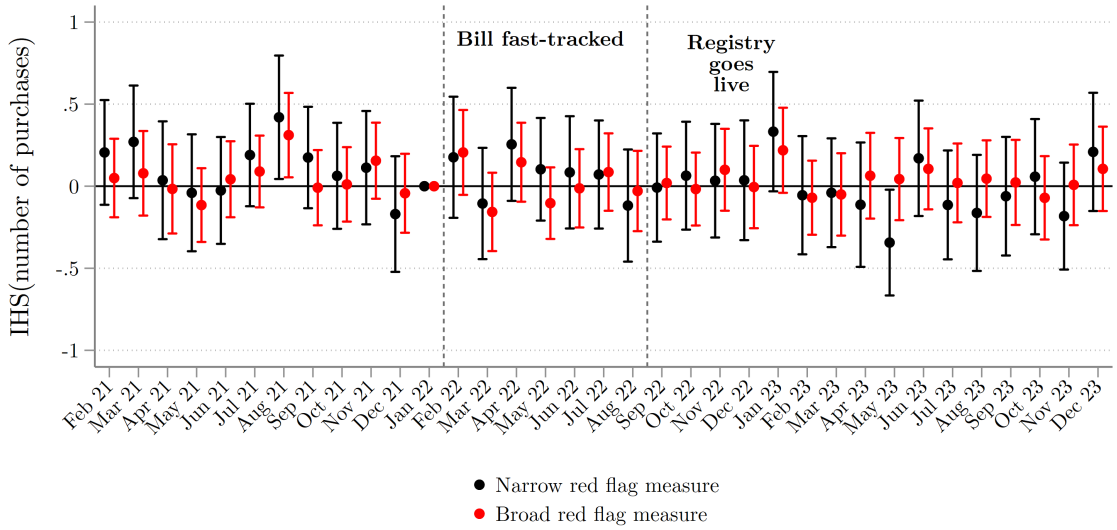
The coefficient λ, therefore, is an estimate of whether areas that, before enactment of the ECB, were a larger target of offshore investment see substitution to ownership via suspicious-appearing UK companies.

Figure 10 shows event-study estimates of equation (4) for local authorities with a high proportion of tax haven ownership, for both firms identified using the broad and narrow red flag measures. No consistent effect is observed, although there is some sign of a relative decline in purchases after January 2023, the point after which all foreign firms needed to come into compliance with the register. In table Table 7 we report the triple-difference estimates across a range of transformations of the outcome of interest. There is some evidence of an increase on the extensive margin (whether a local authority with a higher % of offshore ownership saw *any* high risk purchases in a month). But for most outcomes we do not find any consistent, significant effects of note, neither for purchases nor for sales. Our conclusion is, at this stage, that there does not appear to be strong evidence that there has been a significant diversion of investment into suspicious high-risk companies, nor a significant deterrence effect on these companies purchasing property.

[40] Data on addresses and incorporation dates come from the Basic Company Data product released by Companies House: `https://download.companieshouse.gov.uk/en_output.html`. Being registered at a popular address is increasingly being used a metric used to identify a shell company (Aliprandi, Busschots, and Oliveira, 2023).

[41] This specification differs slightly from that which we specified in our pre-analysis plan. That is because, in error, we did not include all the relevant fixed effects for a triple-difference specification in the pre-analysis plan.

Figure 10: Triple difference event-study estimates of the (non)impact of the re-tabling of the ECB on purchases by suspicious domestic companies in local authorities with a high proportion of tax haven ownership



Notes: Figure 10 shows event study estimates of (4) - triple difference estimates of monthly property purchases by UK-registered companies. The unit of analysis is a local-authority + transaction type (either made by a low risk or a high risk one by the narrow or broad criteria set out above). Treated observations are purchases by high risk companies in local authorities at or above the 75th percentile for the proportion of all properties in 2020 owned by offshore companies based in tax havens (as defined by Menkhoff and Miethe, 2019) Confidence intervals shown are at the 95% level.

Table 7: Triple difference estimates of impact of re-introduction of ECB on purchases by suspicious domestic companies in local authorities with a high share of offshore ownership

	Binary outcome	**Untransformed**			**Inverse hyperbolic sign**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Any transaction?	# properties	# transactions	£ volume	# properties	# transactions	£ volume
(A) Narrow risk measure							
High-risk purchases in LAs with high offshore share after Feb 2022	0.011	1.81	1.40	141977.2	0.0066	0.022	0.15
	(0.013)	(1.62)	(0.78)	(351709.5)	(0.043)	(0.034)	(0.20)
(B) Broad risk measure							
High-risk purchases in LAs with high offshore share after Feb 2022	0.0061*	0.56	1.41**	-128091.6	0.014	0.051**	0.093
	(0.0031)	(1.50)	(0.67)	(334461.0)	(0.030)	(0.024)	(0.057)
R^2	0.630	0.872	0.924	0.893	0.891	0.909	0.764
Observations	31,114	31,114	31,114	31,114	31,114	31,114	31,114
# Local Authorities	331	331	331	331	331	331	331

Notes: Table presents estimates of equation (3) - triple difference estimates of monthly property purchases by UK-registered companies. The unit of analysis is a local-authority + transaction type (either made by a low risk or a high risk one by the strict criteria set out above). Treated observations are purchases by high risk companies in local authorities at or above the 75th percentile for the proportion of all properties in 2020 owned by offshore companies based in tax havens (as defined by (Menkhoff and Miethe, 2019)) . Treatment begins in February 2022. Standard errors clustered at the local authority level. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

6 Discussion

Our results show that the ECB led to a decrease in new purchases through tax havens, jurisdictions that in the past afforded their clients a high degree of secrecy. We show that this effect, while more pronounced for havens with a high degree of Russian ownership, is unlikely to be driven by the behavior of Russian clients. We interpret this effect as evidence that the Economic Crime Bill/Act and the subsequent creation of the Register of Overseas Entities created a credible threat to the anonymity of inward investment in the real estate market. Taken together with recent evidence by Johannesen, Miethe, and Weishaar (2022) indicating that the temporary threat of transparency can affect real estate investment decisions, we interpret this as promising evidence that transparency can deter illicit investment.

The fact that the ECB had a discernible impact stands in contrast to another similar program aimed at the real estate sector in the United States. First introduced in Manhattan and Miami in 2016 and ultimately expanded to 21 counties, the the Geographic Targeting Order (GTO) program required corporate buyers of any residential real estate asset above certain price thresholds to report their beneficial owners *confidentially* to the Treasury's Financial Intelligence Unit FinCEN. Previous work failed to find evidence that this program had an effect on the buying behavior of corporate entities since its introduction (Collin, Hollenbach, and Szakonyi, 2021).

What explains this divergence in the impact of two broadly similar policies in similar real estate markets? While we cannot test for it directly, we argue the relative effectiveness of the ECB is driven in part by the fact that the information it contains is open to public scrutiny. ECB created a public, permanent register of beneficial owners of overseas companies, drawing on an existing definition and infrastructure already applied to domestic companies. Even if they had doubts about the ability of Companies House to verify data and conduct investigations, overseas companies considering purchasing property may have been wary of a public record of ownership records raising significant questions by journalists and civil society. Indeed dozens of investigative stories have drawn on the beneficial ownership contained in the ROE, covering the property portfolios of sanctioned oligarchs and high profile politically connected persons from former Soviet countries. It has also allowed civil society organizations to assess and critique the quality of the data on the register and its enforcement, perhaps creating an expectation that in the long run the register will be better enforced than it is today. By contrast, although all corporate all-cash buyers of real estate had to submit roughly the same information to government authorities in the United States, FinCEN has not shared publicly any of the ownership data and only in rare cases shared information with other US law enforcement agencies (GAO, 2020). As FinCEN may lack the capacity to both process the large information being submitted and verify its validity, the chances that illicit wealth are detected under the GTO program may have been substantially lower than if it had relied on a public register.

However, despite the declines in new investment we observed following the introduction of the ECB and the Register, we do not observe a major change in sales, nor a large change in the total stock of properties held through tax havens. By our estimates, as of January 2025, at least £45–78

billion worth of property in England and Wales is still held by shell companies in tax havens.[42] The lack of a sell-off, combined with the modest effects on purchases and on the overall stock, is one of the plausible explanations for why we are unable to detect any price effects of the ECB. In short, the policy has been successful at dissuading some previously anonymous investors from buying UK property, but such a policy is unlikely to have large effects on local house prices.

The explanation for a decline in new purchases but no substantial significant decline in the total number of properties held through tax havens may lay with the fact that significant shortfalls still exist with the enforcement of the Register of Overseas Entities. For example, those who own property through an overseas trust are *not* required to submit information on the beneficiaries or settlors of the trust to Companies House, and are instead only required to report this privately to the UK Tax Authority, HMRC. Recent research by Transparency International indicates that several thousand properties are owned this way, possibly circumventing the public scrutiny created by the register (TI UK, 2023). The 25% ownership reporting threshold may also allow some overseas entities to avoid revealing their true owners to the ROE, as well as those registered through unincorporated partnerships (Advani et al., 2023).

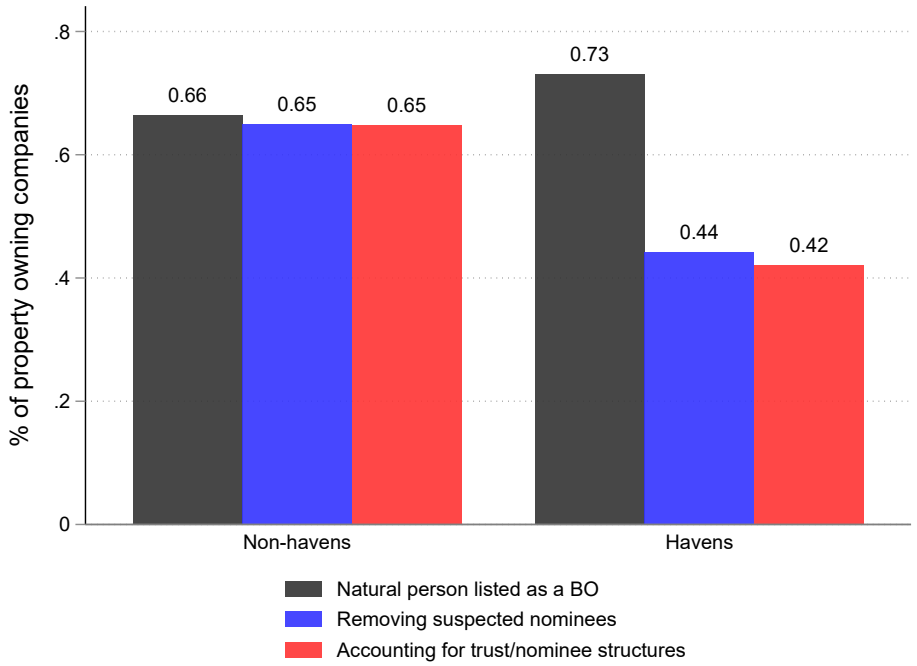
For the majority of properties held through overseas entities, essential beneficial ownership information could still be missing or incomplete (Advani et al., 2023). Companies based in different jurisdictions may have employed different techniques to obscure their identity from the register. Those that are often highlighted by financial crime and transparency experts include nominee relationships, where a natural person is listed as the owner but they are acting (officially, but privately) on behalf of the true beneficial owner, as well as trusts, which are rarely covered even by privately beneficial ownership registers Knobel (2022); Advani et al. (2023).

To investigate this, we take a complete sample of the Register of Overseas Entities acquired in February 2025, which at the time comprised 42,000 beneficial ownership declarations across around 31,000 companies. For many entries, another company is listed as a beneficial owner instead of a natural person. Every time this is the case, we search through the database for that company to find the ultimate owner. We repeat this process until we either (i) reach a natural person, (ii) reach a UK company, which we presume are covered by the UK beneficial ownership registry or (iii) we cannot find the company elsewhere on the Register of Overseas Entities. A small share of companies (9%) file no beneficial ownership information at all.

We then make two further adjustments: first, we discard natural persons we suspect are nominees, which are all natural persons who declare an address in a tax haven. Second, we discard natural persons who, in the chain of ownership, have either a trust management company or a nominee services company between them and the company owning the property. We do this because if a trust management company or a similar corporate service provider is listed as the beneficial owner of a company that owns property, we think it is more likely that they are taking on the role

[42] We estimate this by taking either the number of titles or the number of estimated properties held by tax havens in each local authority and multiplying it by the House Price Index's average price for that local authority. This is likely to be an underestimate as offshore investment is often premium investment. Note that this is a lower estimate than has been made by other organizations, such as Global Witness.

Figure 11: Proportion of companies on the Register of Overseas Entities that list a natural person as a beneficial owner



Notes: Figure 11 calculates, for companies that filed any beneficial onwerhip information on the Register of Overseas entities as of April 1 2024, (i) the share of companies that list any natural person (or UK company) as a beneficial owner, either directly or indirectly further down an ownership chain, (ii) the share that list any natural person once suspected nominees are dropped (those based in tax havens) and (iii) the share once natural persons who only appear 'behind' a trust management company or nominee services company, and thus are likely to be nominees/incorrect beneficial owners, are removed. Tax havens are classified according the list used by Menkhoff and Miethe (2019). The shares are calculated over all companies in tax havens/non-havens (not the average per jurisdiction, averaged across types of jurisdictions). Sample is restricted to those who had filed prior to Jan 1, 2024.

of a nominee in the ownership chain, and that the beneficial owner of the management company is unlikely to be the true person benefiting from the property.

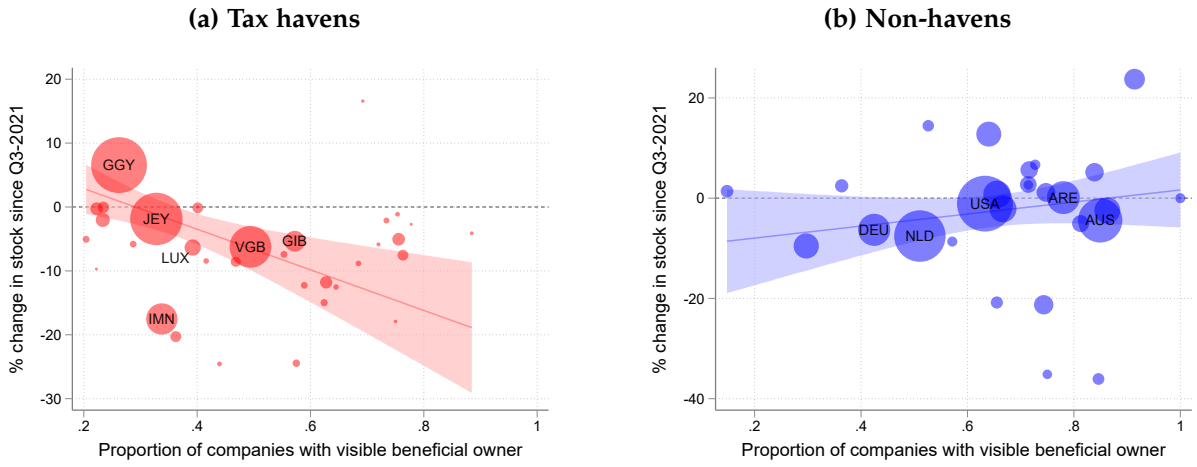
Figure 11 displays the proportion of property owning companies registered in tax havens (or non-havens) who list a natural person as a beneficial owner in the Register. Before making any adjustments for presumed nominees, companies in tax havens are actually more likely - on average - to list a natural person as a beneficial owner, either directly or indirectly by listing them as the ultimate owner of a corporate chain visible throughout the register. However, once we remove suspected nominees and account for trust management/company structures, companies in tax havens are substantially less likely to report a natural person than those based in non-havens.

Effective beneficiary ownership transparency is particularly low for the tax jurisdictions that hold a very large fraction of British real estate. Jersey, Guernsey, the Isle of Man, the British Virgin Islands and Luxembourg all have rates lower than 60%, for example. We also find that, when

weighted by pre-invasion stock sizes, effective beneficial ownership transparency is correlated with declines in stocks held through tax haven jurisdictions, but has no relationship for changes in the stock held through non-havens (Figure 12). While this is not necessarily a causal relationship, there may be persistence of ownership through a small number of very important tax havens despite the introduction of the register: the places with the largest share of ownership were the ones that were best positioned to deploy different methods (trusts, nominees, complex structures) of remaining out of public scrutiny.

The impact of the introduction of the Register of Overseas Entities appears to have been successful in reducing new investment through tax havens, indicating that a significant portion of that investment was previously dependent on the anonymity afforded by holding property through offshore shell companies. But if the goal is to extend ownership transparency to the entire British offshore real estate market, then extending the scope of the policy to include trusts, and using the wider powers afforded by government to Companies House to investigate and challenge suspected nominees would be a sensible place to start.

Figure 12: Effective beneficial ownership transparency and evolution of offshore real estate stocks



Notes: Figure 12 shows the correlation between the share of companies registered in a jurisdiction that file a natural person as a beneficial owner (after accounting for nominees and trust structures, as described in Figure 11) and the change in the stock between the last quarter of 2021 (prior to the invasion) and the last quarter of 2023. Jurisdictions that hold fewer than 100 properties are dropped, and the linear predictions are weighted by pre-invasion stock levels. Tax havens are those in the list used by Menkhoff and Miethe, 2019. Sample is restricted to those who had filed prior to Jan 1, 2024.

7 Conclusion

Using data available as of September 3, 2024 , we find that the ECB led to decreases in new purchases of properties in England and Wales by companies based in tax havens, an indication that those wishing to anonymously invest in UK property viewed the policy as a threat. The large effects we have found stand in contrast to the implementation of a similar policy in the United States, likely driven by the fact that the reporting requirements have resulted in a public database that

will be subject to public scrutiny as well as the presence of forestalling components that 'catch' any investment or divestment made in the interim. Beneficial ownership transparency, a cornerstone of current efforts to reduce corruption, money laundering, and tax evasion around the world, appears to have a strong deterrent effect if implemented correctly.

Importantly, our results indicate that Russian money avoiding the UK was not completely responsible for the drop in both purchases and sales[43] of property by overseas companies starting in the spring of 2022. Removing Russian-favoured havens from the analysis (which still are made up of over 90% non-Russian assets) does not diminish the overall dampening effect of the ECB on purchases by overseas companies. Declines in purchases by overseas buyers also accelerated in August 2022, when the Register of Overseas Entities first went live. By that month, the political risk caused by the war had more or less already been priced into the market. The continued drop-off in interest of offshore companies after that point reflects the impact of the ECB independent of the war in Ukraine. However, we find that the stock of real estate owned by tax havens in England and Wales has only declined a small amount since the introduction of the Register of Overseas Entities, one of the potential reasons we do not detect measurable price effects. We also find that levels of effective beneficial ownership transparency are low for many jurisdictions, and that the growth in the stock of properties is correlated with that level of transparency.

While imposing transparency requirements on offshore ownership has led to a partial decline in 'Londongrad,' policies which remove any scope for opting out of divulging ownership information are likely to have more pronounced effects. Furthermore, investing in enforcement capacity, such through enhancing identification verification, banning nominee arrangements, and facilitating cross-border information sharing, could potentially close existing loopholes and elicit more truthful information from company owners. Current efforts appear to be under way in England and Wales, suggesting that future research may uncover even larger effects of the Register of Overseas Entities on investment by offshore companies.

[43] As described above, our monthly sales measure omits sales to natural persons.

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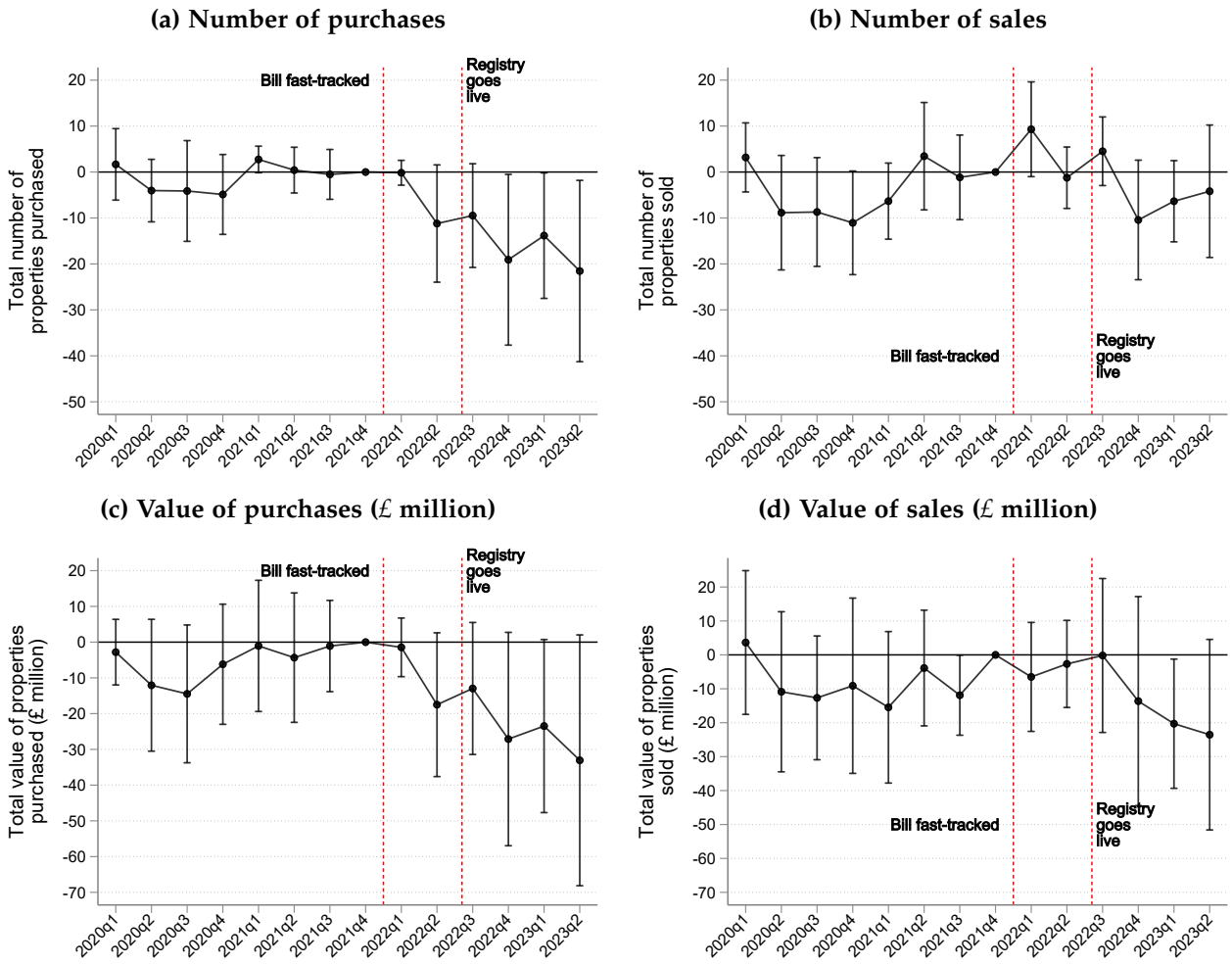
Appendix:

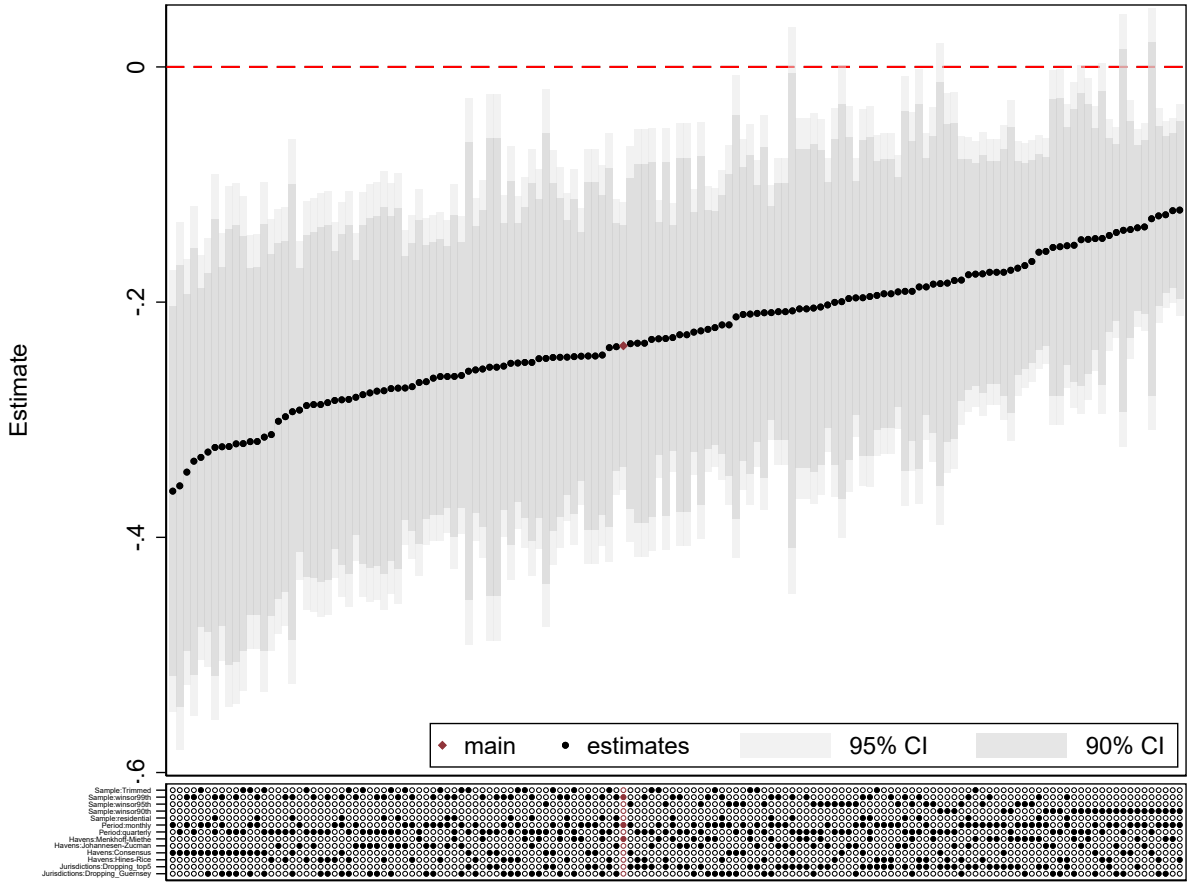
A Additional figures

Figure A1: Event study estimates of impact of ECB on quarterly purchases and sales made through tax havens (untransformed outcomes)



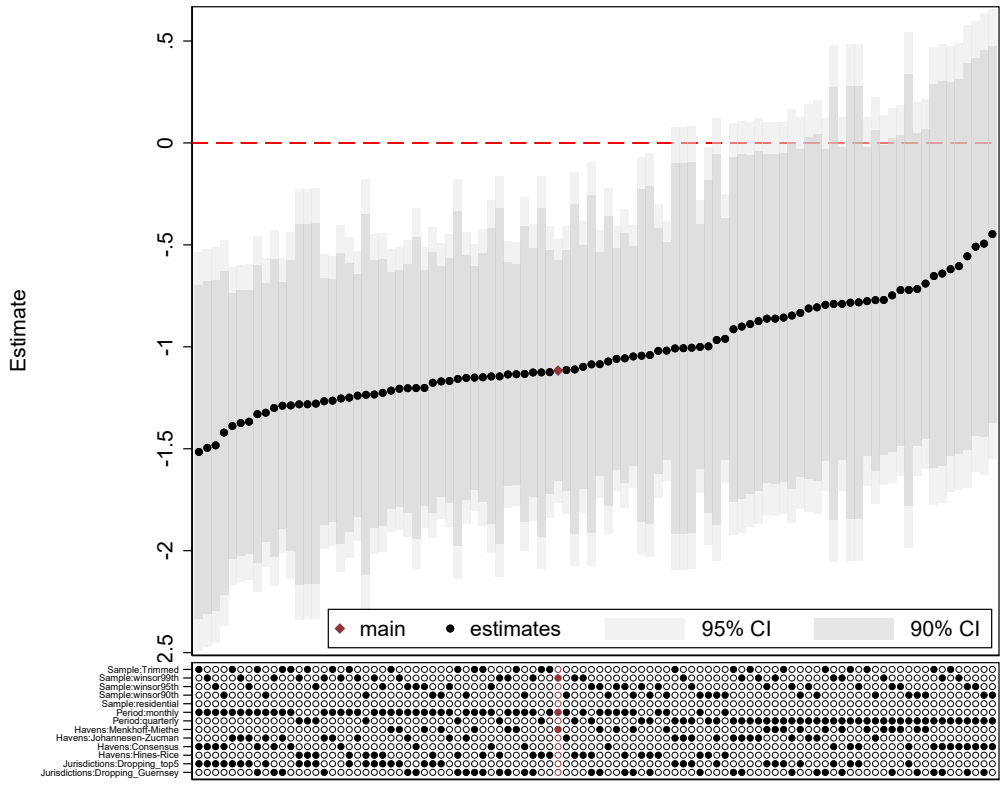
Notes: Figure A1 shows the impact of the announcement of the ECB on total quarterly number and value of property purchases and property sales in England and Wales by companies based in tax havens (the list used by Menkhoff and Miethe, 2019) versus companies not based in tax havens. Confidence intervals shown are at the 95% level.

Figure A2: Specification curves: ihs(purchases)



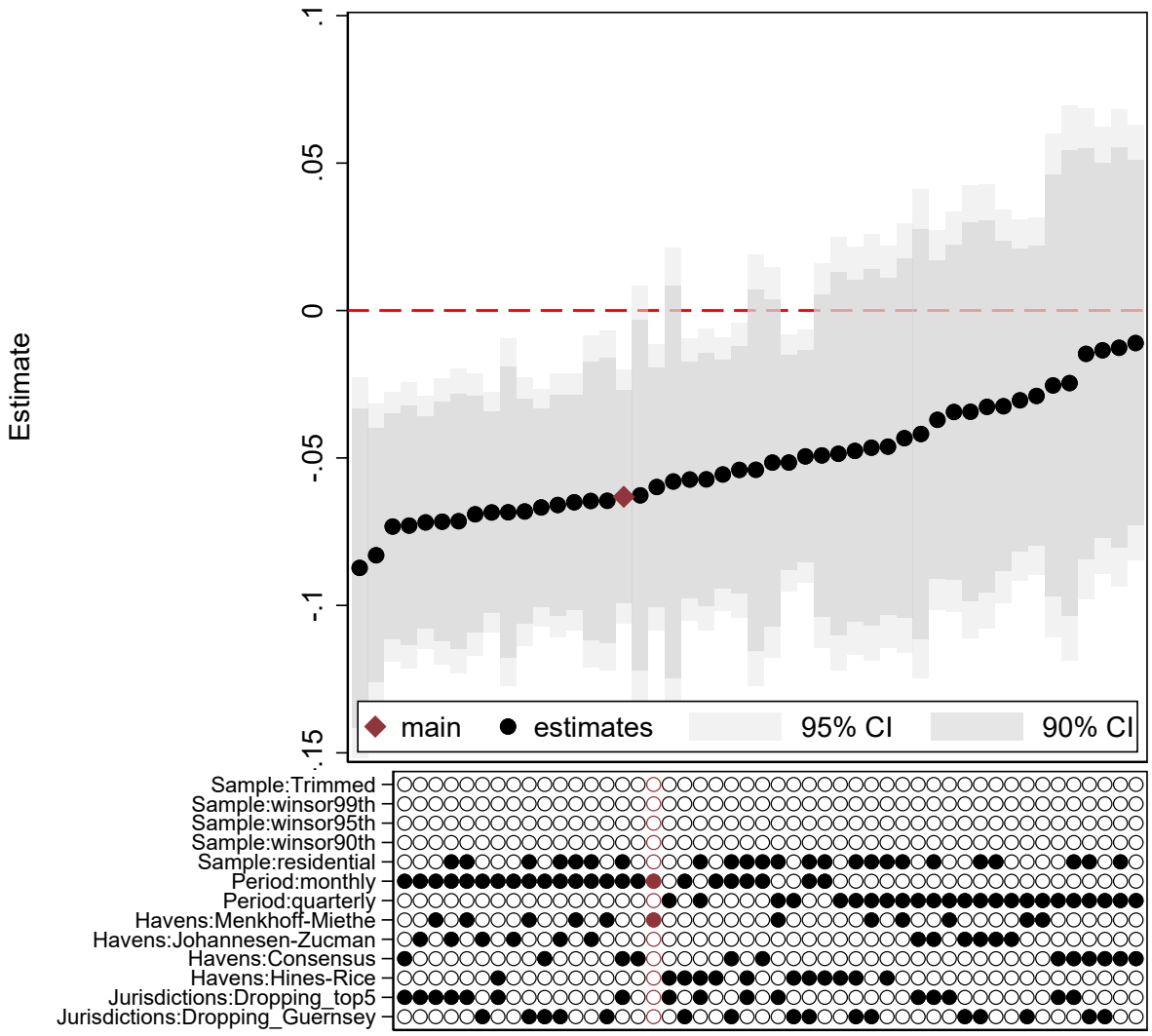
Notes: Figure A2 shows specification curves for difference-in-difference estimates (equation (1)) for the inverse hyperbolic sign of purchases. There are four categories of specification options: **Sample:** either uses winsorsized outcomes (at different percentiles) or a 'trimmed' sample, where transactions involving an usually high number of properties (above the 99th percentile) are dropped from the sample. **Period:** alters the estimation sample between monthly or quarterly data. **Havens:** alters the tax haven classification. Finally **Jurisdictions:** drops either Guernsey or the top-5 purchasing jurisdictions together (Guernsey, Jersey, Isle of Man, Luxembourg and the BVI). Confidence intervals shown are at the 95% level.

Figure A3: Specification curves: ihs(transactions)



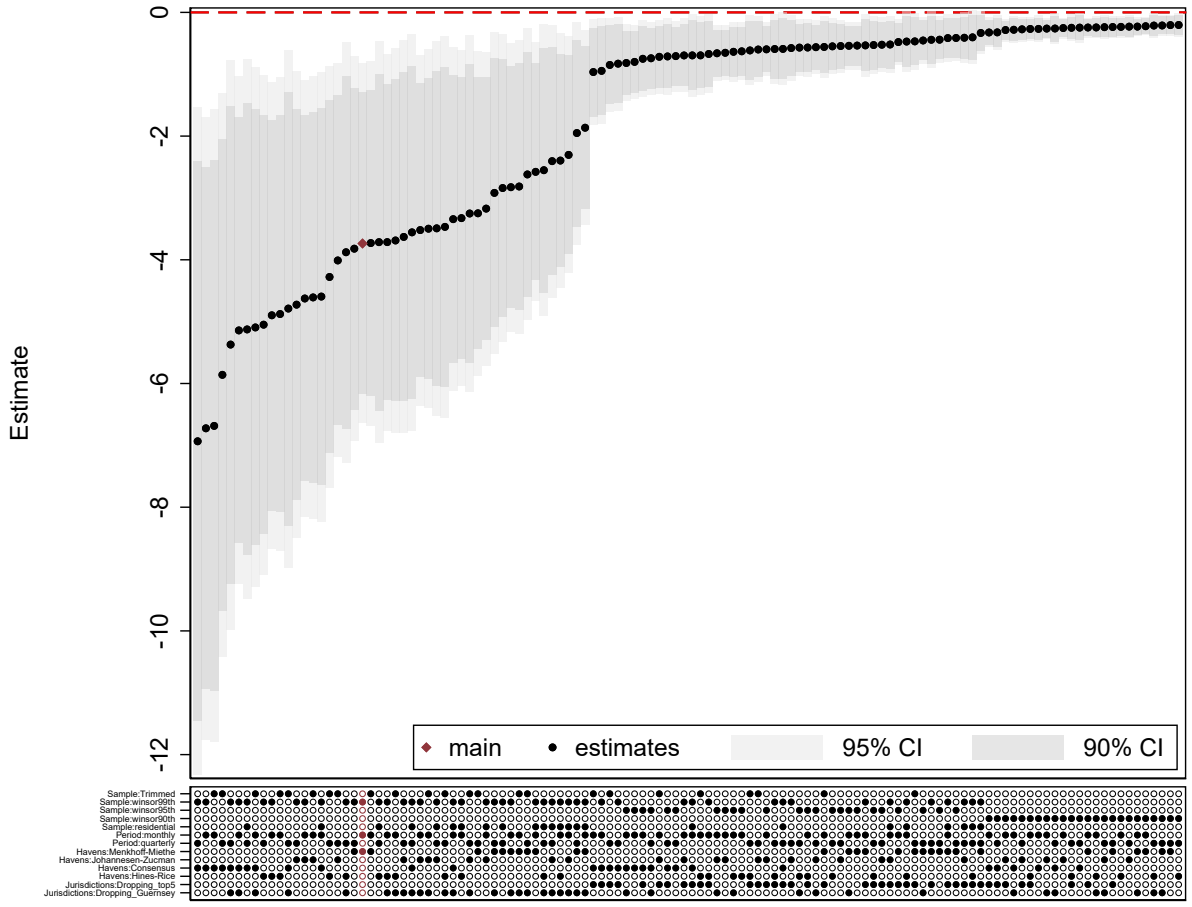
Notes: Figure A3 shows specification curves for difference-in-difference estimates (equation (1)) for the inverse hyperbolic sign of transactions. There are four categories of specification options: **Sample:** either uses winsorsized outcomes (at different percentiles) or a 'trimmed' sample, where transactions involving an usually high number of properties (above the 99th percentile) are dropped from the sample. **Period:** alters the estimation sample between monthly or quarterly data. **Havens:** alters the tax haven classification. Finally **Jurisdictions:** drops either Guernsey or the top-5 purchasing jurisdictions together (Guernsey, Jersey, Isle of Man, Luxembourg and the BVI). Confidence intervals shown are at the 95% level.

Figure A4: Specification curves: any purchase



Notes: Figure A4 shows specification curves for difference-in-difference estimates (equation (1)) for whether any purchase was made. There are four categories of specification options: **Sample:** either uses winsorsized outcomes (at different percentiles) or a 'trimmed' sample, where transactions involving an usually high number of properties (above the 99th percentile) are dropped from the sample. **Period:** alters the estimation sample between monthly or quarterly data. **Havens:** alters the tax haven classification. Finally **Jurisdictions:** drops either Guernsey or the top-5 purchasing jurisdictions together (Guernsey, Jersey, Isle of Man, Luxembourg and the BVI). Confidence intervals shown are at the 95% level.

Figure A5: Specification curves: number of monthly purchases (untransformed)



Notes: Figure A5 shows specification curves for difference-in-difference estimates (equation (1)) for whether any purchase was made. There are four categories of specification options: **Sample:** either uses winsorsized outcomes (at different percentiles) or a 'trimmed' sample, where transactions involving an usually high number of properties (above the 99th percentile) are dropped from the sample. **Period:** alters the estimation sample between monthly or quarterly data. **Havens:** alters the tax haven classification. Finally **Jurisdictions:** drops either Guernsey or the top-5 purchasing jurisdictions together (Guernsey, Jersey, Isle of Man, Luxembourg and the BVI). Note that winsorsizing and dropping big jurisdictions will mechanically lower the untransformed estimates. We divide quarterly counts of purchases by three to obtain monthly averages so that the quarter and monthly estimates can be directly compared. Confidence intervals shown are at the 95% level.

B Additional tables

Table A1: Summary statistics for local authorities

	Mean	SD	Min	p25	p50	p75	Max	N
Average price	271,763	140,441	89,598	175,728	242,837	334,854	1,250,691	315
Population density	1,829	2,658	26	260	750	2,376	16,237	313
Proportion of properties owned through havens	0	1	0	0	0	0	8	313
Proportion of titles owned by Russian individuals	0	0	0	0	0	0	0	313
Proportion owned by individual from highly-corrupt countries	0	0	0	0	0	0	0	313
Proportion owned by individual from CRS countries	0	0	0	0	0	0	6	313

Notes: Table presents local-authority level summary statistics (all estimates taken from Jan 2020)

Table A2: Summary statistics for overseas transaction data (Jan 2020 - Dec 2023)

	Non-havens (81 jurisdictions)	Havens (53 jurisdictions)
# purchases (monthly)	0.50	11.36
	(2.30)	(123.47)
# titles purchased (monthly)	0.38	5.81
	(1.58)	(22.37)
Any purchase? (monthly)	0.13	0.36
	(0.34)	(0.48)
Total value purchases (monthly, £ millions)	1.05	19.59
	(6.27)	(91.03)
# number of sales* (monthly)	0.40	7.46
	(5.00)	(29.14)
Any sale? (monthly)	0.14	0.45
	(0.34)	(0.50)
# number titles sold (monthly)	0.28	4.87
	(3.43)	(18.01)
Total value sales (monthly, £ millions)	0.77	15.65
	(9.09)	(65.93)
Total stock (monthly)	112.29	3,207.12
	(289.17)	(9,879.89)
Total # titles (monthly)	88.77	1,514.93
	(234.88)	(4,114.03)
N	6,432	

Notes: Table presents jurisdiction-month level summary statistics (mean and stndard deviation) for havens (using Menkhoff and Miethe (2019) measure) and non-havens. Sale data only includes sales to domestic or offshore companies, not natural persons.

Table A3: Difference-in-difference estimates of impact on land transactions involving tax havens versus other overseas entities (by property type)†

	Binary outcome	**Untransformed**			**Inverse Hyperbolic sign**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Any transaction?	# properties	# transactions	£ volume	# properties	# transactions	£ volume
(A) Purchases							
Residential	-0.067***	-2.58**	-1.13***	-1.61***	-0.23***	-0.19***	-1.13***
	(0.020)	(1.06)	(0.40)	(0.57)	(0.058)	(0.047)	(0.30)
Commercial	-0.033	-0.53*	-0.43*	-2.19	-0.11*	-0.10*	-0.55*
	(0.017)	(0.26)	(0.21)	(1.18)	(0.046)	(0.043)	(0.27)
Land	-0.026	-0.33*	-0.31*	-1.26	-0.077*	-0.076*	-0.47
	(0.015)	(0.16)	(0.15)	(0.65)	(0.034)	(0.034)	(0.24)
(B) Sales							
Residential	-0.0081	-0.44	-0.25	-0.55	-0.032	-0.030	-0.12
	(0.011)	(0.31)	(0.14)	(0.31)	(0.027)	(0.021)	(0.16)
Commercial	0.020	-0.071	-0.042	-0.87	0.015	0.018	0.29
	(0.014)	(0.091)	(0.079)	(0.59)	(0.023)	(0.023)	(0.21)
Land	0.00024	-0.069	-0.054	-0.54*	-0.0052	-0.0043	-0.034
	(0.012)	(0.061)	(0.054)	(0.28)	(0.015)	(0.015)	(0.17)
R^2	0.529	0.703	0.706	0.662	0.715	0.717	0.572
Observations	5,628	5,628	5,628	5,628	5,628	5,628	5,628
# jurisdictions	134	134	134	134	134	134	134
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

Notes: Table presents different-in-difference estimates of new property purchases and new property sales by offshore companies. Each row represents a seperate regression, where the outcome is restricted to residential property, commercial property, or land. The unit of analysis is a jurisdiction , and treated jurisdictions are tax havens (* as classified by Menkhoff and Miethe (2019)), with treatment beginning on February 2022, the month of the Russian invasion and the re-tabling of the Economic Crime Bill. Standard errors clustered at the jurisdiction level. $^{*}p < 0.10$,$^{**}p < 0.05$,$^{***}p < 0.01$

† This analysis was not featured in our original pre-analysis plan

Table A4: Test for sales surge in first three months following invasion (March-May)

	Binary outcome	Untransformed			Inverse Hyperbolic sign		
	(1) Any transaction?	(2) # properties	(3) # transactions	(4) £ volume	(5) # properties	(6) # transactions	(7) £ volume
xlincom **(A) Sales to corporates** Treatment = tax haven* × post-Feb 2022	-0.011	0.31	1.02	-2.69	0.11	0.14	-0.012
	(0.059)	(0.93)	(0.75)	(3.76)	(0.10)	(0.092)	(0.90)
xlincom **(B) All residential sales to corporates** Treatment = tax haven* × post-Feb 2022	0.019	0.44	0.60	0.066	0.069	0.12	0.37
	(0.057)	(0.44)	(0.33)	(1.58)	(0.098)	(0.077)	(0.85)
xlincom **C) All sales** Treatment = tax haven* × post-Feb 2022	0.0051	-3.95*	-1.59	-4.30	-0.12	-0.058	-0.033
	(0.049)	(2.24)	(1.39)	(4.17)	(0.11)	(0.10)	(0.75)
R^2	0.641	0.838	0.856	0.792	0.816	0.829	0.686
Observations	6,432	6,432	6,432	6,432	6,432	6,432	6,432
# jurisdictions	134	134	134	134	134	134	134
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

Notes: Table presents test of average effect of the re-tabling of the Economic Crime Bill. On new property sales by tax havens for the three months following the invasion of Ukraine (March, April and May). Each coefficient is the average affect across this period (taken from the monthly event × treatment dummies from the main specification) Standard errors clustered at the jurisdiction level. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Table A5: Difference-in-difference estimates of impact on land purchases involving tax havens of different risk-profiles (alternative control group)

	Binary outcome	Untransformed			Inverse Hyperbolic sign		
	(1) Any transaction?	(2) # properties purchased	(3) # transactions	(4) £ volume	(5) # properties purchased	(6) # transactions	(7) £ volume
(1) Treated = Russian-favored havens Control = all other havens	-0.072*	-4.58	-3.31*	-4.24	-0.33***	-0.30***	-1.28**
	(0.040)	(3.23)	(1.67)	(4.64)	(0.098)	(0.085)	(0.60)
(2) Treated = Corrupt-favored havens Control = all other havens	-0.088*	-9.38*	-4.33*	-6.10	-0.36***	-0.29***	-1.51*
	(0.043)	(4.36)	(1.78)	(4.65)	(0.095)	(0.076)	(0.60)
(3) Treated = CRS/AEOI-favored havens Control = all other havens	-0.047	-5.59	-2.00	-2.05	-0.18	-0.14	-0.64
	(0.040)	(4.23)	(1.58)	(4.53)	(0.11)	(0.084)	(0.59)
R^2	0.629	0.780	0.833	0.817	0.844	0.856	0.691
Observations	2,544	2,544	2,544	2,544	2,544	2,544	2,544
# jurisdictions							
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

Notes: Table presents different-in-difference estimates of new property purchases by companies from jurisdictions of different risk profiles. The unit of analysis is a jurisdiction , all of which are tax havens (* as classified by Menkhoff and Miethe (2019)), whith treatment beginning on February 2022, the month of the Russian invasion and the re-tabling of the Economic Crime Bill. In (1) the treatment group are the top 25% of havens that are most-favored by Russian beneficial owners as described in the ICIJ Offshore Leaks Database, with all other havens acting as the control group. The treatment group in (2) are havens favored by individuals from countries that score in the bottom 25% on TI's Corruption Perception's Index. (3) are havens that are most favored by beneficial owners from CRS/AEOI participating countries. The control group in each case are all other tax havens. Standard errors clustered at the jurisdiction level. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Table A6: Difference-in-difference estimates of impact on land sales involving tax havens of different risk-profiles

	Binary outcome	Untransformed			Inverse Hyperbolic sign		
	(1) Any transaction?	(2) # properties sold	(3) # sale transactions	(4) £ volume	(5) # properties sold	(6) # sale transactions	(7) £ volume
(1) Treated = Russian-favored havens							
Control = non-havens	0.011	-1.14	-1.07	-5.21*	0.012	0.0096	0.11
	(0.026)	(0.96)	(0.69)	(2.95)	(0.062)	(0.057)	(0.37)
(2) Treated = Corrupt-favored havens							
Control = non-havens	0.0080	-2.11	-1.52	-7.14*	0.0097	0.0081	0.060
	(0.029)	(1.38)	(0.82)	(3.17)	(0.063)	(0.056)	(0.40)
(3) Treated = CRS/AEOI-favored havens							
Control = non-havens	-0.010	-1.51	-1.10	-5.35*	0.017	0.0045	-0.19
	(0.029)	(1.41)	(0.83)	(3.10)	(0.064)	(0.059)	(0.42)
R^2	0.594	0.775	0.798	0.783	0.774	0.794	0.639
Observations	4,608	4,608	4,608	4,608	4,608	4,608	4,608
# jurisdictions							
Jurisdiction fixed effects	✓	✓	✓	✓	✓	✓	✓
Time fixed effects	✓	✓	✓	✓	✓	✓	✓
Winsorized	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct	99th pct
Period	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

Notes: Table presents different-in-difference estimates of new property sakes by companies from jurisdictions of different risk profiles. The unit of analysis is a jurisdiction , all of which are tax havens (* as classified by Menkhoff and Miethe (2019)), whith treatment beginning on February 2022, the month of the Russian invasion and the re-tabling of the Economic Crime Bill. In (1) the treatment group are the top 25% of havens that are most-favored by Russian beneficial owners as described in the ICIJ Offshore Leaks Database, with all other havens acting as the control group. The treatment group in (2) are havens favored by individuals from countries that score in the bottom 25% on TI's Corruption Perception's Index. (3) are havens that are most favored by beneficial owners from CRS/AEOI participating countries. The control group in each case are non-haven countries Standard errors clustered at the jurisdiction level. $^{*}p < 0.10,^{**}p < 0.05,^{***}p < 0.01$

Table A7: UK Company Red Flags

Variable	N	Mean
(1) Was the company incorporated at any address with at least 100 other companies?	906875	0.0366
(2) Was the company formed within three months of the property purchase date?	906875	0.0446
(3) Did the company declare that it had no qualifying PSC?	906875	0.0753
(4) Has the company failed to submit any Persons of Significant Control Reports?	906875	0.0579
(5) Were there any PSC from the Menkhoff and Miethe (2019) list of tax havens?	906875	0.0219
(6) Were there any PSC from the Johannesen and Zucman (2014) list of tax havens?	906875	0.0211
(7) Were there any PSC from the consensus list of tax havens?	906875	0.019
(8) Were there any officers from the Menkhoff and Miethe (2019) list of tax havens?	906875	0.0139
(9) Were there any officers from the Johannesen and Zucman (2014) list of tax havens?	906875	0.0128
(10) Were there any officers from the consensus list of tax havens?	906875	0.00885
(11) Were there any PSC that also were listed as a PSC of at least 50 other companies?	906875	0.00543
(12) Were there any PSC that are trusts?	906875	0.00137
Red Flag: Broad	906875	0.233
Red Flag: Narrow	906875	0.0936

This table shows the summary statistics for the indicators used to create the red flags based on Companies House data. PSC stands for Persons of Significant Control, the UK term that encompasses beneficial owners. The Broad Red Flag takes a 1 if a company met any of the 12 criteria listed. The Narrow Red Flag indicator takes a 1 if the company met any of the criteria in rows 4-12.

C Updates of the OCOD and delays in reporting

C.1 Lags in reporting

For any given property transaction there exists a lag between the date the property was purhased/sold and when it is entered into either the CCOD or OCOD. Across all transactions in our assembled dataset (2018-2023), the median entry appears 81 days (122 on average) after the actual transaction has taken place. This means that our estimates of recent trends of property transactions will be undercounting the true number and value of purchases, as some of those transactions will not yet have been lodged in the OCOD or CCOD. This would bias our results if, following the announcement of the ECD, transactions involving companies based in tax havens were more likely to be lodged later than transactions involving those in other foreign countries, as it would make it appear as if haven transactions were falling, when in fact they were just appearing with a lag.

To investigate this, we compare the difference in the "lag time" (between the date the company was registered as an owner of the property and the date the transaction was posted to the OCOD) between companies based in tax havens and those based elsewhere overseas. Figure A6(a) shows the overall distribution for all observed transactions through 2018-2023. Transactions made through tax havens are posted only moderately faster to the OCOD: 8 days on average (the median transaction is posted 11 days), not enough to make a substantial difference in our monthly or quarterly estimates.

Figure A6(b) tracks the average number of days taken for a transaction to enter in the OCOD, indexed by the month the transaction took place. Delays in posting begin to increase substantially in early 2020 due to a COVID-induced government backlog. Note that this is defined over observed transactions: thus as the series approaches the latest data release (January 2024), the average lag mechanically falls as transactions that have not yet posted are not included. Both transactions posted by havens and those by non-havens largely follow the same trajectory: although non-haven transactions are slightly more likely to be subject to a delay during the mid-2020 to mid 2021 period.

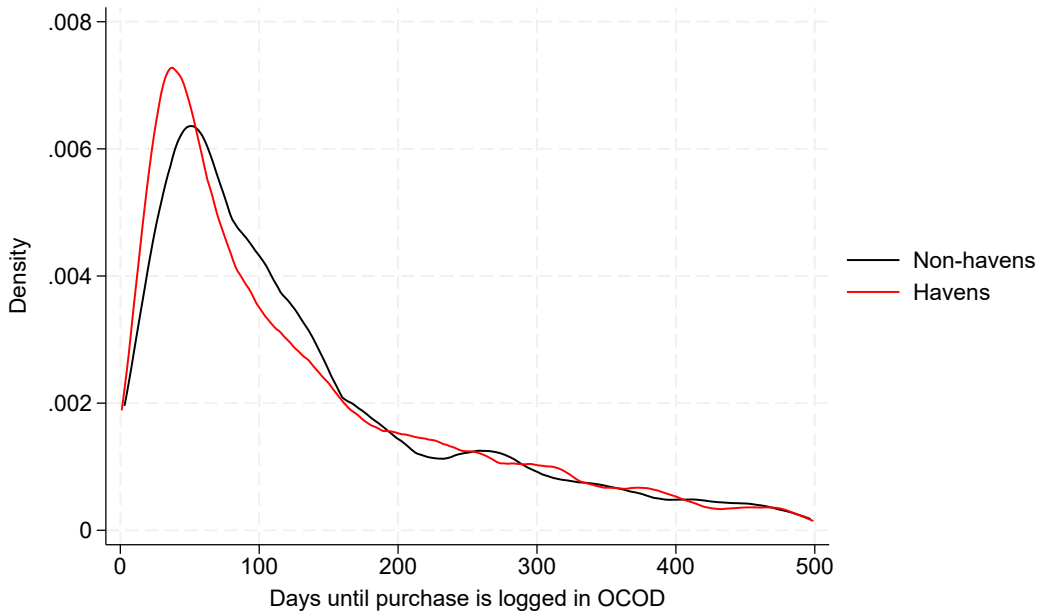
C.2 Updates to the database

Both the OCOD and CCOD release a new update of their respective databases each month. These updates result in two changes: (i) the addition of a new month of reporting (the most recent month) and (ii) the inclusion of new changes in ownership that had not been processed in the past version. This means that, due to reporting delays, the full trajectory of purchases and sales for a jurisdiction will be affected by an update of the database, with more recent periods being more affected as they will be more strongly subject to under-reporting.

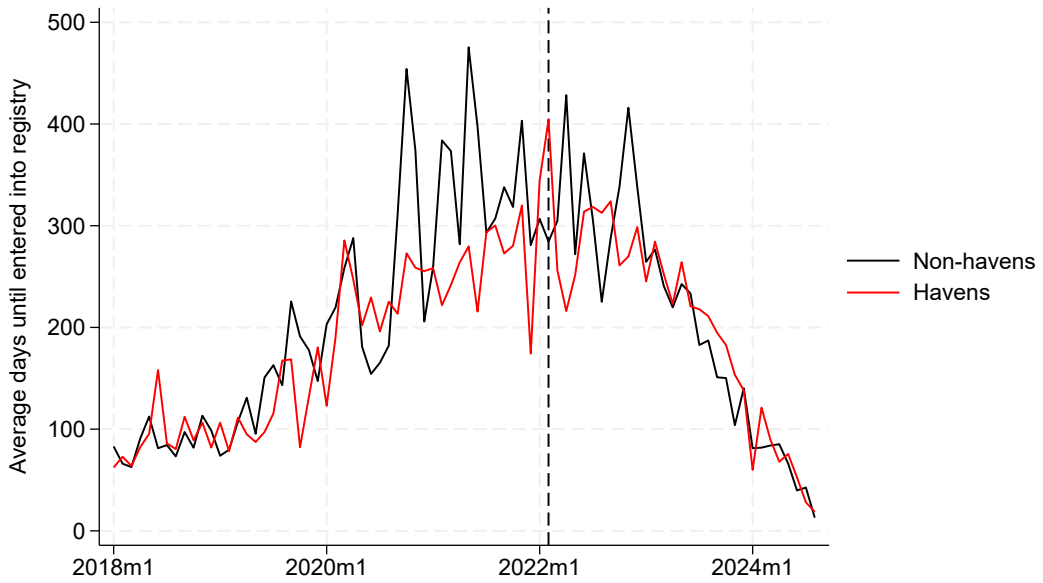
To guard against under-reporting affecting our estimates in a substantial way, we first discard the most recent nine months of purchase data (January 2024 until September 2024, the current date of the database we use in this paper). We also investigate whether our results are likely to be 'stable' to updates in the database. In Figure A7, we re-estimate our main specification using different vintages of the OCOD, starting with July 2023, then August, and so on. We restrict our different in difference specification to a post period which ends in July 2023, so that the estimated coefficient

Figure A6: Delays in posting transactions to the OCOD, between tax havens and non-havens

(a) Overall distribution of reporting lag (2018-2023)

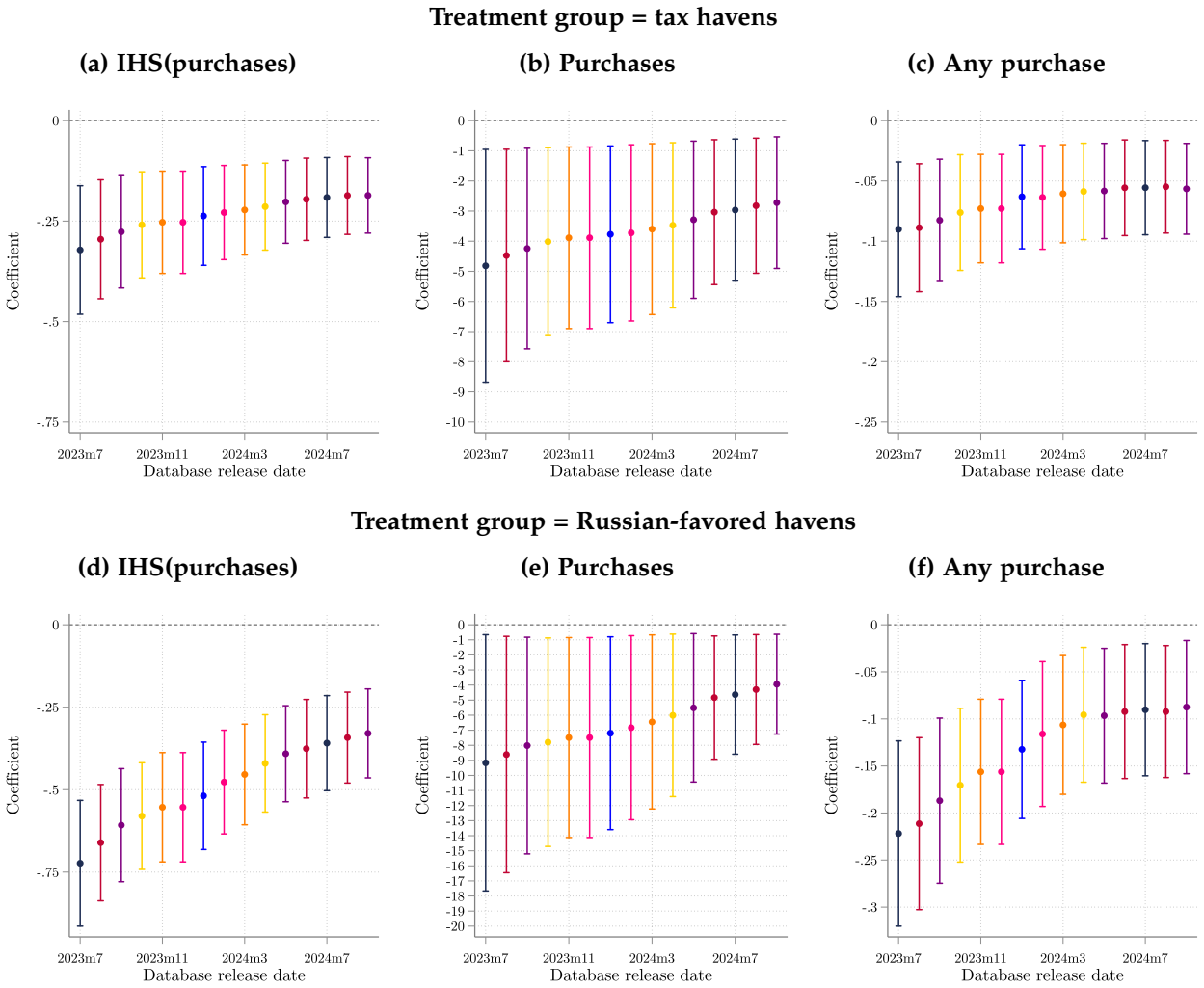


(b) Changes in average reporting lags across time



Notes: Figure A6(a) displays the distribution of 'reporting lags' for every transaction in the OCOD database lodged between 2018-2021 for transaction lodged by companies based in tax havens (consensus list) versus non-havens (only transactions n with a lag < 500 days are shown). The reporting lag is the difference between the registration date for the owning company and the date the transaction was lodged in the OCOD database. Figure A6(b) displays the average 'reporting lag' for transactions at a monthly level, divided between havens and non-havens.

Figure A7: Evolution of point estimates as OCOD Land Registry data is updated



Notes: Figure A7 shows our main different-in-difference estimated coefficients of the Russian Invasion/re-tabling of the ECB for different vintages of the OCOD database, as well as results for our Russian-haven favored sample. The last coefficient is the version used for our main results. To maintain comparability, the estimated effects are restricted to to the period ending in July, 2023 (so as to not conflate differences driven by the increased coverage of the OCOD with including new post-periods in the specification). Observations are winsorized at the 99th percent level within countries. Confidence intervals shown are at the 95% level.

covers the same post period, no matter which version of the OCOD we are relying on.

What we find is that our coefficient was most strongly negative with earlier versions of the database (where the share of transactions that had posted to the OCOD would have been at their lowest). The strength of the cofficient then decline (modestly, for our main results, less so for our Russian haven results) with updates to the database, eventually stabilizing by the time the vintage of the data is 8-12 months after the last post-period in our regression. We view this as evidence that our decision to drop post periods that are close to the current edition of the database (September 2024) will safeguard against the possibility that our estimates would vary with a later version of the database.

D Deviations from the PAP

D.1 Entropy balancing as a robustness check to the main specification

The first is the implementation of entropy balancing using the method devised by Hainmueller (2012) as a robustness check to our estimation equations (1) and (4), which estimate the impact of the re-introduction of the ECB on purchases and sales made via tax havens versus non-havens. In the PAP, we indicated that we would use "at a minimum, the pre-treatment stock of properties owned for every country in the sample," as the main characteristic for the re-weighting.

There are a few reasons why we did not include this check in the paper. The first is that, the method designed by Hainmueller (2012) cannot find a set of weights for the control group (non-haven countries) that provides a similar mean pre-treatment stock for haven countries. This is because the "big five" havens, as discussed in our paper, lead to such a high treatment group mean as to make the re-weighting exercise impossible, as there is no observation in the control group that, even if given all the weight in the subsequent estimation, can produce a control group mean equal to the treatment mean. Dropping the "big five" makes this possible, but leads to a very high degree of weight on just three control countries: the United States, Netherlands, and Australia. The results are available on request (they are neither negative nor significant), but due to the weighting issues above, we do not have confidence in them.

The second reason is that because our main results indicate reasonable pre-trends, we no longer believe the use of entropy balancing to ensure similar trends is necessary (although we do use it for our estimates of the impact on prices at the local authority level, as these showed significant pre-treatment trend differences between treatment and control groups).

D.2 The use of inverse hyperbolic sign instead of the natural log of our main outcome

In the PAP we indicated that we would use log(purchases), log(sales) and log(stock) as our main outcome. As our first two sets of data have a substantial number of zeros, we instead use the inverse hyperbolic sign transformation (we could have used log(x+1), but the literature has demonstrated that these are broadly similar in their interpration). We retain natural logs for our stock outcomes we only have to drop a handful of jurisdictions to have a balanced panel with a positive number of properties.