EU Tax Observatory Working Paper No. 1

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September 2025

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September 16, 2025

Abstract

We use novel leaked microdata to study offshore real estate in Dubai, a fast-growing tax haven. We find that the non-resident ownership share of residential real estate grew from nearly zero in 2005 to 30% ($68 billion) in 2019, a share much larger than other large global cities. We then go on to show that offshore real estate displays a strong gravity relationship and is more frequently owned at the upper end of the wealth distribution. Finally, we document that both tax evasion (with an 80% evasion rate) and sanctions-driven capital flight are important motives for owning offshore real estate.

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1 Introduction

Despite substantial progress in the measurement and estimation of offshore wealth,[1] data on cross-border real estate holdings remains a major blind spot in existing economic statistics. This is of a growing concern because recent innovations in automatic information exchange between tax authorities do not extend to real assets, which has led some households to re-balance their portfolios away from financial assets toward real estate (Simone et al., 2020; Bomare and Le Guern Herry, 2025). Because it is generally possible to hold offshore real estate opaquely, there are ongoing concerns that it is of high risk of abuse by those engaging in tax evasion, money laundering and sanctions evasion. Measuring the size, ownership and drivers of offshore real estate ownership is essential both for understanding one of the last major components of hidden wealth as well as informing policy efforts to address it. But measuring what is deliberately hidden remains a principal challenge in this field.

The central contribution of this paper is to open an empirical window into the largely opaque domain of offshore real estate. We use novel microdata to describe the state of offshore real estate in Dubai, one of the world's foremost secrecy jurisdictions. Through collaboration with an international consortium of investigative journalists and the nonprofit Center for Advanced Defense Studies (C4ADS), we gained access to a set of non-public datasets that offer unprecedented insight into the ownership of real estate in Dubai.[2] In addition, we draw on detailed records of property transactions and rental activity in the city's real estate market, which allow us to estimate asset values and track how transactions respond to major geopolitical events. This enables us to document the scale, ownership patterns, and policy relevance of a significant but poorly understood form of offshore wealth, with implications for tax enforcement, capital flight, and financial transparency.

Our analysis delivers five main findings. First, Dubai's offshore real estate is globally significant: more than $68 billion is invested in the Dubai housing market by foreign non-residents. This makes Dubai one of the world's major destinations for offshore real estate investment, only rivaled by London ($143 billion) and Singapore (76 billion) in dollar terms (Alstadsæter et al., 2025a).[3] However, Dubai is unrivaled in terms of the degree to which its real estate is owned

[1] See, e.g., Zucman (2015), Alstadsæter et al. (2019), Roussille (2020), Johannesen et al. (2020), Collin (2021), Leenders et al. (2023), Londoño-Vélez and Àvila-Mahecha (2021), Londoño-Vélez and Ávila-Mahecha (2022).

[2] This paper is the result of the research group and an international consortium of investigative journalists working in parallel on the same dataset over several years. Our analysis focus exclusively on aggregate patterns and we do not know the source of the leaked data. The journalists have investigated individual cases of tax evasion, money laundering, and corruption published under the DubaiUncovered (2022) and DubaiUnlocked (2024) projects, which involved 74 media outlets across 58 countries.

[3] And likely some major U.S. cities, for which the necessary data is not currently existing (Collin et al., 2024).

by foreign non-residents, who held around 30% of the total value of all residential real estate in the city in 2019.

Second, Dubai real estate is becoming more popular, the result of a multitude of policy changes made by the UAE government. Following the opening up of the real estate market to foreign ownership in 2006, we document that the share of foreign ownership increased from close to zero to more than 40% of all residential real estate in 2023.[4] While the bulk of the increase in the share owned by foreigners happened quickly, prior to 2011, the largest expansion in terms of total investment happened later, as the size of the Dubai residential real estate market sharply expanded in the period 2012 to 2016 and then again following the COVID-19 pandemic.

Our third finding is that investments are governed by a strong gravity relationship. Geographical proximity and historical ties are important determinants of offshore investments in Dubai. The largest group of offshore owners are Indian residents: Indians own Dubai properties worth almost $10 billion (14% of total offshore Dubai real estate). The United Kingdom comes next (properties worth $8 billion, 12% of the total). The remaining top countries by aggregate values include countries in the wider Middle Eastern and Central Asia region (e.g., Pakistan, Saudi Arabia, Iran, Jordan, and Russia) and large economies (e.g., Canada, United States, and China). These patterns remain when we focus on the most affluent neighborhoods, where the share of real estate owned by foreigners is particularly large – nearly 50%. The main difference is that India's share of offshore-owned real estate is surpassed by the United Kingdom, Russia and Saudi-Arabia. The share of Russia changes the most, and more than doubles to reach reach 10% in the most expensive districts.

Fourth, when matching the leaked data to unique administrative wealth data from Norway, we show that the likelihood of owning real estate in Dubai increases with the level of wealth. This wealth gradient is comparable to the one found for bank accounts in the Swiss bank HSBC Switzerland(Alstadsæter et al., 2019). However, the data also shows that the mean investment by wealth groups has a much more gentle gradient than found in Swiss banks, indicating that the offshore real estate in Dubai is not as concentrated among top wealth groups in terms of value as offshore financial wealth.

Lastly, we shed light on two key drivers for investment in Dubai real estate: tax evasion and sanctions-enabled capital flight. For Norway, a country with a wealth tax on global assets, we show that nearly 80% of properties in Dubai are not declared for wealth tax purposes by Norwegian taxpayers. We also present evidence from several countries (the UK, Italy, Spain)

[4]Foreign ownership includes offshore ownership and ownership by foreign nationals residing in Dubai.

that most rental income from Dubai real estate is not declared for tax purposes in the home country, and estimate the total amount of rental and capital gains income that goes undeclared by all non-residents: $2.7 billion per year. Second, we document how Russian money has poured into the Dubai real estate market after the full-scale invasion of Ukraine in 2022. Despite a large influx of Russian residents in Dubai, most of the real estate bought by Russians after the invasion appears long-term investment in unbuilt properties, likely owned by Russians residing elsewhere.

Our results have implications for the analysis of financial globalization and both international tax cooperation and ownership policies. Our results suggest that both the lack of cross-border exchange of information on real estate ownership and public reporting of the ultimate ownership of real estate positions is an issue for tax enforcement, depriving governments of income tax revenues (on rental income and capital gains) and wealth tax revenues (for the countries that tax wealth). Expanding the forms of international cooperation currently existing for financial assets to real assets could help address this issue, or encouraging more governments to make their real estate registers as transparent as possible.

These findings underscore Dubai's central role in the global offshore real estate landscape, as documented in our companion paper (Alstadsæter et al., 2025a), which provides the first systematic measurement of global cross-border real estate investments. While that global analysis reveals substantial variation in offshore real estate patterns – with London leading in absolute dollar terms ($143 billion) and Singapore following ($76 billion) – Dubai emerges as the paradigmatic case of offshore real estate investment. With $68 billion in offshore investment and an extraordinary 30% foreign ownership share of total residential value, Dubai far exceeds the 10-15% offshore ownership typical of other major cities, making it the world's most internationally integrated residential real estate market.

Related Literature. Our paper contributes to the growing literature on offshore wealth, which has predominantly examined financial assets held abroad (Zucman, 2013; Alstadsæter et al., 2018, 2019). Our contributions to this literature are fourfold. First, we deliver the first comprehensive analysis of offshore real estate ownership in a globally-significant tax haven, Dubai, by merging unique microdata on ownership, transactions, and rentals with detailed administrative records. Second, we build a longitudinal series of foreign investment in Dubai's property market over the past two decades, demonstrating how the importance of the investments has grown rapidly over time. Third, by linking property records to Norway's wealth registry to uncover investor heterogeneity, we are the first paper showing how the likelihood of

owning offshore real estate and its concentration vary across the wealth distribution. Fourth, we assess the effects of the Russia-Ukraine war on asset rebalancing toward real estate, illuminating how this asset class can attract investment driven by capital flight and sanctions-evasion concerns.

The first strand of related work measures offshore wealth. Shifting wealth outside the borders of your home country, either by investing through a bank account or a shell company in an offshore financial center or buying real assets abroad, has historically been a reliable means for concealing wealth from the authorities back home (Johannesen and Zucman, 2014). However, current estimates of offshore wealth typically only cover financial wealth, such as bank deposits and portfolios of equities, bonds, and mutual fund shares owned by households in foreign financial institutions (see Økland (2024) for a review of this literature.) Recent papers have also investigated investment in offshore real estate, but the best evidence on ownership of offshore real estate is concentrated on London and the UK (Bomare, 2019; Bomare and Le Guern Herry, 2025; Collin et al., 2025; Johannesen et al., 2024).[5] Studies of London reveal atypical gravity relationships, with buyer origins deviating from distance-based predictions (Johannesen et al., 2024; Alstadsæter et al., 2025a). By focusing on Dubai, we add a novel, large-scale example and demonstrate how gravity and wealth factors play out in a fast-growing tax haven that has little sign of introducing the kinds of transparency measures that may make markets like London less attractive in the future.

Second, as offshore wealth has important implications for the study of inequality, another persistent question in the literature concerns the place of investors in their country's income or wealth distribution (Alstadsæter et al., 2019; Londoño-Vélez and Àvila-Mahecha, 2021). Our analysis indicates that offshore real estate is concentrated among the upper end of the wealth distribution, but less so than offshore financial wealth. This is driven by the relative small portfolio size of wealthy investors, rather than by their likelihood to invest – almost as many in the top 0.1% of the Norwegian wealth distribution have invested in the Dubai real estate market as had bank accounts in HSBC Switzerland in 2006. We find that wealthy investors tend to hold a relatively small share of their net wealth in Dubai offshore real estate.

Third, we also contribute to a large literature on measuring offshore tax evasion (Alstadsæter et al., 2019; Londoño-Vélez and Àvila-Mahecha, 2021; Londoño-Vélez and Tortarolo, 2022; Leenders et al., 2023) and efforts to crack down on it (Johannesen et al., 2020; Alstadsæter et al., 2022b; Boas et al., 2024). Existing studies use either leaked data or information from voluntary

[5] Cvijanović and Spaenjers (2021) study Paris and Morel and Uri (2021) study France as a whole.

disclosure programs or CRS reports to estimate the level and distribution of under-reporting and tax evasion, typically driven by the ownership of previously-undeclared offshore financial accounts. We complement this literature by showing that, similar to bank accounts and securities in the world before automatic exchange-of-information, most offshore real estate goes undeclared to – and undetected by – tax authorities back home. When taken together with recent research showing that offshore real estate grew in popularity following the introduction of automatic reporting on financial accounts (Simone et al., 2020; Bomare and Le Guern Herry, 2025), our work highlights the growing tax compliance risks driven by real assets, compounded when there is no regular reporting or public transparency around their ownership (Agarwal et al., 2020; Collin et al., 2022, 2025).

Fourth, we contribute to a growing literature on the effect of sanctions circumvention and capital flight. In particular, we complement recent work by Kavakli et al. (2023) and Langenmayr et al. (2025) that has highlighted the degree to which there is a flight-to-safety of capital to tax havens from countries being targeted by financial sanctions, either to directly circumvent those sanctions, or because banks in more scrupulous markets have become less willing to deal with customers in targeted countries, regardless of their sanctioned status. In particular, we show that Russian demand for unfinished Dubai real estate spiked following the invasion of Ukraine and implementation of Western sanctions, at a time when demand for real estate in countries implementing sanctions likely decreased (Collin et al., 2025). As the UAE does not enforce sanctions on Russian individuals directly, our work also complements a growing body of research on the role that third party states play in undermining the effectiveness of sanctions more generally (Chupilkin et al., 2025; Scheckenhofer et al., 2025).

The rest of this paper proceeds as follows. Section 2 provides institutional background on Dubai's real estate market and establishes why it represents an ideal setting for studying cross-border real estate investment flows. Section 3 details the construction of our database from proprietary leaked data and describes our methodology for estimating the value and geographic distribution of offshore real estate ownership. Section 4 and 5 present our main findings on the magnitude and distribution of offshore real estate ownership across countries and wealth groups. Finally, Section 6 examines the underlying drivers of these investments by analyzing tax compliance behavior and estimating responses to international sanctions. Section 7 concludes.

2 Institutional Background: The Dubai real estate market as a tax haven

In this section, we describe how Dubai's real estate market has emerged as one of the most attractive destinations for foreign and offshore real estate ownership. We show that this market shares many characteristics with opaque financial markets – such as security holdings and bank deposits – making Dubai a key place for studying the dynamics and implications of cross-border real estate investment flows.

2.1 Dubai: An opaque investment environment

The United Arab Emirates (UAE) consists of seven largely independent emirates, the capital of which is Abu Dhabi. However, Dubai is the largest emirate and the country's economic and financial center. The vast majority of the UAE population – similar to that of other oil-rich countries in the Gulf region – are not Emirati citizens. This is especially evident in Dubai: out of its 3.8 million inhabitants, fewer than 8% are Emirati citizens (Dubai Statistics Department, 2024). A special feature of the UAE system is that residents without Emirati citizenship are only eligible for short-term (two to five-year) visas, typically sponsored by their employers. Emirati citizenship is hard to acquire, even for long-term or Emirati-born residents (Ali, 2010).

Despite the high bar for establishing a permanent residency, Dubai has experienced inward migration of individuals across the socioeconomic spectrum from all over the world.[6] Its flourishing financial industry and its role as a regional cultural and economic center have been critical in attracting highly educated professionals. This has been bolstered by very low tax rates: the UAE has no individual income tax, and the corporate income tax, only recently introduced, is only 9%.

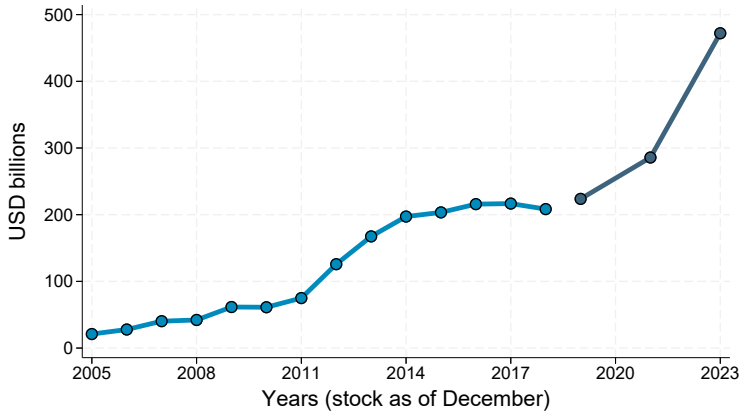
The low tax environment is one of the reasons that the United Arab Emirates is often considered a tax haven. Further reasons are the high level of secrecy concerning ownership and corporate structures and the reported weakness in the anti-money laundering enforcement, which also have given them a reputation for acting as a global hub for illicit trade and finance (Page and Vittori, 2020).[7] The United Arab Emirates ranks 13th in the 2025 update of Tax Justice Network's Financial Secrecy Index Tax Justice Network (2025), in which it has consistently

[6] Although most migrants are low-wage workers from Asian countries (Naidu et al., 2016).

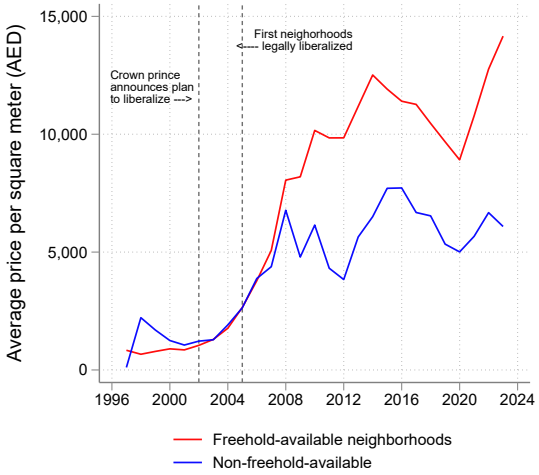
[7] The city is reportedly a major thoroughfare for smuggled gold (Lezhnev and Swamy, 2020) and reporting by journalists and non-profits has highlighted the significant number of criminals and foreign politicians who have acquired high-value property there (Page and Vittori, 2020). It has also, in part due to the United Arab Emirates' abstention from imposing sanctions following the 2022 invasion of Ukraine, reportedly become a haven for much of Russia's sanctioned elite.

Figure 1: Changes in the Dubai housing market since liberalization

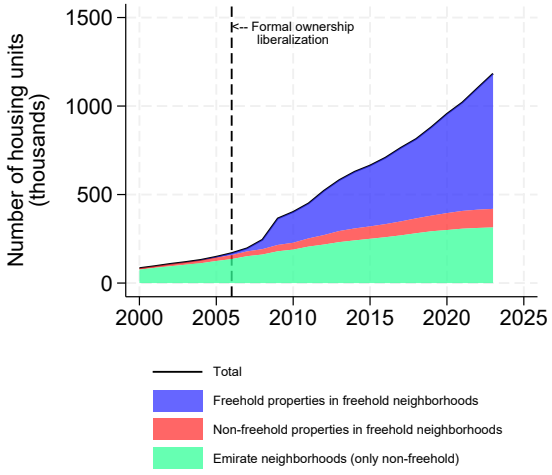
(a) Total value of residential real estate stock



(b) Prices, disaggregated



(c) Housing stock (units), disaggregated



Notes: Panel A shows our calculations of the total value of the residential real estate stock. Panel B shows the change in house prices in freehold areas (those that, as of the time of writing, have finished residential freehold units) relative to that of non-freehold (Emirate and GCC national ownership only) areas. Panel C shows the evolution of the housing stock, separately for freehold and non-freehold properties in freehold areas, as well as properties in non-freehold areas.

been ranked as a top country. In early 2022, as a result of growing concern over the United Arab Emirates' role in facilitating illicit activity, both the European Union and the Financial Action Task Force (FATF) – an international anti-money laundering standard setter – added it to their watchlist of high-risk jurisdictions for several years.

2.2 The growth of the real estate market

Prior to a set of reforms in the early 2000s, only nationals from other Gulf Cooperation Council (GCC) countries[8] were allowed to own real estate in the Emirate of Dubai. In an effort to further diversify its economy, attract foreign investment, and provide longer-term security for its growing foreign population, the government decided to begin opening up ownership to foreign nationals. In 2002, the Crown Prince of Dubai announced that a small number of (largely state-controlled) developers would eventually be allowed to build and sell properties that foreigners could purchase with a freehold title, confined to a few small areas of the city. This led to a surge in demand between 2002 and 2006, fueling prices and a construction boom, despite the lack of a legal framework to register foreign ownership. The policy was formalized when the government passed *Law No. (7) of 2006 Concerning Real Property Registration*, which explicitly designated which areas of the city would be eligible for leasehold or freehold ownership by foreigners. The resulting reforms set off a boom in the growth of the housing stock, particularly pronounced in the areas of the city that allowed for freehold ownership, as we show in figure 1.

Figure 1 charts the evolution of the housing market since liberalization. Panel A documents how the Dubai housing stock has grown by more than a factor of ten in terms of value during the last two decades. This is partly due to strong increases in prices over time, especially in the areas where all foreigners are allowed to buy property (freehold areas). Panel B shows that the average per-square-meter prices of completed residential units in the areas of the city that would eventually be made freehold eligible tracked those of the areas where only GCC nationals could buy until 2006, then grew to be 80% higher - on average - for the following period. However, the main factor has been the large number of new-built houses and buildings. Panel C shows that the housing stock in freehold areas grew very quickly after 2006, reaching more than 20 times its pre-liberalization levels by 2010 and 100 times by 2020, primarily driven by freehold properties (some properties in freehold areas where not released for foreign purchase).

In total, our estimate of the number of housing units grew from 450,000 to 1.02 million between 2011 and 2021, an increase of 127%. By contrast, the housing stocks of New York and London both increased by only 9% over a similar period. The extremely fast growth of the housing stock in liberalized areas during this period, compared to strong but more modest price growth, highlights that Dubai's market likely exhibits very high levels of elasticity of supply.[9]

[8] Bahrain, Kuwait, Oman, Qatar and Saudi Arabia.

[9] The expansion of the freehold policy included many neighborhoods with no existing housing stock or transactions pre-policy, making a straightforward estimation of the price and supply response to liberalization difficult. A back of the envelope calculation, comparing the change in average per square meter prices between all freehold

Today, Dubai's real estate and construction sectors are essential parts of the city's economy, comprising around 14% of GDP (Dubai Statistics Center, 2021). Real estate is also an important source of government revenue. The sale of government-owned land for developments is an essential source of income (Ali, 2010). There is also a 4% transfer tax on real estate and a yearly property tax of around 0.2-0.5% (5-10% of the property's annual rental value) (Deloitte, 2024).

This rapid expansion of Dubai's real estate market, coupled with the emirate's regulatory opacity, created substantial opportunities for foreign investors seeking to buy assets beyond their home countries' regulatory oversight or to circumvent international sanctions.

2.3 Dubai real estate as a tax haven asset

Dubai's real estate market offers several advantages to offshore investors, above and beyond what can be found in other large-scale property markets.

The first advantage is the opacity of ownership. At present, Dubai does not have a public property ownership register, making it challenging for foreign tax authorities or law enforcement to determine if someone being targeted for investigation owns a property there without initiating a formal legal request. This is further complicated by the fact that there is currently no global regime for the automatic exchange of information for real estate ownership, in contrast to the agreements that currently cover financial assets, such as FATCA and the CRS. This is true for other jurisdictions as well, but Dubai offers an additional level of opacity: its large off-plan market allows foreign investors to park their capital in the real estate market before a property is even built. Because existing automatic-exchange frameworks do not extend to escrow accounts held for the purpose of real estate investments, an offshore investor's assets become non-reportable the moment they decide to invest in an upcoming project, even if they decide to sell their stake in a property at a later date, before it is built.

The second advantage is a very low level of taxation. The UAE does not levy income tax, making the capital gains and rental income earned by foreign investors very attractive. Owners are only required to pay a 4% transaction tax when the property is sold, and a recurring "housing fee," equivalent to 5% of the average annual rent for the property (based on local indices) if the property is not let out, or 5% of the actual rent if it is.

areas and non-freehold areas (and the same for the housing stock) suggest an elasticity price response of the policy of $\frac{\Delta p}{\Delta freehold} = 83\%$ and a elasticity supply response of around $\frac{\Delta s}{\Delta freehold} = 1{,}090\%$, implying a supply elasticity response of around 13, which is higher than every OECD country and six times that of the United States (Caldera and Johansson, 2013).

The third advantage is scale and absorptive capacity: due to the high elasticity of housing supply, as well as the large off-plan market, the city can absorb large amounts of foreign capital with only a modest increase in prices. This means that an investment in a Dubai property is closer in many ways to opening up an investment or depository account in a financial institution in a more traditional tax haven, than it is to buying a fully built property in another major cosmopolitan city.

The final advantage is the possibility of a golden visa. The United Arab Emirates has offered a route to residency via investment (RBI) in real estate since at least 2018. Over time, the government has reduced the minimum level of investment needed for a visa, as well as offered it to those making fractional payments towards off-plan properties. Now, all real estate worth at least 2 million dirhams ($540,000) qualifies the investor for a 10-year residency permit, with two-year residency permits available for as low as AED 750,000 ($200,000). In addition to granting residency, UAE visas, together with property ownership, can be used by individuals to help skirt existing automatic exchange-of-information reporting requirements, by posing to financial institutions that they are tax residents in the UAE, when they are in fact based elsewhere. Recent research has shown that such schemes may be frequently used for circumventing the CRS (Langenmayr and Zyska, 2023), and in 2018 the OECD published a list of RBI schemes that were prone to abuse, which included the UAE. In Section B in the Appendix, we show how recent changes to the real estate RBI scheme in the UAE led to observable bunching around the eligibility threshold, a strong suggestion that the scheme is affecting investment patterns.

3 Data and Methodology

This section describes the data sources we collected and used to create a novel dataset with leaked data, allowing us to estimate both the total value of residential real estate and the share that is 'offshore-owned' (i.e., owned by non-Emirati nationals residing outside the United Arab Emirates).[10] First, we estimate property prices for the entire stock of residential real estate every year, using both linkable and anonymous transaction data.[11] Second, drawing on leaked data on property owners' nationalities and residence countries, we construct a dataset tracking foreign-owned real estate in Dubai from 2005 to 2023, providing detailed ownership statistics

[10] A comprehensive measure of offshore-owned real estate would also include real estate owned by Emirati nationals residing outside the United Arab Emirates. We do not consider this type of ownership, although it seems to be negligible.

[11] In all cases, we focus on residential property units: apartments, hotel apartments and villas, as our ownership information for these types of properties is the most complete.

by country for around the end of 2019. Third, and finally, combining the confidential ownership data with non-public rental agreement records, we estimate the total value of foreign-held real estate that is offshore-owned.

3.1 Data sources

Before presenting and explaining the data construction, we provide further details on our data sources, offering a comprehensive view of Dubai's real estate stock and transactions.

3.1.1 Stock data

Public microdata on residential real estate stock (Dataset A): The Dubai Land Department regularly publishes cadastral microdata on land parcels, buildings (including apartment buildings and villas), and units. In total, these datasets cover approximately 200,000 land parcels, 200,000 buildings, and 2 million units. They provide detailed geographic information at the neighborhood, land parcel, and building level, along with very precise characteristics such as surface area, number of bedrooms, and terrace size. The data also indicate whether a property is eligible for foreign ownership or restricted to Emirati nationals. However, they do not contain information on the nationality of ownership. Despite this limitation, the Dubai Land Department's data remains the most comprehensive administrative source of data available and serves as the 'backbone' of our analysis to estimate the value of Dubai's residential real estate stock. We also use it to validate and classify properties in the leaked ownership records. We discuss cleaning and additional classification of this dataset in Online Appendix F.

Leaked property ownership records (Dataset B): For the purpose of this research, we were provided with two property-level micro datasets by the Washington-based non-profit organization C4ADS. According to C4ADS, these datasets are sourced from the Dubai Land Department and other public utilities companies, so have been constructed by C4ADS from multiple sources.[12] These data are not publicly available and were shared with C4ADS by confidential sources that have not been disclosed to us. The records include detailed information on ownership and property characteristics of Dubai's property stock, including the property's size, details, location, and use of the property. Individual owners of properties are usually recorded, including their names, nationality, residence country, and other personal details.[13] We discuss

[12] https://C4ADS.org/multimedia/the-C4ADS-dubai-property-database/

[13] Corporate ownership is primarily restricted to large, local corporations, like local real estate developers. Real estate ownership through offshore companies is generally prohibited https://www.tamimi.com/law-update-articles/can-real-estate-dubai-part-2-know-rights-real-estate-investors-dubai-guide/

our corroboration of this data and additional data cleaning and classification in Appendix Sections D and F. The measures taken to ensure data and privacy protection are described in the Data Protection and Ethics Statement in Appendix E.[14]

The records provided to us by C4ADS comprise two separate leaks of information:

1. Records of real estate ownership in Dubai as of approximately January 2020, provided to us by C4ADS. This dataset covers 458,370 unique properties.

2. Records of real estate ownership in Dubai as of early to mid-2022, provided to us by C4ADS. Although these records are less complete, after supplementing them with information from the January 2020 leak (as described below), we construct a dataset containing ownership information for 455,505 properties as of early to mid-2022.

Both of these datasets only cover property that is held in the neighborhoods of the city where foreign nationals are allowed to own property. We explain below how we estimate foreign-owned property in the 'Emirati-only' areas where only Emirates and Gulf Cooperation Council (GCC) nationals are allowed to own property (subsection 3.2.2).

3.1.2 Transaction data

Public microdata on residential real estate transactions (Dataset C): This dataset is published by the Dubai Land Department and includes microdata on real estate transactions, including the price, time of transaction, type of property, and its location. Although it cannot be directly matched to other datasets used in this project, we use it to estimate property values for properties without a directly matched transaction in our non-public transaction record database, as discussed in the next subsection.

Non-public transaction records (Dataset D): In addition to the records provided to us by C4ADS, journalists involved in the investigation of illicit activity in the Dubai property market provided us with non-public transaction records covering around 900,000 property transactions between December 1997 and March 2024. At this time, we are unable to publicly specify the exact origin of the data, but based on comparisons with the public transactions data, we believe this dataset captures all sales in the public database. This leaked transactions dataset has several advantages over the publicly released transaction data. First, it includes unique property identifiers that can be linked to the confidential property ownership records provided

[14]Best practices for working with leaked data is discussed further in the paper Alstadsæter et al. (2025b)

by C4ADS, as well as unique identifiers for the building (for apartments) and the land the property sits on. Second, it contains enough identifying information to match a large proportion of properties featured in the Dubai Land Department's stock microdata. Finally, it contains partial information on the brokers involved in the transactions, along with geographic details that we incorporate in our analysis. It does not include nationality information about the buyer and seller.

Non-public rental records (Dataset E): In addition to non-public transaction records, journalists also provided us non-public rental records covering roughly 5 million unique rental agreements signed between the mid-2000s and March of 2024 that were registered with the electronic *Ejari* system managed by the Dubai Land Department. Ejari only became mandatory for new rental contracts in 2011, so we expect coverage before this point to be incomplete. Similar to before, our non-public rental data has several advantages over the public data published by the Dubai Land Department. For one, for a large share of contracts we are able to observe the nationality of the landlord (50% of the contracts before 2021, and none after) and the renter (in around 85% of residential leases, throughout the entire database). We are also able to merge rental records to the confidential property ownership data from C4ADS, allowing us to know which properties are leased out and when.

3.2 Estimating property values

We now discuss how we value individual properties for the public microdata (Dataset A) to estimate the total value of all residential real estate in Dubai. We rely on a two-step approach to estimate a property's value in a given year.

3.2.1 Direct match to a recent transaction

The first approach is to match the non-public transaction records (Dataset D) directly to the public microdata on the stock. We match through a combination of unique identifiers for the land and building of the property, as well as property-specific characteristics (e.g., unit number and size). When this matching is successful, which it is for 55% of the residential properties we consider, we value the property using the closest transaction price to December 31 of the year of interest, using the house price index published by the DLD to inflate or deflate the price accordingly.

3.2.2 Estimating the price for the remaining properties

Hedonic model. For the 45% of properties in the public microdata that lack a direct transaction match,[15] we estimate value $V_{i,t,g}$ of a property i of type t located in neighborhood g as of end-of-2019 as:

$$V_{i,t,g} = S_i \cdot P_{t,g} \tag{1}$$

where S_i is the size of the property i and $P_{t,g}$ is the average price per square meter of a property of type t ($t \in \{\text{Flat}, \text{Villa}\}$) in neighborhood g. We derive $P_{t,g}$ from the public transactions microdata (Dataset C) by averaging square meter price for properties of type t sold between January 2018 to December 2020 in neighborhood g.[16] We winsorize these averages per type of property at the 5% and 95% levels.[17] To ensure robustness, we match each price estimate to the most granular combination of project/area and type with at least five transactions[18].

For years other than 2019, we proceed in two steps. First, for any property that existed in 2019, we adjust its 2019 value by the Dubai Land Department's residential sale price index to arrive at its value in the target year. Second, for properties without a 2019 benchmark – whether because they were built after 2019 or demolished before it – we estimate their value following a similar approach to that of 2019: we multiply the property's size by the average price per square metre for the same type (and, where data allow, the same neighborhood or project), computed from transactions between two years before and one year after December 31 of the target year.

Estimating prices in Emirati-only areas. The above approach allows us to estimate property prices for most of the city. However, through close examination of the public micro data published by the Dubai Land Department and all available transaction data (both confidential and public), there are frequently insufficient transaction volumes in the 'Emirate-only' areas of the city to produce neighborhood-specific estimates of the per-square meter price.To properly price these properties, we use the observed price differential between properties that are identical in type (flat or villa), neighborhood and quality, but differ in their tenure status (eligible for foreign ownership or not), to adjust the predicted price of the Emirate-only/GCC stock of

[15] Those account for 35% of total value after estimation.

[16] We inflate or deflate prices to December 2019 using the Dubai Land Department's residential sale index (separately for flats and villas)

[17] See AppendixC for predictive accuracy and spatial variation.

[18] First, we try to match transactions within the same project and of the same type, then within the same project only, then within the same master project and of the same type, then within the same master project, then within the same area and of the same type, then within the same area, and finally of the same type only.

properties (this is described in more detail in Appendix Section C).

Estimating the price for properties in the leaked data. Finally, we perform a similar property estimation exercise for the confidential property ownership data (Dataset B), using both the public and non-public transaction data (Datasets C and D) to estimate the value of each property. For the large share of properties in the leaked data (B) that we succesfully matched to the public microdata (A), our price estimates for these properties will be identical to what we estimated before. But, as we will explain in the next section, for the subset of properties from either dataset that do not match, we will use their value estimates in the imputation of national ownership shares.

We report values in current US dollars. The United Arab Emirates dirham has been pegged to and stable at the same US dollar value since November 1997 (1 $ (USD) = 3.6725 AED).

3.3 Creating estimates of the foreign-owned and offshore-owned stocks

Having created an estimate of the value of all residential property at the end of 2019, we then proceed to 1) use confidential ownership data to allocate that value to different nationalities and 2) determine the proportion held by each nationality that is offshore-owned (owned by non-residents of the UAE).

3.3.1 Estimating foreign-owned stock in 2019

We begin with the stock of residential properties from the public microdata (Dataset A). We directly match 85% of the stock that can be owned by foreigners to the confidential microdata (Dataset B) and use Dataset B's nationality information for these properties.[19] For the properties that only appear in the public microdata (Dataset A), but exist in parts of the city where foreign ownership is legal, we impute national shares by neighborhood: we multiply the total value of unmatched properties in each neighborhood by each country's share of unmatched value observed in Dataset B for that same neighborhood, under the assumption that the latter is representative of the true distribution. For example, if in the public data $1 billion worth of properties in Jumeirah Bay cannot be matched to the confidential data, and French nationals own 10% of the value of properties in Jumeirah Bay in the confidential data, then we allocate $100 million of ownership to French nationals.

A significant share of residential properties (36% of the value) lie in Emirate-only areas, and thus do not appear in Dataset B. For these areas, we draw on our non-public rental record

[19] See Online Appendix G for matching procedure.

database (Dataset E). We extract all active rental contracts as of December 2019 with known landlord nationality, and allocate the total property value in each Emirate-only area according to the distribution of landlords, weighted by the value of the contract.[20] Neighborhoods lacking both confidential and rental coverage are treated as UAE nationality in the analysis.[21]

3.3.2 Estimating offshore-owned stock in 2019

We now have a country-by-country estimate of the total value of residential property owned by each nationality. We then estimate what share of that value is offshore-owned (in this case: owned by non-Emirati residing outside the UAE). To do so, we rely on microdata on owners' country of residency, available for 60% of the sample of owners, in the confidential property ownership data (Dataset B), as well as information on which properties were rented out in the period we consider (Dataset E). An owner is classified as non-resident if either they declare residency outside the UAE or rent out all their properties.

For each nationality, we compute the non-resident share of property value among owners with known residence status. We then apply that share to the nationality's total value.[22] For example, if Norwegian owners with known residency status hold $80 million offshore (i.e., have Norway listed as their country of residence in the ownership records or rent out all their real estate in Dubai) and $20 million domestically, we assume 80% of all Norwegian-owned value is offshore-owned and 20% is owned by Norwegian UAE residents. This procedure allows us to distribute each nationality's total property value between offshore and resident holdings. The assignment is based on property values, not individual owners.

Property use. We do not provide a further breakdown of the offshore-owned properties into how much the offshore owners use the properties. However, figure A1 panels A and B shows how the population density has not kept up pace with the housing stock, indicating that many of the offshore-owned properties is neither owned nor rented by Dubai residents. Further evidence of this is provided in figure A2, which highlights that a noticeable share of properties registered with a foreigner as primary user do not consume water nor electricity in certain winter months, in contrast to properties registered on Emirati citizens. The analysis in figure A2 is based on a few snapshot of anonymized data on electricity and water use. We are not able to expand the

[20] The same procedure is applied to a few freehold areas that do not appear in the confidential data.

[21] This residual amounts to approximately $15 billion of on-plan residential real estate, which is around 6.6% of the real estate stock.

[22] Concretely, we assume that the observed nationality-specific split between residency and non-residency in the confidential data (Dataset B) is representative of the entire ownership distribution.

analysis to the full year.

3.4 Constructing time-series of offshore value (2005-2023)

In Section 5 we present our main country-by-country estimates for offshore-owned real estate in Dubai for end-2019, since that year has the most complete confidential information on ownership and residency. We also extend our analysis to cover the overall foreign share and offshore-owned share for the period following the liberalization of ownership (2005-2018) and two later snapshots with country-distribution (2021 and 2023) to capture post-Ukraine-invasion shifts (see Section 6.2).

2005-2018. For many properties in the public microdata (Dataset A), we know both the nationality of ownership at the end of 2019 and the details about the acquisitions of the property by matching each property to our non-public transactional data (Dataset D) and our non-public data on rental contracts (Dataset E). Whenever a property changed hands or a landlord's nationality appears in a rental record, we assign its value to the nationality observed in the rental records for the relevant years. For example, imagine a property that has a British owner in 2019 and that first sold in 2015, rented under an Emirati landlord in 2017, and then sold again in 2018. We credit its value to the United Arab Emirates from 2015-2017 and to the UK from 2018.

For properties that have no observed transaction or landlord nationality for the observable years before 2019, we assume that each property's nationality remains as in end of 2019 throughout 2005-2019.[23]

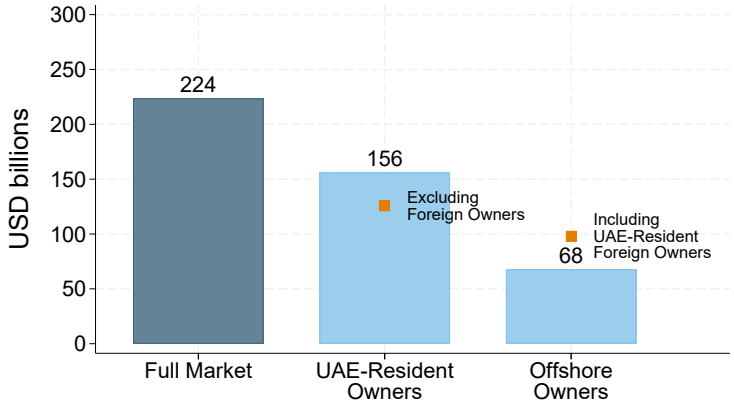
In neighborhoods restricted to UAE/GCC nationals, we hold nationality shares constant over time, adjusting only for new construction and price changes to reflect their relative share of the total residential housing stock over time.

2019, 2021 and 2023. We are not able to observe landlord nationality in the data on rental contracts (Dataset E) from early 2020 and onwards. This means that we have to use alternative approaches to estimate foreign investment from 2021 onwards. For our end-2021 estimate, we utilize the partial coverage we have from the 2022 edition of the leaked data, and impute

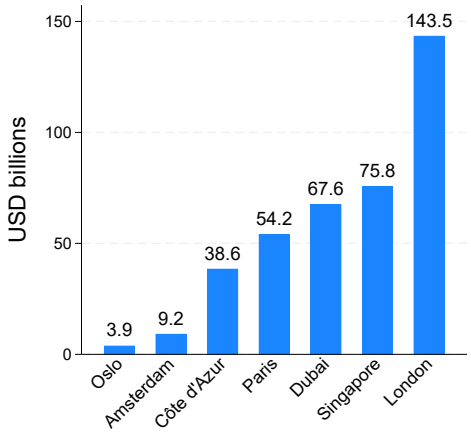
[23]We are cautious that this might bias our estimate of foreign ownership upwards in some years, if Emirati nationals were net sellers in the sample of properties that was sold in the period but not covered by rental data. An alternative methodology, which reallocates each property's value in the period the nationality of the owner was unobserved according to the observed, neighborhood-level nationality shares of properties with known history, shows only a minor deviation from the baseline approach.

Figure 2: Dubai Real Estate in an International Perspective

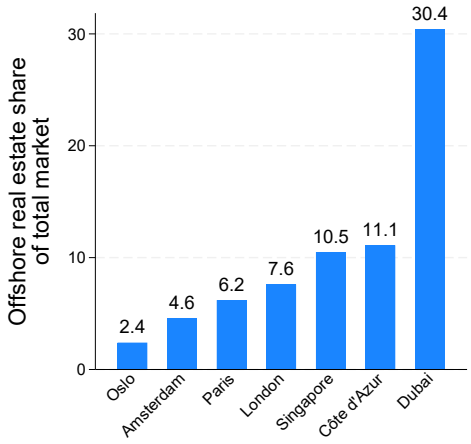
(a) Size of real-estate market in Dubai (2019)



(b) Amounts of offshore real estate (2019)



(c) Share of offshore real estate (2019)



Notes: This figure present our estimate of offshore investment in Dubai residential real estate and compares it to offshore investment in other major cities. Panel A shows the total size of the Dubai residential real estate market and how it divides between locals and offshore owners. The orange squares illustrate how the the values owned by local and offshore owners change when we exclude real estate owned by foreign nationals residing in Dubai from the measure of UEA owners and instead include them in the measure of offshore ownership. Panel B shows how the estimate of offshore-owned residential real estate in Dubai compares with offshore-owned real estate in five other cities and areas around the world. Panel C plots the same estimates, but as a share of total real estate in the respective city or area. All numbers are for residential real estate only, with the exception of London. The methodology behind the estimates is documented is documented in Alstadsæter et al. (2025a), and the London estimates in more detail in Bomare and Le Guern Herry (2025). The country-by-country estimates from the different cities are shown and can be downloaded from Atlas of the Offshore World.

nationality for the remainder, which we describe in more detail in Section G.1.2 in the Appendix. For our end-2023 estimate, we observe properties that are added to the housing stock (Dataset A) or change owners (Dataset D) and assume that the Emirate share of new purchases/additions is the same as between 2019 and 2021.

4 How big is offshore real estate?

In this section, we present our estimates of the size and growth of offshore real estate in Dubai, demonstrating that the liberalization of the real estate market, combined with the other features we described in Section 2, has led to a rapid rise in cross-border capital flows. We also show that these cross-border positions are larger relative to the size of the real estate sector than other cross-border positions (bank deposits). We also show that while the size of offshore real estate wealth in Dubai is small relative to the foreign asset position of most countries, for a select few countries it represents a significant – and unrecorded – share.

Aggregate estimate. Dubai is one of the world's largest providers of offshore real estate. Our central estimate is for 2019, where we find that the total value of the residential real estate market was $224 billion, and that $68 billion of this was held by non-resident foreigners, as we show in figure 2 panel A.[24] For overall levels of offshore real estate, Dubai is comparable to other large global cities. Figure 2 panel B shows that the level of offshore real estate is comparable to cities like London and Singapore, and exceeds a city like Paris.

However, Dubai stands out for the prevalence of cross-border investments in the real estate market: in total, around 30% of all residential real estate in the city are held by non-residents, making offshore ownership far more common than other global cities. Panel C of Figure 2 reports estimates for other cities from our companion paper Alstadsæter et al. (2024). Singapore comes second with only an offshore share of 11%. This is still relatively high in an international context, the shares in London and Paris – two global mega-cities – are a bit lower, at 8% and 6%, but still far lower than what we observe in Dubai.

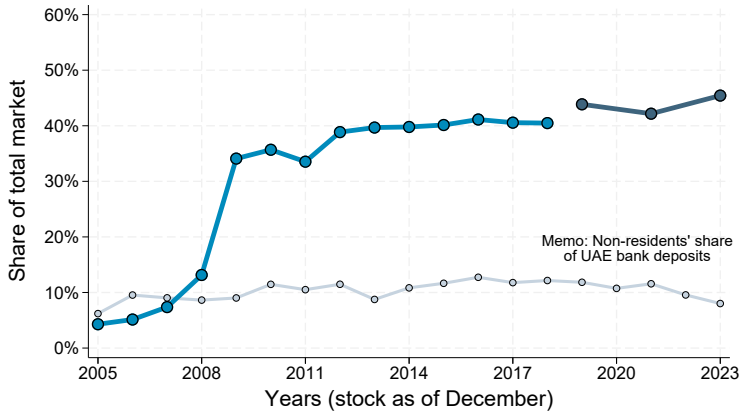
We also present estimates of the foreign-held share of real estate, combining both residents and non-residents. Due to Dubai's substantial foreign population, these are significantly higher: in 2019 foreigners owned approximately $98 billion, or around 44% of all residential real estate in the city. Emirate nationals, by contrast, owned the majority of residential real estate, at around $125 billion.

The evolution of offshore real estate since the early 2000s. We have established that Dubai is an important destination for foreign investment in real estate. To understand how it emerged as a global investment hub, we rely on our yearly estimates of the stock of foreign holdings of real estate, using the methodology described in Section 3.4.

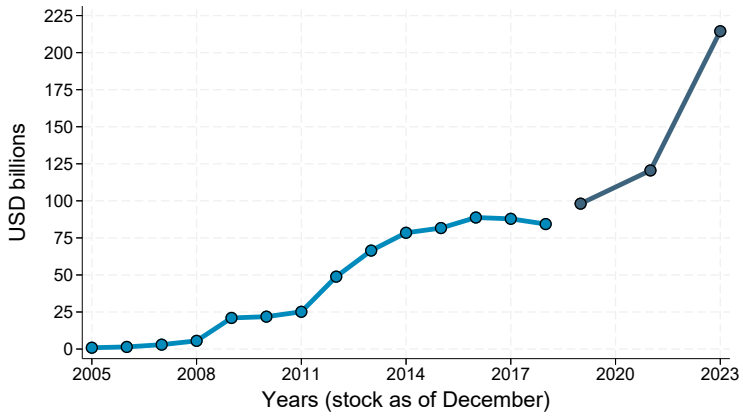
[24] Conceptually, we would also like to include Emirati nationals living outside the United Arab Emirates as well, but this group is negligible.

Figure 3: Foreign Ownership of Real Estate in Dubai over time

(a) Share of market owned by foreigners (2005-2023)



(b) Amount invested in Dubai (2005-2023)



Notes: This figure present our estimate of how the stock of foreign investment in Dubai residential real estate has developed over time. The figure considers foreign ownership, which includes both offshore ownership and ownership by foreign nationals who reside in Dubai. Our estimate for 2019 is that around 32% of foreign owners reside in Dubai. Panel A shows the share of the overall market which is owned by foreigners. The gray line display the the share of bank deposits in the UAE which are attributable to non-residents who are not banks (individuals, companies, non-bank financial institutions and government/non-profit entities) as a share of all bank deposits in the UAE owned by non-banks for comparison. The source for this data is the UAE Central Bank's Statistical Bulletin. Panel B shows the value of real estate owned by foreigners in USD. The development is shown as two separate connected lines highlight the difference in data sources, as detailed in section 3.4.

This measure is conceptually different from our estimate of the level of offshore real estate: as our method for allocating foreign-owned real estate between residents and non-residents is based on a snapshot of data from the start of 2020, we cannot reliably infer residency status going back in time, as owners may have been resident in Dubai in the past. However, a good rule of thumb is that if offshore ownership remained constant as a share of total foreign ownership throughout our period of study, then approximately 68% of the estimates we present here are

offshore-owned.

Figure 3 displays how foreign ownership has developed since full legal liberalization in 2006. Panel A shows that Dubai real estate was quickly included in the portfolio of international investors, who bought a significant share of the market in the years following the liberalization. The large increase in foreign ownership in terms of available properties happened already between 2007 and 2009: The foreign ownership share climbed from below 10% in 2007 to approximately 35% by the end of 2009. It thereafter stabilized around 40-45% from 2012 onward.[25]

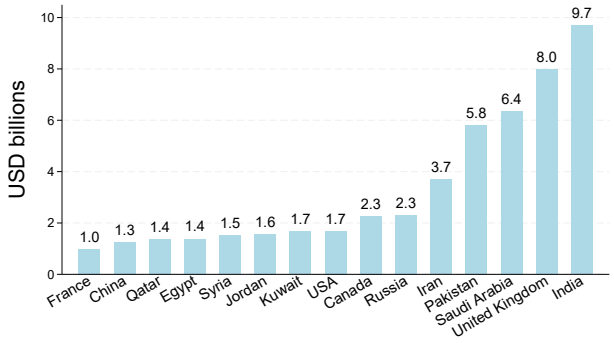
The stabilization in the foreign share does not translate into a halt in foreign demand. Instead, later influxes of foreign capital were matched by investment by UAE investors. Panel B of figure 3 shows that the overall wealth held in Dubai real estate tripled, despite not growing much faster in relative terms than the value of the total residential real estate stock. The large nominal increases in foreign ownership occurred first in 2009, when the foreign ownership share also climbed, to 22 billion. It then increased again between 2011 and 2014, and then finally between 2019 and 2023, when it peaked at 214 billion. This is explained by the rapid expansion of Dubai's housing stock and strong price appreciation in those later periods. For instance, the total value of Dubai's housing stock rose by 65% from 2021 to 2023 – attributable to price increases and newly completed units. The foreign share only increased by a couple of percentage points during this period, because the proportion of foreign holdings in existing properties almost matched that of newly built real estate. These trends persist when the value of foreign-owned real estate is scaled by world GDP and offshore financial wealth, as shown in Figure A4.[26]

[25]We find that this pattern closely mimics (with some lag) the development of the foreign share of landlords in Dubai. In figure A3 in the appendix, we show that foreign landlords account for roughly half of all rental contracts, weighted by the amount of the rent, in 2020.

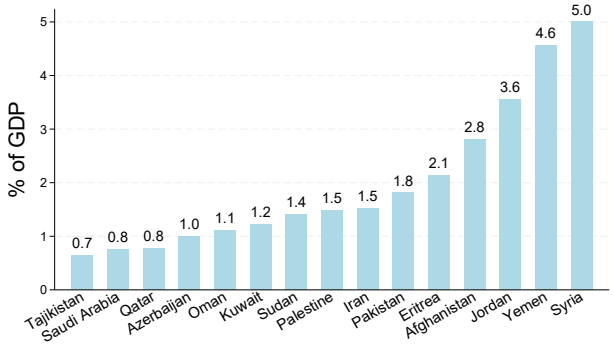
[26]The large, initial inflow of foreign capital into the Dubai real estate market happened during the early days of the international crackdown on tax evasion in tax havens. The EU Savings Directive introduced a withholding tax on interest income earned by EU investors in Switzerland from 2005. In 2009 and 2010, the U.S. FATCA policy was approved, and there was an overall boom in the signing of Information Exchange Treaties between non-havens and tax havens. The CRS was first proposed in 2013. All of these policies primarily or solely covered financial wealth, making the allocation of offshore wealth to real estate relatively more attractive. However, we do not attempt to establish a causal link between these policies and real estate investment in Dubai.

Figure 4: Real Estate Held in Dubai in 2019: Top 15 Countries

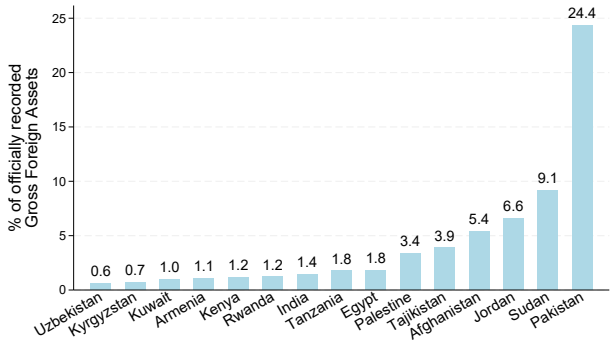
(a) Total Value (billions of USD)



(b) Total Value as % of GDP



(c) Total Value as % of Recorded Gross Foreign Assets



Notes: This figure shows statistics on the ownership of real estate in Dubai by the top countries (other than the United Arab Emirates) on three different metrics. Panel A shows the value of Dubai real estate owned by residents of the top 15 investing countries. Panel B shows the same values scaled by GDP. The GDP series used is custom and developed by this method: we choose the one that has the best 2000-2022 coverage from 5 potential sources (UN, IMF's WEO, WB, External Wealth of Nations, and WID). We then use the list in that order of preference to choose between ties. Panel C shows the value of Dubai real estate scaled by the the officially recorded gross foreign assets (excluding monetary gold), as recorded in the International Investment Position database published by the IMF. We exclude countries that are tax havens or have prominent citizenship-by-investment programs. These are shown in appendix I. Values for all countries are displayed in online appendix tables H1 to H5.

Real estate assets versus financial assets. Although Dubai is recognized as a growing 'offshore' financial center, the growth of offshore real estate exceeds that of non-resident financial deposits in the UAE. In Panel A of figure 3, we chart the share of foreign-held real estate alongside the development of non-resident, non-bank financial deposits (individual, corporate, and government/NGO profits) as a proportion of all bank deposits, as published by the UAE's central bank. In contrast to the stark growth of foreign (and likely also offshore) real estate, non-resident deposits as a share of all bank deposits grew modestly, from 4.6% in 2005 to 7% in 2023, or $49 billion in total.[27]

5 Who owns offshore real estate?

Who invests in offshore real estate? In this section, we will present macro-level estimates of the offshore stock by the residence country of the investor. We will also leverage the rich Norwegian administrative data, which we are able to match to individual property owners in Dubai, to characterize the wealth profiles of foreign investors.

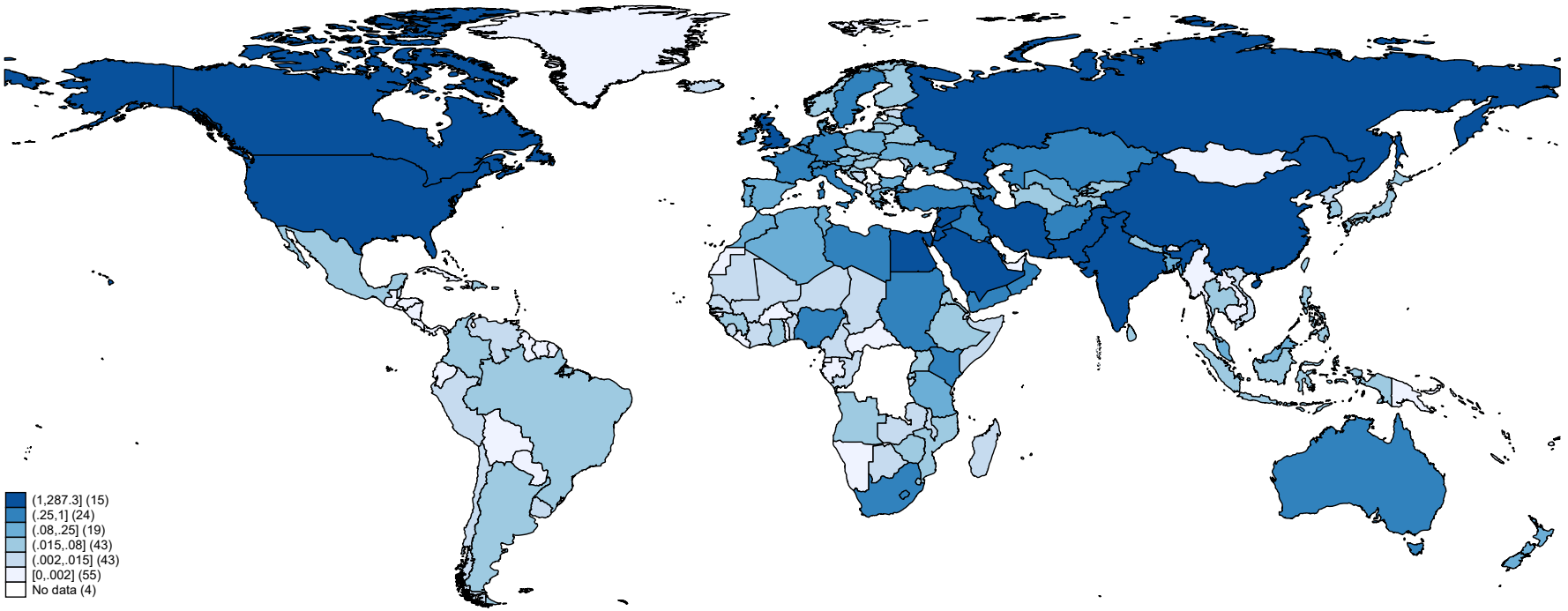
5.1 The geographical origin of cross-borders investments

Country-by-country estimates. Panel A of Figure 4 zooms into the top 15 investing countries, which altogether own close to 75% of offshore real estate in Dubai. India is the country with the largest ownership, worth almost $10 billion (14% of total Dubai offshore real estate). The second largest investor is the United Kingdom with $8 billion in assets (12% of the total). This highlights the role of geographical proximity and historic ties: Dubai (along with the other precursor states of the United Arab Emirates) was a British protectorate until 1971, with foreign policy and defense assumed by the British government. Figure 5 presents a global map of offshore real estate wealth held in Dubai by country in 2019.[28] The maps shows that the main owners of Dubai real estate in absolute terms are large neighboring countries (such as India, Pakistan, Saudi Arabia, Iran, Russia) and a number of large, often English-speaking, economies (United Kingdom, United States, Canada; and to a lesser extent China, Germany, France).

[27] It is possible that some non-residents own bank deposits in Dubai through local shell companies. However, even if we allocated *all* domestic corporate deposits to non-residents, an extreme assumption it would only exceed the offshore real estate share modestly (44% non-resident deposits versus 30% non-resident share.

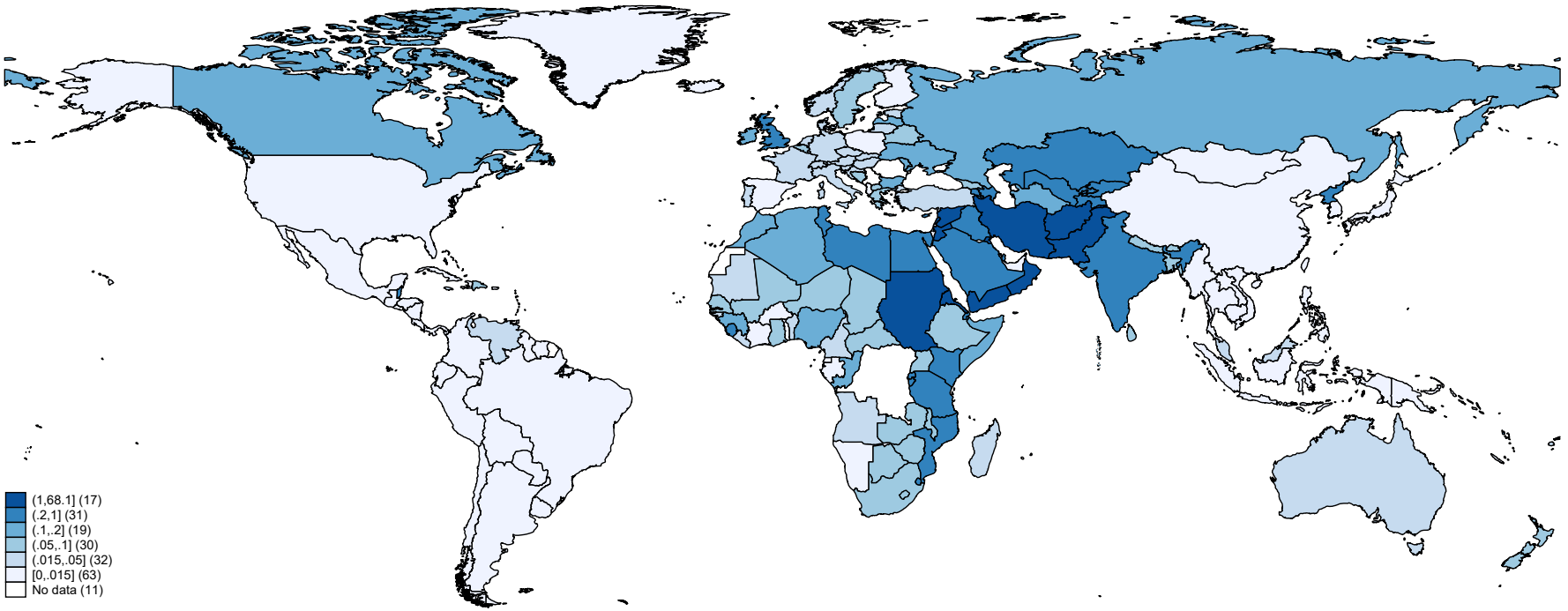
[28] Table H1 to H5 reports detailed and comprehensive statistics at the country level.

Figure 5: Value of Residential Real Estate Held in Dubai by Resident of Country in 2019 ($ Billion)



Notes: This map shows the value of properties in Dubai by residency country of owner. The range of values for each shade of blue is shown in the square brackets in the bottom left corner, with the number of observations in each bin in parenthesis. Values are in USD.

Figure 6: Value of Residential Real Estate Held in Dubai by Resident of Country in 2019 (percent of GDP)



Notes: This map shows the value of properties held in Dubai by residency country, scaled by the residency country's GDP. The range of values for each shade of blue is shown in the square brackets in the bottom left corner, with the number of observations in each bin in parenthesis. The GDP series used is custom and developed by this method: we choose the one that has the best 2000-2022 coverage from 5 potential sources (UN, IMF's WEO, WB, External Wealth of Nations, and WID). We then use the list in that order of preference to choose between ties.

It is also interesting to focus on countries that are over-represented relative to the purchasing power of their citizens, by scaling offshore real estate wealth by the total income in the home country. Figure 6 presents a global map of real estate wealth held in Dubai by country, scaled by the investing country's GDP.[29] The picture that emerges is somewhat different from the one that emerged in panel A of Figure 4. Neighboring countries still appear as the most inclined to invest in Dubai. But the United States, China, and European Union countries – which had sizable holdings in absolute terms – have small holdings relative to the size of their economy, equivalent of less than 0.05% of their GDP. The ranking of the top 15 investing countries by this measure is presented in figure 4 Panel B. The ranking is dominated by low-income countries. The most important is the conflict-ridden countries Syria and Yemen, of which residents holds residential real estate in Dubai worth around 5% of GDP. Other countries at the top of the list include other conflict-ridden countries like Afghanistan, Palestine and Sudan; countries under autocratic rule like Eritrea, Azerbaijan and Tajikistan; and neighboring countries such as Pakistan, Kuwait, Oman and Iran. This measure underlines the importance of Dubai real estate for elites in low-income countries.

We validate our results with a gravity model, and further discuss those results in Appendix Section K.

Real estate as part of foreign asset positions How important is offshore real estate for estimating aggregate foreign asset positions? The International Monetary Fund (IMF) surveys and maps the assets and liabilities of countries and their residents in the International Investment Position statistics. The Gross Foreign Assets is a subset of this statistic that measures the value of financial assets held abroad by the residents of each country, in other words, the country's gross wealth abroad. This is an important macroeconomic indicator, but it does not cover directly held real estate. Panel C of figure 4 compares the wealth in residential real estate in Dubai to the Gross Foreign Assets, as they are recorded in the database published by the IMF. While Dubai offshore real estate is only a small proportion ($68 billion) of the aggregate gross foreign asset positions for all countries with real estate investments, there are major exceptions for several developing countries and territories, including Pakistan, Jordan, Sudan, Afghanistan, Palestine, and Egypt. It is especially important for Pakistan, for which the inclusion of Dubai real estate would increase the recorded gross foreign assets of the country by almost 25 percent.

[29]We exclude tax havens and countries and territories with citizenship by investment territories, these are analyzed in appendix I.

5.2 Offshore ownership across wealth groups

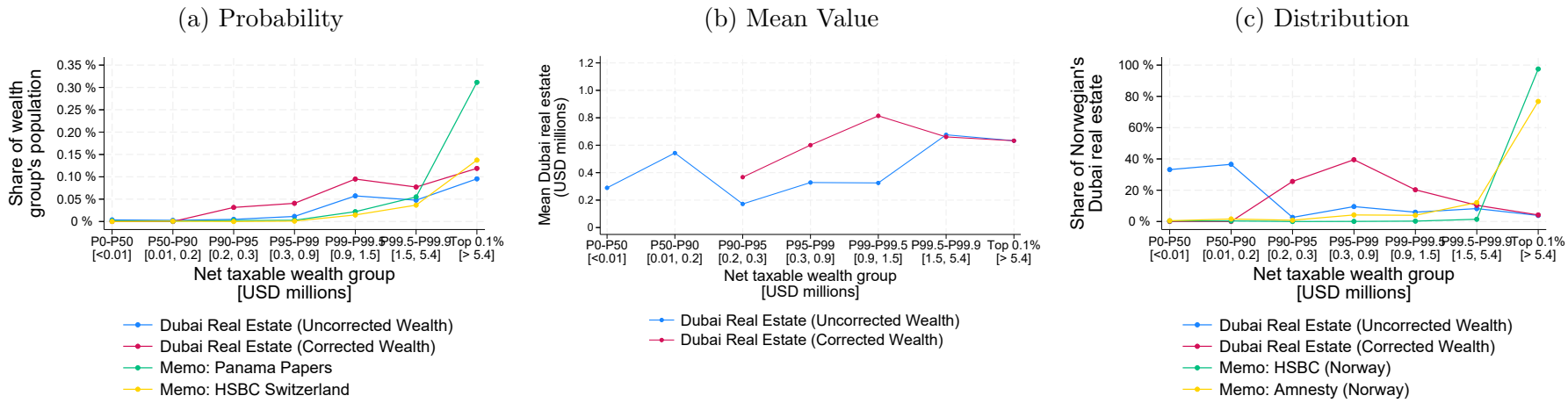
Linking owners to administrative Norwegian tax records. This subsection analyzes how the ownership of Dubai real estate varies across the wealth distribution within the population of a given country, following the work by Alstadsæter et al. (2019) on financial wealth in Switzerland and shell companies in the Panama Papers. We conduct our analysis for a separate subsample of owners of Dubai properties who are certainly tax residents in Norway, which was created through a collaboration with Norwegian journalists.[30] Journalists are allowed to merge Norwegian owners in Dubai with tax record information, they then shared an anonymized, processed dataset with us for analysis. We end up with a dataset containing information on wealth[31], income and tax payments in 2018 for all the 172 Norwegian resident owners in Dubai.

Wealth distribution from administrative micro data. We correct the net taxable wealth by adding the taxable value of the Dubai real estate wealth to each owner's net taxable wealth. In the case where the owner is still in the bottom 90 percent after adding the Dubai property values, we assume that this is the result of our inability to observe their true wealth and true rank in the wealth distribution due to data limitations and other non-reporting (e.g., owner has undeclared wealth in other tax havens, property registered with straw person, etc.). We distribute the owners and their properties to the different wealth groups within the the 10 percent of the wealth distribution, proportionally to the populations size of those groups.

[30]The collaboration with the journalists follows data processing restrictions, which means that they are not able to merge the leaked data of Dubai real estate owners with Norwegian administrative data. We detail the exact data construction in Appendix N.

[31]This observable net taxable wealth is an underestimate of the true market value of net wealth, due to the rules that regulate the Norwegian wealth tax. Taxable net wealth is total tax assessed wealth net of debts, truncated at zero if net wealth is zero. The tax-assessed wealth varies across asset classes and also depends on asset class and time-varying rebates for the tax-assessed valuation, as described in detail in Alstadsæter et al. (2022a). This will somewhat affect the ranking of individuals in the wealth distribution, as those who have a higher share of highly discounted wealth objects, like primary housing and holiday homes, in their portfolio will appear lower in the distribution than they really are. The value of non-listed companies is also imperfectly measured, but this is the case for most estimates of the wealth distribution based on administrative data.

Figure 7: Ownership of Dubai Properties Across Wealth Groups



Notes: This figure shows statistics on real-estate ownership in Dubai for different Norwegian wealth groups. The sample of Norwegian Dubai property owners include the 172 owners of Dubai real estate who are identified as Norwegian tax residents by journalists. For the series labeled "Uncorrected Wealth", the wealth of these owners is measured as their reported taxable net wealth before adding the value of Dubai properties. For the series labeled "Corrected Wealth", their wealth is measured after adding the value of their Dubai properties using the discount rate for holiday homes (70%). In our data, reported taxable wealth when negative is published as zero. For the corrected wealth, we replace 0 by NOK -924,500, which is the average net taxable wealth of Norwegian taxpayers with zero or negative taxable wealth. If the owner is still in the bottom 90 percent after adding the Dubai property values, we assume that this is the result of our inability to observe their true wealth and true rank in the wealth distribution due to data limitations and other non-reporting (e.g., owner has undeclared wealth in other tax havens, property registered with straw person, etc.). We therefore distribute these owners/properties proportionally to the top 10 percent groups in Panel A and C. Panel A shows the probability of owning a Dubai property by wealth group. It is compared to the comparable series for Norwegian's account ownership in HSBC Switzerland and connections to companies revealed in the Panama Papers, available in the appendix tables of Alstadsæter et al. (2019). Panel B shows the mean value of the real estate portfolios of the individuals in each wealth group, conditional on them owning a property in Dubai. Panel C shows each wealth group's share of the Dubai real estate owned by Norwegians in early 2020. It is compared to the distribution of Norwegians' wealth at HSBC Switzerland and disclosed in the Norwegian tax amnesty, both from Alstadsæter et al. (2019).

Results. Panel A of Figure 7 plots the share of each (Norwegian) wealth group that holds offshore real estate in Dubai against the same statistic for ownership of an account in HSBC Switzerland and for ownership of a shell company unveiled in the Panama Papers. The y-axis of the plot reveals that only a small share of the (Norwegian) population are owners of these types of investment objects or vehicles, regardless of wealth level.[32] The plot shows that the chance of owning Dubai real estate increases with wealth. More than 1 in 1,000 among the richest 0.1% of Norwegian individuals owned real estate in Dubai by the end of 2019. For comparison, only 1 in 25,0000 in the general population did. However, the wealth gradient does not directly mimic that for Swiss bank accounts and shell company ownership. The relative prevalence of Dubai real estate ownership generally exceeds HSBC Switzerland accounts and shell company connections in all wealth groups, with the exception of the top 0.1%.[33] While 0.12% of the richest 0.1% own real estate in Dubai in 2019, 0.14% of Norwegians in the same group had a bank account in HSBC Switzerland and more than 0.3% of the group was among Norwegian owners of Panama Papers-linked shell companies.

Panel B of Figure 7 sheds light on the mean size of the Dubai real estate portfolios.[34] We find that the mean portfolio size is relatively flat across the wealth groups when we rank individuals by uncorrected wealth, apart from the mean being significantly higher among the top 0.5 percent, and curiously the group P50-P90, than the rest of the groups ($0.6 million vs. $0.3 million). The latter is driven by individuals that seemingly are outside the top 10 percent of the wealth distribution based on their tax returns, but owns valuable properties in Dubai. This becomes clear when we rank owners by the wealth corrected for the value of their Dubai real estate (assuming it is not declared and thus not included in the original wealth measure). The mean value of portfolios owned by individuals in the top 10 percent approximately doubles when we correct the wealth ranking, from around 0.25 million to around 0.5 million. There is a clear contrast between the mean value of the portfolios owned by individuals in the top half of the top 10 percent and the bottom half ($0.6 million vs. $0.4 million).[35]

Panel C of Figure 7 shows that the wealth gradients observed for the two prior statistics does not translate into overwhelming ownership shares for the wealthiest segments. Only 4% of

[32] Alstadsæter et al. (2019) finds much higher numbers when considering participation in the broad tax amnesty in Norway: 1,422 households in total declared hidden wealth as part of the amnesty in the years they investigate, which is around 0.05% of the total population. Around 6.5% of the top 1% participated in the amnesty.

[33] The total number of observations for Dubai real estate (172 individuals) is higher than for HSBC (22 households) and Panama Paper (53 households) ownership (also relative to the population, despite a higher denominator when looking at individuals).

[34] Most Norwegian owners are only owners of one property.

[35] The correction disregards owners in the bottom 90 percent.

Dubai real estate is owned by the top 0.1%, while the rest of the top 1% owns 30%. This is in contrast to what Alstadsæter et al. (2019) found for financial wealth in HSBC bank accounts and the Norwegian tax amnesty, where the the top 0.1% owned 98% and 77% respectively. The discrepancy is driven by two factors: 1) individuals across the wealth distribution own real estate in Dubai, not only individuals at the very top, and 2) the size of the portfolios of real estate of the wealthiest owners are not massive, but instead only slightly larger than for the merely rich.

6 Drivers of offshore real-estate

So far, we have established that offshore real estate is an asset class that is both substantial in size and more likely to be held by investors with higher levels of wealth. In this section, we shed light on two drivers and determinants of such ownership: tax evasion and capital flight influenced by sanctions.

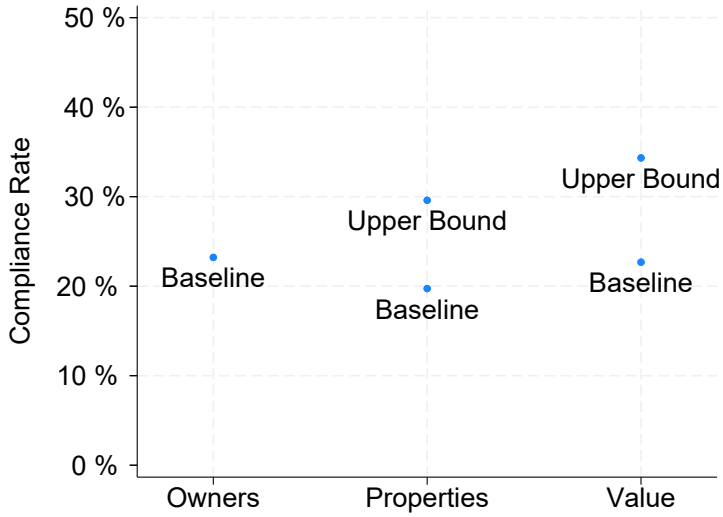
6.1 Tax (non)compliance

Real estate is an attractive investment for those looking to evade taxes. This is due to the fact that tax authorities do not regularly have access to information on the offshore real estate holdings of their taxpayers, unless they are self-declared. In contrast to financial assets, automatic exchange-of-information reporting does not currently extend to physical assets, although tax authorities may make one-off spontaneous transmissions of information. Since 2016, the recent introduction of the Common Reporting Standard has increased the relative opacity of real estate ownership vis-a-vis financial accounts (Bomare and Le Guern Herry, 2025). Thus, due to the lack of regular, third-party information on real estate holdings in Dubai, we would expect overall levels of tax compliance to be low.

Evidence from Norway. To estimate the levels of tax compliance among non-resident owners of Dubai real estate, we rely on data on the number of and value of properties declared by Norwegian tax residents in 2019. As Norway has a tax on worldwide wealth, all Norwegian tax residents are required to declare the value of their real estate positions on an annual basis. We consider this a reasonable proxy for tax obligations that are typically present in jurisdictions that do not levy a wealth tax, such as capital gains and taxes on rental income.

Both we and our media partner during this project, the Norwegian business newspaper *E24*, requested and received aggregate statistics from the Norwegian Tax Authority on the value of

Figure 8: Compliance rates among Norwegian tax residents, by measure



Notes: This figure shows our estimates of offshore real estate reporting rates by Norwegian tax residents owning real estate in Dubai. Norwegian tax residents are obliged to report their foreign real estate and its value as of 31 December in their tax return. We calculated reporting rates for the number of owners who declare real estate, the number of properties that are declared, and for the value of the properties. Our baseline estimate is calculated based on statistics published in the Norwegian newspaper E24 about Norwegian tax resident individuals' reporting of United Arab Emirates real estate and compare this to the same aggregates for the sample of Dubai real estate owners who are tax resident in Norway as of early 2020, according to the ownership records of Dubai real estate and research made by Norwegian journalists. For robustness, we compare the statistics based on the Dubai ownership records and journalistic work to tax statistics we have received directly from the Norwegian Tax Administration for 31 December 2019. These statistics are less granular than those received by the the media, as they also include real estate declared in Norwegian corporations tax statements. They thus represent a strict upper-bound on the declared real estate by Norwegians. They are also without the number of owners.

properties in the UAE declared by Norwegian tax residents in 2019. E24 received statistics based on individuals' tax returns, while we received statistics that cover both properties owned by persons and by businesses. The data is not available for Dubai separately. This means we cannot compute the exact fraction of Dubai real estate wealth duly declared by Norwegian taxpayers, only conservative estimates that serve as upper bounds for that fraction.

Figure 8 reports estimates for our baseline measure of tax compliance. The baseline compliance rate is around 20%, with minor variation across owners, properties, and values. We calculate our baseline estimate based on the number of Norwegian owners in Dubai we are certain are tax residents in Norway, and compare it to the number of tax resident individuals that report they are the direct owner of UAE real estate as of 31 December 2019 (as obtained

by E24). For robustness, we use as a reference group the data we received for 31 December 2019, which includes both individual ownership and firm ownership (Dubai real estate declared in the tax return of a Norwegian corporation). This means that it might cover the United Arab Emirates branch of a Norwegian company, for instance. [36] Finally, for both our measures, we assume that each property in Dubai qualifies for the 70% discount rate in taxable wealth for holiday homes. This affects our estimates of the compliance rate for values and might bias this upwards. The upper-bound estimates of the compliance rate are in the area of 30-35%.

Evidence from other countries. The findings for Norway are supported by corresponding evidence from other countries. The Italian news organization *IrpiMedia*[37] has obtained records from the Italian tax authorities that show that Italian tax residents declared 645 properties in the UAE, for the tax year 2022. These were worth EUR 186 million ($200 million). For comparison, we estimate that Italian tax residents own Dubai real estate worth around $640 million around the end of 2019 and around $800 million around the end of 2021. The implied compliance rate is thus around 25%.[38]

The British newspaper *The Times* has investigated British owners of Dubai real estate.[39] The British government does not keep track of UK tax residents real estate abroad in the same way as the Norwegian and Italian government, but foreign rental income is still taxable. According to the HMRC (UK's tax department), around 1,900 UK tax residents declared rental income from the United Arab Emirates during the 2021-2022 tax year. *The Times* analysis finds that around 13,000 of the 22,000 of the properties owned by British nationals in Dubai have been rented out in recent years. This implies a compliance rate around 15% for rental income, as multi-property ownership is rare among British owners.

Spain collects information about the ownership of foreign real estate from their taxpayers, as most Spanish regions impose a wealth tax on their residents. The Spanish newspaper *InfoLibre* reports that Spanish tax residents disclosed Dubai real estate wealth worth only EUR 11.93 million in 2013 and EUR 11.02 million in 2015, according to the tax administration. This is the

[36] This measure also accounts for properties owned by a Norwegian corporation, but nominally registered with an individual due to restrictions on corporate ownership in Dubai. We generally see direct ownership by foreign individuals, as ownership by foreign offshore companies is prohibited: https://www.tamimi.com/law-update-articles/can-real-estate-dubai-part-2-know-rights-real-estate-investors-dubai-guide/

[37] https://irpimedia.irpi.eu/dubaiunlocked-inchiesta-domande-e-risposte/

[38] We have not produced the number of Italian tax residents with the same accuracy as for Norwegian tax residents, as we have not had the same collaboration with Italian journalists. Instead, we rely on the methodology described in section 3.

[39] https://www.thetimes.com/uk/crime/article/thousands-of-britons-may-be-avoiding-tax-on-properties-in-dubai-wp6p0vhc0?region=global

most recent statistics that is published by the Spanish government. Our estimate, based on our time series of ownership by Spanish nationals and the share of Spanish owners residing outside the UAE in 2019, is that Spanish tax residents owned roughly EUR 106 million in Dubai at the time around the end of 2015, implying a compliance rate of around 10%.

There is also evidence on tax compliance behavior from outside Europe, however not in the same systematic manner. India, the only country with more owners in Dubai than the UK, has launched a series of enforcement efforts in recent years. These efforts have uncovered that at least 2,500 Indian owners of Dubai real estate are not disclosing their properties in their Indian tax returns.[40] This is of course only a minor fraction of the more than 30,000 Indian owners of residential real estate in Dubai, but indicate that tax compliance is comparably poor also outside Europe.

Aggregate estimate of undeclared real estate income. We proceed to estimate the magnitude of real estate income earned by non-residents in Dubai and how much of this goes untaxed. To estimate this, we rely on three sources of information on ownership of and income from residential real estate, first presented in section 3 . The first is the non-public transaction record data (Dataset D), which allows us to track the subsequent sales of all properties held in the leaked property ownership records for January 2020 (Dataset B). The second is non-public rental record data (Dataset E), which allows us to observe which of the properties in the leaked property ownership records for January 2020 (Dataset B) were rented out, for how much, and for how long.

We first estimate the total amount of capital gains for any properties owned by non-residents that sold within two years of January 2020. We then calculate the total amount of rental income earned by non-resident landlords in 2020 and 2021. These two estimates are only for the properties observed in the the leaked property ownership records. We therefore scale up those two income estimates to reflect that the properties observed in the leaked property ownership records are a fraction of the total value observed in the city (our aggregate estimates from Section 4) before we add them together.

The resulting estimate is that during 2020 and 2021, non-resident owners of Dubai real estate earned approximately $2.9 billion in rental income, and $4.1 billion in capital gains. If we apply the same compliance rate observed for Norwegian taxpayers (22.7%), then roughly

[40]Business Today (2020): "The Income Tax Department's criminal investigation wing has identified 2000 Indian citizens who hold properties in Dubai but had failed to declare it in their IT returns". Economic Times (2024): 500 cases of undisclosed properties held by Indians in Dubai discovered by tax authorities in 2024.

$5.4 billion worth of income (or $2.7 billion per year) of undeclared offshore income is generated by the residential real estate market alone in 2020 and 2021, before the size of the market grew dramatically after 2022.

6.2 Sanctions, war and save haven effects

We now turn to the discussion on the role real estate can play in facilitating conflict and sanctions-induced capital flight by elites. To that end, we analyze one particularly salient episode, which triggered a 'flight to safety' of foreign wealth into Dubai real estate: the Russian invasion of Ukraine in 2022. We estimate a lower bound for the causal impact the war has had on Russian investments in the Dubai real estate market. We also show that while some of these investments are likely driven by non-offshore purchases – Russians fleeing to Dubai and purchasing property – a significant proportion is likely to be offshore-owned real estate.

Dubai as a safe haven. The invasion of Ukraine changed incentives for Russian investors in several ways. First, sanctions imposed by the US, UK and Europe shut off Western property markets from most of the country's oligarch class. Second, both the war and the imposition of sanctions raised the perceived risks of dealing with wealthy Russians more generally, leading to a chilling effect in other markets (Collin et al., 2025). This was complemented by a Russian presidential decree issued in the days following the invasion, which limited the scope for Russian residents to transact with individuals from "unfriendly states." Finally, political turmoil following the invasion, including the eventual conscription of men of military age, potentially led many Russians to move both their capital and their families out of the country. The Dubai property market presented an attractive destination for the adrift Russian capital and labor, largely because the UAE showed little interest in imposing direct sanctions on Russia, its oligarchs, or its companies following the onset of the war. This, along with its low tax and business-friendly policies, also allowed Russian businessmen to maintain their trade and financial ties to the rest of the world.

Russian real estate brokers as proxy. We adopt an indirect approach to estimating the effect of the 2022 full-scale invasion of Ukraine on Russian real estate purchases. We use data on real estate brokers as a proxy for Russian buyers, since the latest comprehensive ownership data we have does not extend past early 2022.

We start out with the assumption that Russian buyers will be more likely to seek out Russian real estate brokers when looking to buy a property in Dubai. This is likely both because

prospective buyers will be able to discuss transactions in their mother tongue and because there might be a higher degree of mutual trust between buyers with the same cultural background.

We next establish that Russian brokers also are more likely to deal with Russian clients. Broker lists published online by the Dubai Land Department (DLD) let us classify around 24,000 brokers. To single out brokers who are likely to be Russian nationals, we employ *Namsor*, an AI tool which uses machine learning methods to predict the origin of a name. Russians brokers are the 7th most common predicted nationality and make up 3.42% of roughly 24,000 registered brokers, according to the tool.[41]

The non-public transaction data (Dataset D), which covers all property transactions until May 2024, reveals that non-Russian brokers very rarely handle transactions involving Russian buyers, while between 7-13% of the transactions handled by Russian brokers involved a Russian buyer, whether or not the broker was representing the buyer or the seller (Figure O2 in the Appendix). Thus, Russian brokers, regardless of which side of the transaction they represent, are more likely to be involved in transactions with Russian buyers than brokers of other nationalities.

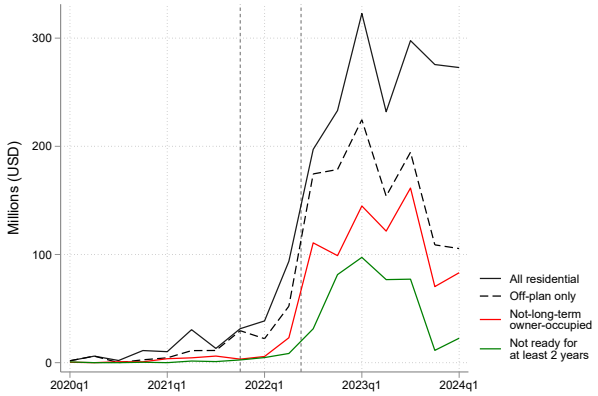
Measuring a surge in Russian-linked purchases. We see a significant surge in Russian broker activity after the invasion when we analyze transactions by broker nationality over time. Figure 9 panel A details this surge, emphasizing an immediate and substantial increase. In the first year after the invasion, nearly 75% of this surge was in property that was not built at the time of purchase (off-plan), consistent with a need to move capital more quickly than the existing real estate market could absorb.[42]

[41]To ensure that the predictions of *Namsor* are accurate, we scraped the details of 13,800 UAE property brokers from a popular property website (https://www.bayut.com/ which includes the purported languages spoken by the brokers. We are able to successfully merge (using the broker's unique id) 8,747 of these with DLD's list of registered Dubai brokers. We then look at the probability that a broker will speak Russian by their predicted nationality. Roughly 95% of the brokers identified as being Russian by the *Namsor* algorithm list Russian as one of their spoken languages. Only 1.6% of all other brokers speak Russian (see Figure O1)

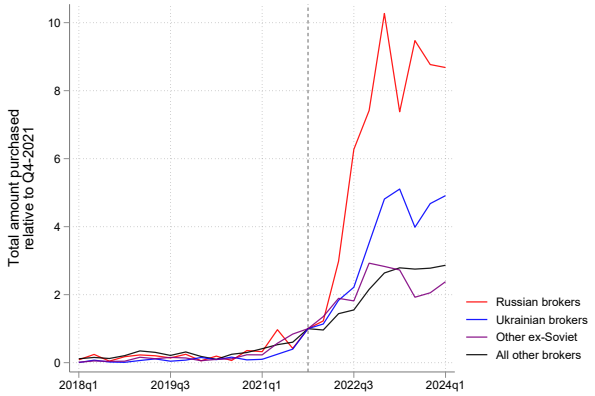
[42]We price off-plan property at the final purchase price, although it is possible that the actual amounts transferred into escrow were initially lower.

Figure 9: Observed residential real estate purchases made through Russian brokers

(a) By type of investment



(b) Compared to all other brokers



Notes: Figure 9 panel A displays aggregate quarterly residential real estate purchases handled by Russian brokers observed in the non-public transaction data, broken down by type of investment: (i) all residential purchases, (ii) purchases that were off-plan at the time of purchases, (iii) 'non-resident' purchases that were other off-plan or rented out for 75% of observed ownership and (iv) 'rental investment' purchases that are rented out for 75% or more of the observed on-plan ownership of the property. Figure 9 panel B shows the total amount of quarter residential real estate, relative to its 2021-Q4 value, handled by (i) Russian brokers and (ii) all other brokers identified in the data.

Around 43% of the initial surge were investments in properties we judge to be likely investment properties not intended to be owner-occupied, because they are either rented out or off-plan for at least 75% of the time following the purchase. Over 25% of the purchases were not only off-plan properties, but off-plan properties which would not be completed for at least two years, according to the project timeline. Taken together, we see this as evidence that a large share of the surge in investment after the invasion was driven by the reallocation of Russian investment to the real estate market, above and beyond that being driven by newly arrived Russian migrants.[43]

Figure 9 panel B illustrates that the surge in purchases involving Russian brokers was largely driven by factors specific to the Russian brokers, rather than the general increase in market activity. It reveals the unusual intensity of the surge: Russian broker-mediated purchases peaked at tenfold their pre-invasion level, compared to approximately double for other nationalities, and more so than Ukrainian brokers, who may have also seen higher levels of demand following the war. As a robustness check, we also confirm this basic result using data scraped directly from the DLD website on broker transactions (Figure O3 in the Appendix). Taken together our results confirm a multitude of media and industry reports indicated that Russian investment in

[43]We do find that the Russian population did surge following the invasion of Ukraine (See Figure O5 in the appendix) although less so relative to the relative increase we observe in Figure 11 panel B.

Dubai property had skyrocketed.[44]

One potential concern is that the surge is mechanically being driven by an increase in Russian brokers moving to the city. In the appendix, we show that while the Russian broker population did increase faster than other nationalities, Russian brokers also became more productive following the invasion, processing more sales per broker than other nationalities (figure O4).

Estimates of additional purchases driven by invasion of Ukraine. The above analysis establishes that there was a large increase in residential real estate purchases handled by Russian brokers in Dubai after the Russian full-scale invasion of Ukraine. Under certain assumptions, we can estimate the causal impact of the invasion on total inward investment made by Russians (through Russian brokers). We apply a synthetic control approach (Abadie et al., 2010), where we track the total volume of purchases made through Russian brokers and compare it to a "synthetic Russian broker" group. To reduce the prospect of overfitting (Abadie, 2021), we keep the 30 nationality groups that are the closest match to Russian brokers based on pre-invasion transaction patterns, excluding Ukraine and post-Soviet states to avoid contamination.[45] We then use the following characteristics to construct the synthetic group: the quarterly observed amount transacted through 'buyer' brokers of a given nationality averaged over the pre-treatment period, (ii) the same but for 'seller' brokers, (iii) the same two outcomes, but measured one quarter and six quarters before the invasion and (iv) the average USD exchange rate for the country in question, relative to its Q4-2021 value.

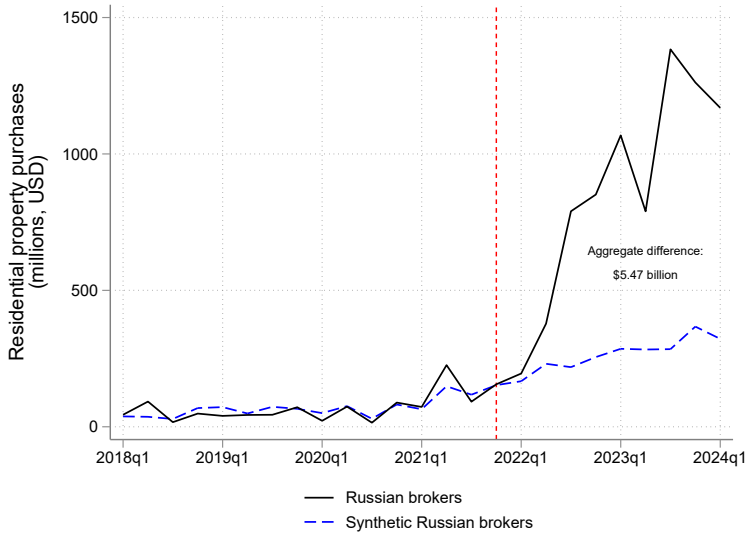
Our main estimates rely on three assumptions: (i) additional purchases made through Russian brokers are exclusively driven by Russian nationals, (ii) there is no anticipation of the invasion by Russian buyers and (iii) no spillovers between the treatment group and those making up the donor pool. The first and second assumption is easier to defend. It is unlikely that non-Russian became more eager to involve Russian brokers in real estate transactions after the invasion.[46] The second assumption is also consistent with the general perception of the course of events. There is some evidence that Russian oligarchs began to take anticipatory action in the weeks leading up to the full-scale invasion (through restructuring ownership of companies,

[44] Just six months after the war, a local property consultancy announced that one in five requests for property information came from Russian nationals. The Dubai-based real estate company Betterhomes reported that in 2022 Russians topped all other nationalities for the number of real estate purchases during the year (a 230 percent increase on the previous year), falling only to third place in 2023. There were even reports in 2024 that infamous Russian oligarch Roman Abramovich was spotted real estate shopping around the city.

[45] For this, we take a simple Euclidean distance and keep the 30 nationalities that are the closest to Russian brokers.

[46] It is possible that non-Russians who previously used Russian brokers were less likely to deal with them after the war, which would bias our estimates downward.

Figure 10: Synthetic control estimates of additional amount of residential real estate purchased through Russian brokers due to the invasion of Ukraine



Notes: Results show the estimated value of property bought through Russian brokers quarterly between 2018 and end of 2023 as well as a synthetic Russian broker group, which comprises: German brokers (56%) Iranian brokers (21%), Iraqi brokers (14%), Saudi Arabian brokers (9%). Prior to estimation, to reduce overfitting (Abadie, 2021), we restricted the donor pool to 30 nationalities closest to Russian brokers based on pre-invasion transaction patterns, excluding Ukraine itself and other post-Soviet states. We then use the following characteristics to construct the synthetic group: the quarterly observed amount transacted through 'buyer' brokers of a given nationality averaged over the pre-treatment period, (ii) the same but for 'seller' brokers, (iii) the same two outcomes, but measured one quarter and six quarters before the invasion and (iv) the average USD exchange rate for the country in question, relative to its Q4-2021 value.

transferring wealth to relatives, or purchasing physical goods), largely confined to oligarchs who may have received insider information. To account for anticipation, our analysis is conducted at the quarterly level, treating the first quarter of 2022 as the initial treated period. The third assumption of no spillovers is harder to satisfy. While we demonstrate that Russian brokers are more likely to deal with Russian clients, many Russian clients following the invasion will still have turned to non-Russian brokers. Thus we see our estimates as very likely to be underestimating the total impact of the invasion on Russian investment in real estate, but that they are a credible lower-bound[47] [48].

Then, we scale up our estimates at the city level, as we only observe the broker's identity for

[47] We would expect spillovers to be strongest for other Russian-speaking brokers, our main specification omits these groups, but we also present results when we restrict the donor pool to only Russian-speaking groups.

[48] Our results would also be threatened if spillovers took a different form: if the increase in observed transactions in part reflected a shift in the *relative* demand for Russian brokers, rather than an increase in the absolute demand for Dubai real estate by Russian buyers. We show next that we have direct evidence that direct Russian purchases surged following the invasion, indicating that it is unlikely that the results above are purely driven by "switching" behavior.

Table 1: Synthetic control estimates of amount purchased through Russian brokers due to invasion of Ukraine (billion USD)

Estimate	All residential purchases	Off-plan only	On-plan only
(1) Original†	5.91	4.59	1.36
(2) Conservative estimate†	2.83	1.88	1.47
(3) Only Russian-speaking groups as controls‡	4.65	3.69	1.22
(4) Only Russian-speaking controls (conservative)‡	2.37	1.58	1.47

Notes: This table reports the total amount of estimated real estate purchased through Russian brokers above what was estimated for synthetic Russia using the synthetic control approach reported in section 6.2 for the entire post-invasion period. The original estimate (1) scales up observed broker purchases by the total value of all purchases in a neighborhood in a given quarter. Estimates (2) scale up observed broker purchases by the observed under-reporting rate vis-a-vis the Dubai Land Department's online portal. Estimates (3) and (4) drop other Russian-speaking agent groups (or keep them as the only control group). Note that each column is a separate estimation, so the second two columns do not necessarily sum to the first.
Mean and standard deviation are reported for each variable.
† Synthetic group: Germany (56%) Iran (21%), Iraq (14%), Saudi Arabia (9%)
‡ Synthetic group: Uzbek (84%), Moldovan (16%)

a subset of transactions. Our main approach is to assume that broker identities are missing at random from transaction data, and applying nationality shares from reported transactions to those unreported[49]. Our main results are shown in Figure 10: we find that purchases handled by Russian brokers mimicked those of our group of synthetic Russian brokers until the invasion of Ukraine, after which purchases handled by Russian brokers exceeded the synthetic group by $690 million a quarter on average. In total, the difference between the two groups in the post-invasion period (Q1-2022 to Q1-2024) is around $5.9 billion.

In Table 1 we show these aggregate estimates broken down by the status of the property (showing again that the majority of the effect is concentrated among off-plan property), our scaling assumptions, as well as different restrictions on the control group. We find our results to be slightly lower when we only use non-Russian, but Russian-speaking nationalities as candidates for the donor pool, suggesting that there are positive spillovers between Russian brokers and other Russian-speaking groups. Our results using our more conservative scaling approach are about half as large as our preferred estimates.

[49]We also calculate a more conservative estimate, where we do not scale up the value of purchases fully, but instead calculate a broker nationality-specific under-reporting rate. We do this by, for every broker we have data for, adding up the total number of residential transactions reported in both the confidential transaction data as well as the Dubai Land Department website across the broker's history. We then aggregate both at the broker nationality level, to calculate the share of transactions on the DLD website that go unreported in the non-public transaction data, at the broker nationality level.

7 Conclusion

Offshore real estate remains one of the most opaque components of the global financial system, largely invisible to tax authorities and regulators, despite its substantial scale. This paper opens this black box through a novel analysis of confidential data in Dubai – one of the world's premier destinations for cross-border property investment. Our analysis reveals that offshore real estate is big: in Dubai, offshore residents hold approximately 33% of residential property value ($68 billion), with an additional 14% ($30 billion) owned by foreign nationals residing in the UAE. While traditional partners (India, UK, Saudi Arabia) dominate holdings, significant investments originate from sanctioned jurisdictions and corruption-prone states. To illustrate the dynamics of investment from sanction nations, we document how Russian money poured into the Dubai real estate market after the full-scale invasion of Ukraine in 2022.

More broadly, our paper highlights a structural asymmetry at the heart of global financial governance: while capital and asset ownership move easily across borders, legal authority and access to information do not. As attention turns toward global tax cooperation and domestic resource mobilization, there is a pressing need for more data, descriptive analysis, and empirical research that exposes these blind spots and supports evidence-based policy reform. This paper demonstrate how researchers can bring transparency to financial activity that is intentionally concealed: By leveraging novel, non-public data, while adhering to strict ethical and data protection standards, we open a new empirical frontier for studying hidden wealth.

Our findings have key implications for international financial governance. First, the offshore real estate sector represents a major vulnerability in global tax enforcement. While automatic exchange-of-information agreements like CRS cover financial assets, they exclude real estate, creating substantial opportunities for tax evasion. Our evidence from Norway shows that approximately 80% of Dubai property holdings are not declared for tax purposes, highlighting this regulatory gap's practical consequences. We estimate that globally, $2.7 billion per year in rental and capital gains income from Dubai is not declared to the relevant tax administrations.

Second, the scale and growth of foreign investment expose significant money laundering risks. Despite UAE's removal from the FATF greylist in 2024, the sector's explosive growth – coupled with a suspicious transaction reporting rate of just 0.1% – suggests minimal effective oversight.[50] The disconnect between formal compliance and practical enforcement remains stark.

Third, current international frameworks require urgent upgrading. The OECD's Common

[50] According to UAE's Financial Intelligence Unit, between July 2020 and June of 2023, only 405 STRs were filed by real estate brokers over a period where over 300,000 property transactions took place.

Reporting Standard should be expanded to include real estate assets, building on existing FATF recommendations that already require real estate professionals to collect client information comparable to banking standards. Additionally, creating unified asset registries – first regionally, then globally – would help authorities link ownership information across asset types, substantially improving capabilities to combat tax evasion, money laundering, and sanctions evasion.

Without renewed international coordination and concrete policy change, jurisdictions like Dubai will remain key facilitators of hidden wealth. The scale of offshore real estate investments documented here shows that addressing this blind spot is not only possible, it is essential for the future of global financial transparency.

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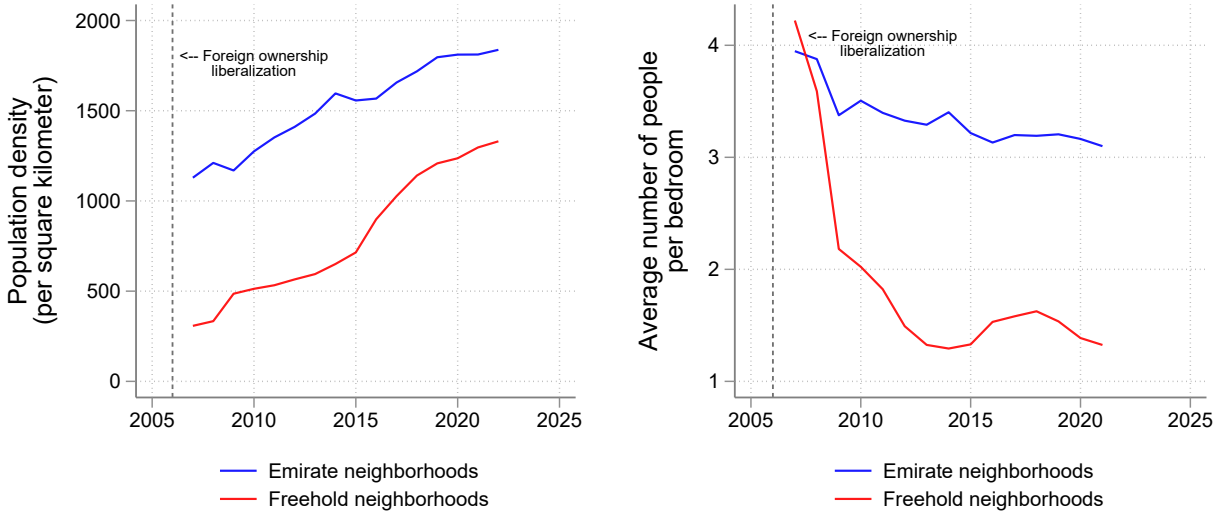
Appendix (for Online Publication)

A Additional figures and tables

Figure A1: Evolution of population density following the liberalization policy

(a) Population density

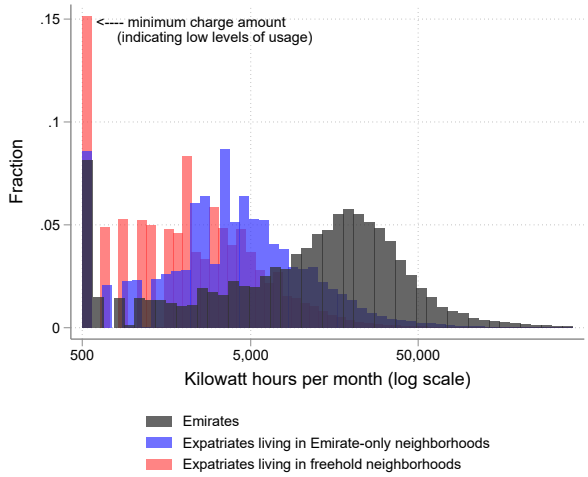
(b) People-per-bedroom



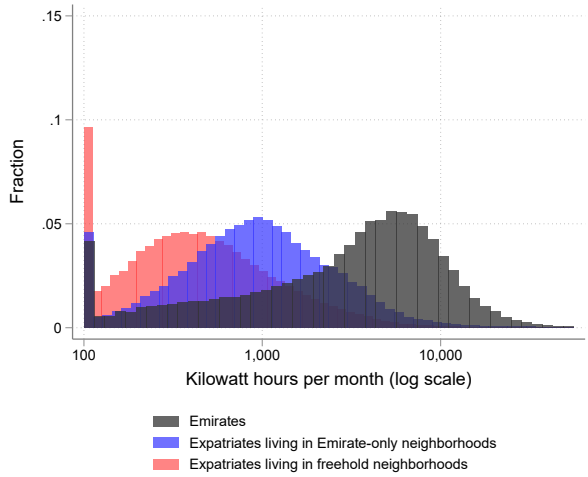
Notes: Figure shows the evolution of (a) population density and (b) the number of people per available bedroom across all neighborhoods with freehold properties versus those with no freehold properties available, both following the liberalization. This is calculated using neighborhood-by-neighborhood population estimates published by the Dubai Statistics Center, as well as authors' calculations of the housing stock.

Figure A2: Electricity and water consumption by type of client

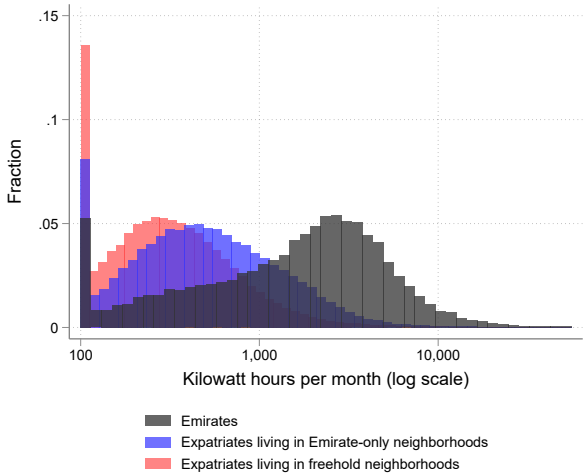
(a) Water usage (Feb 2022)



(b) Electricity usage (Nov 2022)

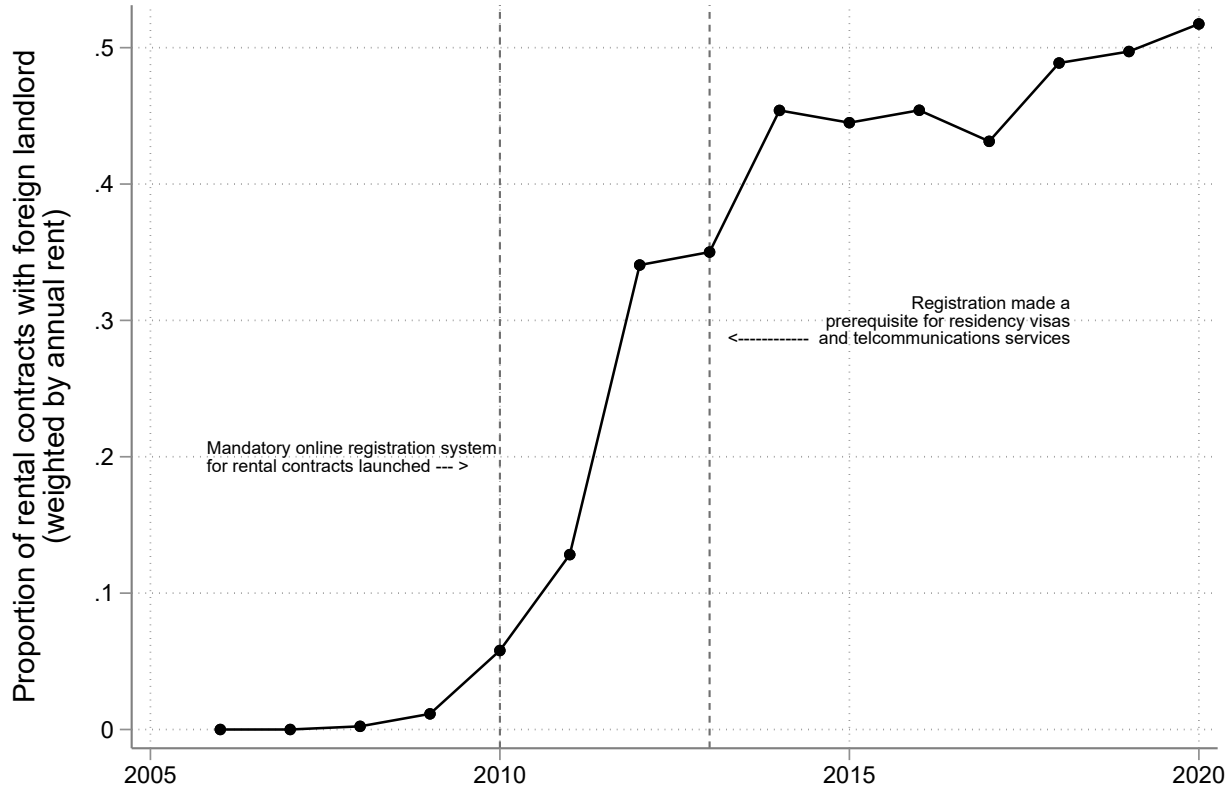


(c) Electricity usage (Jan 2023)



Notes: Figure A2 displays a histogram of electricity and water usage across clients of the Dubai Electricity and Water Authority (DEWA) for three separate time periods The data used here was formerly uploaded to the Dubai Pulse platform. The sample is divided into three groups: 1) those coded by DEWA as Emirati clients (RESINATE), 2) those coded as expatriate clients (RESIEXPE) who are located in either Emirate-only neighborhoods (thus are theoretically only renters) and 3) those coded as expatriate clients (RESIEXPE) who are located in freehold neighborhoods (in which a majority of properties are foreign-owned). For electricity accounts, those who use less than 100 kilowatt hours per month are charged that amount. For water accounts the minimum charge is for 500 imperial gallons. This analysis comes from three datasets downloaded from DEWA's page on the Dubai Pulse website (but have since been taken down): $Electricity_Consumption_2023-02-06_17-11-52.csv$, $Electricity_Consumption_2022-12-05_11-43-34.csv and water_consumption_2021-03-09_12-41-01.csv$

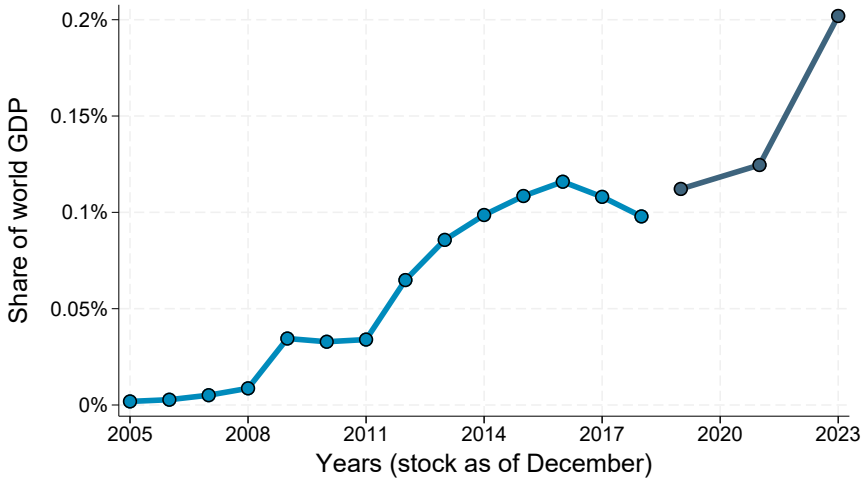
Figure A3: The share of rental contracts with a foreign landlord



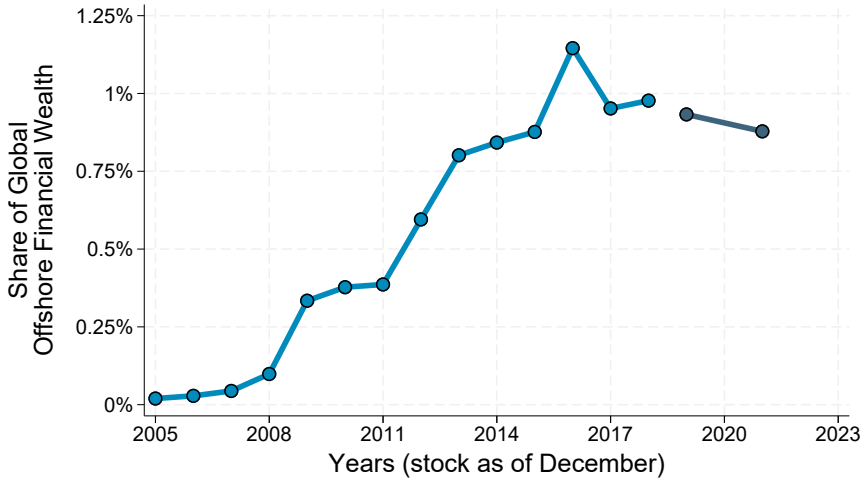
Notes: Figure A3 calculates the share of the value of all rental contracts with a foreign landlord across the entire city. This estimate is calculated using the non-public rental records data (Dataset E). First, we keep all contracts involving residential real estate properties (apartments, hotel apartments and villas). Next, we keep all contracts where the landlord's nationality is visible (roughly 50% of the time prior to 2021). Then, for December of every year, we calculate the total value of annual rent (in AED) of those contracts, as well as the share involving foreign (non-Emirate) landlords. Note that the observability of rental contracts changed significantly between 2007 and 2013: In 2007, Dubai passed a law making it a requirement for landlords and tenants to register their contract with the Real Estate Regulatory Agency (RERA), which launched an online portal in 2010, making registration mandatory. Enforcement was increased in 2013, when registration was made a prerequisite for the processing of residency visas (for tenants) and for signing up for telecommunications services.

Figure A4: Foreign Ownership of Real Estate in Dubai Over Time, Scaled by Relevant Amounts

(a) Scaled by World GDP



(b) Scaled by Global Offshore Financial Wealth



Notes: Panel A plots the overall size of foreign-owned real estate in Dubai against world GDP. Panel B plots the overall size of foreign-owned real estate in Dubai against the estimates of offshore financial wealth presented in Alstadsæter et al. (2023).

B Property prices and residency-by-investment schemes

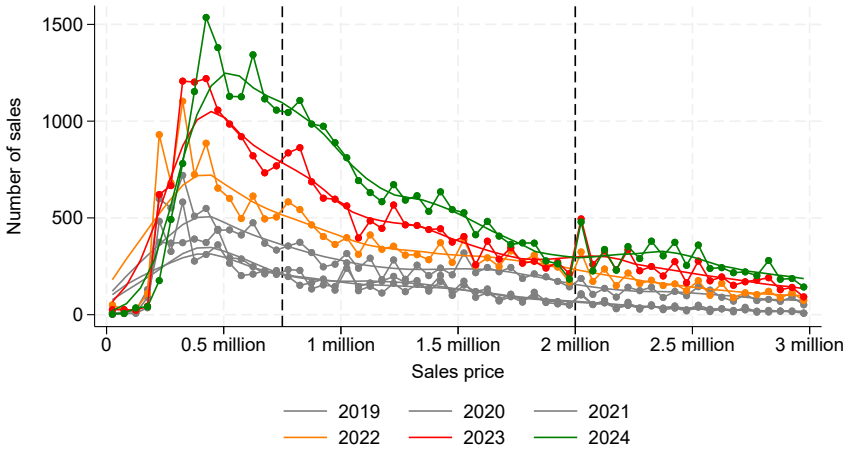
The United Arab Emirates announced a Golden visa program in November 2018, implementing it the following year. The program grants residency to individuals who make a substantial investment in the UAE, predominantly high net worth individuals, and other individuals that fall under the category of having a specialized skill or entrepreneurial talent. The initial program granted residence to individuals and their families for 5 years, with the option of renewal, if the applicant owned real estate worth at least AED 5 million (USD 1.36 million). The real estate could not be mortgaged. Alternatively, investors could receive a 10-year residence permit if they invested at least AED 10 million in shares of Emirate companies or investment funds.

The government altered the residency-by-investment program in 2022 to make it more attractive. First, the length of the initial residence permit was extended from 5 to 10 years. Second, the price threshold for real estate investments was lowered from AED 5 million to AED 2 million (USD 540k) and it was allowed for the properties to be mortgaged via approved local banks.6 Third, it also allowed for investment in 'off-plan' properties, properties that are not yet built. The change was announced in April 2022, but not implemented before in October 2022. Around the same time, a scheme that granted owners of real estate worth AED 750,000 (USD 204,000) a 3-year residence permit (later reduced to 2 years) was introduced. The rules were again liberalized this year, as the down-payment requirement was removed.

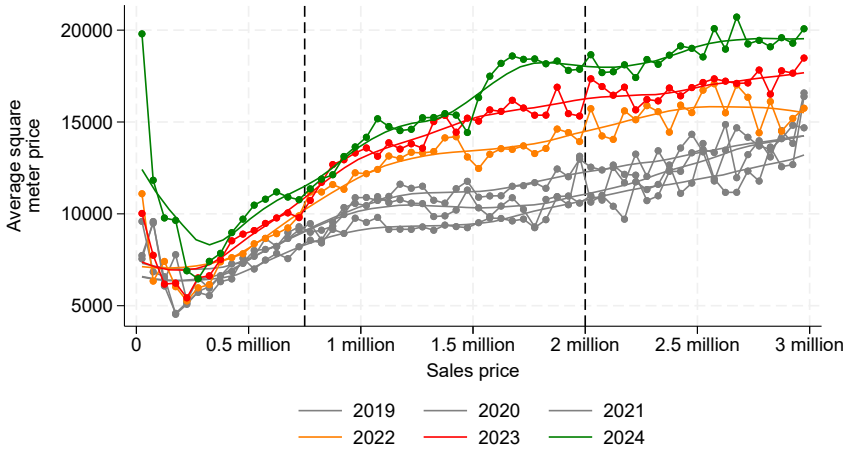
In Figure B1, we chart the price distribution both before the 2022 reforms (2019-2021) and after (2022-2024). We show significant bunching around the AED 2 million threshold after the RBI was made more attractive and the threshold was lowered to 2 million.

Figure B1: Transaction Prices for Existing (On-Plan) Residential Real Estate in Dubai, Before and After Changes to Residency-by-Investment Scheme

(a) Sales price distribution, by year



(b) Average square meter price over the sales price distribution, by year



Notes: This figure shows the distribution of sales prices in the Dubai residential real estate market. The data on sales prices are obtained from the Dubai Land Department, which publishes anonymized transaction records for all real estate transactions. Subfigure (a) shows this distribution for the years 2019 to 2024. Subfigure (b) shows the average square meter price across the price distribution. Each vertical line shows the price thresholds of AED 750k and 2m needed for accessing a 2-year (or 10-year) residence permit from 2022 and onwards.

C House price imputation, additional details

Testing our imputed house prices. Section 3 describes how we impute prices for houses where we cannot observe the transaction price. We impute based on a simple price algorithm that combines the observed size of house and the mean square meter price in the district where the house is located.

To assess the quality of our price algorithm, we compare our price predictions to the actual transaction prices we have for 313,989 properties. Specifically, we calculate the ratio of the difference between our estimated prices (generated through hedonic models) and the observed transaction prices, relative to the transaction prices themselves. The resulting statistics indicate that our model is accurate, with a mean ratio close to 5% (after trimming at 99% to remove outliers), suggesting slight overestimation on average, but generally balanced. Moreover, the median ratio is very close to zero (-0.022), reinforcing the unbiased nature of our predictions. Although outliers are present, as evidenced by extreme minimum and maximum ratios, the central tendency demonstrates that our algorithm reliably captures the true market values (bottom 5% percentile of the ratio is -.5, top 5% percentile is 1, see Table C1).

Table C1: Summary Statistics of Price Prediction Error Ratio

Statistic	**Value**
Observations	313,989
Mean	0.296
Median	-0.022
Standard Deviation	18.021
Selected Percentiles	
5^{th} Percentile	-0.466
10^{th} Percentile	-0.369
25^{th} Percentile	-0.206
75^{th} Percentile	0.203
90^{th} Percentile	0.577
95^{th} Percentile	1.015

Note: This table displays key summary statistics for the error ratio of our price prediction algorithms. This ratio is calculated as the difference between the estimated price and the actual transaction price, divided by the transaction price. These numbers are based on 313,989 properties for which we have recent transactions information.

Price deflation for Emirate-only areas As we also describe in Section 3, transaction data, both confidential and public, seems to comprehensively cover neighborhoods in Dubai in which freehold ownership is possible. However, very few transactions from the neighborhood where only GCC nationals (i.e. 'Emirate-only') areas seem to be covered in this data, as they make up less than 10% of the total. This makes creating neighborhood-specific per-square meter price estimates challenging. Instead, we predict the prices of properties in Emirate-only areas using the city-wide price per square meter estimate derived above. We then make an adjustment, to reflect the difference in obeserved prices between freehold properties and non-freehold properties. Specifically, for villas and apartments separately, we estimate:

$$Log(priceperquaremeter)_{i,t,g} = \alpha freehold_i + \beta Log(areasqm)_i + \sigma_i + \theta_g + \gamma_t + \epsilon_{itg} \quad (2)$$

Where the log of a property's per square meter price is regressed on an indicator equal to one if it is a non-freehold eligible property ($freehold_i$), its size (in logged squared meters), with fixed effects for how many rooms it has (σ_i), its neighborhood θ_g and the year of transaction (γ_t). From each regression, we retrieve the percentage difference in the price for non-freehold properties (approximately 40% lower for apartments, 10% higher for villas) and apply this to our price estimate for each property in Emirate-only neighborhoods.

Memo: House prices by district. The below tables display how the mean square meter prices varies across the different neighborhoods we differentiate between in the pricing algorithm.

Table C2: Mean square meter price by district (2018-2020)

City district	Mean price	City district	Mean price
Abu Hail	1,502	Al Yelayiss 1	1,635
Al Bada	1,957	Al Yelayiss 2	2,037
Al Baraha	1,926	Al Yufrah 1	1,821
Al Barsha First	2,748	Al Yufrah 2	2,283
Al Barsha Second	1,198	Al Yufrah 3	1,759
Al Barsha South Fifth	2,569	Burj Khalifa	4,813
Al Barsha South Fourth	2,453	Business Bay	3,776
Al Barsha Third	1,129	Dubai Investment Park First	1,583
Al Barshaa South First	916	Dubai Investment Park Second	1,913
Al Barshaa South Second	2,768	Hadaeq Sheikh Mohammed Bin Rashid	3,146
Al Barshaa South Third	2,809	Hessyan First	2,338
Al Garhoud	1,926	Hor Al Anz	2,211
Al Goze First	1,103	Hor Al Anz East	933
Al Goze Fourth	1,933	Island 2	5,285
Al Goze Second	3,558	Jabal Ali First	2,173
Al Hamriya	2,636	Jabal Ali Industrial Second	3,158
Al Hebiah Fifth	2,372	Jumeirah First	5,033
Al Hebiah First	2,083	Jumeirah Second	1,771
Al Hebiah Fourth	2,366	Jumeirah Third	1,800
Al Hebiah Second	2,090	Madinat Al Mataar	2,159
Al Hebiah Sixth	1,680	Madinat Dubai Almelaheyah	4,514
Al Hebiah Third	2,828	Mankhool	1,738
Al Hudaiba	901	Marsa Dubai	3,953
Al Jadaf	3,382	Me'Aisem First	2,186
Al Jafliya	1,687	Mirdif	1,947
Al Khabeesi	2,426	Muhaisanah First	2,383
Al Khairan First	4,674	Muhaisanah Third	981
Al Khawaneej First	1,063	Nad Al Hamar	1,065
Al Khawaneej Second	697	Nad Al Shiba	1,555
Al Kheeran	2,880	Nad Al Shiba First	2,492
Al Kifaf	3,949	Nad Al Shiba Fourth	1,151
Al Mamzer	1,328	Nad Al Shiba Second	794
Al Manara	1,832	Nad Shamma	1,026
Al Merkadh	4,215	Nadd Hessa	2,071
Al Mezhar First	949	Naif	2,931
Al Mezhar Second	910	Oud Al Muteena First	876
Al Muteena	2,550	Oud Al Muteena Second	790
Al Qusais Industrial Fourth	2,034	Palm Jumeirah	3,947
Al Qusais Second	1,137	Port Saeed	3,651
Al Qusais Third	844	Rega Al Buteen	2,230
Al Raffa	2,506	Saih Shuaib 2	1,980
Al Rashidiya	979	Trade Center First	3,572
Al Saffa First	1,470	Trade Center Second	3,085
Al Saffa Second	1,699	Um Al Sheif	1,980
Al Safouh First	2,528	Um Hurair Second	4,279
Al Safouh Second	792	Um Suqaim First	1,774
Al Satwa	2,107	Um Suqaim Second	1,774
Al Thanayah Fourth	1,669	Um Suqaim Third	4,542
Al Thanyah Fifth	2,344	Wadi Al Amardi	734
Al Thanyah First	3,501	Wadi Al Safa 2	2,028
Al Thanyah Third	2,798	Wadi Al Safa 3	1,715
Al Twar First	1,043	Wadi Al Safa 4	1,933
Al Twar Second	821	Wadi Al Safa 5	2,099
Al Twar Third	1,033	Wadi Al Safa 6	1,373
Al Waheda	1,335	Wadi Al Safa 7	1,995
Al Warqa Fourth	872	Warsan Fourth	1,959
Al Warqa Second	910	World Islands	7,252
Al Warqa Third	885	Zaabeel First	5,671
Al Warsan First	1,981	Zaabeel Second	5,452
Al Wasl	4,237		

Notes: The table shows the (adjusted) mean square meter prices from residential properties in 119 different Dubai districts and buildings. The averages are for the time period January 2018 to November 2020. The averages exclude the top and bottom 5 percent square meter prices from the calculation. The averages are calculated from transactions data compiled by the Dubai Land Department and published through the Dubai Pulse portal. The values are in US dollars.

Table C3: Mean square meter prices by district and type (2018-2020) – I

City district	Villa mean price	Obs.	Unit mean price	Obs.	Building mean price	Obs.	Land mean price	Obs.
Abu Hail	1,502	47	NA	NA	2,260	8	1,684	5
Al Bada	1,957	47	NA	NA	7,682	32	2,632	11
Al Baraha	1,926	11	NA	NA	7,214	21	1,657	3
Al Barsha First	1,553	7	3,392	13	8,874	69	2,799	26
Al Barsha Second	1,198	50	NA	NA	2,120	17	637	31
Al Barsha South Fifth	1,335	370	3,119	830	3,489	11	1,269	45
Al Barsha South Fourth	2,066	742	2,500	6163	4,528	75	1,610	196
Al Barsha Third	1,129	36	NA	NA	1,105	31	1,363	50
Al Barshaa South First	916	15	NA	NA	508	13	351	49
Al Barshaa South Second	2,021	223	3,127	463	1,195	27	736	113
Al Barshaa South Third	NA	NA	2,809	2040	2,594	13	1,379	49
Al Garhoud	1,926	23	NA	NA	5,933	25	1,154	5
Al Goze First	1,103	18	NA	NA	2,667	16	423	37
Al Goze Fourth	1,519	19	1,947	569	1,535	7	840	19
Al Goze Second	1,070	8	3,810	79	281	83	429	67
Al Hamriya	2,636	2	NA	NA	5,044	45	5,846	1
Al Hebiah Fifth	NA	NA	2,372	705	493	2	3,350	3
Al Hebiah First	1,878	100	2,106	905	4,173	3	1,574	13
Al Hebiah Fourth	2,184	1200	2,436	3086	2,795	4	2,818	58
Al Hebiah Second	1,541	33	2,160	259	2,702	10	1,090	12
Al Hebiah Sixth	1,505	532	3,438	53	NA	NA	2,089	167
Al Hebiah Third	1,764	967	3,486	1565	1,657	1	2,089	510
Al Hudaiba	901	2	NA	NA	3,691	1	410	1
Al Jadaf	NA	NA	3,382	948	6,762	28	1,751	192
Al Jafliya	1,687	20	NA	NA	1,973	6	1,069	7
Al Khabeesi	2,426	1	NA	NA	3,403	45	NA	NA
Al Khairan First	NA	NA	4,674	4474	NA	NA	1,784	7
Al Khawaneej First	1,063	21	NA	NA	658	41	746	246
Al Khawaneej Second	697	1	NA	NA	517	63	336	501
Al Kheeran	2,248	11	2,923	160	NA	NA	NA	NA
Al Kifaf	NA	NA	3,949	434	NA	NA	NA	NA
Al Mamzer	1,328	21	NA	NA	9,635	12	1,101	61
Al Manara	1,832	34	NA	NA	2,400	4	1,760	13
Al Merkadh	2,350	332	4,335	5162	1,855	19	2,451	102
Al Mezhar First	949	39	NA	NA	1,105	14	520	45
Al Mezhar Second	910	20	NA	NA	483	12	590	15
Al Muteena	2,550	15	NA	NA	3,545	64	1,216	4
Al Qusais Industrial Fourth	NA	NA	2,034	42	3,355	1	3,581	3
Al Qusais Second	1,137	1	NA	NA	2,464	8	760	33
Al Qusais Third	844	6	NA	NA	509	2	433	7
Al Raffa	2,506	4	NA	NA	6,053	83	3,492	15
Al Rashidiya	979	86	NA	NA	1,602	1	1,013	14
Al Saffa First	1,470	14	NA	NA	969	2	1,639	6
Al Saffa Second	1,699	37	NA	NA	565	2	1,174	5
Al Safouh First	1,963	13	2,563	210	10,163	3	1,894	11
Al Safouh Second	792	1	NA	NA	9,415	13	2,957	6
Al Satwa	2,107	31	NA	NA	5,912	15	3,484	72
Al Thanayah Fourth	1,664	2300	3,933	5	819	12	2,747	159
Al Thanyah Fifth	1,341	1134	2,561	5256	3,855	9	1,784	93
Al Thanyah First	NA	NA	3,501	618	8,548	22	3,822	5
Al Thanyah Third	2,060	374	2,932	2054	3,599	5	3,470	3
Al Twar First	1,043	17	NA	NA	1,277	2	394	3
Al Twar Second	821	3	NA	NA	NA	NA	334	11
Al Twar Third	1,033	13	NA	NA	806	1	679	11
Al Waheda	1,335	38	NA	NA	2,227	1	1,088	7
Al Warqa Fourth	872	8	NA	NA	731	11	366	131
Al Warqa Second	910	7	NA	NA	606	7	448	32
Al Warqa Third	885	23	NA	NA	799	14	348	161
Al Warsan First	2,592	461	1,920	4631	2,703	27	1,598	81
Al Wasl	1,615	17	4,298	734	3,597	4	1,576	68
Al Yelayiss 1	1,635	1375	NA	NA	NA	NA	561	1
Al Yelayiss 2	1,571	1864	2,491	1912	NA	NA	514	21
Al Yufrah 1	1,821	83	NA	NA	NA	NA	NA	NA
Al Yufrah 2	1,836	289	2,753	275	NA	NA	2,673	752
Al Yufrah 3	1,759	72	NA	NA	NA	NA	2,041	167
Burj Khalifa	NA	NA	4,813	6469	6,531	6	3,407	15

Table C4: Mean square meter prices by district and type (2018-2020) – II

City district	Villa mean price	Obs.	Unit mean price	Obs.	Building mean price	Obs.	Land mean price	Obs.
Business Bay	NA	NA	3,776	10486	5,712	29	3,446	29
Dubai Investment Park First	1,193	332	2,180	217	1,385	110	1,031	36
Dubai Investment Park Second	NA	NA	1,913	99	1,070	213	1,025	18
Hadaeq Sheikh Mohammed Bin Rashid	2,013	1967	3,860	3121	788	5	1,925	543
Hessyan First	1,895	8	2,469	27	5,204	1	1,034	7
Hor Al Anz	2,211	38	NA	NA	3,991	77	3,164	8
Hor Al Anz East	933	15	NA	NA	5,322	20	3,810	1
Island 2	2,014	2	5,612	20	NA	NA	3,038	56
Jabal Ali First	1,771	1322	2,329	3407	5,275	14	761	297
Jabal Ali Industrial Second	NA	NA	3,158	281	NA	NA	2,495	7
Jumeirah First	2,271	73	5,268	858	3,647	12	1,550	134
Jumeirah Second	1,771	39	NA	NA	2,635	4	2,913	20
Jumeirah Third	1,800	64	NA	NA	2,273	5	2,035	7
Madinat Al Mataar	1,893	1631	2,380	1970	1,538	6	1,108	72
Madinat Dubai Almelaheyah	NA	NA	4,514	43	1,307	2	2,555	11
Mankhool	1,738	13	NA	NA	7,808	62	3,317	8
Marsa Dubai	2,288	15	3,955	10706	5,588	19	3,706	7
Me'Aisem First	1,943	558	2,257	1893	1,893	12	1,577	348
Mirdif	1,423	228	2,663	167	1,849	18	1,557	66
Muhaisanah First	912	10	2,666	52	963	9	488	22
Muhaisanah Third	981	12	NA	NA	729	6	464	14
Nad Al Hamar	1,065	22	NA	NA	1,618	23	1,103	53
Nad Al Shiba	1,555	2	NA	NA	NA	NA	1,331	12
Nad Al Shiba First	2,343	255	2,539	813	1,309	8	1,037	458
Nad Al Shiba Fourth	1,151	8	NA	NA	566	26	487	133
Nad Al Shiba Second	794	1	NA	NA	NA	NA	604	36
Nad Shamma	1,026	6	NA	NA	NA	NA	NA	NA
Nadd Hessa	1,609	175	2,102	2584	5,909	66	2,371	18
Naif	2,931	1	NA	NA	6,975	71	NA	NA
Oud Al Muteena First	876	9	NA	NA	189	1	398	173
Oud Al Muteena Second	790	4	NA	NA	375	6	322	38
Palm Jumeirah	2,555	203	4,030	3398	4,129	4	2,359	191
Port Saeed	2,499	2	3,715	36	6,626	26	4,249	4
Rega Al Buteen	NA	NA	2,230	20	13,562	4	5,862	1
Saih Shuaib 2	1,590	113	2,618	69	1,722	17	371	70
Trade Center First	NA	NA	3,572	36	8,221	7	NA	NA
Trade Center Second	NA	NA	3,085	63	7,804	1	NA	NA
Um Al Sheif	1,980	23	NA	NA	2,346	20	1,583	35
Um Hurair Second	NA	NA	4,279	37	8,065	9	3,392	2
Um Suqaim First	1,774	49	NA	NA	3,594	5	1,432	5
Um Suqaim Second	1,774	36	NA	NA	2,418	7	2,095	13
Um Suqaim Third	1,970	26	4,690	451	4,047	5	1,340	10
Wadi Al Amardi	734	1	NA	NA	289	16	250	5
Wadi Al Safa 2	1,323	262	2,176	1250	2,449	13	753	848
Wadi Al Safa 3	1,320	680	2,231	521	2,477	23	858	195
Wadi Al Safa 4	1,933	16	NA	NA	1,160	2	1,673	39
Wadi Al Safa 5	2,065	3343	2,238	812	6,015	33	1,560	484
Wadi Al Safa 6	1,373	1693	NA	NA	390	1	2,258	11
Wadi Al Safa 7	1,988	2467	2,352	54	1,181	6	885	9
Warsan Fourth	NA	NA	1,959	369	3,083	55	808	66
World Islands	NA	NA	7,252	99	NA	NA	381	9
Zaabeel First	NA	NA	5,671	17	NA	NA	NA	NA
Zaabeel Second	NA	NA	5,452	777	7,524	1	528	1

Notes: The table shows the (adjusted) mean square meter prices from residential properties in 119 different Dubai districts and buildings separately for the different types of properties: Unit, Villa, Building and Land. The averages are for the time period January 2018 to November 2020. The averages exclude the top and bottom 5 percent square meter prices from the calculation. The averages are calculated from transactions data compiled by the Dubai Land Department and published through the Dubai Pulse portal. The values are in US dollars.

D Corroboration of the leaked data

A comprehensive micro dataset at the property-level (Dataset B), which contains detailed ownership information, is central to our analysis. The data was originally obtained by the Washington-based nonprofit organization C4ADS, who has given us access to utilize the data for research purposes. Property ownership data in Dubai are not publicly available. The data sets we have obtained is, according to C4ADS, sourced from the Dubai Land Department and public utilities companies.[51] These data are not publicly available and was shared with C4ADS by confidential sources. (We do not know the identity of these sources). The records include detailed information on ownership and property characteristics on most Dubai properties in freehold areas as of the start of 2020 (and, in part 2022), including the property's size, details, location, and use of the property. Individual owners of properties are usually recorded, including their names and nationality.

All our analyses are based on aggregation or regression analysis. We do not provide any analysis of specific individuals or analysis that could identify specific individuals. The measures taken to ensure data and privacy protection are described in our online Data Protection and Ethics Statement.

When utilizing leaked data, there is always a challenge to corroborate the credibility of the data, both for the researchers utilizing them and for the readers (Alstadsæter et al., 2025b). In our case, corroborations have been conducted on three different levels, leaving us confident in the both the accuracy of the individual observations and in the total coverage of the data:

1. C4ADS. The organization has over several years worked extensively on mapping and analyzing the Dubai property market, with a focus on case studies identifying properties owned by sanctioned individuals. Their landmark Sandcastles report was published in 2018, and in collaboration with the Carnegie Endowment a 2020 report examined Dubai's Role in Facilitating Corruption and Global Illicit Financial Flows.[52][53] Over the last years, C4ADS have extended the original data used in the Sandcastles report to an extensive Dubai Property Database covering 833,000 property ownership records, at the same time corroborating the accuracy of the information. On their website, they state that "C4ADS assesses this data to be credible, with the caveat that it does not constitute evidence of the same quality and standard as a property deed, a form of official documentation strictly controlled in the UAE as confidential

[51] https://c4ads.org/multimedia/the-c4ads-dubai-property-database/
[52] https://C4ADS.org/reports/sandcastles/
[53] https://C4ADS.org/reports/dubai-corruption-and-global-illicit-financial-flows/

information. The mention of any individual, company, organization, or entity in this dataset does not imply the violation of any law or international agreement." [54]

2. Investigative journalists. C4ADS has shared their Dubai Property data, both the original Sandcastles data and the extended Dubai Property Database, with numerous investigative journalists and media outlets, who separately have published stories based on the property and owner information in the leak. The Organized Crime & Corruption Reporting Project (OCCRP), a reporting platform for a global network of independent media centres and journalists, coordinated a series of stories on illicit finance and ownership of Dubai properties in their Golden Sands project in 2018.[55] The updated Dubai Property databases – the data used in this project – are the basis for stories on ownership of Dubai real estate in the New York Times and for the stories published under two taglines "Dubai Uncovered" and "Dubai Unlocked." The "Dubai Uncovered" and "Dubai Unlocked" revelations were a result of the work by a consortium of investigative journalists from around the world, headed by the Norwegian financial newspaper E24 and including Le Monde, Süddeutsche Zeitung, De Tijd, OCCRP and more than 20 other media outlets.[56] These investigations provide important confirmation of the accuracy of the database. The journalists investigated and corroborated several hundred owner-property-links, through their own detailed research and in some cases also through gaining outright confirmation of the accuracy of the data from the owners of properties.

3. The research group. At the outset of the work conducted for this paper, the research team underwent the ambitious task of matching the Sandcastles dataset to publicly-provided data published by the Dubai Land Department on the Dubai Pulse Platform. This helped the team verify many attributes of the properties in Sandcastles, including their size, location, and status (on-plan, off-plan, cancelled) and type. Also, using both transaction data published by the DLD as well as transaction data provided to the team by journalists, the team was able to confirm the sale price of a large share of properties.

[54] https://C4ADS.org/multimedia/the-C4ADS-dubai-property-database/#disclaimer

[55] https://www.occrp.org/en/goldensands/

[56] For overview of media coverage, see: https://C4ADS.org/multimedia/the-C4ADS-dubai-property-database/#publications

E Data Protection and Ethics Statement

As, the use of leaked data carries with it unique ethical and data protection concerns, this project underwent at the outset a Data Protection Impact Assessment (DPIA) via the Norwegian University of Life Sciences (NMBU) (DPIA reference Skatteforsk DPIA 2v5_23/00470-26), the result of which required that the bulk of the data processing was conducted using secure storage.

Our original Data Protection and Ethics Statement, released with the first working paper version of this work, is available on Dropbox: here.

Below, we re-state our main arguments for why this work is in the public interest.

E.1 Research question and public interest

Our work seeks to shed light on question of public interest: how much wealth is held in tax havens? And who own s this wealth? A blind spot in the analysis of tax havens is the lack of information on the ownership of offshore real estate. Currently available estimates — both at the macro level and at the micro level — only include offshore financial assets (the bank deposits and portfolios of equities, bonds, and mutual fund shares held in offshore financial institutions). They typically disregard real assets, such as real estate, works of art, valuables, yachts, private planes, etc. There has long been a concern that offshore real estate might be used for money laundering and hiding wealth from tax authorities. Moreover, most available estimates of offshore wealth and its distribution are for the 2000s or early 2010s, a period when there was little exchange of information across countries, i.e., when hiding wealth abroad required less efforts than today . Since then, tax h avens have started exchanging bank information with OECD countries under the Common Reporting Standard. Since 2017, more than 100 countries automatically and bilaterally exchange financial information. In this context, the nature of the wealth held offshor e may have evolved , away from financial assets (covered by the automatic exchange of bank information) and towards real assets, such as real estate and works of art held in "freeports" (not covered by the automatic exchange of bank information). Our work pushes forward knowledge by analyzing contemporary data on the ownership of offshore real estate in a prominent offshore center, Dubai. Our methodology is mostly descriptive. As there is virtually no evidence on the size and distribution of offshore real estate, this type of descriptive analysis is essential.

E.2 Ethical implications of using leaked data

We do not know the source of the data. It cannot be ruled out that the source, by handing over the data to C4ADS, has violated certain laws or regulations. This in itself could pose an ethical challenge. However, a major problem with tax evasion is precisely that the location of capital is hidden in countries with limited public information about capital and its owners. Neither the owners of capital nor the authorities of tax havens have an interest in transparency regarding ownership. It is therefore difficult to obtain information about such matters. The analysis of these data offers a unique opportunity to make progress on issues of general interest. The secrecy provided by tax havens can contribute to the erosion of the tax base. Knowledge about the size and distribution of offshore wealth can help understand the dynamics of the tax base, tax loss for various countries, and the implications for inequality. This in turn provides useful insights for policy makers, tax administrations, and researchers across the world.

F Data cleaning

We outline the overarching details of the dataset we use in our analysis in subsection 3.1 in the main body. In this section, we describe in more detail how we clean and classify the public microdata obtained from Dubai Pulse (Dataset A) and the leaked property ownership records (Dataset B) provided to us by C4ADs.

Cleaning and classifying properties (public microdata - Dataset A): First, we keep only properties we can verify are residential units: villas and flats (apartments), hotel rooms and hotel apartments. We do this because our ability to match commercial property to public sources for verification is more restricted and also because there is less coverage of these types of properties in the transaction data we use to assign prices. We also drop lands, both to avoid double counting (i.e. both land and the property that sits on it) and because distinguishing ownership of built-up lands is often not possible. For most properties (all villas and apartments in areas where foreign ownership is allowed), the type of property is identified directly in the database. However, roughly 30% of residential apartment units are missing this classification, all of them in 'Emirate-only' areas of the city where foreign ownership is not possible, aside from GCC nationals. We recover these units by classifying properties in the public microdata as apartments if either the address suggests they are a flat or hotel apartment, or they contain bedrooms. When we include these units in Emirate-only areas, our estimates of the number of villas and apartments in the city exceeds official estimates by the Dubai Statistical Center by approximately 45% in 2020. We discuss why our estimates are more likely to be correct than the officially reported statistics in Appendix Section J.

Second, we identify and separate off-plan properties, those that have not yet been built, from the rest. While off-plan properties are of interest, and we will report some estimates using them, they have several features that make them difficult to compare to on-plan properties. First, while we observe the ownership of off-plan properties and have an estimate of its price, we do not know precisely what share of the final price the owner has transferred to the property development company at a given point in time (full amounts are typically due only shortly before completion). Second, because off-plan properties do not yet exist, no land title has yet been issued by the Dubai government, and they instead only represent a financial investment in a future home. We use the public micro data on real estate projects published by Dubai Pulse to identify when properties a finalized.[57]

[57]For our stock estimates, we count a property as being on-plan when the project it is associated with is

Cleaning and classifying properties (confidential property records - Dataset B): We next clean the confidential property record data provided to us by C4ADS. First, we match the properties in this data to the entire pre-cleaned public microdata on the Dubai real estate stock. We do this using two methods:

1. **Using the non-public transaction data as a 'bridge':** by matching the leaked property record data provided to us by C4ADS to the non-public transaction data using a unique identifier present in both. We then match to the Dubai Land Department micro data using features specific in both to the property (the villa/apartment number and unique identifiers for the building and land the property is part of).

2. **Direct matching:** we directly match properties to the Dubai Land Department microdata using sets of characteristics that identify unique properties in the latter, such as the building name, land parcel identifier, size of property and number of bedrooms.

Using these two approaches, we match 99% of properties (representing 91% of the total value) in the 2020 confidential data to the Dubai Land Department public microdata (and 80% of properties in microdata - representing 85% of the value - in areas where foreigner can buy properties). We will discuss below how unmatched properties factor into our estimates.

Through matching the two datasets, we are able to clean the confidential microdata in a number of ways: first, it allows us to complete missing information. While each property in this data has a unique identifier, in many circumstances some characteristics of the property (such as its type, or which building or land parcel it is located in) are missing. Through matching to the public microdata, we are better able to identifier these characteristics.

Having performed the match, we then restrict the data in the same way, keeping only properties we can verify are residential units and separating on and off-plan properties. For properties we are unable to match to the public microdata, we match the name of the project directly with the public project database in order to identify their on-plan date. We also exclude duplicates and winsorize the property's recorded size at the 5th and the 95th percentile.

Many properties are registered with shared ownership. In this case, we create multiple observations for each property, with the correct value assigned to each co-owner based on how much of the property each owner possess. This means that the unit of observation in the processed dataset is either full or parts of properties.

finalized. Properties in GCC-only areas typically are not associated with an official real estate development project, so for these properties we use separate data on the construction of buildings published by the Dubai Municipality in order to determine their likely on plan date.

Defining nationality of owners (confidential data - Dataset B): We assign nationality and residence country to each owner, as far as the data permits it. The majority of properties in 2020 edition of the confidential data is owned directly by individuals, while the remaining residential real estate in the non-Emirati areas is primarily owned by UAE companies.[58]

For properties owned by individuals, we assign them the nationality information that is provided in the confidential property ownership records. For more than 90% of the properties owned by individuals, nationality can be directly identified in this way in the confidential property ownership records from 2020. If nationality is missing, we impute it using information in the data on the passport number, phone number, email address, and address of the owner, as well as public sources.

Next, for the smaller share of properties owned by firms, 32% of value owned by firms in SC (28% on the SC share matched to DLD), we proceed as follows: Firms in our sample are identified by running an algorithm that looks for common terms and abbreviations like "Holding" and "S.A.R.L" among observations that do not have a passport number, followed by extensive manual cleaning. Our guiding principle is then to try to identify the nationality of the beneficial owners of these firms. To do so, we use the address, phone number, and email address reported in the data, as well as public sources such as information on the beneficial owner of shell companies appearing in the publicly-available ICIJ offshore leaks database. Close to 75% of the properties owned by firms are owned by 485 large companies, mostly real estate development firms. We manually checked the nationality of these firms if no country was assigned to them after exploiting the information available in the data and in public sources. Of these large firms, 422 (owning 89% of properties belonging to large firms) are assigned to the United Arab Emirates. We note that because we lack systematic information on the beneficial owners of United Arab Emirates firms, our procedure can under-estimate the amount of Dubai real estate with foreign beneficial owners. Importantly, we assign the full ownership of the United Arab Emirates companies listed on the stock exchange to the United Arab Emirates.

For about 6% of the total value matched to DLD, we are unable to identify a country. This corresponds to observation where there is no information about the owner, or where information about the owner exists but is too limited to identify a country (e.g., there is only a street name).

For the properties in the 2022 edition of the confidential ownership data, if residence country and nationality information is missing, but not the owner's name/other identifying information, we import the residence country from the ownership records for 2020. For properties where no

[58]Likely due to the restrictions on ownership by foreign companies. See: https://www.tamimi.com/law-update-articles/can-real-estate-dubai-part-2-know-rights-real-estate-investors-dubai-guide/.

information is available in the ownership records for 2022, we first check whether the property has been sold since 2020 using transaction data provided to us by journalists. If the property has not been sold, we assign it the same country as before.

Defining residence country of owners (confidential data - Dataset B) : While the above methods provide us with the nationality of owners, we also require information on each owner's residence. The residence country is listed directly or indirectly through address information for 33% of the owners in the confidential ownership data for 2020. For the remaining set of owners, we use the non-public rental data to identify which of them are likely to be non-resident, based on whether their properties were being rented out in January of 2020.[59] For those with missing residency information, 40% were renting out the entire property portfolio at this time.[60] For the 27% (67% x 40%) owners who rented out all the properties they owned in Dubai and have missing residence information, we assume that their country of residence is the same as their nationality, based on the assumption that these individuals are non-resident landlords with primary ties to their country of origin.[61]

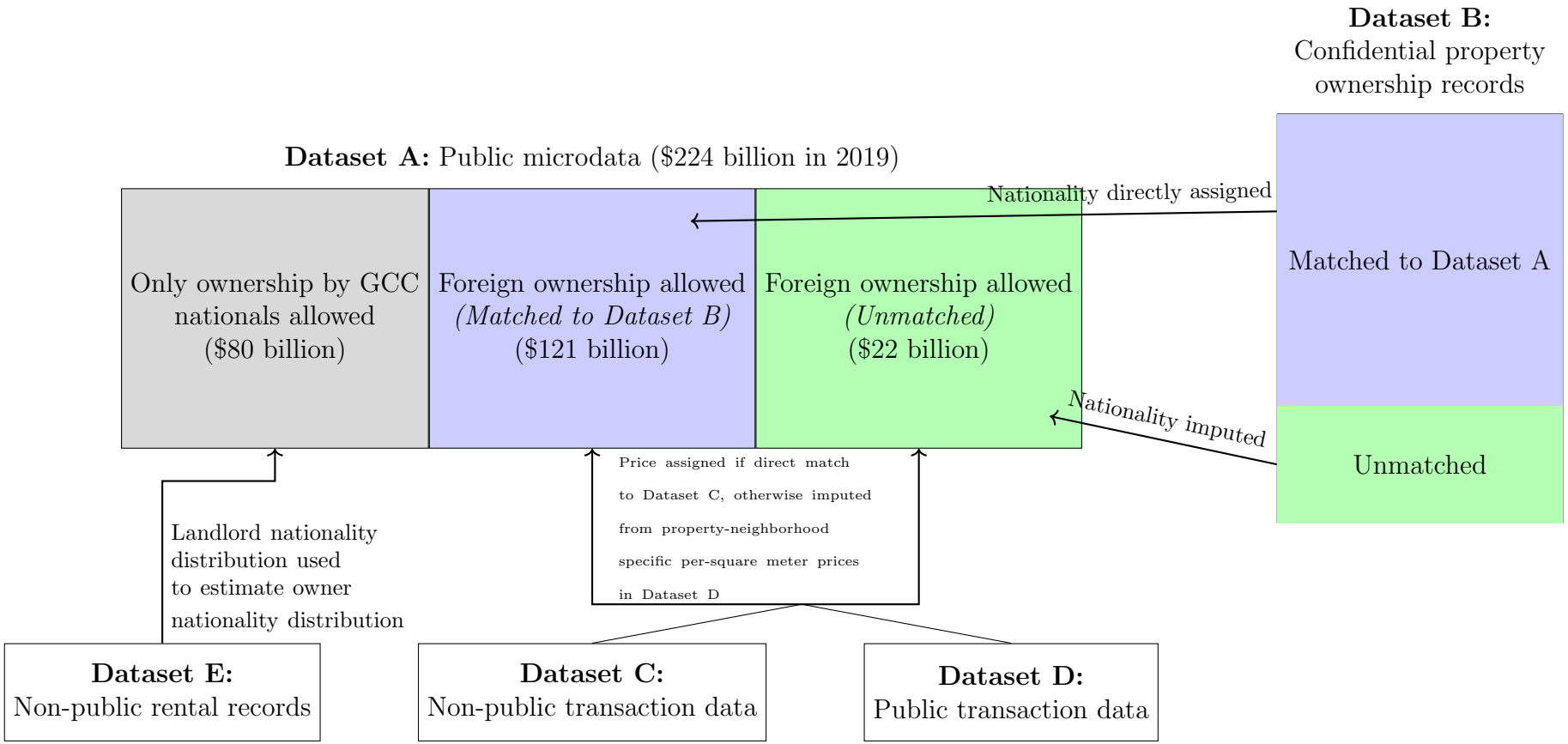
This provides us with a directly or indirectly assigned residency for around 60% of the owners as of January 2020. We outline how we use this information to impute residency for properties owned by the remaining 40% and for properties we do not know the exact owner of in subsection G.2.

[59] We indicate a property as being rented out if there was an active rental contract for that property on January 1, 2020.

[60] 35% of all owners in the confidential ownership data for 2020 rented out the entire property portfolio in January 2020.

[61] Nationality, if not directly stated, may also be imputed based on information in the data, like the passport number, the phone number, the email address, or based on information from public sources.

Figure G1: How each data source is used to construct the foreign-owned stock in 2019



G Data processing and estimate construction, additional details

In Figure G1 above, we summarize how our main estimate for the stock of foreign-owned wealth in 2019 is constructed, as described in Section 3. Below, we describe in more detail how we create our estimates of the foreign-owned and offshore stock that we present in this paper.

G.1 Creating estimates of the foreign-owned stock

We will first begin with our construction of our estimate for the 2019 foreign-owned stock (owner has a non-UAE nationality), which is the estimate that requires the fewest assumptions.[62] We then proceed with explaining how we extend this estimate forward to 2021 and 2023, and then back to 2005.

G.1.1 Foreign-owned stock in 2019

Table G1: Constructing nationality-level stocks for 2019

Properties in public microdata:	**# Properties**	**$ Value**	**Method for estimating nationality**
Directly matched to a property in confidential data	347,118	121 billion	Nationality of ownership taken directly from confidential data
Have no match in confidential data found but in freehold neighborhood	86,787	22 billion	Imputed at the neighborhood level from unmatched properties in confidential data
Are in neighborhood where only GCC ownership is permitted	406,844	80 billion	Imputed using landlord distribution for neighborhood in confidential rental data
Total	840,749	224 billion	

We begin with the stock of 840,749 residential properties (apartments and villas) in the public microdata published by the Dubai Land Department, collectively worth $224 billions in 2019. Out of this stock, we were able to match 54% directly to the confidential microdata. For these properties that appear in both datasets, we use the nationality information from the confidential data. For those that only appear in the public microdata, but exist in parts of the city where foreign ownership is legal, we impute the share of the value using the following method: for each neighborhood we allocate the value of unmatched properties to each nationality based on

[62] We observe a small number of Emirati property owners who are likely to reside outside the United Arab Emirates, regard them as United Arab Emirates residents for simplicity.

that country's share of the value of unmatched properties in the *confidential data*, under the assumption that the latter is representative of the true distribution.

A significant share of properties (36% of total value) exist only in areas of the city where foreign ownership is forbidden, aside from GCC nationals, which we refer to as Emirate-only areas. As these area were not covered in the confidential records we have access to, we instead rely on our non-public rental record database. We take all active rental contracts as of January 2020 for which we can observe the nationality of the landlord, and then distribute the total value of property in each of these Emirate-only areas according to the distribution of landlords, weighted by the value of the contract.[63] For any neighborhood that has neither coverage in the confidential data nor rental data, we assign the total value to unknown nationality.[64]

G.1.2 Foreign owned stock in 2021 and 2023

Ideally, we would use the same procedure we used to produce end-2019 estimates with the 2020 confidential data to produce end-2021 estimates using our early-2022 confidential property data. However, we must grapple with the fact that early-2022 edition of our confidential property data covers a significantly lower fraction of properties in the city. We proceed as we did above: first using properties that match between the 2022 edition of confidential property (Dataset B, 2022) data and the public microdata (Dataset A) to estimate the nationality of the owners of the latter. We also do the same for properties that are missing in the 2022 confidential data, but we observe - via the non-public transaction data - that they have not sold since end-2019.

This leaves two sets of properties for which we need further information in order to predict nationality shares for: (i) properties that were sold between end-2019 and end-2021 and do not appear in the confidential data and (ii) new properties that have were built and sold between end-2019 and end-2021 and either do not appear in the 2022 confidential data or do so without ownership information.

For both of these sets of sold properties we need to estimate the share of the value that was bought by each nationality. To do this, we use information from properties we observe in both 2020 and 2022 editions of the confidential data that changed hands. The intuition is as follows: if in a given neighbourhood, if French nationals were the final owners of 10% of the value of all properties that were bought between the 2020 and 2022 editions of the confidential data for neighborhood X, we apply that same 10% to all properties without ownership information in

[63] We also do this for a small number of neighborhoods in the freehold districts that do not appear in the confidential data.

[64] We end up with existing (on-plan) residential real estate worth around USD 15 billion in total where we assign unknown nationality. For simplicity, we allocate this to the United Arab Emirates in the analysis.

the 2022 public microdata that changed hands or were newly-built since 2020.

For properties that are in neighborhoods that are entirely missing in the 2022 confidential data, we use the citywide nationality shares instead of neighborhood-specific nationality shares. The main drawback of this approach is that it will not account for significant changes in investments by nationalities that are not reflected in the changes observed between the two editions of the confidential data. For example, if Russian buyers had an out-sized presence in a new project started in a given neighborhood that is missing from the confidential data, then we might underestimate their level of investment in 2021.

For 2023, our estimates are even more tentative. For each area of the city, we calculate the share of properties sold since 2022 and include newly constructed properties. We then allocate these properties according to the nationality distribution of recent buyers within each area, or, if area-level data is insufficient, based on city-wide nationality patterns. For properties not sold during this period, we retain their previous nationality distribution. Finally, we adjust property prices from 2021 to 2023.

G.1.3 Estimating total foreign-held stocks from 2005 to 2018

After establishing country-by-country estimates for the foreign owned stock in the years 2019, 2021 and 2023, we then project backwards the level and proportion of foreign-held real estate, starting in 2006 when foreign ownership became widely legal. We do this for on-plan properties only.

We proceed in reverse as follows. We move back one year in time (Dec 31, 2018, then Dec 31, 2017, etc). We then drop all properties that had not yet been built prior to that date. We then adjust each property's value to current year prices (adjusting prices at the area-level when possible).

For each year, we determine the ownership of the properties as follows. First, we combine the non-public transaction data with the 2020 edition of the confidential data. Because the two can be merged on a common property identifier, we are able to track the date that the owner in question bought a property. When the property never changes between the date of initial purchase and December 31, 2019, we assign the ownership to the owner in the 2020 confidential data for the entire period. When the property changes hands at least once, we assign ownership period following the most recent purchase to the owner in the 2020 confidential data. For earlier periods where we do not observe ownership, we use information taken from the non-public rental

data when possible to identify the owner.[65] Using this approach, we assign the nationality for each property in each year.

This still leaves a significant proportion of properties for which there are years that, due to having changed hands prior to 2020 and not having any identified landlords, we cannot observe the nationality of the owner. For these, we assume the nationality of these properties does not change: if a property had a Canadian owner in 2020 and we cannot observe the owner between 2006-2012, for example, we assume the owner was Canadian then as well.

The above approaches only cover the parts of the city where foreign ownership is allowed. For neighborhoods where only UAE or GCC ownership is permitted, we keep the nationality shares fixed over time, only changing the stock as properties are built and readjusting prices as necessary.

G.2 Creating estimates of the offshore-owned stock

Finally, we estimate the offshore-owned stock for every country in 2019. We use our estimate of foreign-held property, together with our data on residency for the owners we observe in the confidential ownership records. The offshore-owned stock is the subset of the foreign-held property which is owned by individuals residing outside the United Arab Emirates.

We start by relying on residency information, which we have assigned to 60% of the sample of owners in the confidential property ownership data, as described above. For each country, we calculate the share of owners in the confidential property ownership data who are resident in the United Arab Emirates. We then assume that the observed country-specific breakdown between residency vs. non-residency in the confidential property ownership data is representative for the remaining residential real estate. This let us distribute the amount of residential real estate assigned to a given nationality in the prior subsection between owners who are offshore-owners and owners with the same nationality who are United Arab Emirates residents.[66].

Suppose we observe Norwegians with USD 80 million in Dubai residential real estate who either have Norway listed as their country of residence in the ownership records or rent out all their real estate in Dubai according to the rental records. Additionally, we observe Norwegians with USD 20 million in Dubai residential real estate who have the United Arab Emirates listed as

[65] Whenever we observe a rental contract for a property that reports a landlord of nationality n, we assign ownership of that property to that nationality for the entire 'ownership segment' (period between two sales). Once the property is sold, we can only update the ownership nationality if we observe another rental contract with non-missing ownership nationality, or if it is the last transaction before Dec 31, 2019. For instances where multiple landlord nationalities are listed within the same ownership segment, we take the most common one.

[66] Note that the assignment is done based on property values, not the specific owners

their country of residence in the ownership records. In the case where we have another group of Norwegians USD 100 million in Dubai residential real estate for whom we lack concrete residency information or whom we lack evidence that they rent out all their real estate in Dubai, for this group, we will assign Norway as residence country to USD 80 million and local residency to the remaining USD 20 million.

H Detailed Country-by-Country Estimates

Table H1: Detailed Country Results – I

Country	Offshore			UAE resident		Total		
	USD mill.	% of GDP	% of offshore	USD mill.	% of GDP	USD mill.	% of GDP	% of all foreign
Afghanistan	519.0	2.8	0.8	228.9	1.2	747.9	4.0	0.8
Albania	2.2	0.0	0.0	1.1	0.0	3.4	0.0	0.0
Algeria	219.4	0.1	0.3	105.3	0.1	324.8	0.2	0.3
American Samoa	1.3	0.2	0.0	0.0	0.0	1.3	0.2	0.0
Andorra	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Angola	19.2	0.0	0.0	5.2	0.0	24.5	0.0	0.0
Anguilla	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Antigua and Barbuda	21.0	1.3	0.0	0.0	0.0	21.0	1.3	0.0
Argentina	30.0	0.0	0.0	22.5	0.0	52.4	0.0	0.1
Armenia	68.2	0.5	0.1	25.2	0.2	93.4	0.7	0.1
Aruba	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Australia	592.2	0.0	0.9	272.9	0.0	865.1	0.1	0.9
Austria	173.8	0.0	0.3	96.7	0.0	270.6	0.1	0.3
Azerbaijan	477.8	1.0	0.7	166.4	0.3	644.2	1.3	0.7
Bahamas (the)	109.7	0.8	0.2	13.7	0.1	123.5	0.9	0.1
Bahrain	696.5	1.8	1.0	194.3	0.5	890.8	2.3	0.9
Bangladesh	179.4	0.1	0.3	88.2	0.0	267.5	0.1	0.3
Barbados	6.3	0.1	0.0	0.0	0.0	6.3	0.1	0.0
Belarus	34.4	0.1	0.1	24.7	0.0	59.1	0.1	0.1
Belgium	346.0	0.1	0.5	161.4	0.0	507.4	0.1	0.5
Belize	15.0	0.6	0.0	1.4	0.1	16.4	0.7	0.0
Benin	2.4	0.0	0.0	1.6	0.0	4.0	0.0	0.0
Bermuda	6.5	0.1	0.0	13.1	0.2	19.6	0.3	0.0
Bhutan	1.8	0.1	0.0	2.4	0.1	4.3	0.2	0.0
Bolivia	1.1	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Bosnia and Herz.	14.9	0.1	0.0	5.8	0.0	20.7	0.1	0.0
Botswana	8.8	0.1	0.0	0.5	0.0	9.3	0.1	0.0
Brazil	35.4	0.0	0.1	54.9	0.0	90.3	0.0	0.1
British Virgin Islands	44.0	3.1	0.1	0.0	0.0	44.0	3.1	0.0
Brunei	3.8	0.0	0.0	0.5	0.0	4.3	0.0	0.0
Bulgaria	82.9	0.1	0.1	38.5	0.1	121.4	0.2	0.1
Burkina Faso	2.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
Burundi	10.1	0.4	0.0	0.0	0.0	10.1	0.4	0.0
Cabo Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cambodia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cameroon	13.8	0.0	0.0	1.0	0.0	14.8	0.0	0.0
Canada	2,275.9	0.1	3.4	1,234.6	0.1	3,510.5	0.2	3.6
Cayman Islands	55.9	0.9	0.1	0.0	0.0	55.9	0.9	0.1
Central African Rep.	1.3	0.1	0.0	0.0	0.0	1.3	0.1	0.0
Chad	10.9	0.1	0.0	6.6	0.1	17.5	0.2	0.0
Chile	3.6	0.0	0.0	2.4	0.0	6.1	0.0	0.0
China	1,266.8	0.0	1.9	875.6	0.0	2,142.5	0.0	2.2
Colombia	24.9	0.0	0.0	18.2	0.0	43.0	0.0	0.0
Congo	14.4	0.1	0.0	2.9	0.0	17.2	0.1	0.0
Cook Islands (the)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Costa Rica	0.9	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Croatia	16.4	0.0	0.0	17.7	0.0	34.1	0.1	0.0
Cuba	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Curaçao	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cyprus	111.9	0.4	0.2	16.3	0.1	128.3	0.5	0.1

Table H2: Detailed Country Results – II

Country	Offshore			UAE resident		Total		
	USD mill.	% of GDP	% of offshore	USD mill.	% of GDP	USD mill.	% of GDP	% of all foreign
Czechia	63.0	0.0	0.1	20.5	0.0	83.5	0.0	0.1
Côte d'Ivoire	5.3	0.0	0.0	0.4	0.0	5.6	0.0	0.0
Dem. Rep. Congo	0.0	0.0	0.0	1.3	0.0	1.3	0.0	0.0
Denmark	149.2	0.0	0.2	63.4	0.0	212.6	0.1	0.2
Djibouti	10.7	0.3	0.0	3.3	0.1	13.9	0.5	0.0
Dominica	104.0	17.0	0.2	38.3	6.3	142.3	23.3	0.1
Dominican Rep.	53.9	0.1	0.1	91.5	0.1	145.4	0.2	0.1
Ecuador	1.3	0.0	0.0	1.0	0.0	2.3	0.0	0.0
Egypt	1,388.8	0.4	2.1	1,182.8	0.4	2,571.6	0.8	2.6
El Salvador	1.3	0.0	0.0	0.0	0.0	1.3	0.0	0.0
Equatorial Guinea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eritrea	42.5	2.1	0.1	24.1	1.2	66.5	3.4	0.1
Estonia	6.5	0.0	0.0	5.3	0.0	11.8	0.0	0.0
Eswatini	18.3	0.4	0.0	1.9	0.0	20.2	0.5	0.0
Ethiopia	57.2	0.1	0.1	26.4	0.0	83.6	0.1	0.1
Faroe Islands	0.4	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Fiji	1.4	0.0	0.0	0.0	0.0	1.4	0.0	0.0
Finland	34.6	0.0	0.1	13.2	0.0	47.8	0.0	0.0
Foreign Gov. Org.	7.6		0.0	0.0		7.6		0.0
France	990.1	0.0	1.5	460.8	0.0	1,450.9	0.1	1.5
French Guiana	0.6		0.0	0.0		0.6		0.0
French Polynesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gabon	0.0	0.0	0.0	9.7	0.1	9.7	0.1	0.0
Gambia	2.2	0.1	0.0	2.2	0.1	4.4	0.2	0.0
Georgia	8.8	0.1	0.0	0.9	0.0	9.7	0.1	0.0
Germany	862.5	0.0	1.3	400.5	0.0	1,263.0	0.0	1.3
Ghana	35.2	0.1	0.1	2.1	0.0	37.3	0.1	0.0
Gibraltar	0.7	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Greece	184.0	0.1	0.3	119.3	0.1	303.3	0.1	0.3
Greenland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grenada	22.5	1.9	0.0	0.0	0.0	22.5	1.9	0.0
Guam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guatemala	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Guernsey	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Guinea	15.9	0.1	0.0	4.0	0.0	19.9	0.1	0.0
Guinea-Bissau	0.5	0.0	0.0	0.9	0.1	1.4	0.1	0.0
Guyana	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haiti	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Honduras	0.6	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Hong Kong	29.5	0.0	0.0	11.0	0.0	40.5	0.0	0.0
Hungary	33.5	0.0	0.0	32.3	0.0	65.8	0.0	0.1
Iceland	2.9	0.0	0.0	0.0	0.0	2.9	0.0	0.0
India	9,692.9	0.3	14.3	7,573.2	0.3	17,266.1	0.6	17.6
Indonesia	26.2	0.0	0.0	17.2	0.0	43.4	0.0	0.0
Iran	3,689.5	1.5	5.5	1,246.3	0.5	4,935.7	2.0	5.0
Iraq	927.2	0.4	1.4	637.3	0.3	1,564.5	0.7	1.6
Ireland	511.7	0.1	0.8	118.1	0.0	629.7	0.2	0.6
Isle of Man	2.2	0.0	0.0	0.0	0.0	2.2	0.0	0.0
Israel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Italy	638.7	0.0	0.9	254.7	0.0	893.4	0.0	0.9

Table H3: Detailed Country Results – III

Country	Offshore			UAE resident		Total		
	USD mill.	% of GDP	% of offshore	USD mill.	% of GDP	USD mill.	% of GDP	% of all foreign
Jamaica	4.1	0.0	0.0	0.8	0.0	4.9	0.0	0.0
Japan	62.2	0.0	0.1	36.5	0.0	98.8	0.0	0.1
Jersey	21.1	0.3	0.0	0.0	0.0	21.1	0.3	0.0
Jordan	1,580.3	3.6	2.3	1,503.4	3.4	3,083.7	6.9	3.1
Kazakhstan	714.4	0.4	1.1	153.9	0.1	868.3	0.5	0.9
Kenya	258.7	0.3	0.4	57.3	0.1	316.0	0.3	0.3
Kiribati	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kosovo	0.2	0.0	0.0	0.2	0.0	0.4	0.0	0.0
Kuwait	1,674.5	1.2	2.5	153.6	0.1	1,828.1	1.3	1.9
Kyrgyzstan	28.8	0.3	0.0	12.6	0.1	41.4	0.5	0.0
Laos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Latvia	37.9	0.1	0.1	11.9	0.0	49.8	0.1	0.1
Lebanon	1,188.0	2.2	1.8	958.8	1.8	2,146.8	4.0	2.2
Lesotho	1.4	0.1	0.0	0.5	0.0	1.8	0.1	0.0
Liberia	1.6	0.0	0.0	0.0	0.0	1.6	0.0	0.0
Libya	254.5	0.4	0.4	123.6	0.2	378.2	0.5	0.4
Liechtenstein	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0
Lithuania	20.3	0.0	0.0	6.8	0.0	27.0	0.0	0.0
Luxembourg	19.3	0.0	0.0	1.0	0.0	20.3	0.0	0.0
Macao	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Madagascar	6.6	0.0	0.0	0.0	0.0	6.6	0.0	0.0
Malawi	6.5	0.1	0.0	3.9	0.0	10.5	0.1	0.0
Malaysia	134.6	0.0	0.2	76.9	0.0	211.6	0.1	0.2
Maldives	6.5	0.1	0.0	0.0	0.0	6.5	0.1	0.0
Mali	11.5	0.1	0.0	0.0	0.0	11.5	0.1	0.0
Malta	59.0	0.4	0.1	61.8	0.4	120.7	0.8	0.1
Marshall Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mauritania	3.7	0.0	0.0	0.3	0.0	4.0	0.0	0.0
Mauritius	32.3	0.2	0.0	9.0	0.1	41.3	0.3	0.0
Mexico	20.0	0.0	0.0	21.8	0.0	41.8	0.0	0.0
Micronesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moldova	12.8	0.1	0.0	0.0	0.0	12.8	0.1	0.0
Monaco	1.7	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Mongolia	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Montenegro	3.2	0.1	0.0	0.0	0.0	3.2	0.1	0.0
Montserrat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Morocco	187.7	0.1	0.3	148.0	0.1	335.8	0.3	0.3
Mozambique	42.0	0.3	0.1	19.4	0.1	61.4	0.4	0.1
Myanmar	1.6	0.0	0.0	1.6	0.0	3.1	0.0	0.0
Namibia	1.8	0.0	0.0	0.0	0.0	1.8	0.0	0.0
Nauru	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Nepal	23.0	0.1	0.0	19.8	0.1	42.8	0.1	0.0
Netherlands	387.8	0.0	0.6	204.6	0.0	592.4	0.1	0.6
New Caledonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Zealand	124.3	0.1	0.2	82.3	0.0	206.6	0.1	0.2
Nicaragua	0.0	0.0	0.0	0.7	0.0	0.7	0.0	0.0
Niger	10.6	0.1	0.0	5.3	0.0	15.9	0.1	0.0
Nigeria	517.7	0.1	0.8	66.2	0.0	583.9	0.1	0.6
North Korea	6.3	0.3	0.0	3.8	0.2	10.2	0.5	0.0
North Macedonia	9.5	0.1	0.0	3.6	0.0	13.0	0.1	0.0

Table H4: Detailed Country Results – IV

Country	Offshore			UAE resident		Total		
	USD mill.	% of GDP	% of offshore	USD mill.	% of GDP	USD mill.	% of GDP	% of all foreign
N. Mariana Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norway	71.7	0.0	0.1	22.8	0.0	94.5	0.0	0.1
Oman	976.5	1.1	1.4	242.9	0.3	1,219.3	1.4	1.2
Pakistan	5,814.6	1.8	8.6	2,197.8	0.7	8,012.4	2.5	8.2
Palau	0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.0
Palestine	253.4	1.5	0.4	293.3	1.7	546.7	3.2	0.6
Panama	1.3	0.0	0.0	1.3	0.0	2.5	0.0	0.0
Papua New Guinea	1.7	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Paraguay	0.0	0.0	0.0	0.4	0.0	0.4	0.0	0.0
Peru	3.4	0.0	0.0	1.7	0.0	5.1	0.0	0.0
Philippines	35.7	0.0	0.1	37.7	0.0	73.3	0.0	0.1
Poland	82.5	0.0	0.1	30.9	0.0	113.4	0.0	0.1
Portugal	105.4	0.0	0.2	79.3	0.0	184.7	0.1	0.2
Puerto Rico	3.6	0.0	0.0	0.0	0.0	3.6	0.0	0.0
Qatar	1,363.8	0.8	2.0	118.3	0.1	1,482.1	0.8	1.5
Romania	80.2	0.0	0.1	55.6	0.0	135.8	0.1	0.1
Russia	2,321.0	0.1	3.4	465.5	0.0	2,786.5	0.2	2.8
Rwanda	23.1	0.2	0.0	1.1	0.0	24.2	0.2	0.0
Saint Kitts and Nevis	268.2	24.2	0.4	396.2	35.8	664.4	60.0	0.7
Saint Lucia	2.1	0.1	0.0	0.0	0.0	2.1	0.1	0.0
Saint Martin (French)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Vincent and Gren.	1.1	0.1	0.0	0.0	0.0	1.1	0.1	0.0
Samoa	6.5	0.7	0.0	0.0	0.0	6.5	0.7	0.0
San Marino	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sao Tome and Principe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saudi Arabia	6,367.2	0.8	9.4	791.4	0.1	7,158.7	0.9	7.3
Senegal	13.6	0.1	0.0	10.2	0.0	23.7	0.1	0.0
Serbia	39.1	0.1	0.1	30.9	0.1	70.0	0.1	0.1
Seychelles	56.7	3.4	0.1	18.9	1.1	75.5	4.6	0.1
Sierra Leone	10.9	0.3	0.0	6.6	0.2	17.5	0.4	0.0
Singapore	320.8	0.1	0.5	90.2	0.0	411.0	0.1	0.4
Sint Maarten (Dutch)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slovakia	23.7	0.0	0.0	12.5	0.0	36.2	0.0	0.0
Slovenia	18.1	0.0	0.0	12.5	0.0	30.6	0.1	0.0
Solomon Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Somalia	8.2	0.1	0.0	2.1	0.0	10.3	0.2	0.0
South Africa	381.3	0.1	0.6	151.7	0.0	533.0	0.1	0.5
South Korea	72.1	0.0	0.1	55.0	0.0	127.1	0.0	0.1
South Sudan	3.1	0.1	0.0	3.1	0.1	6.3	0.1	0.0
Spain	117.0	0.0	0.2	78.3	0.0	195.3	0.0	0.2
Sri Lanka	67.1	0.1	0.1	51.4	0.1	118.4	0.1	0.1
Sudan	454.8	1.4	0.7	275.5	0.9	730.3	2.3	0.7
Suriname	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweden	285.3	0.1	0.4	106.1	0.0	391.4	0.1	0.4
Switzerland	328.5	0.0	0.5	141.8	0.0	470.3	0.1	0.5
Syria	1,511.7	5.0	2.2	1,237.7	4.1	2,749.4	9.1	2.8
Taiwan	15.0	0.0	0.0	4.3	0.0	19.3	0.0	0.0
Tajikistan	54.1	0.7	0.1	27.8	0.3	81.9	1.0	0.1
Tanzania	137.2	0.2	0.2	64.8	0.1	201.9	0.3	0.2
Thailand	30.5	0.0	0.0	18.9	0.0	49.4	0.0	0.1

Table H5: Detailed Country Results – V

Country	Offshore			UAE resident		Total		
	USD mill.	% of GDP	% of offshore	USD mill.	% of GDP	USD mill.	% of GDP	% of all foreign
The Comoros	9.7	0.8	0.0	35.5	3.0	45.3	3.8	0.0
Timor-Leste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Togo	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Tonga	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trinidad and Tobago	0.9	0.0	0.0	2.2	0.0	3.1	0.0	0.0
Tunisia	93.5	0.2	0.1	72.4	0.2	166.0	0.4	0.2
Turkey	303.9	0.0	0.4	176.2	0.0	480.1	0.1	0.5
Turkmenistan	79.8	0.2	0.1	38.5	0.1	118.3	0.2	0.1
Turks and Caicos	2.3	0.2	0.0	0.0	0.0	2.3	0.2	0.0
Tuvalu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
USA	1,679.4	0.0	2.5	470.6	0.0	2,149.9	0.0	2.2
Uganda	32.5	0.1	0.0	2.0	0.0	34.4	0.1	0.0
Ukraine	190.0	0.1	0.3	91.3	0.1	281.3	0.2	0.3
United Kingdom	7,995.6	0.3	11.8	2,118.9	0.1	10,114.5	0.4	10.3
Uruguay	2.8	0.0	0.0	1.1	0.0	3.9	0.0	0.0
Uzbekistan	238.3	0.4	0.4	121.0	0.2	359.3	0.6	0.4
Vanuatu	5.1	0.5	0.0	0.0	0.0	5.1	0.5	0.0
Venezuela	11.0	0.0	0.0	13.0	0.0	24.0	0.0	0.0
Viet Nam	2.7	0.0	0.0	2.7	0.0	5.5	0.0	0.0
Yemen	591.7	4.6	0.9	377.8	2.9	969.5	7.5	1.0
Zambia	12.0	0.1	0.0	7.0	0.0	18.9	0.1	0.0
Zimbabwe	18.6	0.1	0.0	6.0	0.0	24.6	0.1	0.0

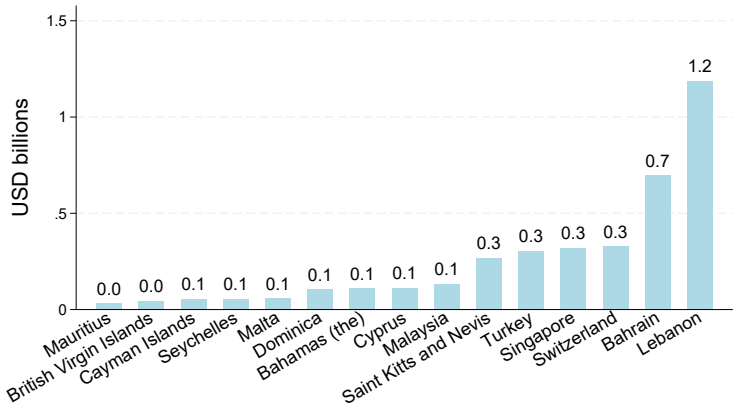
Notes: This table documents our estimate of foreign ownership of real estate in Dubai by country (other than the United Arab Emirates) as of the end of 2019. The first panel (Offshore) shows the value of Dubai real estate owned by citizens of each country that resides outside the United Arab Emirates. The second panel (UAE resident) shows the value of Dubai real estate owned by citizens of each country that resides in the United Arab Emirates. The third panel summarizes the total foreign ownership by country.

I Tax havens and Citizenship by Investment Countries

List of tax havens. Our list of tax havens is taken from Menkhoff and Miethe (2019), with the following modifications. We include the United Arab Emirates. We exclude Austria, Belgium, and Ireland for the purpose of this paper, as they are also populous European economies. We also exclude Jordan, which has strong ties to the United Arab Emirates and a sizeable population. There are no observations in our data for Anguilla, Aruba, Curacao, Marshall Islands, Montserrat, Nauru, Netherlands Antilles, Niue, Sint Maarten, Virgin Islands (US). The final list we use is: Antigua & Barbuda, Bahamas, Barbados, British Virgin Islands, Cayman Islands, Dominica, Grenada, Saint Kitts And Nevis, Saint Lucia, Saint Vincent & The Grenadines, Turks And Caicos Islands, Belize, Costa Rica, Panama, Hong Kong, Macao, Singapore, Andorra, Guernsey, Jersey, Cyprus, Gibraltar, Isle Of Man, Liechtenstein, Luxembourg, Malta, Monaco, San Marino, Switzerland, Maldives, Mauritius, Seychelles, Bahrain, Bermuda, Cook Islands, Samoa, Vanuatu, Liberia, Malaysia, Chile, Trinidad & Tobago, Uruguay, Lebanon, United Arab Emirates

List of citizenship-by-investment countries. Our list of Citizenship-by-investment countries and territories is taken from the OECD to which we add Comoros Islands (which had an extensive scheme between 2001 and 2018), Montenegro (which has a limited program), and Turkey, following Langenmayr and Zyska (2023). The final list includes: Antigua & Barbuda, Comoros Islands, Cyprus, Dominica, Grenada, Malta, Montenegro, Saint Kitts and Nevis, Saint Lucia, Seychelles, Turkey, Turks and Caicos Islands, Vanuatu.

Figure I1: Real Estate Held in Dubai by Country in 2019: Tax Havens and Citizenship by Investment Countries



Notes: The figures shows the value of properties owned in Dubai for the top 20 tax havens and citizenship by investment countries.

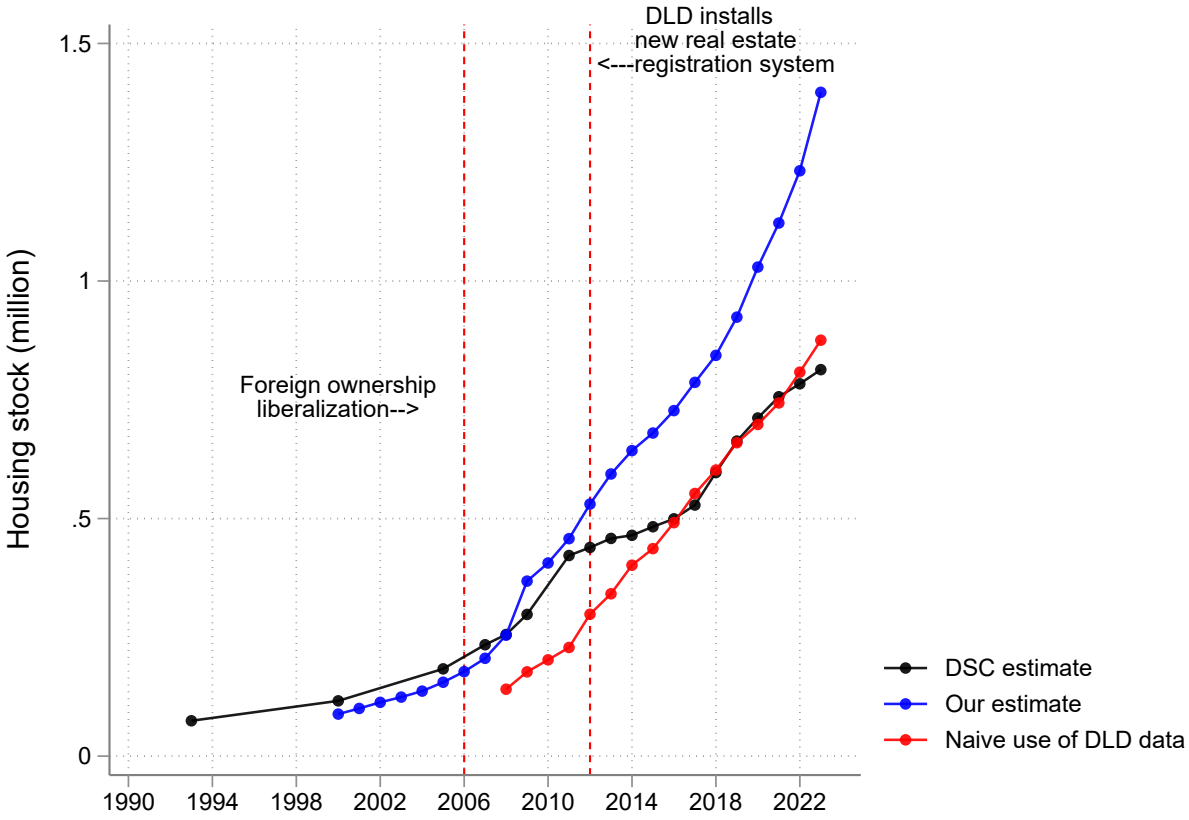
J Detecting 'missing' properties in public microdata published by DLD

In Appendix Section G we describe that, in our treatment of the public microdata published by the Duba Land Department, we detected a large number of apartments that were no classified as being apartments, and that these were properties that were exclusively in parts of the city where non-GCC national ownership was forbidden. After checking a random sample of these properties using the DLD's online tool, we verified that these properties were in fact real. To reclassify them as apartments, we flagged properties that had similar attributes to those already classified (e.g. whether "flat" was in the property address or the property was listed as having bedrooms).

When we combine this data with our estimates of the point when each property was built, our estimate of the total residential housing stock (of villas, apartments and hotel apartments) exceeds that of official estimates substantially (see Figure J1).

Our estimate is more likely to be correct for several reasons. First, as noted below, we verified that these properties to appear to exist. Second, our estimate tracks official estimates closely until 2012. The Dubai Land Department launched its 'Al Tabou' real estate registration system in this year, which we believe is used to produce the micro data published in the Dubai Pulse website. After this point, the series start diverging sharply. However, at this point, official estimates begin to coincide with what we call a 'naive' estimate of the housing stock, which one would obtain if they took the DLD micro data and only kept properties classified as villas or apartments/hotel apartments (thus dropping the unclassified properties we discovered upon close inspection of the data). We think it is plausible that either (i) the Dubai Statistics Center is using the DLD data in this fashion, or (ii) the Dubai authorities are intentionally excluding the stock of properties in Emirate-only areas.

Figure J1: Estimates of residential housing stock (apartments and villas) in Dubai



Notes: Figure J1 shows several estimates of the housing stock (apartments and villas only) in Duba. The "DSC Estimate" are official estimates publishedby the Dubai Statistical Center. Our estimate is constructed using several vintages of the public microdata on properties published by the Dubai Land Department, including properties that are not formally classified as apartments in the published data, but appear to be so. The red line indicates the size of the housing stock if someone were to use the DLD micro data 'naively,' keeping only properties that are formally classified as apartments and villas, dropping all of those that appear in non-freehold areas.

K Gravity relations in the ownership of Dubai real estate

To analyze the gravity relationship and the other factors that might drive investment in Dubai together, we turn to systematic regression analysis of Dubai property ownership. We study the determinants of property ownership in Dubai using gravity-like models that have been successfully used to study cross-border financial investments; see, e.g., Portes and Rey (2005), Lane and Milesi-Ferretti (2008) and Pellegrino et al. (2025). The models are estimated using Poisson pseudo maximum likelihood estimation (PPML) to account for potential heteroskedasticity (Silva and Tenreyro, 2006). We also present results for regular OLS estimation (log-linear) in columns 4-6. We first estimate static gravity models of the form:

$$Dubai_i = \alpha + \beta X_i + \epsilon_i \tag{3}$$

where $Dubai_i$ is the value of Dubai real estate owned by investors from country i in 2019. Explanatory variables X_i includes the distance to Dubai in logs, a dummy for sharing border with the United Arab Emirates, household wealth per capita in log, a dummy for whether the United Arab Emirates has a tax treaty with country i, a dummy for whether the country is classified as an autocracy, a dummy for sharing the same language, a dummy for being an English-speaking country, the volume of travel to the United Arab Emirates from country i in logs, and a dummy for colonial ties.

Table K1: Gravity model

	PPLM Model			OLS Model		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Dist)	-0.914***	-0.906***	-1.038***	-1.773***	-1.839***	-1.835***
	(0.352)	(0.352)	(0.341)	(0.348)	(0.367)	(0.369)
Log(Population)	0.483***	0.479***	0.599***	0.784***	0.785***	0.781***
	(0.167)	(0.166)	(0.154)	(0.161)	(0.162)	(0.162)
Log(HH wealth/capita)	0.481***	0.485**	0.385**	0.595***	0.609***	0.599***
	(0.183)	(0.189)	(0.154)	(0.071)	(0.074)	(0.075)
Common language	0.724	0.686	0.625	1.812***	1.898***	1.893***
	(0.579)	(0.548)	(0.429)	(0.396)	(0.404)	(0.405)
Tax treaty	0.615	0.680	0.264	0.577*	0.500	0.487
	(0.616)	(0.742)	(0.562)	(0.325)	(0.350)	(0.351)
Log(Travels)	0.188	0.180	0.098	0.041	0.044	0.043
	(0.201)	(0.201)	(0.136)	(0.068)	(0.068)	(0.068)
English-speaking	1.189***	1.222**	0.823*	1.494***	1.496***	1.444***
	(0.461)	(0.508)	(0.498)	(0.318)	(0.319)	(0.326)
Autocracy	0.193	0.211	0.341	-0.588	-0.585	-0.574
	(0.412)	(0.424)	(0.372)	(0.501)	(0.502)	(0.504)
Share border		0.233	0.058		-1.261	-1.245
		(0.556)	(0.528)		(0.793)	(0.797)
Colonial ties			1.718***			1.451***
			(0.634)			(0.358)
Constant	-9.958***	-9.969***	-8.698***	-8.076***	-7.649***	-7.504***
	(3.238)	(3.272)	(3.030)	(2.323)	(2.380)	(2.390)
Obs	165	165	165	144	144	144
R^2	0.576	0.577	0.601	0.646	0.648	0.650
Sample	Non-havens	Non-havens	Non-havens	Non-havens	Non-havens	Non-havens
Estimation	Poisson	Poisson	Poisson	OLS	OLS	OLS
Denomination	USD billions	USD billions	USD billions	Ln(USD billions)	Ln(USD billions)	Ln((USD billions)

Notes: Columns (1) to (3) report Poisson pseudo-maximum likelihood (PPML) estimates for the total value of properties held in Dubai (in USD). Columns (4) to (6) report estimates from OLS regressions of the log of the total value of properties held in Dubai (in USD). The tax haven list is reported in appendix I. Distance, common language (1 if a language is spoken by at least 9% of the population in both countries), English-speaking country, and colonial ties variables are retrieved from the GeoDist database published by CEPII. Household wealth (net wealth, household sector) is retrieved from the World Inequality database. Population statistics are retrieved from the World Bank. Tax treaties is an indicator variable equal to one if the country/territory had a double-taxation agreement implemented before 2020 according to the United Arab Emirates, Ministry of Finance. The number of travels to the United Arab Emirates is retrieved from the Global Transnational Mobility Dataset Recchi et al. (2019). The autocracy dummy cover all jurisdictions that are defined as either "closed autocracies" or "electoral autocracies" by the Varieties of Democracy (V-Dem) project. Robust standard errors are reported in parentheses. */**/*** indicates significance at the 10/5/1% levels respectively.

Results are reported in Table K1. Consistent with Figure 5, proximity with Dubai and country size are strongly positively correlated with property ownership in the Emirate, with elasticities of around 1 for distance and 0.5–0.6 for population size. Households wealth per capita is also correspondingly positively correlated, with elasticities in the range of 0.4–0.6. These coefficients are exclusively statistically significant. Common language is also strongly positively correlated with Dubai investments, although not statistically significant. The dummy for English speaking countries are on the other hand statistically significant. In our preferred specification (col. 3), where we also include a dummy for the colonial between the UAE and the UK, English-speaking countries have more than twice ($e^{0.823} - 1$) the Dubai real estate wealth

compared to non-English-speaking countries, all else equal.

As is common in the literature, the R^2 from these gravity-like regressions is very high, around 0.6. Simple gravity-like models can predict patterns in cross-border real estate investments remarkably well, as for cross-border financial investments (Portes and Rey, 2005; Lane and Milesi-Ferretti, 2008; Pellegrino et al., 2025). In the companion paper Alstadsæter et al. (2025a), we analyze static offshore ownership patterns in London (UK), Paris and Côte d'Azur (France), Singapore (Singapore), and Oslo (Norway) around 2019 and 2020. With the notable exception of London, a gravity effect (measured by the distance elasticity) comparable to or large than the one found in Dubai is present in all cities.

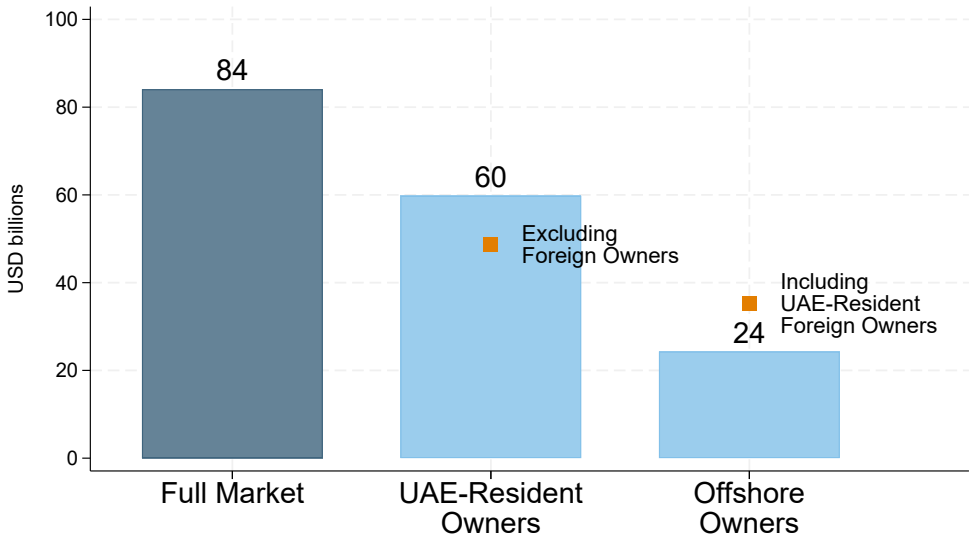
The gravitational pull of cross-border real estate investments mimics the findings for cross-border deposits (Alworth and Andresen, 1992; Huizinga and Nicodème, 2004) and equity investments (Portes and Rey, 2005; Lane and Milesi-Ferretti, 2008), and as well as the establishment of offshore shell companies (Laffitte, 2024). This suggest that investors that invest their money offshore regard the cost of placing the investments in assets far from home. An alternative scenario would be that offshore investors saw the distance as a benefit, as the distance cost also applies to domestic law enforcement.

The gravity relationship also tells us that the country distribution of owners of offshore real estate is likely to depend on which city you are studying, as we also show in Alstadsæter et al. (2025a).

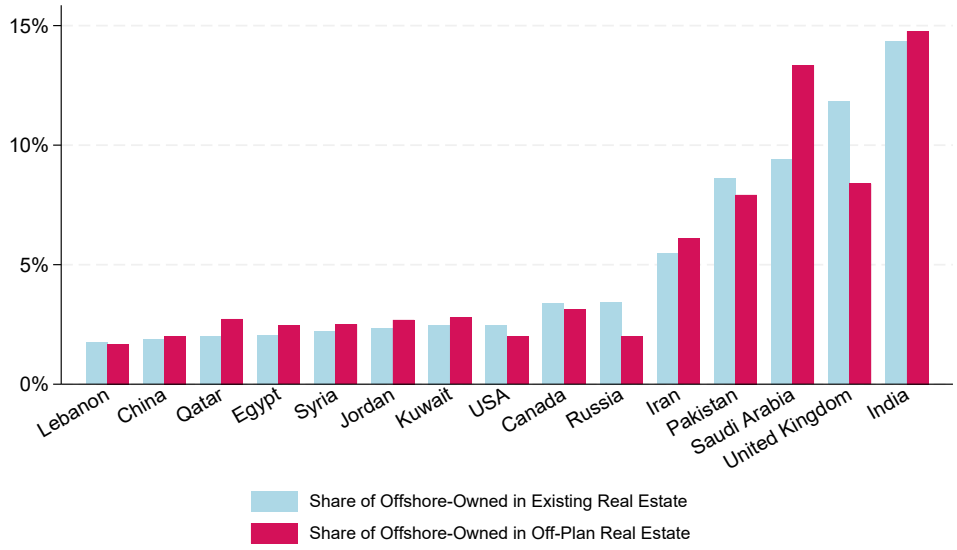
L Off-Plan Investments in Dubai

Figure L1: Value of Off-Plan Real Estate in Dubai in 2019

(a) Domestic vs. Offshore-Owned (USD)



(b) Share of Offshore-Owned: Off-plan vs. Existing



Notes: Panel A) shows the total value of real estate market in Dubai Marina and Palm Jumeirah. It shows the total value and the total value over whether it is domestically owned, foreign owned or owned by an owner with uncertain country background. Values are USD . Panel B) compares the ownership share of offshore real estate by the top 20 countries in Dubai Marina and Palm Jumeirah vs. Dubai overall.

Our analysis has this far focused on the ownership of existing real estate. But Dubai also has a large market for unfinished properties, in style with its status as an ever-expanding city. The

sale of these are tracked within the same framework as existing properties. Existing properties are categorized as "on-plan" in this framework. Off-plan properties are planned or unfinished properties. An off-plan sale occurs when buyers put down money for an off-plan property. The sale of off-plan properties has increased in recent years, and more than half of residential real estate sold (in terms of value) in the last decade has been off-plan, as seen in Panel B of Figure 1.

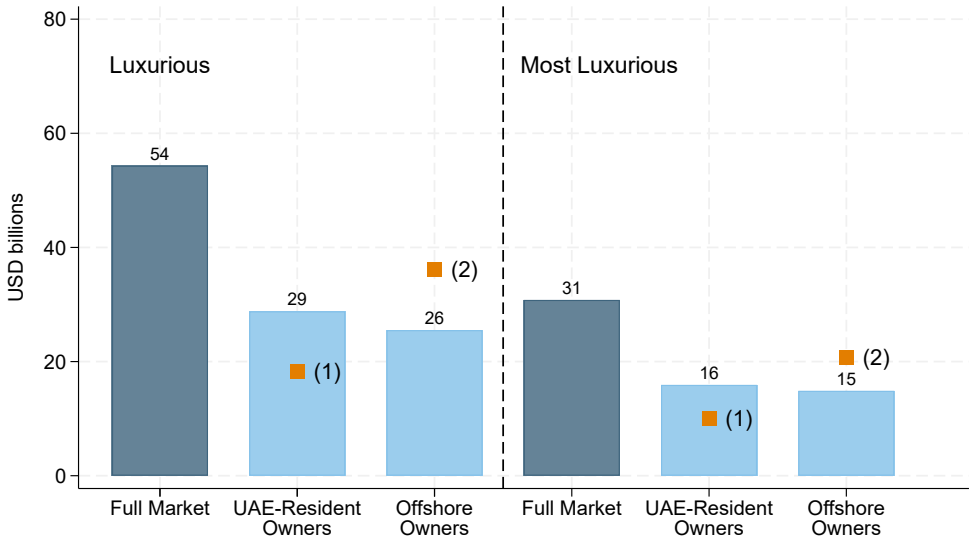
The values of off-plan properties exceeded USD 80 billion as of the end of 2019, which is more than one third of the value of the existing housing stock. Panel A of figure L1 summarizes how the ownership of the off-plan real estate is divided between local and offshore investors. Our estimate is that offshore investors owned off-plan real estate worth USD 24 billion as of the end of 2019, which is around 28% of the total off-plan real estate stock. This is slightly lower than the offshore share in the existing real estate stock, which was 31%. Still, the offshore real estate stock increases by around 33 % if we include the real estate that is not yet built.

Panel B of figure L1 compares the distribution of the top countries' investment in existing real estate and off-plan real estate. We see that the largest differences are for British residents, who are under-represented in the off-plan market compared to their presence among owners of existing residential real estate (8% vs. 12%). Saudi-Arabia are correspondingly over-represented in the off-plan market (13% vs. 9%). A last difference is for Russian owners (2% vs. 3.4%). This makes it important to stress that these numbers are for the end of 2019, as Russians have increased their investment in off-plan properties massively in recent years (see more in section 6.2).

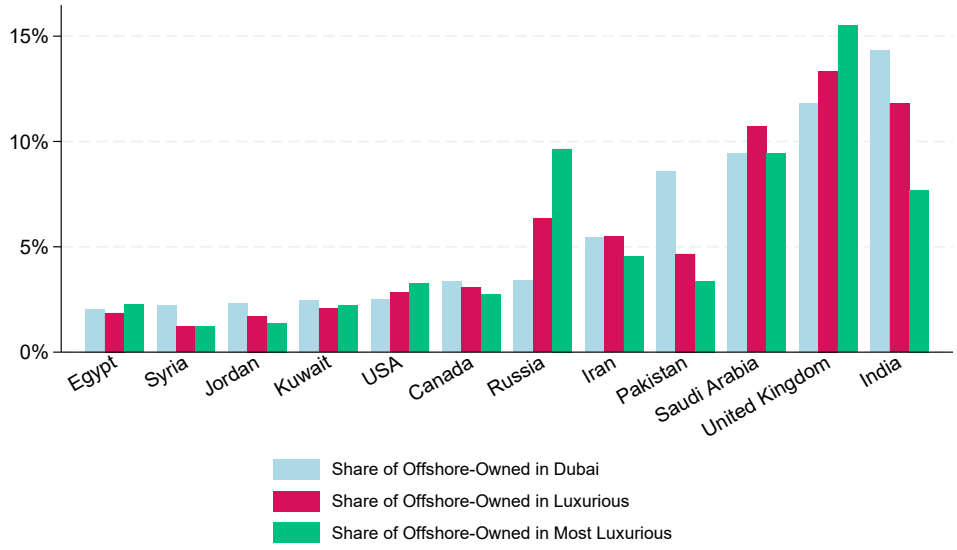
M Affluent Neighborhoods and Upper Segment of Market

Figure M1: Value of Real Estate in Affluent Areas in Dubai in 2019

(a) Domestic vs. Offshore-Owned (USD)



(b) Ownership Shares: Affluent Areas vs. All Areas



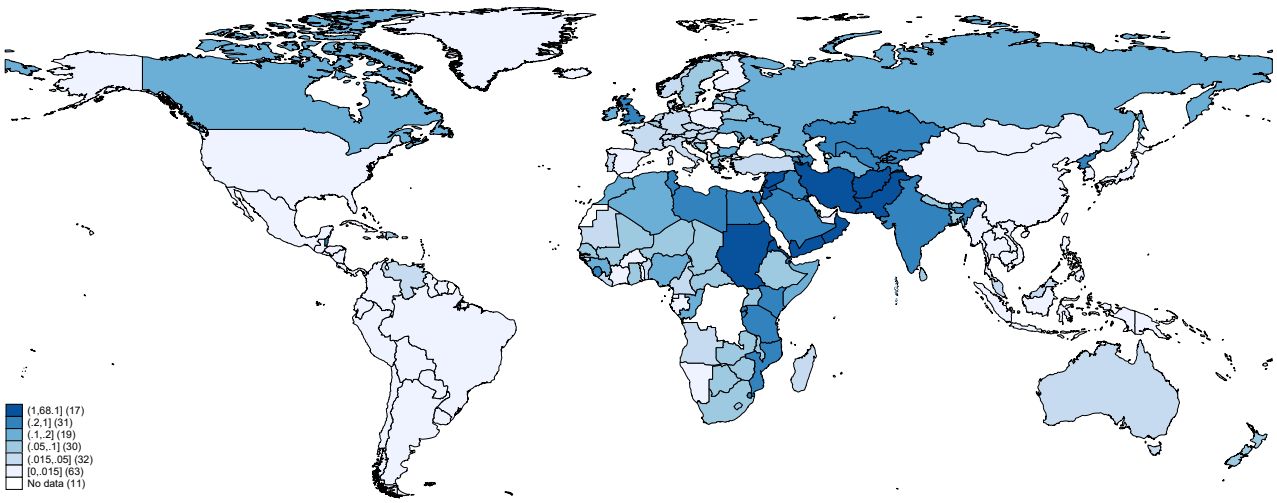
Notes: Panel A) shows the total value of real estate market in the most affluent districts in Dubai. It shows the total value and the total value over whether it is domestically owned, foreign owned or owned by an owner with uncertain country background. Values are USD . Panel B) compares the ownership share of offshore real estate by the top 20 countries in the most affluent areas (narrow definition) vs. Dubai overall. The broader definition of affluent areas includes Al Thanyah, Burj Khalifa, Marsa Dubai, Palm Jumeirah, and Wadi Al Safa. The stricter defintion include only Marsa Dubai and Palm Jumeirah. Explanation: (1) Excluding Foreign Owners, (2) Including UAE-Resident Foreign Owners.

The most affluent neighborhoods and buildings, which primarily cater to foreign investors, is a second subset of the Dubai real estate market we analyze in detail. Panel A of figure M1 summarizes the overall offshore investment in these neighborhoods. The figure first shows offshore ownership in the neighborhoods Al Thanyah, Burj Khalifa, Marsa Dubai/Dubai Marina, Palm Jumeirah, and Wadi Al Safa, which are labeled "Luxurious". Properties in these districts and buildings are worth more than USD 50 billion (more than a fifth of the total value of Dubai real estate). According to our estimates, almost half of this real estate is offshore-owned, as opposed to 31% of the full existing residential real estate market. We then focus on the two most exclusive neighborhoods, Marsa Dubai and Palm Jumeirah, which are labeled "Most Luxurious". Properties in these two districts and buildings are worth more than USD 30 billion, of which approximately half is offshore-owned. This shows that the offshore ownership is even more pronounced in the most exclusive neighborhoods, and also indicate that the offshore investors are able to invest relatively large sums of money.

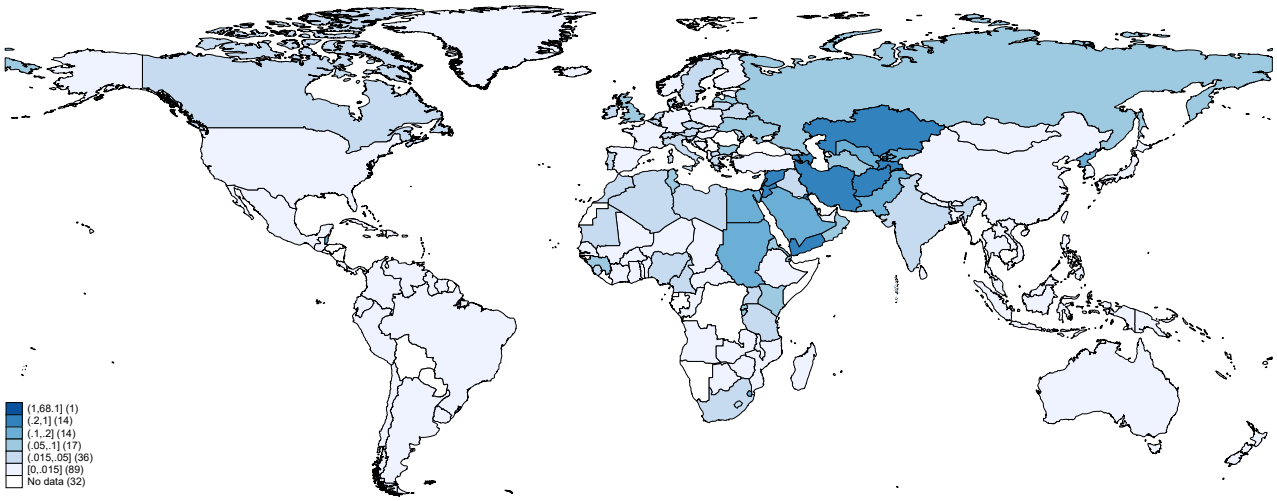
Panel B of Figure M1 display the relative importance of each country in the high-value neighborhoods compared to the general market. It shows that while Indian residents are the largest owners of Dubai real estate in general, British residents become more important when we look at the more exclusive neighborhoods. In Marsa Dubai and Palm Jumeirah, the two most exclusive neighborhoods, the Indian ownership is also surpassed by Russian and Saudi-Arabian ownership. The pattern of the Russian ownership at the end of 2019 is especially interesting: Russian residents own 3% of all residential real estate, but they own almost 10% of the most exclusive residential real estate. This means that around 75% of the USD 2.3 billion of residential real estate owned by Russian residents as of the end of 2019 was located in Marsa Dubai and Palm Jumeirah.

Figure M2: Value of Real Estate in Dubai in 2019 (percent of GDP)

(a) Full market



(b) Marsa Dubai/Dubai Marina and Palm Jumeirah



Notes: This map shows the value of properties held in Dubai by investing country, relative to the investing country's GDP. The range of values for each shade of blue is shown in the square brackets in the bottom left corner, with the number of observations in each bin in parenthesis. The map in panel A) is full property market. The map in panel B) is only for Marsa Dubai/Dubai Marina and Palm Jumeirah.

N Placing Dubai Owners in the Norwegian Wealth Distribution

Background. In subsection 5.2, we analyze offshore ownership across the wealth distribution, for which we use Norway and the Norwegian owners as our laboratory. The analysis is made possible by our collaboration with our Norwegian media partner *E24*, who also received the ownership records of Norwegian owners of Dubai properties from C4ADS. They have been allowed to merge it with publicly available tax record information (*Skattelistene*) for these owners.[67] *E24* then shared an anonymized, processed dataset with us for analysis. This appendix details how the anonymized dataset was constructed and how we processed it to place the real estate owners in the wealth distribution.

Creating the anonymized dataset. *E24* first construct a sample of owners of real estate in Dubai who are tax residents in Norway.[68] The procedure of the journalists is strictly separate from the assignment of residence country in the overall estimate, described in section 3. The publicly available tax record information is only comprehensive for individuals who are fully tax resident in Norway.[69]

The journalists start out with the 259 individuals who own property in Dubai as of early 2020, according to the leaked ownership records, and have either Norwegian citizenship or residency. They then use information gained in Freedom of Information requests, tax record information, and other public sources to evaluate the tax residency of these individuals. If any uncertainty remained at the end of this process, the journalists assign Norwegian tax residency if the individual had i) at least NOK 100,000 in reported income in 2018, ii) a tax liability commensurate with reported income and wealth, and iii) a place to live in Norway. The final sample includes 172 owners which the journalists are certain are Norwegian tax residents who own real estate in Dubai. This is, therefore, a conservative estimate of how many owners of Dubai properties are tax residents in Norway. [70] The journalists enrich the data on the

[67] There is a long-standing tradition of transparency regarding tax records in Norway. Journalists can access tax record information in bulk. Regular citizens can access the same data, but they can only access one observation at a time. People requesting such information must identify themselves when accessing the tax record of another person, and the person whose tax return is checked is notified.

[68] This sample is not restricted to owners of residential real estate only, in contrast to the main analysis in the paper.

[69] Any tax resident of Norway is liable for tax on their worldwide income and wealth, unless exempt under a tax treaty (which Norway does not have with the United Arab Emirates). Domestic income and wealth are typically third-party reported and pre-filled on the taxpayer's annual tax statement and taxpayers are required to self-report any foreign income or wealth.

[70] Note that there was no information about social security numbers in the data. Given this restriction, the

172 owners with information about their recorded taxable wealth, income, and tax payments in 2018, as well as the decade of birth, number of properties owned, and the value of the properties. Information about whether a specific individual declared a property in Dubai or not with is not available.

Processing the anonymized dataset. The information in the anonymized dataset lets us place each of the 172 owners of Dubai real estate in the Norwegian net taxable wealth distribution. [71]

The tax record information in the anonymized dataset is from the end of 2018.[72] We map the distribution of taxable wealth in 2018 using separately held administrative data. This anonymized dataset contains comprehensive tax records delivered by Statistics Norway. These include taxable wealth, as Norway has a wealth tax. We consider 7 bins of wealth: P0-50 (bottom 50 percent of the wealth distribution), P50-90, P90-95, P95-99, P99-99.5, P99.5-99.9, and top 0.1 percent. For each of these bins, we calculate the threshold of net taxable wealth, allowing us to place Norwegian tax residents with properties in Dubai in their respective bins.

Importantly, we also re-rank the individuals in the wealth distribution. We correct the net taxable wealth by adding the taxable value of the Dubai real estate wealth to each owner's net taxable wealth. The tax value of Dubai property wealth is computed using our estimate of the market value and the discount applicable to holiday homes that are not rented out through an organized business activity, as per the Norwegian wealth tax rules. This discount rate is 70 percent, meaning the tax value is only 30 percent of the market value.[73] We distribute the value of properties owned by owners that remain in the bottom 90 percent of the wealth distribution after re-ranking to the different groups within the top 10 percent (in proportion to the population size of the different groups).

journalists, through synergies with their journalistic work, are able to do a much more accurate matching of individuals to tax returns than any researcher would be able to do with the available data.

[71] This observable net taxable wealth is an underestimate of the true market value of net wealth, due to the rules that regulate the Norwegian wealth tax. Taxable net wealth is total tax assessed wealth net of debts, truncated at zero if net wealth is zero. The tax-assessed wealth varies across asset classes and also depends on asset class and time-varying rebates for the tax-assessed valuation, as described in detail in Alstadsæter et al. (2022a). This will somewhat affect the ranking of individuals in the wealth distribution, as those that have a higher share of highly discounted wealth objects, like primary housing and holiday homes, in their portfolio will appear lower in the distribution than they really are. The value of non-listed companies is also imperfectly measured, but this is the case for most estimates of the wealth distribution based on administrative data.

[72] Due to further data complications.

[73] Net taxable wealth may be negative due to debt and valuation discounts. Negative net taxable wealth is reported as zero in the data on Dubai property owners. We impute the average taxable wealth of people with zero or negative taxable wealth (NOK -924,500) to those with a reported net taxable wealth of zero when we re-rank individuals in the wealth distribution.

Note that there are three sources of noise here:

1. We use the wealth distribution from 2018, not 2019

2. We assume that none of the tax resident owners declare Dubai real estate when we re-rank. This assumption is too strong, as we show in section 6.

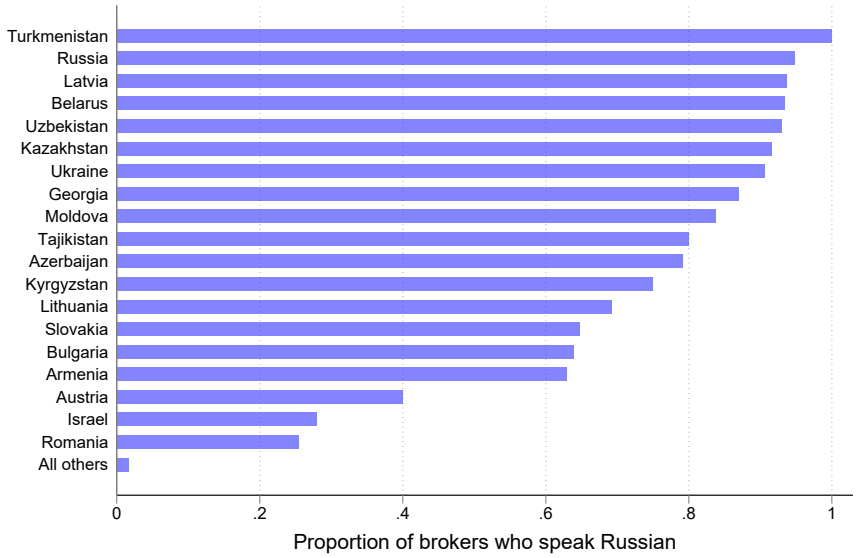
3. We also use the discount rate of 70 percent for all properties, of which some might potentially be homes rented out through an organized business activity or commercial properties. Although most properties are holiday homes, which likely would qualify for the high discount rate, this leads to some bias in the other direction than the above point. (This correction is more about consistency in measuring taxable wealth rather than precisely measuring actual net wealth.)

We accept that these three caveats reduce the precision of this exercise. This is hard to avoid when working with these sorts of data when not employed with a tax administration, for instance. However, we believe the overall picture to be hardly affected by these three imperfections.

If some owners of Dubai real estate also fail to declare other assets (e.g., offshore financial assets or offshore real estate in other countries), then we will under-estimate the true fraction of wealthy Norwegians with real estate in Dubai, while overestimating ownership further down in the distribution.

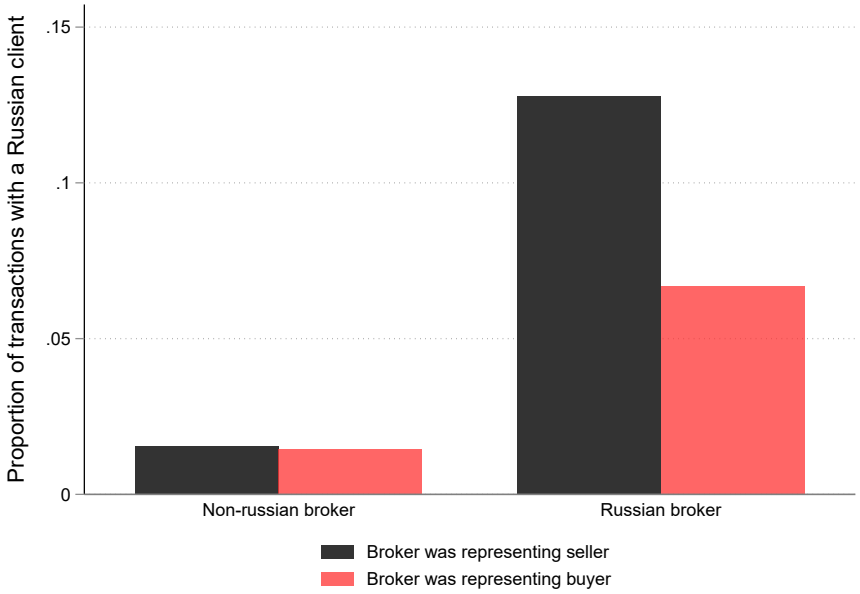
O Details about Russian inflow analysis

Figure O1: Percentage of brokers that speak Russian, by predictioned nationality



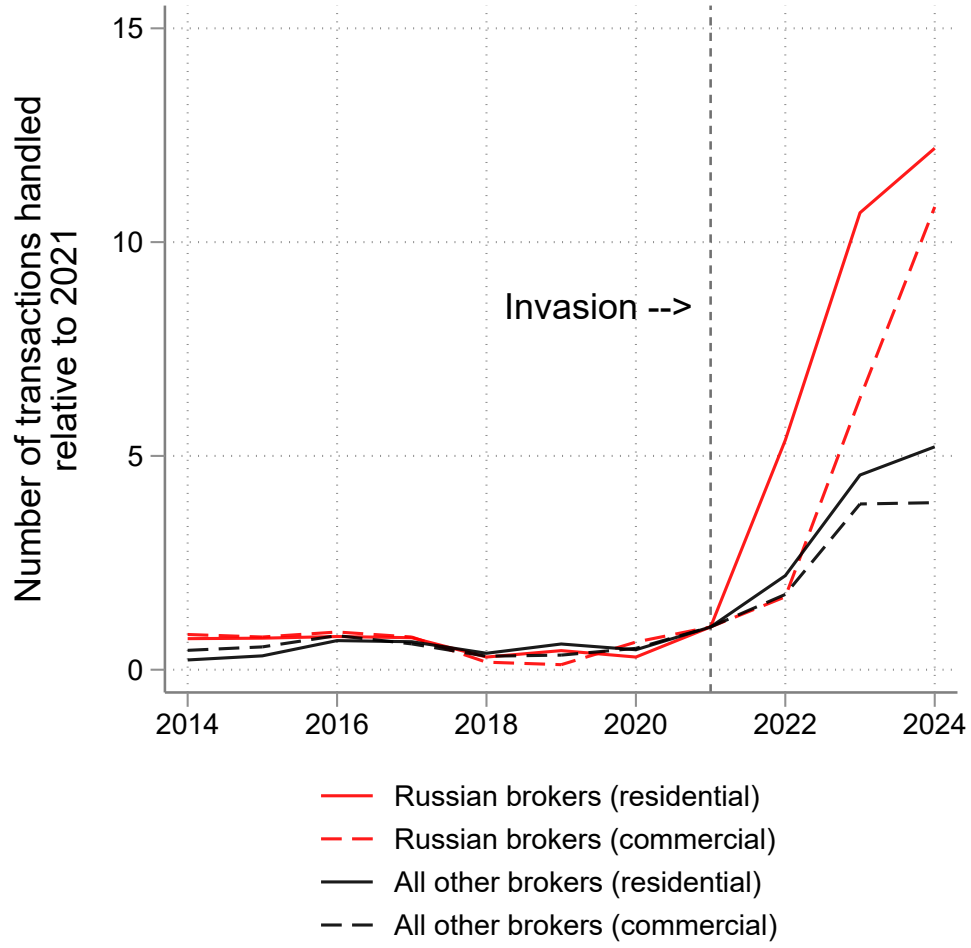
Notes: This figure uses data on 8,641 real estate brokers that appear both on the the Dubai Land Department's public database and on the popular property portal Bayut. Brokers are divided by their nationality as predicted by *Namsor*, and the above figures shows the percentage of those brokers who list "Russian" as a language they speak on Bayut. Above, we show the top 19 nationalities, ranked by the % of Russian speakers, as well as all other nationalities.

Figure O2: Percentage of transactions involving a Russian buyer, by nationality of the broker



Notes: For both Russian brokers and non-Russian brokers, this figure showes the proportion of transactions that involved a Russian buyer when the broker was (a) representing the buyer in the transaction and (b) the broker represented the seller in the transaction. The sample is 1,631 (1,271) real estate transactions that were successfully matched to the Sandcastles 2020 dataset, where a the buyer's (seller's) broker information was also listed. Brokers are divided by their nationality as predicted by *Namsor*.

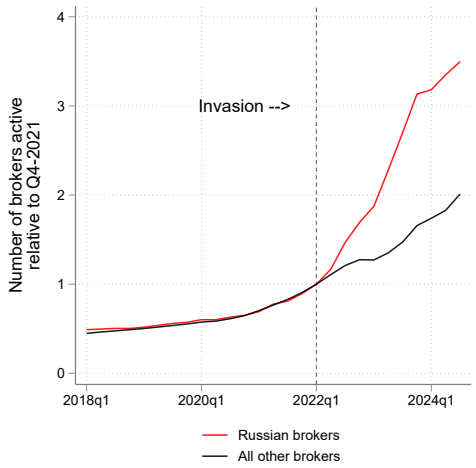
Figure O3: Transactions handled by Russian brokers versus all other (annual data published by DLD)



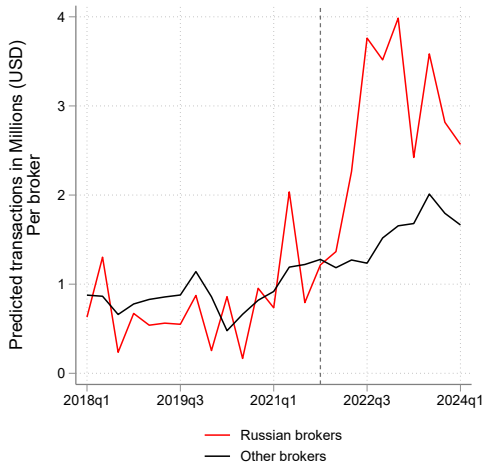
Notes: This figure plots the total number of real estate transactions handled every year, relative to its 2021 value, for two groups: (a) Russian brokers (as predicted by *Namsor*) and (b) all other brokers. Broker-specific transaction data was retrieved in September, 2024 from the Dubai Land Department's public database of real estate brokers and their annual transactions.

Figure O4: Growth in the real estate broker population and broker productivity

(a) Relative broker population



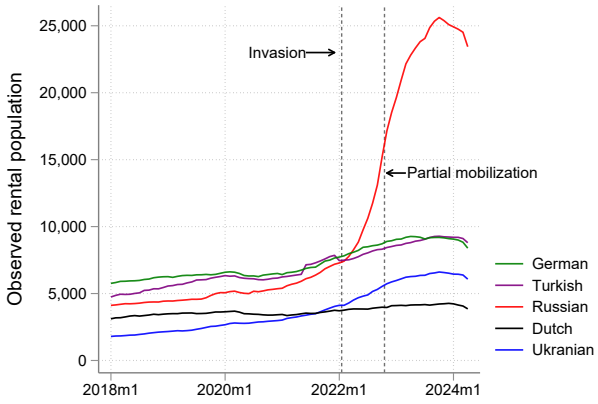
(b) Predicted sales per broker



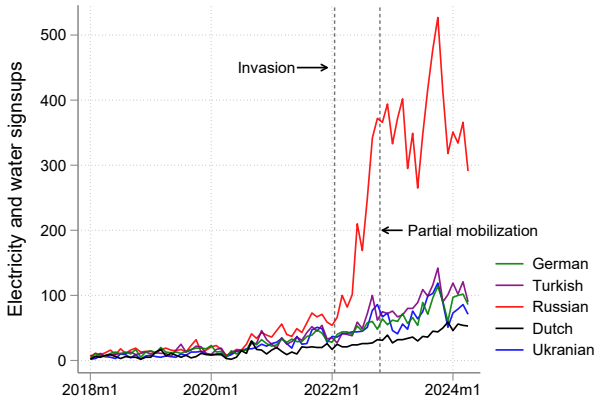
Notes: This figure plots the total number of new real estate broker registrations with the Dubai Land Department, by nationality (Russian versus all others), relative to the Q4-2021 vvalue. Nationality is predicted by *Namsor*). Broker-specific registration data was retrieved in September, 2024 from Dubai Pulse.

Figure O5: Observed growth in the Russian population of Dubai following the invasion of Ukraine

(a) Predicted number of Russians living in rental accommodation



(b) Observed number of new electricity and water customers



Notes: Figure O5(a) graphs the predicted number of Russians living in rental accommodation in the city covered by *Ejari* contracts (this is likely to be an underestimate of the true total). The estimate assumes that each residential property that is rented has a minimum of one person, that the first bed has two occupants, and all subsequent beds have one occupant. For remaining tenants without an identified nationality, we distribution them according to the observed national distribution of the building, or by neighborhood if there are no other active rental contracts in the building. The source of this information is the Non-Public Rental Database. Figure O5(b) shows the number of new signups to the Dubai Electricity and Water Authority (DEWA) by nationality. The source is Dubai Pulse.