The signals of money laundering and tax fraud through offshore residential real estate purchases

A quantitative study covering all housing purchased by offshore commercial investors between 2010 and 2022 in the Netherlands to examine the relationship between the use of a secrecy jurisdiction by a commercial offshore investor and whether or not the housing unit is part of a portfolio transaction.

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Title	**The signals of money laundering and tax fraud through offshore residential real estate purchases:** A quantitative study covering all housing purchased by offshore commercial investors between 2010 and 2022 in the Netherlands to examine the relationship between the use of a secrecy jurisdiction by a commercial offshore investor and whether or not the housing unit is part of a portfolio transaction.
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PREFACE

The Dutch land registry gave me the opportunity to conduct research on real estate investments in relation to anti-money laundering and tax fraud. After many weeks of searching for data and writing various research proposals, the study evolved into determining the relationship between the use of a secrecy jurisdiction to purchase a housing unit and whether or not the housing unit is part of a portfolio transaction, as these two determinants or signals provide an opportunity for commercial offshore investors to launder money and commit tax fraud. Although it is a complex research topic, here is my attempt to scratch the surface of this mysterious world. While working on this research, I began to see the connections in broad daylight. The other day I read on the Bloomberg online news site that people were caught taking 80 flights from London to Dubai in less than a year with suitcases full of cash, bringing $124 million to Dubai. After this research, I know that London has an Ultimate Beneficial Owner (UBO) registration requirement and Dubai is classified as a secrecy jurisdiction with a secrecy score higher than 70. Who knows what they want to invest their cash in ... real estate? The more real estate is purchased by offshore investors in a country, the more likely it is that the country's tax authorities will receive less tax than they are entitled to, or that money laundering will occur through the real estate. Therefore, the real estate share of offshore companies should not be overlooked. I would like to thank Martijn Rijsdijk for his guidance in the progress of the research, Jacques Vos for helping me understand the context, Hans Wisman and Matthieu Zuidema for providing the dataset and helping me understand the data and the feasibility of the analyses, Hinke van der Werf for helping me with GIS visualizations for the presentation, Dr. Mark van Duijn for his keen eye in making a feasible study possible, and last but not least Dr. Michiel Daams for his final review.

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Executive Summary

The government has designated the notary as an authority that is required to adhere to the guidelines of the Prevention of Money Laundering and Financing of Terrorism Act (Wwft) when transferring real estate. Besides registering property purchases, the Dutch Land Registry has no such gatekeeper role. However, if desired, the Dutch Land Registry could provide a valuable service to society if money laundering signals are made identifiable so that data extraction can be applied to variables in a dataset. In this context, quantitative research is aimed to be conducted based on the Dutch Land Registry micro dataset constructed from information derived from deeds of every residential property in the Netherlands acquired between 2010 and 2022 by companies from a jurisdiction outside the Netherlands - also known as offshore companies. Although an investor who uses an offshore company does so primarily to legally avoid tax, research also shows that such an investor regularly goes a step further and evades tax and/or launders money (Van Koningsveld, 2015). To form an unambiguous picture, only commercial offshore company residential investments have been selected, and that is 82% of the population.

Christensen (2012) reports in his literature review a qualitative relationship between the use of secrecy jurisdiction and mispricing (Christensen, 2012). A secrecy jurisdiction is a jurisdiction that uses secrecy to facilitate offshore companies to escape the rules, regulations, and laws of other jurisdictions. Such a jurisdiction complicates the exchange of information with other jurisdictions and makes it complicated for Dutch tax authorities to find out whether (the correct amount of) tax has been levied on, for example, Dutch corporate income tax on rental income and income from the sale of the property in the Netherlands. A qualitative study by Teichmann (2018) on criminals who launder money through real estate shows that mispricing in the purchase phase is related to the introduction of cash. If part of the purchase price is paid in cash, the actual purchase price is typically lower than the market price. Furthermore, the results show that money launderers tend to use a non-secrecy jurisdiction as a cover to disguise the actual secrecy jurisdiction behind the deal in order not to attract the attention of notaries (Teichmann, 2018). A quantitative study by Van Duyne and Soudijn (2009) on criminal money as a threat to the Dutch real estate sector raised the issue that some property prices are difficult to determine because only the summarized value of properties are recorded. The authors recommend better recording of data to pursue knowledge-based policy making in the story of global criminals against global database contamination (Van Duyne & Soudijn, 2009). In a quantitative study on home purchases by offshore companies in the United Kingdom, an Ordinary Least Squares (OLS) regression is applied on 64% of the residential purchases to predict the purchase price per property as these properties were part of a portfolio transaction, and motives around money laundering were not addressed (Bomare & Le Guern Herry, 2022). The scientific gap in knowledge is that no quantitative research has yet been conducted on the relationship between a secrecy jurisdiction and property mispricing. This study contributes to the existing qualitative statement by providing quantitative evidence on whether the use of a secrecy jurisdiction is related to a possibility of mispricing, which will be addressed in this study as whether or

not the purchase of a Dutch housing unit is part of a portfolio transaction, as it disguises the price per property. Among offshore commercial company residential investment properties, only data without missing information is selected, meaning that the study is conducted based on 80% of the population of offshore commercial company residential investment properties, or 3,466 properties.

First, exploratory research is conducted on the content of the dataset. It stands out that between 2010 and 2022, for 88%, or 3,049 home purchases, the price is not set and thus the housing unit is part of a portfolio transaction. In addition, 110 homes (3.2%) are purchased through a secrecy jurisdiction between 2010 and 2022. Of the 88% of housing units that are part of a portfolio transaction, 1.5% of the housing purchases (that is 45 housing units) are made through a secrecy jurisdiction. According to the Tax Justice Network's lists (known since 2018), the jurisdiction of Luxembourg is not a secrecy jurisdiction, and between 2010 and 2022, 96% of the offshore housing purchases (3,313 homes) originated from offshore companies based in the jurisdiction of Luxembourg. Next, the relationship between the use of a secrecy jurisdiction and a housing unit being part of a portfolio transaction is tested at the micro level, or property level, using a binary logistic regression through the software program Stata/SE 17.0 with the binary control variables usable space greater than 40 m2 or not, apartment or not, municipality of Amsterdam or not, and purchase year before or after the introduction of the Common Reporting Standards (CRS). The introduction of the CRS is referred to in the existing literature as the time when financial data of offshore companies is automatically exchanged between participating jurisdictions, except for data on real estate purchases. Binary variables are chosen as otherwise not enough observations per group are available. The small proportion of the use of secrecy jurisdictions relative to the large proportion of housing that is part of a portfolio transaction in the data resulted in the binary logistic regression establishing a negative relationship between the use of a secrecy jurisdiction and the housing unit being part of a portfolio transaction. It is important to note that 19% of the variance on whether or not a housing unit is part of a portfolio transaction is explained by the model, so it cannot be said with certainty that the probability of a commercial investor purchasing a housing unit as part of a portfolio transaction decreases, on average, when the housing unit is purchased through a secrecy jurisdiction compared to a non-secrecy jurisdiction, at a 99% confidence level.

To provide the Dutch Land Registry with a useful dataset to potentially find the signals of money laundering through data extraction, it is important to be able to determine the purchase price per property. It can be concluded that for 88% of the purchased properties in the dataset containing commercial offshore company residential purchases between 2010 and 2022, the purchase price is not known, and this gives room for mispricing and thus possible money laundering. As indicated in the existing literature, better recording of data and thus recording the actual price, rather than an estimate per property, will help in doing sound research and ultimately pursuing knowledge-based policy making (Van Duyne & Soudijn, 2009).

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GLOSSARY

Term	Definition
Guidelines Wwft	Guidelines of the Money Laundering and Terrorist Financing Prevention Act (Wwft). On the basis of these guidelines, notaries carry out client due diligence, and investigate the origin of the buyer's assets in real estate transactions. These are guidelines, so each notary will handle client due diligence and the investigation of the origin of assets in real estate transactions differently. The Financial Supervision Authority (FIU) monitors notaries to ensure that client due diligence and investigating the origin of assets are carried out carefully (Bureau Financieel Toezicht, 2018).
Jurisdiction	The area over which states and their agencies have judicial power, that is, authority to regulate and/or enforce (Ministry of foreign affairs, 2023).
Money laundering	Hoekje et al. (1993) state that money laundering is seen as a very broad definition by tax authorities. The Chief of the Examination Division of the Internal Revenue Service in Newark, New Jersey made the following statement: "The IRS takes a very broad view of money laundering. Any activity or practice used to conceal or disguise the existence and source of profits or funds generated, whether from legal or illegal sources, is a money laundering concern to us" (Hoekje et al., 1993).
Offshore company	Van Koningsveld (2015) describes an offshore company as a private limited liability company incorporated under foreign law - i.e., not a Dutch company - that is not allowed to engage in economic activities in the jurisdiction of incorporation and/or registered office, and whose actual owner(s) reside in a country other than the country of incorporation. In addition, there is a varying composition per offshore company of the following five characteristics: (1) The government does not levy (direct) taxes, but a certain annual fee to the government, and therefore local commercial activities are prohibited. (2) Separate laws and regulations apply to the incorporation, taxation and management of the company. (3) The company must have a registered agent, which means that the address of a law or trust office is used instead of having its own physical office (address) with means of communication and personnel. (4) Governance and/or management is carried out by the local law or trust office. (5) The anonymity associated with an offshore company encourages nominee services and exempts the public filing of basic company information (Van Koningsveld, 2015).
Portfolio transaction	A transaction where only the total price of the transaction is defined in the deed and not the price of a single property in the transaction. A transaction price in the deed may include more than one property, and it may also have been agreed that movable items such as a car, machinery or other inventory be included in the transaction price. Therefore, the land registry cannot always determine the price of the property traded if only the total price of the transaction is recorded in the deed (CBS, 2023).
Real estate	According to Clayton & Ling, properties in the real estate market are traded with information inefficiency, in an illiquid, and highly segmented local market, and

	evidence is found that investor sentiment impacts the pricing of real estate (Clayton & Ling, 2008).
Secrecy Jurisdiction	Christensen (2012) refers to the Tax Justice Network (TJN) to define a secrecy jurisdiction. The TJN provides a tax secrecy index. The tax secrecy index is a score based on a detailed survey that assesses the opacity of a jurisdiction based on three key components: transparency of commercial activities, transparency of proprietary information, and commitment to international judicial cooperation to combat harmful practices (Christensen, 2012). For the quantitative part of this study, the TJN's secrecy score cutoff of 70 is used to distinguish between secrecy jurisdictions (70 or higher) and non-secrecy jurisdictions (lower than 70). The guidelines of the Wwft for notaries recommend to use the tax secrecy index when assessing whether or not they deal with a client doing business from a suspicious offshore company (Bureau Financieel Toezicht, 2018).
UBO	UBO stands for ultimate beneficial owner, which refers to people who own at least 25% of the offshore company (Bureau Financieel Toezicht, 2018; Rijksdienst voor Ondernemend Nederland, 2023).
WOZ value	The WOZ value in the Netherlands indicates the home value, which the municipality determines based on their appraisal. This value is used to pay certain levies and taxes. It is therefore somewhat different from the selling price of a home (Rijksoverheid, 2023).

INTRODUCTION

1.1 Motivation and societal relevance

News reports show that Dutch real estate has become increasingly popular in recent years among companies purchasing through a jurisdiction outside of the Netherlands – also known as offshore companies. In 2022, offshore companies in the Netherlands are estimated to own or finance €21.9 billion of real estate, while in 2013 the total value of offshore real estate in the Netherlands was €3.8 billion (Vastgoedmarkt 2022; Pols & van Staalduine, 2022). Although an investor who uses an offshore company does so primarily to legally avoid taxes, research also shows that such an investor uses an offshore company structure to go a step further and evade taxes and/or launder money (Ungoed-Thomas, 2022; Story & Saul, 2015). These illegal practices place this type of investor in a parallel financial system compared to the rest of the world (Van Koningsveld, 2015). In turn, this parallel financial system deprives countries of a significant amount of taxpayer money and incentivizes people to engage in shady activities to generate illicit money, such as human trafficking or drugs (Henry, 2012). Banning an offshore company structure will not end the parallel financial system, but deconstructing the investment patterns of investors who use an offshore company can lead to insights that can discourage the abuse of an offshore company.

The government has designated the notary as the authority required to conduct client due diligence and investigations into the origin of the purchasing party's assets when transferring real estate to comply with the guidelines of the Money Laundering and Terrorist Financing Act (Wwft). Part of the screening process is that the notary looks at the list of secrecy jurisdictions compiled by the Tax Justice Network (Bureau Financieel Toezicht, 2018). A secrecy jurisdiction is a jurisdiction that uses secrecy to facilitate offshore companies to escape the rules, regulations, and laws of other jurisdictions. Such a jurisdiction complicates the exchange of information with other jurisdictions and therefore makes it, for example, complicated for Dutch tax authorities to find out whether (the correct amount of) tax has been levied on, for example, Dutch corporate income tax on rental income and income from the sale of the property in the Netherlands (Christensen, 2012). If the jurisdiction used for the transaction is on the list, a notary is more likely to find the transaction suspicious and make a report to the Financial Intelligence Unit (FIU) (Bureau Financieel Toezicht, 2018). The problem at hand is that there is a risk that the notary may not notice an unusual transaction from a particular jurisdiction and (un)intentionally allow money laundering or tax evasion fraud to occur in the purchase of real estate by an offshore company. The Dutch Land Registry has, besides registering property purchases, no such gatekeeper role. However, if desired by the government, the Dutch Land Registry may be able to provide a valuable service to society if the signals of money laundering are made identifiable so that data extraction can be applied to variables in a dataset. Therefore, the core motivation for this research is to determine if there is a

relationship between two variables found in existing literature to provide information on variables that may be related to money laundering and tax fraud for data extraction.

1.2 Academic relevance

Christensen (2012) reports in his literature review a qualitative relationship between the use of secrecy jurisdiction and mispricing (Christensen, 2012). A qualitative study by Teichmann (2018) on criminals who launder money through real estate shows that mispricing in the purchase phase is related to the introduction of cash. If part of the purchase price is paid in cash, the actual purchase price is typically lower than the market price. Furthermore, the results show that money launderers tend to use a non-secret jurisdiction as a cover to disguise the actual secrecy jurisdiction behind the deal in order not to attract the attention of notaries (Teichmann, 2018). A quantitative study by Van Duyne and Soudijn (2009) on criminal money as a threat to the Dutch real estate sector raised the issue that some property prices are difficult to determine because only the summarized value of properties are recorded. The authors recommend better recording of data to pursue knowledge-based policy making in the story of global criminals against global database contamination (Van Duyne & Soudijn, 2009). In a quantitative study by Bomare and Le Guern Herry (2022) on home purchases by offshore companies in the United Kingdom, an Ordinary Least Squares (OLS) regression is applied on 64% of the residential purchases to predict the purchase price per property as these properties were part of a portfolio transaction, and motives around money laundering were not addressed (Bomare & Le Guern Herry, 2022). The scientific gap in knowledge is that no quantitative research has yet been conducted on the relationship between a secrecy jurisdiction and property mispricing. This study contributes to the existing qualitative statement by providing quantitative evidence on whether the use of a secrecy jurisdiction is related to a possibility of mispricing, which will be addressed in this study as whether or not the purchase of a Dutch housing unit is part of a portfolio transaction, as it disguises the price per property.

1.3 Research statement

The purpose of this study is to quantitatively investigate whether a housing unit that is part of a portfolio transaction is associated with an investor who uses an offshore company in a secrecy jurisdiction, in the context of the opportunity to launder money and evade taxes. The Land Registry provides a micro dataset built from information derived from deeds of every property in the Netherlands acquired by companies from a jurisdiction outside the Netherlands between 2010 and 2022. To form an unambiguous picture, only commercial offshore company residential investments are selected. This research is a first step in providing a quantitative examination into distinctive real estate investment patterns of offshore companies based on variables compiled from available information in deeds. In addition, an attempt is made to test the relationship between two variables that the existing literature suggests are associated with tax fraud and money laundering. It should be noted that for this study, no information is known on

transactions where actual tax fraud and money laundering have occurred. Based on the research aim, the following research question is identified: *What is the relationship between the use of a secrecy jurisdiction by a commercial offshore investor and whether or not the Dutch housing unit purchase is part of a portfolio transaction?*

The research question is answered in three steps. First, the (theoretical) mechanism between the two concepts stated in the research question are explained by reviewing the existing literature. Thereafter, an exploratory analysis is performed that focuses on which jurisdictions are used to finance the housing unit purchase, the timing, and the amount of portfolio transactions to get a rough understanding of their relationship. Lastly, a binary logistic regression analysis is performed that aims to find whether there is a relationship between the use of a secrecy jurisdiction and whether or not the housing unit is part of a portfolio transaction, while controlling for other research-based determinants at a housing unit level.

1.4 Reader's guide

The remainder of this paper is organized as follows. Section 2 explains the (theoretical) mechanism between the two concepts stated in the research question by reviewing the existing literature. Section 2 also provides the theoretical foundation to construct the hypotheses and conceptual model to answer the research question. Section 3 informs about the methodology to answer the research question and gives an overview of the data used and selected for the exploratory analysis and binary logistic regression analysis. Section 4 presents the results of both analyses, and section 5 concludes by answering the research question, addressing the limitations of the study, and suggesting recommendations for further research.

2. THEORY, LITERATURE REVIEW & HYPOTHESES

The foundation of knowledge to answer the research question is provided by collecting and synthesizing previously written literature. The definitions of the key concepts can be found in the glossary.

2.1 Purchasing process of real estate through offshore companies in Dutch context

The official transfer of property takes place at a notary, followed by registration at and by the Dutch land registry. The potential for an offshore company to invest in the Netherlands depends on the notary who takes on the role of gatekeeper in the transfer of property by following the guidelines of the Money Laundering and Terrorist Financing Act (Wwft) (Bureau Financieel Toezicht, 2018). Therefore, the notary is required to perform client due diligence on the selling and buying parties and to inquire about the origin of the real estate financing assets deposited in the notary's third-party account. The client due diligence consists of asking who the ultimate beneficial owner (UBO) of the offshore company is, as the notary may be given the power of attorney to sign the deed and the legal representative of the offshore company may sign the tax identification number (TIN) paperwork. In the case of an offshore company, the company data is not registered with the Chamber of Commerce, so the notary depends on what documents the client provides about the ultimate beneficial owner (Bureau Financieel Toezicht, 2018). Therefore, the notary examines the location of the offshore jurisdiction. For the list of secrecy jurisdictions, in other words, the jurisdictions that are relatively most complicit in helping consumers to hide their finances from the rule of law, the specific guidelines on compliance for notaries refer to the website of the Financial Action Task Force (FATF) and the website of Transparency International. However, the guidelines of the Money Laundering and Terrorist Financing Act (Wwft) are guidelines, so it is up to the notary to judge whether there is a potentially suspicious situation. Each notary will investigate his clients in a slightly different way. The Bureau Financieel Toezicht (BFT) is the supervisory body in the Netherlands. Notaries can be prosecuted if they do not investigate their clients carefully enough. They can be warned and fined, suspended or removed from office (Overheid.nl, 2022; Overheid.nl, 2022; Overheid, 2020). Furthermore, the notary cannot simply refuse to provide the service requested by the client because of the notary's ministerial duty (KNB, 2023). Therefore, a notary with free rates could set a high rate in advance, so that the client is more likely to choose another notary (Bartjens, 2021). However, if the client does not go to another notary and the notary encounters a potentially suspicious situation, the notary is obliged to inform the Financial Intelligence Unit (FIU) of the Netherlands during the request for the deed to be passed or after the deed has been passed without informing the client (Bureau Financieel Toezicht, 2018).

Once a property in the Netherlands is purchased through an offshore bank account, the offshore Taxpayer Identification number (TIN) is used in the relevant offshore jurisdiction to tax, for example, Dutch corporate income tax on rental income and income from the sale of the property in the Netherlands.

Since January 1, 2022, the notary is required to ask for the offshore TIN number – with the possibility of not revealing the ultimate beneficial owner – for the housing transfer. However, no Dutch tax identification number is required (Belastingdienst, 2023). Therefore, the tax authority remains dependent on the exchange of information based on bilateral and multilateral arrangements with other jurisdictions for information on accounting. Therein lies the risk that if the jurisdiction's data comes from a jurisdiction where high secrecy of client data applies, then it is very difficult to even impossible to obtain information to be able to rightfully tax (Streiff & Scheltema Beduin, 2017; Rabobank, 2023). Real estate purchases in particular are prone to tax fraud and money laundering vulnerabilities as real estate is typically a high-value, high-yield investment. In an international context, findings of the OECD report on tax fraud and money laundering vulnerabilities in the real estate sector show that it is relatively easy to overstate or understate the true value of a property, that it is difficult for authorities to obtain reliable and timely information on property sales and money transfers, and that the ability to disguise ownership is a vulnerability in identifying suspicious transactions (OECD, 2007).

The problem at hand is that there is a risk that the notary may not notice an unusual transaction from a particular jurisdiction and (un)intentionally allow money laundering or tax evasion fraud to occur in the purchase of real estate by an offshore company. In addition to the difficulty of identifying the ultimate beneficial owner and the associated cash flows, the risk of over- and under-declaration lies in the nature of the deed. According to Statistics Netherlands (CBS), a transaction price in the deed may include more real estate and it may also have been agreed that movable items such as a car, machinery or other inventory are included in the transaction price. Therefore, the land registry cannot always determine the price of the property traded if only the total price of the transaction is recorded in the deed (CBS, 2023).

2.2 Money laundering and tax evasion in real estate through offshore companies

The definition of money laundering also targets tax evaders, although tax evasion does not necessarily involve money laundering (Gelemerova, 2011). Bongard's (2001) conceptual framework of money laundering as a process of three stages of (1) placement, (2) layering, and (3) integration in a cash-based underground economy embraces both money laundering and tax evasion. Placement links to the introduction of cash into the economy, layering links to a series of transactions to lose track of the cash, and integration links to the integration of cash into the legitimate economy (Bongard, 2001). Gelemerova (2011) criticizes the placement stage in the cash-based underground economy. In economic and white-collar crimes involving income or corporate tax fraud, cash is not always used. In this case, the money is already in the bank and placement is not necessary. Instead, displacement through an offshore safe account is required to remove the money from the domestic financial system. However, the author also points out that the basic cash-based approach of the three-stage model remains the dominant conceptual framework in the literature over the years (Gelemerova, 2011). Robinson (2003) provides evidence that the cash-based approach could also be applied to offshore companies, since cash derived from tax

evasion or drug trafficking, for example, can be placed directly in offshore banks to avoid a money trail (Robinson, 2003). Teichmann (2018) illustrates how criminals launder money through real estate based on placement, layering, and integration in Germany, Austria, Switzerland, and Liechtenstein. He conducted qualitative research through 58 semi-standardized interviews on criminals and prevention experts. He finds that money launderers take preliminary steps before they purchase real estate. Money launderers tend to use a company with a nominee director, aim to buy properties in an anonymous big city, and avoid rural areas where people know each other to keep the attention from neighbors and local politicians away. Smart money launderers also aim to buy smaller real estate properties and avoid high-profile deals to avoid the risk of being discovered by authorities. Furthermore, intelligent money launderers aim to avoid direct financing from offshore jurisdictions that are under heightened supervision by authorities. The authors refer to an example of purchasing property in Austria. Direct funding from the British Virgin Islands is suspicious, so a finance company in Liechtenstein is put in between that is part of the set-up, so the Austrian authorities only see Liechtenstein as a financier. In the placement phase, the real estate is purchased by the money launderer. The author finds that when money launderers buy real estate, the combination of money laundering and tax evasion becomes evident. For example, the seller provides a portion of the price to be paid in cash. This portion generally does not exceed 30% of the market value to avoid a suspicious transaction in the eyes of public notaries or tax authorities. Preferable, real estate is bought in large volumes to justify a discount of the market value. In the layering and integration phase, money launderers create legitimate rental income and sell the property after, for instance, ten years, because a jump in the sales price near the actual market value by that time appears natural to the authorities (Teichmann, 2018). In another qualitative study on money laundering by Teichmann (2017), ten money launderers and their advisors based in Italy, Switzerland, Germany, Austria, and the United Arab Emirates were informally interviewed between January 2011 and March 2014 to develop twelve effective methods to launder money. The interviews were not recorded because the money launderers feared criminal charges. Results show that real estate is used to launder money. Also in these findings, it is confirmed that money launderers use offshore companies with nominee directors to buy real estate. They find that money launderers aim to buy real estate in need of renovations in big cities. Money launderers also aim to do small transactions and avoid high profile real estate to avoid attention of tax authorities and notaries. The purchase of real estate is largely done with clean assets, but a plausible portion is purchased with illicitly obtained cash to obtain tax benefits for both the seller and the buyer. Therefore, money launderers avoid financing the purchase of real estate through secrecy jurisdictions. After the purchase of property, money launders attempt to renovate the property with cash and (fictitiously) rent it out (Teichmann, 2017).

Table 1 provides a summary of the real estate investment characteristics related to money laundering and tax evasion found in the existing literature. The underlying causal reasoning linking the use of a secrecy jurisdiction versus a non-secrecy jurisdiction to the conditions under which the offshore investor

purchases real estate can be found in the theoretical mechanism of the money launderer taking preparatory steps and the money launderer purchasing real estate as part of the placement phase in the three stages of the money laundering process.

Table 1 Real estate investment characteristics of money laundering and tax evasion.

Real estate investment characteristics of money laundering and tax evasion	**Literature**
Jurisdiction: use of secrecy offshore jurisdiction, but not directly visible for the authorities	(Teichmann, 2018)
Financing of transaction: not directly related to the offshore company of use, but another company in another less suspicious jurisdiction (money laundering)	(Teichmann, 2017; Teichmann, 2018)
Volume of transaction: large volumes to justify discount or multiple smaller objects	(Teichmann, 2017; Teichmann, 2018)
Price of property: not more than 30% deviation from the market value	(Teichmann, 2018)
Location of property: Anonymous big city	(Teichmann 2017; Teichmann, 2018)
Characteristics of property: small property, avoidance of high-profile real estate, renovation of property is needed	(Teichmann 2017; Teichmann, 2018)

2.3 The association between a secrecy jurisdiction and a portfolio transaction

Christensen (2012) reviewed existing literature on the role of a secrecy jurisdictions in stimulating the supply of corrupt practices. He finds that the use of a secrecy jurisdiction can be associated with the mispricing of a transaction, as the secrecy space creates an effective obstacle to government investigations into activities booked through the secrecy jurisdiction. The secrecy space facilitates the laundering of proceeds for purposes such as drug or illegal arms trafficking, bribery, insider trading, false commercial invoicing, tax evasion, and mispricing of transactions. Accountants and lawyers - usually well-paid - are brought in to weave dirty money into a commercial transaction to conceal the returns from these practices. He also notes that the anti-corruption campaign organization Transparency International has been calling for change since 2009, stating that jurisdictions with secrecy rules cannot be justified because they are used by companies that launder money and evade taxes. In the following years, the FATF and the Tax Justice Network made further efforts to list these secrecy jurisdictions, which must be treated with more suspicion by notaries and banks (Christensen, 2012). However, Teichmann (2018) finds in his qualitative study that money launderers tend to avoid detection by the authorities when they purchase real estate and deviate from the market price by paying partly in cash. Therefore, money launderers declare a non-secrecy jurisdiction for the funding, so that the authorities

only see the non-secrecy jurisdiction and not the underlying secrecy jurisdiction (Teichmann, 2018). Teichmann's (2017) other qualitative study also confirms that real estate financing does not take place through a secrecy jurisdiction to avoid attention of the tax authorities when the purchase of real estate is partly done with cash (Teichmann, 2017). Van Duyne & Soudijn (2009) explored their concerns about criminal money as a threat to the real estate sector, because once the dirty money is invested in real estate, local authorities must deal with it daily, as real estate comes with legal rights and obligations in the public space. Therefore, the authors analyzed real estate confiscations next to other objects between 2000 and 2008 through the Dutch prosecution office's confiscation database. The authors indicate that some property prices are difficult to determine because they are not unambiguously linked to the property. Some price provisions mentioned "multiple properties in foreclosure", and only the summarized value of the properties was noted. Furthermore, in Dutch law, an immovable property is called a "register good," which could also include for example, parking space and a (residential) boat as part of the summarized value. The authors concluded that they were unable to fully substantiate their concerns about crime money as a threat to the real estate market due to data uncertainties, in part because of the difficulty of determining prices per property. They recommend a better recording of data to pursue knowledge-based policy making in the story of global criminals against global database pollution (Van Duyne & Soudijn, 2009). Bomare & Le Guern Herry (2022) conducted a quantitative exploratory analysis to provide insight into the real estate purchases by offshore companies in the United Kingdom. The authors mention portfolio transactions as a main limitation of the Land Registry Overseas Companies Ownership Dataset (OCOD), with the purchase price per property unambiguously specified for only 36% of the residential unit purchases by offshore companies. However, they decided to disentangle portfolio transactions and predict the purchase price per property. They used purchase characteristics such as date of purchase, location, and property type, to predict the price per property in a forecasting model estimated by Ordinary Least Squares (OLS). However, in the absence of important data on the size of the property, the prediction of the actual purchase price is less accurate. In addition, the author's exploratory analysis provides insights into the investment patterns of offshore companies, starting with a descriptive table of the data with average characteristics of the transactions. Insight into secrecy and non-secrecy jurisdictions is provided through the inclusion of a 'top five' table on the use of secrecy jurisdictions or non-secrecy jurisdiction, explaining the number of transactions and total amounts invested. The authors also visualize the origin of transactions in a graph of the amounts invested through secrecy jurisdictions versus non-secrecy jurisdictions over time (Bomare & Le Guern Herry, 2022). Johannesen et al. (2022) conducted a quantitative study of real estate owned by offshore companies in the United Kingdom. They combine administrative land registry data, a transaction database, and a database on links to commercial ownership and data leakage of offshore companies. The authors mention the difficulty they have had in disaggregating transactions to the level of individual properties to conduct housing value analyses, as in some cases the housing value cannot be traced to a single property, but only to the total price of the transaction (Johannesen et al., 2022).

2.4 Housing unit level control variables

Alstadsæter et al. (2022) provide a quantitative analysis of micro-level data on residential property ownership by offshore companies in Dubai. The authors include value, size, price per square meter, type of housing unit, and number of bedrooms as property characteristics for their analysis. The results show that the most popular type of housing unit is an apartment (Alstadsæter et al., 2022). Bomare & Le Guern Herry (2022) provide a quantitative analysis of micro-level data on residential property ownership by offshore companies in the United Kingdom. The authors indicate value, size, expensive London, housing type (house, flat, bungalow), number of rooms, area in square feet as property characteristics for their analysis (Bomare & Le Guern Herry, 2022). Fernandez et al., (2016) discuss that the wealthy, who tend to use an offshore company to purchase residential real estate, are interested in luxury apartments in certain neighborhoods of alpha cities, which are perceived as highly liquid (for real estate terms) and therefore easy to resell. The authors identify Amsterdam as an alpha city (Fernandez et al., 2016). The term alpha city is taken from Beaverstock et al. (2000), who explain in their research that the connectivity between cities is important for geography. Therefore, three levels of service provision measure the flow of information between global command centers, including ten alpha cities, ten beta cities, and thirty-five gamma cities (Beaverstock et al., 2000). Bomare & Le Guern Herry (2022) investigate the value of timing based on a policy consequence in their research on residential property ownership by offshore companies in the United Kingdom. The authors use the UK's implementation of the Common Reporting Standards, which focuses on the automatic exchange of financial information between participating jurisdictions and excludes the automatic exchange of property purchase information. The results show that commercial offshore investors that use an offshore company in a jurisdiction that has implemented the Common Reporting Standards invest significantly more in UK’s real estate after the UK implemented the Common Reporting Standards than commercial offshore investors that use an offshore company in a jurisdiction that has not (yet) implemented the Common Reporting Standards (Bomare & Le Guern Herry, 2022). Knobel & Meinzer (2014) critically discuss the potential effect of the implementation of the Common Reporting Standards by reviewing existing literature on the Common Reporting Standards loopholes. The authors find that there is no consistent way to collect tax identification number (TIN) information, which is essential for analysis when receiving the information from authorities. Other results show that a jurisdiction can already choose to participate in the Common Reporting Standards automatic exchange of information by exchanging information with only a limited number of countries. For example, Switzerland, opts to exchange financial information with a limited number of countries that are considered to have market potential for the Swiss financial sector. Similarly, a jurisdiction can sign on for full financial information exchange with all participating jurisdictions, but if it does not collect income tax, it cannot collect tax information for other jurisdictions. The findings also indicate that some jurisdictions are defending their financial sector by offering a tax residency certificate when clients open a bank account. As a result, people who

do not actually live or do business within the jurisdiction are considered residents of the jurisdiction, and the tax information gets sent to the wrong jurisdiction. Based on these loopholes, the authors question whether the implementation of the Common Reporting Standards for a jurisdiction will results in an improved fight against tax evasion and money laundering (Knobel & Meinzer, 2014).

Table 2 presents a summary of the investment characteristics found in the existing literature that influence the investor's use of an offshore company to invest in residential real estate. From these characteristics, variables are created and positioned as control variables in the conceptual model for the quantitative analysis.

Table 2 Investment characteristics explaining the investor's use of an offshore company to invest in residential real estate.

Offshore company housing unit investment characteristics	**Literature**
Location: Global city, specific neighborhood in global city	(Fernandez et al., 2016; Bomare & Le Guern Herry, 2022)
Time: after implementation of Common Reporting Standards (CRS)	(Bomare & Le Guern Herry, 2022; Knobel & Meinzer, 2014)
Housing characteristics: usable space, apartment, housing type, price per m2, price, luxury status, number of bedrooms, number of rooms	(Alstadsæter et al, 2022; (Bomare & Le Guern, 2022)

2.5 Hypotheses

Hypothesis 1: There has been a decrease in the use of a secrecy jurisdiction to purchase residential real estate over time.

Christensen points out in his 2012 literature review that there has been more attention paid to the use of secrecy jurisdictions since 2009, because jurisdictions with secrecy rules are no longer excusable as they are being used by money launderers and tax evaders. The Tax Justice Network has made further efforts to compile a list of secrecy jurisdictions that should be treated with more suspicion by notaries and banks (Christensen, 2012). However, a qualitative study by Teichmann in 2018 shows that money launderers tend to use a non-secrecy jurisdiction as a front to disguise the actual secrecy jurisdiction behind the deal (Teichmann, 2017; Teichmann, 2018). Given that qualitative research conducted in 2018 indicates that money launderers tend to launder through a non-secrecy jurisdiction following authorities' efforts to list secrecy jurisdictions, it is expected that the use of a secrecy jurisdiction to purchase a housing unit will decrease over time.

Hypothesis 2: There is a negative relationship at a housing unit level between the use of a secrecy jurisdiction and the housing unit being part of a portfolio transaction, when controlling for relevant variables.

Literature research qualitatively connects the use of a secrecy jurisdiction to mispricing of real estate (Christiansen, 2012). Portfolio transactions pose an obstacle to obtaining per-property sales prices from land registry data (Bomare & Le Guern Herry, 2022; Johannesen et al., 2022). It is unclear from land registry data what the price of a property is that is part of a portfolio transaction, and that allows for the possibility of mispricing. In addition, qualitative findings show that money launderers avoid secrecy jurisdictions to avoid the attention of authorities when they pay for the property partially in cash, and thus pay less than market value (Teichmann, 2017; Teichmann, 2018). There may ultimately be a secrecy jurisdiction behind the purchase of the property, but the financing is not routed through a secrecy jurisdiction (Teichmann, 2018). Therefore, it is expected that a secrecy jurisdiction is rarely mentioned in the deed of the transaction if a housing unit transaction is done in a portfolio deal structure, since findings of qualitative research show that a secrecy jurisdiction is specifically not used when deviation from the market price, and thus mispricing, is the motivation.

3. METHODOLOGY & DATA

This section first discusses the methodology and then the data that is entered into the models to gather relevant knowledge. The methodology section explains how the methods fit the research question, and the data section explains how the data fit the methods.

3.1 Methodology

Exploratory data analysis

Data exploration is the first step in uncovering the characteristics of the variables of interest in the data set and the initial patterns. The exploration of the determinants of residential real estate purchases by offshore companies at the level of housing units is new in the Dutch context but has already been performed for the United Kingdom. Therefore, parts of the research by Bomare & Le Guern Herry (2022) are used in this study to effectively investigate both variables of interest for the research question. As described in the second chapter, the authors begin with a descriptive table of the data with average characteristics of the transactions. Insight into secrecy and non-secrecy jurisdictions is provided by the inclusion of a top-five table on the use of secrecy or non-secrecy jurisdictions, explaining the number of transactions and the total amounts invested. In addition, the authors visualize the origin of transactions in a graph of amounts invested over time through secrecy and non-secrecy jurisdictions (Bomare & Le Guern Herry, 2022). This study will use similar graphs and tables to map portfolio transactions. Therefore, the exploratory data analysis will be conducted using variables created in the statistical software Stata (version 17.0) and charts and tables created in Excel and Stata.

Binary logistic regression analysis

A binary logistic regression is performed using the statistical software Stata (version 17.0) to determine whether there is an association between secrecy jurisdiction and a portfolio transaction at a housing unit level. The investor's decision to engage in a portfolio transaction is based on utility maximization behavior. People choose the option that maximizes their utility given any type of constraint they may have (DeMaris, 1995). As discussed in the second chapter, in the pre-purchase and purchase phases, the person decides which options maximize his or her utility for money laundering, tax evasion, or tax avoidance. In the pre-purchase phase and during the actual purchase phase, the person decides that the type of jurisdiction used for the transaction determines whether the purchase price per property is defined in the deed or not (Christensen, 2012; Teichmann, 2017, Teichmann, 2018). The basic formula for the binary outcome variable Y and the explanatory variable X is as follows (Abdulqader, 2017):

$$ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = \alpha + \beta x + \varepsilon \quad (1)$$

The left side of the formula shows the natural logarithm of the odds of Y, since the logistic regression model predicts the logit of Y from X. The right side of the formula shows the α as the y-intercept, β as the parameter of the slope, X as an explanatory variable, and ε as the standard error. In this study, not only the key independent variable is used, but also control variables are used. Therefore, the formula can be extended as follows (Abdulqader, 2017):

$$ln\left(\frac{\hat{p}}{1-\hat{p}}\right) portfolio\ transaction = \alpha + \beta_1\ secrecy\ jurisdiction + \beta_n\ control\ variables + \varepsilon \quad (2)$$

The dependent variable is the variable "portfolio transaction", the key independent variable is "secrecy jurisdiction", and the control variables include variables derived from the existing literature at the housing unit level, namely location characteristics, housing characteristics, and timing characteristics (Alstadsæter et al, 2022; Fernandez et al., 2016; Bomare & Le Guern Herry, 2022; Knobel & Meinzer, 2014).

To run a binary logistic regression, the basic assumptions must be met. The assumptions are (1) independence of errors, (2) absence of multicollinearity, (3) absence of highly influential outliers, and (4) linearity in the logit for continuous variables (Stoltzfuz, 2011). Independence of errors means that all observations, in other words, all housing units, are independent and not used repeatedly over the years. Each housing unit in this dataset is uniquely registered in the dataset with its own housing characteristics, regardless of whether it is part of a larger purchase. In addition, housing units are manually checked to ensure that they are not part of a repeat sale to meet this assumption. Table 3 in Appendix B provides the Spearman correlation matrix to verify that there is no multicollinearity among the categorical predictor variables in the model. Multicollinearity is undesirable because it implies that the predictors are correlated. A correlation coefficient between 0.4 and 0.6 is considered moderately correlated. A correlation coefficient with a magnitude between 0.7 and 0.9 is considered highly correlated (Dancey & Reidy, 2007). For this analysis, the highest correlation is -0.585, indicating a moderate correlation, and is found between secrecy jurisdiction and purchase after implementation CRS. All other independent variables have a correlation of 0.322 or less. Since the highest correlation coefficient falls into the moderate correlation category, there is no cause for concern and removal of the independent variable is not considered. Therefore, the second assumption is also met. The assumption of the absence of highly influential outliers is met because the variables used in the analysis are binary variables whose range cannot be less than 0 or greater than 1. The last assumption mentions linearity in the logit for continuous variables. However, this study has only binary variables, so the assumption is automatically met.

3.2 Data context

The data for this quantitative study are collected by the Dutch land registry. The official transfer of a housing unit takes place at a notary, followed by registration at and by the Land Registry. Therefore, the information in the dataset depends on what is mentioned in the deed. The dataset contains microdata on all housing units purchased by investors using an offshore company between 2010 and 2022. For each housing unit, information is provided on location (municipality), investor type, dwelling type, floor area, date of purchase, transaction price (total transaction price or applicable to a housing unit), secrecy jurisdiction, subject seat, and offshore company name. It is important to note that the data in the dataset refer to the population and not to a sample to contribute to the validity of this research.

Ethics are of great importance in this study. The Dutch land registry aims to handle privacy sensitive data carefully. A CSV file with data on at most the name of the offshore company, without data on the ultimate beneficial owner (if indicated in the deed) is provided by the Dutch Land Registry to conduct this research. Within this research, the names of offshore companies are not mentioned and information on individual transactions is not extracted to preserve the anonymity of the investor. This specific CSV file containing the data for this research is only accessible until September 2023. However, there is a main database containing all this information only accessible for the Dutch Land Registry.

3.3 Data selection

Between 2010 and 2022, a total of 5,235 residential units are purchased by investors using an offshore company. To ensure the validity of this study, it is important to measure what needs to be measured. Therefore, a measurable data selection is pursued, where one type of investor is selected in the dataset. Properties purchased by offshore investors are classified by investor type by the Dutch land registry. The investor types are owner-occupier, second home, private other, commercial, other, and unknown. Table 3 shows how the data are selected. In the case of owner-occupiers, a natural person buys the property and lives in it. However, in this dataset, the offshore country is listed but no further information on the legal entity is provided. This is explainable because an offshore company is by definition a legal entity, so this error is removed. In the case of a second home, a natural person purchases a second home but does not live in it. In the dataset, the offshore company is listed as a 'foundation' legal entity. This is an error as this type of investor is a natural person and not a legal entity. Therefore, the second home is removed from the dataset. For the category 'other', the dwelling is usually owned by a foundation/fund, church, or municipality. In the dataset, the observations are also listed as legal entities. However, this category has been removed because 'other' is too imprecise a description. The category 'unknown' means that the Dutch land registry cannot determine the type of investor. This is particularly the case for new build properties/apartments. In such cases, it is not always possible to link the cadastral parcel to the property with 100% certainty. This category is also removed because unknown indicates ambiguity. The

last category is the commercial category. Commercial is a legal form with legal personality, which is in fact referred to in the dataset as a foreign legal entity. This foreign legal entity is a public limited company - like the Dutch NV - or a private limited company - like the Dutch BV. The commercial group is the group of interest to which most of the dwelling units in the dataset are also assigned. This leaves a total of 4,313 housing units to be examined. However, due to missing information in the control variables used in the analysis, 847 observations have to be dropped. The first table in Appendix B provides more information on the process of deleting missing observations. Therefore, the analysis is carried out on a total of 3,466 housing units.

Table 3 Data selection. Source: Dutch Land Registry, 2023.

Data selection	**Housing units**
All investor types	5,235
Owner-occupier	- 3
Second home	- 1
Private other	- 1
Other	- 422
Unknown	- 495
Commercial	**4,313**
Missing information	-847
Total	**3,466**

3.4 Variable selection

Portfolio transaction

The dependent variable indicates whether the dwelling is part of a portfolio transaction or not. In the deed, the purchase price may not be attributable to a single property (Johannesen et al., 2022). In the Dutch Land Registry dataset, this is indicated as 'reference to other properties'. It may also have been agreed that movable assets such as a car, machinery or other inventory were included in the transaction price. Therefore, it is possible that in the cadastral registration, the traded real estate objects do not refer to an unambiguous purchase price for a real estate object. For example, the deed indicates that two shops with eight apartments on the first floor together cost 2,300,000 euros, but it does not indicate what each apartment costs within the transaction (CBS, 2023). In other words, a portfolio transaction. The variable that distinguishes between the two possibilities is called "housing unit part of portfolio transaction" and is a dummy variable that distinguishes between the housing unit being part of a portfolio transaction (1) and the housing unit not being part of a portfolio transaction (0). In total, 3,049 housing units are part of a portfolio transaction and 417 housing units are not part of a portfolio transaction. Table 4 shows the frequency table regarding the housing units that are part of a portfolio transaction.

Table 4, Frequency table of housing units that are part of portfolio transaction. Source: Dutch Land Registry, 2023.

Housing unit part of portfolio transaction	Frequency	Percentage	Cumulative
No	417	12.0	12.0
Yes	3,049	88.0	100.0
Total	3,466	100.0	

Secrecy offshore jurisdiction

The key independent variable provides information on whether or not an offshore secrecy jurisdiction is used to purchase the housing unit. Based on the literature, it is possible to filter out secrecy jurisdictions from the dataset using information from the Tax Justice Network (Christensen, 2012). The first table in Appendix A provides information on the secrecy score recorded by the Tax Justice Network by jurisdiction for the years 2018, 2020, and 2022. Note in the table that new jurisdictions are added each year. The Tax Justice Network produces a ranking of the jurisdictions that do the best job of helping individuals hide their finances from the law (Tax Justice Network, 2022). The second table in Appendix A provides information on the frequencies and adhering percentages for all jurisdictions used to purchase residential real estate in the Netherlands between 2010 and 2022. In total, 27 different offshore jurisdictions are used. To achieve this result, the variable offshore country is complemented with the information from the variable subject seat - location of the company - to complete the missing information for twelve observations within the variable offshore jurisdiction. There are two cases that require verification. The first case is the country United Arab Emirates, for which the subject seat in the dataset is found to be Dubai for all observations. The second case concerns the Channel Islands country, which involves multiple jurisdictions, Jersey, and Guernsey - with Alderney and Sark being dependencies of Guernsey. Jersey is found to be the subject seat in all observations. The jurisdictions in the first table of Appendix A with a secrecy score greater than 70 in all three years are selected to be defined as secrecy offshore jurisdictions. The third table of Appendix A shows calculation of the average secrecy score of each offshore jurisdictions used to purchase a housing unit in the Netherlands between 2010 and 2022. The jurisdictions in the dataset that are filtered out as secrecy offshore jurisdictions are Anguilla (3 housing units), United Arab Emirates - Dubai (3 housing units), Liechtenstein (8 housing units), Panama (2 housing units), Switzerland (14 housing units), Seychelles (4 housing units), Belize (3 housing units), Aruba (2 housing units), Curacao (52 housing units), Marshall Islands (1 housing unit), Mauritius (4 housing units), and Cayman Islands (1 housing unit). The jurisdiction British Virgin Islands (13 housing unit) has a secrecy score above 70 in two out of three years, but the average score is above 70. Therefore, this jurisdiction is also filtered out as an offshore secrecy jurisdiction. It should be noted that the dataset from the Dutch land registry covers residential property purchases between 2010 and 2022. For the years 2010, 2012, 2014 and 2016, no information is available on the secrecy index score (Tax Justice Network, 2022). Therefore, to contribute to the validity of this study, the

decision is made that the average over all three measurement years must be 70 or higher to be filtered out as an offshore secrecy jurisdiction. The cutoff of 70 is chosen based on the categorization options of the Tax Justice Network, which are <50, 50-60, 60-70, and >70 (Tax Justice Network, 2022). If more categories are used, at least one category ends up with less than 30 observations, which is not preferable for the binary logistic regression analysis. The key independent variable used in the analyses that distinguishes between a secrecy score below 70 (0) or 70 and above (1) is called "secrecy offshore jurisdiction" and is a dummy variable. A total of 110 housing units are purchased by a commercial investor using a secrecy offshore jurisdiction, and 3,356 housing units are purchased by a commercial offshore investor not using a secrecy offshore jurisdiction. Table 5 shows the frequency table for secrecy offshore jurisdictions.

Table 5 Frequency table of secrecy offshore jurisdiction. Source: Dutch Land Registry, 2023.

Secrecy offshore jurisdiction	Frequency	Percentage	Cumulative
No	3,356	96.8	96.8
Yes	110	3.2	100.0
Total	3,466	100.0	

Control variables

The control variables at the housing unit level for the analyses to answer the second and third sub-questions are based on the variables listed in Table 2, which are found to be determining characteristics for a housing unit purchased by an offshore company. However, not all variables listed in Table 2 are found in the dataset. For example, there is no information on whether the housing unit is luxury or not, and the purchase price is not reported for each housing unit as it could be part of a portfolio transaction. Table 6 shows a summary of the control variables used in the analyses of this research.

Table 6 Control variables. Source: Dutch Land Registry, 2023.

Housing characteristics	Time	Municipality characteristics
Apartment	Purchase after implementation CRS	Municipality of Amsterdam
Usable space <40 m2		

The variable apartment is a dummy variable that distinguishes between apartment (1) and no apartment (0). The variable is constructed from the housing type variable in the dataset. In the current literature, there is evidence that investors using an offshore company tend to invest in apartments (Alstadsæter et al. 2022; Fernandez et al., 2016). Moreover, including all housing types - terraced houses, corner terraced houses, semi-detached houses, detached houses and other - would result in (too) few observations per category. Usable space in the dataset is a continuous variable for which a dummy variable is created. A distinction is made between a usable space of 40 m2 or >40 m2 (1) and a usable

space of <40 m2 (0). In the existing literature, there is evidence that investors who use an offshore company to buy residential real estate tend to invest in a global city, which in the case of the Netherlands is Amsterdam (Fernandez et al., 2016). Therefore, the starting point is to look at what the average m2 is in Amsterdam, which is the lowest compared to the rest of the Netherlands and is 40m2 (CBS, 2018). Thereafter, the variable is checked for outliers based on the CBS categories for usable space conform the NEN2580 before it is transformed to a dummy variable (CBS, 2023). Two housing units with 1 m2 of usable space were removed from the dataset, and zero housing units were found to have more than 10,000 m2 of usable space. The variable municipality of Amsterdam is obtained from a variable that mentions all municipalities in the Netherlands and is a dummy variable that distinguishes between a housing unit located in the municipality of Amsterdam (1) and a housing unit not located in the municipality of Amsterdam (0). The implementation of the CRS is a crucial event in the literature for investors with an offshore company in terms of anonymity and the exchange of financial information for tax purposes between authorities, excluding real estate (Knobel & Meinzer, 2014; Bomare & Le Guern Herry, 2022). In the Netherlands, the common reporting standards (CRS) were implemented on January 1, 2016 (Overheid.nl, 2021). Therefore, a variable is created based on the variable indicating the day-month-year, coded to year, and then split into pre-CRS implementation from 2010 to 2015 (0) and post-CRS implementation from 2016 to 2022 (1).

Table 2 in Appendix B provides information on the descriptive statistics, for which the mean, standard deviation, range, and description are determined for each variable. It is important to note that this dataset contains population data of commercial investors using an offshore company, from which only missing variables and errors are removed. The population data of commercial investors includes 4,313 housing units, and the sample data of commercial investors includes 3,466 housing units, which is approximately 80% of the population data.

4. RESULTS & DISCUSSION

4.1 Housing unit level data on secrecy jurisdiction and portfolio transaction

In this section, the exploratory data analysis is performed. As discussed in the methodology section, the exploratory data analysis is performed with variables created in Stata, and graphs and tables created in Excel or Stata.

Table 1 in Appendix C shows a comprehensive descriptive statistics table with information on the distribution of the 3,466 housing units purchased by a commercial investor using an offshore company between 2010 and 2022. It is noteworthy that 88% of all the housing units purchased between 2010 and 2022, which is 3,049 housing units, are part of a portfolio transaction. The results also show that 3.2% of the total number of housing unit purchases between 2010 and 2022, which is 110 housing units, are made through a secrecy jurisdiction. In this context, only 1.5% of the housing units (45 housing units) are part of a portfolio transaction, and 15.6% of the housing units (65 housing units) are not part of a portfolio transaction. Furthermore, it is very striking that in total 97.3%, or 3,371 housing units, are acquired after the implementation of the Common Reporting Standards (CRS) in 2016. Of this number, 3,012 housing units are part of a portfolio transaction.

Table 2 in Appendix C shows the top five offshore jurisdictions through which commercial investors purchase residential real estate between 2010 and 2022 in terms of purchase volume, separating secrecy jurisdictions from non-secrecy jurisdictions. The results show that the number one secrecy jurisdiction is most closely associated with the Netherlands: Curacao, with 52 residential purchases between 2010 and 2022. The most popular non-secrecy jurisdiction is Luxembourg with 3,313 housing unit purchases between 2010 and 2022. Three out of five non-secrecy jurisdictions are located in European countries (Luxembourg, Bulgaria, Cyprus).

Table 3 in Appendix C shows all offshore jurisdictions used to purchase housing units through portfolio transactions between 2010 and 2022, by volume and type of jurisdiction. The results show that the most popular secrecy jurisdiction remains Curacao with 30 housing unit purchases between 2010 and 2022. The most popular non-secrecy jurisdiction remains Luxembourg with 2,983 residential unit purchases between 2010 and 2022, and four of the seven non-secret jurisdictions are located in European countries (Luxembourg, Bulgaria, Cyprus, Malta and Ireland).

Figure 1 in Appendix C shows the number of purchases of housing units by year, visualized by the volume of all transactions, of all housing units that are part of a portfolio transactions, and of all offshore jurisdictions between 2010 and 2022. The x-axis indicates the purchase year, from 2010 to 2022, and the number of residential units acquired ranging from 0 to a maximum of approximately 400 is shown

on the y-axis. The total number of housing unit purchases per year is indicated by an orange line, the total number of housing unit purchases that are part of a portfolio transaction is indicated by a blue line, and the total number of housing units purchased through an offshore jurisdiction is indicated by a gray line. Remarkably, the total number of homes purchased per year is almost identical to the total number of housing units being part of a portfolio transactions purchase per year, with an outlier of about 200 housing units that are not part of a portfolio transaction in 2019. It is also noteworthy that between 0 and 16 housing units are purchased through a secrecy jurisdiction each year, and that the gray line remains fairly constant from 2010 to 2022 with no major outliers.

Table 4 in Appendix C shows the top five municipalities in which housing units are purchased by offshore commercial investors between 2010 and 2022 in terms of purchase volume, separating housing units that are part of a portfolio transaction from housing units that are not part of a portfolio transaction. The results show that the number one municipality where housing units are purchased that are part of a portfolio transaction is Amsterdam with 1,692 housing purchases between 2010 and 2022. The most popular municipality where housing units are purchased that are not part of a portfolio transaction is Groningen with 212 housing purchases between 2010 and 2022. Remarkably, regardless of the fact that the housing unit is part of a portfolio transaction or not, the top five consists of three municipalities located in the Randstad (Amsterdam, Rotterdam, The Hague).

4.2 Influence of secrecy jurisdiction on portfolio transaction

In this section, a regression analysis is performed. As discussed in the methodology section, a binary logistic regression is performed, for which all the assumptions are met. The third table in appendix A shows the results of the chi-squared test for each combination of an independent/control variable with the dependent variable. In all cases, the test proves with $p < 0.001$ (Fisher's exact $p < 0.001$) that there is a difference between the two groups derived from the dependent variable "housing unit is part of portfolio transaction". Table 7 shows the output of the binary logistic regression. The pseudo R-squared indicates a value of 0.192, which means that 19% of the variance of whether a housing unit is part of a portfolio transaction or not is explained by the model. The variable secrecy offshore jurisdiction has a p-value of less than 0.01, which means that inferences can be made at a 99% confidence level, and that this variable contributes to the explanatory power of the model. The control variables apartment, usable space 40 m2 and > 40 m2, municipality of Amsterdam, and purchase after implementation CRS are also significant with a p-value of less than 0.01, which means that inferences can be made at a 99% confidence level, and that these variables contribute to the explanatory power of the model. A discussion of the results will only be provided for the key independent variable, which is the variable secrecy jurisdiction. The odds ratio of the variable secrecy jurisdiction is 0.143, indicating that, on average, the probability of a commercial investor purchasing a housing unit without defining the individual purchase price (because the housing unit is part of a portfolio transaction), decreases when the transaction is

conducted through a secrecy offshore jurisdiction, compared to a non-secrecy jurisdiction, at a 99% confidence level. Furthermore, if a commercial investor uses a secrecy offshore jurisdiction, then the probability that this investor purchases a housing unit without defining the individual purchase price (because the housing unit is part of a portfolio transaction) is 85.7% lower compared to the probability that a housing unit price is defined (because the housing unit is not part of a portfolio transaction). Table 5 in Appendix C shows the output of the binary logistic regression in three steps. The first step shows only the independent variable in relation to the dependent variable, the second step adds the control variable Apartment and Usable space 40 m2 and > 40 m2, and the third step adds all control variables. The addition of control variables in the binary regression analysis serves as a robustness check (DeMaris, 1995). Throughout this process, the independent variable secrecy offshore jurisdiction remains significant.

Table 7 Binary logistic regression output. Source: Dutch Land Registry, 2023.

	Odds Ratio	**St. Err.**
Type of investment		
Secrecy offshore jurisdiction		
Yes – secrecy score 70 and > 70	0.143***	(0.039)
No – secrecy score < 70	reference	reference
Housing characteristics		
Apartment		
Yes	3.202***	(1.045)
No	reference	reference
Usable space 40 m2 and > 40 m2		
Yes – 40 m2 and > 40 m2	0.124***	(0.041)
No – < 40 m2	reference	reference
Location characteristics		
Municipality of Amsterdam		
Yes	4.978***	(0.719)
No	reference	reference
Purchase time characteristics		
Purchase after implementation CRS		
Yes – (2016-2022)	2.995***	(0.877)
No – (2010-2015)	reference	reference

St. Err. = Standard Error. ***p < 0.01 **p < 0.05 *p < 0.1 N = 3,466

4.3 Discussion of results

The exploratory analysis, which focuses on characterizing the determinants of secrecy jurisdictions and portfolio transactions, clarifies the understanding of their relationship. The results indicate that 88% of the housing units that are purchased between 2010 and 2022, which is 3,049 out of 3,466 housing units, are purchased as a part of a portfolio transaction. Furthermore, only 3.2% of all the purchased housing units between 2010 and 2022, which is 110 out of 3,466 housing units, are purchased through an offshore secrecy jurisdiction. These results already indicate the first signs of a possible negative association

between both variables, in line with the existing literature (Teichmann, 2017; Teichmann, 2018). In addition, this exploratory analysis has identified a key jurisdiction that is likely to have a major impact on the relationship between the two variables. The non-secrecy jurisdiction of Luxembourg accounts for 3,313 of the 3,466 housing units that are purchased by offshore investors in the Netherlands between 2010 and 2022. It also appears that Luxembourg accounts for 2,983 housing units that are purchased as a part of a portfolio transaction. Moreover, the top five municipalities preferred by the offshore commercial investor are three municipalities in the Randstad (Amsterdam, Rotterdam, The Hague), regardless of the fact that the housing unit is part of a portfolio transaction or not. Remarkably, most of the housing unit purchases took place in the municipality of Amsterdam, which is in line with existing literature indicating that offshore investors prefer to invest in an alpha city (Fernandez et al., 2016; Bomare & Le Guern Herry, 2022).

Based on the exploratory analysis, the following hypothesis can be answered: *"There has been a decrease in the use of a secrecy jurisdiction to purchase residential real estate over time."* The number of housing units purchased through a secrecy jurisdiction fluctuates between 0 and 16 each year, and that remains fairly constant from 2010 to 2022. Furthermore, 61 housing units are purchased through a secrecy jurisdiction before the implementation of the Common Reporting Standards in 2016, and 49 housing units are purchased after the implementation of the Common Reporting Standards, while 97.3% of all the housing units purchased between 2010 and 2022 are purchased after the implementation of the Common Reporting Standards. Thus, whereas housing units purchased through a secrecy jurisdiction is fairly constant over the years, the purchase of housing units through non-secrecy jurisdictions is remarkably higher in the years after the implementation of the Common Reporting Standards. So, if one looks at the bigger picture, the total of housing transactions among offshore commercial investors, there is a proportionate decrease in the use of a secrecy offshore jurisdiction after the implementation of the Common Reporting Standards, which is expected based on findings in the literature. As efforts are made to list countries that should be treated with more suspicion by notaries and banks from 2012 onwards, the use of secrecy jurisdictions is expected to decrease over the years. As of 2018, the existing literature on money laundering practices indicates that money launderers avoid secrecy jurisdictions to finance real estate purchases. They avoid these jurisdictions because they draw attention to the transaction, which is undesirable when money launderers want to bring in cash to purchase real estate at less than the market value (Teichmann, 2017; Teichmann, 2018).

The binary logistic regression analysis provides insight into the relationship between a secrecy jurisdiction and a portfolio transaction while controlling for other determinants at the housing unit level. The results show that the odds ratio of the variable secrecy jurisdiction is 0.143, indicating that, on average, the probability of a commercial investor purchasing a residential unit without defining the individual purchase price (because the residential unit is part of a portfolio transaction) decreases when

the transaction is conducted through a secrecy offshore jurisdiction compared to a non-secrecy jurisdiction, at the 99% confidence level. Furthermore, if a commercial investor uses a secrecy offshore jurisdiction, then the probability that this investor purchases a housing unit without defining the individual purchase price (because the housing unit is part of a portfolio transaction) is 85.7% lower compared to the probability that a housing unit price is defined (because the housing unit is not part of a portfolio transaction). However, the pseudo R-squared is 0.192, which means that 19% of the variance in whether a housing unit is part of a portfolio transaction or not is explained by the model. It indicates that rigorous conclusions cannot be drawn from this study. Possibly the control variable purchase price itself will account for an increase in the variance explained in the dependent variable. Other authors of quantitative studies have tried to include the variable purchase price in the analysis by disentangling portfolio transactions (Johannesen te al., 2022; Bomare & Le Guern Herry, 2022; Van Duyne & Soudijn, 2009). It is also notable that all control variables based on information from the literature, so the variable apartment, usable space 40 m2 and > 40 m2, municipality of Amsterdam, and purchase after implementation CRS are shown to contribute to the explanatory power of the model (Alstadsæter et al, 2022; Fernandez et al., 2016; Bomare & Le Guern Herry, 2022; Knobel & Meinzer, 2014).

Based on the binary logistic regression, the following hypothesis can be answered: *"There is a negative relationship at a housing unit level between the use of a secrecy jurisdiction and the housing unit being part of a portfolio transaction, when controlling for relevant variables."* The results of the binary logistic regression show evidence of a negative relationship at a housing unit level between the use of a secrecy jurisdiction and the housing unit being part of a portfolio transaction, controlling for relevant variables. However, the results should be interpreted with caution since only 19% of the variance in the dependent variable is explained by the model. On the other hand, these findings are consistent with the existing quantitative studies on money laundering and tax fraud, as they show that money launderers avoid a secrecy jurisdiction when purchase price mispricing is pursued (Teichmann, 2011; Teichmann 2018).

5. CONCLUSION, DISCUSSION & RECOMMENDATIONS

5.1 Conclusion

So far, the Dutch Land Registry does not have a monitoring role in following the guidelines of the Money Laundering and Terrorist Financing Act (Wwft). However, the Dutch Land Registry may be able to provide a valuable service to society if the signals of money laundering are made identifiable so that data extraction on determinants in a dataset can be applied. The scientific gap in knowledge is that no quantitative research has yet been conducted on the relationship between a secrecy jurisdiction and property mispricing. This study contributes to the existing qualitative statement by providing quantitative evidence on whether the use of a secrecy jurisdiction is related to a possibility of mispricing, which is addressed in this study as whether or not the purchase of a Dutch housing unit is part of a portfolio transaction, as it disguises the price per property. Therefore, the research question of the study is as follows: *What is the relationship between the use of a secrecy jurisdiction by a commercial offshore investor and whether or not the Dutch housing unit purchase is part of a portfolio transaction?*

From the binary logistic regression result, no firm conclusions can be drawn because only 19% of the variance in whether a housing unit is part of a portfolio transaction or not is explained by the model. In addition, 3,313 of the 3,466 housing purchases by commercial offshore investors between 2010 and 2022 are made via the offshore jurisdiction of Luxembourg. Luxembourg has a secrecy score of 56.2 and therefore does not fall into the category secrecy jurisdiction (secrecy score of 70 or higher) of this study. If Luxembourg did fall into the secrecy jurisdiction category, the relationship between the use of a secrecy jurisdiction by a commercial offshore investor and whether or not the Dutch housing unit purchase is part of a portfolio transaction might be positive instead of negative. Therefore, the results of the binary regression analysis serve as an encore to provide insight into the investment patterns of these commercial investors. However, it can still be concluded that, between 2010 and 2022, offshore commercial investors prefer an offshore company with a secrecy score lower than 70, as only 3.2% of properties, or 110 out of 3,466 properties, are purchased through an offshore secrecy jurisdiction. It can also be concluded that offshore commercial investors prefer not to record the price of the residential unit in the deed by engaging in a portfolio transaction instead of having the purchase price of the property recorded in the deed between 2010 and 2022, as 88% of the residential units purchased between these years, or 3,049 out of 3,466 residential units, are part of a portfolio transaction. Although it is not known from the housing unit purchases in the dataset where actual tax fraud and money laundering takes place, both conclusions are consistent with mainly the qualitative studies based on interviews with money launderers in the real estate sector by Teichmann (Teichmann, 2017; Teichmann, 2018). Secrecy jurisdictions are hardly used by offshore investors between 2010 and 2022 to purchase housing units, which is seen in Teichmann's qualitative research as an effort to minimize the suspiciousness of the transaction to the notary (Teichmann, 2017; Teichmann, 2018). At the same time, between 2010 and

2022, the vast majority of housing purchases are part of a portfolio transaction, whereby the price per property cannot be traced. This may indicate an opportunity to introduce cash into the purchase of real estate because the deviation of the sales price from the market price cannot be traced, which, according to the results of Teichmann's qualitative research, is the aim of a money launderer who wants to introduce cash into the legal circuit undetected in the purchase phase of real estate (Teichmann, 2017; Teichmann, 2018).

5.2 Discussion

This study presents a global research analysis by combining theory with data on money laundering and tax evasion. The quantitative analysis is carried out on 82% of the population of commercial investors in offshore companies who invested between 2010 and 2022, which does not necessarily indicate a major limitation. However, this research is limited in the sense that investors using an offshore company appear to be significantly involved in portfolio transactions, which prevents the inclusion of the sale price in the analyses, as prices do not always uniquely relate to each property in the dataset. If the data on portfolio transactions is removed, there would be a sample of 417 transactions left to examine relative to the population. The results would therefore be less representative to examine the investment patterns of commercial investors using an offshore company to purchase residential real estate.

Another point of discussion, and therefore mentioned already in the introduction, is that the variables used in this research to uncover the suspicion of money laundering and tax fraud are not backed up with data on transactions with actual money laundering and tax fraud cases. While a secrecy score of 70 or higher should be noticed by notaries as being suspicious, it remains unclear whether these are indeed the jurisdictions for which money laundering and tax fraud takes place. This discussion point leads to Luxembourg having received an average secrecy score of 56.2 from the Tax Justice Network between 2018 and 2022. It remains unclear whether this jurisdiction is ‘non-secret’ enough to be passed with less suspicion by the notary. However, since it is a commonly used jurisdiction among offshore commercial investors in the Netherlands between 2010 and 2022 to purchase housing, one might suggest that notaries are relatively lenient in judging this offshore jurisdiction. More information on the tax authorities' secrecy ratings could also help to provide more robust evidence of the use of secrecy jurisdictions in this dataset. The secrecy scores given to jurisdictions by the Tax Justice Network before 2018 do not exist. For example, if Luxembourg would have a secrecy score of 70 or higher between 2010 and 2017, this jurisdiction would most likely change the results of the binary logistic regression.

Furthermore, this research raises implications for policy as an improved understanding of the subject is at hand. To provide the Dutch Land Registry with a useful dataset to potentially find the signals of money laundering through data extraction, it is important that the purchase price per property can be determined. It can be concluded that for 88% of the purchased properties in the dataset containing

commercial offshore company residential purchases between 2010 and 2022, the purchase price is not known, and this gives room for mispricing and thus possible money laundering. As indicated in the existing literature, better recording of data and thus recording the actual price, rather than an estimate per property, will help in doing sound research and ultimately pursuing knowledge-based policy making (Van Duyne & Soudijn, 2009).

5.3 Recommendations

For further research, it is advisable to further identify the possible signals of money laundering and tax fraud in the context of commercial offshore companies investing in real estate. It may be interesting to investigate why offshore companies from Luxembourg invest in so many residential properties in the Dutch housing market and whether their motive is not limited to tax savings. It is possible that this (non-secret) jurisdiction serves as a cover to disguise the true secrecy jurisdiction behind the deal, which Teichmann has documented in his qualitative research following responses from interviews with money launderers in real estate regarding their view on non-secrecy jurisdictions (Teichmann, 2018). It is also advisable, as long as there is a lack of transparency in the determination of the price per property, to try to define the price per property when conducting quantitative research. Perhaps the predicted price could be compared with the WOZ value to see if there is a deviation of more than 30% from the market value to find stronger possible signals of money laundering and tax fraud in real estate (Teichmann, 2017; Teichmann, 2018).

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APPENDIX A: FIGURES & TABLES FOR VARIABLE SPECIFICATIONS

Table 1 Secrecy score of jurisdictions in 2018, 2020 and 2022. Source: Tax Justice Network, 2022.

2018		2020		2022	
Jurisdiction	**Secrecy Score**	**Jurisdiction**	**Secrecy Score**	**Jurisdiction**	**Secrecy Score**
Vanuatu	88.6	Maldives	79.8	Vietnam	80.9
Antigua and Barbuda	86.9	Angola	79.9	Angola	79.5
Bahamas	84.5	Algeria	79.6	Bolivia	79.3
Paraguay	84.3	Bolivia	79.1	United Arab Emirates	79.2
Brunei	84.0	Jordan	78.3	Algeria	79.1
Arab Emirates (Dubai)	83.8	Brunei	78.3	Puerto Rico	78.3
Maldives	81.1	Liberia	78.2	St. Kitts and Nevis	77.2
Bolivia	80.3	Anguilla	78.2	Antigua and Barbuda	77.0
Kenya	80.0	United Arab Emirates	77.9	Curacao	76.0
Thailand	79.9	Turks and Caicos Islands	77.8	Vanuatu	76.0
Liberia	79.7	Paraguay	77.5	Sri Lanka	75.8
Liechtenstein	78.3	Qatar	77.0	Turks and Caicos Islands	75.7
St. Lucia	78.3	Vanuatu	76.3	Bahamas	75.5
Bahrain	77.8	Cayman Islands	76.1	Anguilla	75.5
Samoa	77.6	Antigua and Barbuda	76.1	Maldives	75.2
Anguilla	77.5	Kenya	76.0	Belize	75.0
Monaco	77.5	Bahamas	75.4	Guatemala	74.8
Montserrat	77.5	St, Kitts and Nevis	75.2	Bangladesh	75.0
Dominica	77.3	Liechtenstein	75.0	Kuwait	74.6
Puerto Rico	77.2	Gambia	74.9	Montserrat	73.8
Grenada	77.1	Curacao	74.8	Barbados	73.7
Turks and Caicos Islands	76.8	Samoa	74.6	Qatar	73.6
St. Kitts and Nevis	76.7	Montserrat	74.6	Monaco	73.5
Gambia	76.6	Vietnam	74.3	Oman	73.5
Panama	76.6	Switzerland	74.0	Brunei	73.3
Switzerland	76.5	Barbados	74.0	Liberia	73.3
Aruba	76.0	Belize	73.9	Samoa	73.0
Taiwan	75.8	US Virgin Islands	73.9	Panama	72.7
Seychelles	75.2	Dominica	73.7	Gambia	72.7
Belize	75.2	Guatemala	73.5	Cayman Islands	72.6
Curacao	74.8	Aruba	73.3	St. Lucia	72.2
Cook Islands	74.6	Thailand	73.3	Liechtenstein	72.2
Barbados	73.8	Puerto Rico	73.1	Seychelles	72.2
Tanzania	73.4	Bermuda	72.7	Rwanda	72.1
Guatemala	73.1	Bangladesh	72.7	Jordan	71.9
US Virgin Islands	73.1	Sri Lanka	72.2	Venezuela	71.9
Bermuda	73.0	Panama	71.9	US Virgin Islands	71.9
Marshall Islands	72.9	p	71.5	Namibia	71.3
Guernsey	72.5	Cameroon	71.5	Marshall Islands	71.3
Mauritius	72.3	Egypt	71.4	Aruba	70.9
Cayman Islands	72.3	British Virgin Islands	71.3	British Virgin Islands	70.7
Lebanon	72.0	St. Lucia	71.0	Guernsey	70.7
Malaysia (Labuan)	71.9	Tanzania	70.8	Fiji	70.3
Dominican Republic	71.9	Guernsey	70.7	Guam	70.3
Hong Kong	71.0	Kuwait	70.6	Cameroon	70.3
Gibraltar	70.8	Grenada	70.5	Bermuda	70.1
St. Vincent and the Grenadines	70.0	Seychelles	70.4	Mauritius	70.1
Saudi Arabia	69.9	Monaco	70.3	Switzerland	70.0
Ukraine	69.2	Cook Islands	70.3	Thailand	69.8
Botswana	68.7	Nigeria	70.2	Cook Islands	69.8
British Virgin Islands	68.7	Marshall Islands	70.1	American Samoa	69.3
Costa Rica	68.7	Malaysia	69.5	Saudi Arabia	69.0
Venezuela	68.5	Gibraltar	69.5	Trinidad and Tobago	69.0
Macao	68.3	Venezuela	69.0	Kosovo	68.9
Turkey	68.0	Morocco	67.8	Tanzania	68.8
Singapore	67.1	Netherlands	67.4	Egypt	68.3
Nauru	66.7	Saudi Arabia	66.7	Bahrain	68.2
Andorra	66.0	Tunisia	66.5	United States	67.4

Netherlands	66.0
Romania	65.5
Jersey	65.5
Philippines	65.4
Trinidad and Tobago	65.3
San Marino	64.0
Russia	64.0
Isle of Man	63.6
Israel	63.3
Montenegro	63.1
Ghana	61.8
Chile	61.6
Indonesia	61.5
Cyprus	61.3
Uruguay	60.8
Macedonia	60.7
Malta	60.5
Japan	60.5
China	60.1
Iceland	59.9
United States	59.8
Croatia	59.3
Germany	59.1
South Korea	59.0
Luxembourg	58.2
Greece	57.9
Latvia	57.4
Poland	57.4
New Zealand	56.2
South Africa	56.1
Australia	55.9
Slovakia	54.9
Canada	54.8
Hungary	54.7
Portugal (Madeira)	54.7
Mexico	54.4
Bulgaria	54.2
Czech Republic	52.9
Finland	52.7
Denmark	52.5
India	51.9
France	51.6
Norway	51.6
Australia	51.1
Estonia	50.9
Ireland	50.6
Italy	49.5
Brazil	49.0
Spain	47.7
Lithuania	46.8
Sweden	45.5
Belgium	44.0
United Kingdom	42.4
Slovenia	41.8

Hong Kong	66.4
St. Vincent and the Grenadines	65.7
Jersey	65.5
Taiwan	65.5
Macao	65.0
Singapore	65.0
Ukraine	64.9
Isle of Man	64.7
Trinidad and Tobago	64.7
Kazakhstan	64.5
El Salvador	64.1
Macedonia	64.0
Lebanon	64.0
Rwanda	63.0
United States	62.9
Japan	62.9
Philippines	62.9
Romania	62.6
Bahrain	62.4
Costa Rica	62.3
Botswana	62.2
Malta	61.8
South Korea	61.6
Cyprus	61.1
San Marino	60.5
Montenegro	60.0
Nauru	60.0
China	59.9
Turkey	59.5
New Zealand	59.2
Latvia	59.1
Dominican Republic	58.7
Israel	58.7
Andorra	58.3
Iceland	57.4
Russia	57.0
Uruguay	57.0
Peru	57.0
Austria	56.5
Colombia	56.5
South Africa	56.2
Canada	55.8
Chile	55.8
Poland	55.5
Luxembourg	55.5
Czechia	55.4
Croatia	55.1
Pakistan	55.0
Argentina	55.0
Portugal	54.0
Hungary	53.8
Mexico	52.8
Finland	52.1
Germany	51.7
Ghana	51.7
Brazil	51.7
Greece	51.5
Indonesia	51.1
Slovakia	50.9
Italy	50.4
Lithuania	50.3
Australia	50.1
France	49.9
Bulgaria	49.5
Ireland	48.1

Singapore	67.3
Philippines	67.1
Gibraltar	66.8
Kenya	66.7
St. Vincent and the Grenadines	66.5
China	66.5
Pakistan	66.3
Paraguay	66.2
Morocco	66.0
Grenada	65.9
Malaysia	65.8
Dominica	65.2
Isle of Man	65.0
Hong Kong	65.0
Nigeria	64.8
Dominican Republic	64.7
Netherlands	64.6
Lebanon	64.6
South Korea	63.8
Jersey	63.5
Japan	63.1
Macao	63.1
New Zealand	63.0
Kazakhstan	62.9
North Macedonia	62.0
Cyprus	61.5
Turkey	61.1
Montenegro	60.7
El Salvador	60.5
San Marino	60.4
Taiwan	60.1
South Africa	60.0
Chile	59.8
Russia	59.6
Tunisia	59.6
Romania	59.4
Israel	59.3
Nauru	59.1
Ukraine	58.9
Uruguay	58.0
Portugal	56.9
Botswana	56.8
Germany	56.7
Spain	56.6
Australia	56.1
Indonesia	55.8
Costa Rica	55.8
Latvia	55.3
Hungary	55.2
Luxembourg	55.0
Andorra	55.0
Italy	54.9
India	54.7
Austria	54.6
Malta	54.5
Albania	54.5
Serbia	54.4
Colombia	54.3
Peru	54.1
Norway	53.3
Slovakia	53.2
Croatia	53.1
Mexico	53.1
Greece	52.8
Bulgaria	52.8

India	47.8	Ghana	52.7
Ecuador	47.2	Belgium	52.5
United Kingdom	46.2	Ecuador	52.2
Sweden	45.6	Finland	51.8
Denmark	45.3	Canada	51.1
Belgium	45.0	Lithuania	51.0
Norway	44.3	Czechia	50.0
Spain	44.0	Brazil	49.1
Estonia	43.0	Argentina	49.1
Slovenia	37.5	Denmark	49.0
		France	47.9
		Ireland	47.2
		United Kingdom	47.2
		Poland	46.0
		Sweden	44.6
		Estonia	44.2
		Iceland	42.5
		Slovenia	35.9

Note: The table shows the secrecy score of the jurisdictions that do the most to help individuals hide their finances from the state of the law in 2018, 2020, and 2022 (Tax Justice Network, 2022). The secrecy score is a score between 0 and 100 that explains how much financial secrecy is allowed by the law of the jurisdiction, where 0 means no secrecy and 100 means complete secrecy. The secrecy score is based on 20 indicators, including banking secrecy, registration of company ownership, registration of trusts and foundations, transparency of limited partners, public access to company ownership, public access to annual company accounts, country-by-country reporting, publication of corporate tax, identification of legal entities, ability to administer taxes, avoidance of tax evasion, rigid personal income tax, judicial secrecy, availability of public statistics, number of harmful structures, and compliance with anti-money laundering standards (Tax Justice Network, 2022).

Table 2 Offshore country in dataset. Source: Dutch Land Registry, 2023.

Offshore country	**Frequency**	**Percentage**	**Cumulative**
American Samoa	1	0.03	0.03
Andorra	1	0.03	0.06
Anguilla	3	0.09	0.14
Aruba	2	0.06	0.20
Belize	3	0.09	0.29
Bonaire	2	0.06	0.35
British Virgin Islands	13	0.38	0.72
Bulgaria	6	0.17	0.89
Cayman Islands	1	0.03	0.92
Curacao	52	1.50	2.42
Cyprus	7	0.20	2.63
Ireland	3	0.09	2.71
Channel Islands (Jersey)	4	0.12	2.83
Liechtenstein	8	0.23	3.06
Luxembourg	3,313	95.59	98.64
Malta	2	0.06	98.70
Isle of Man	1	0.03	98.73
Marshall Islands	1	0.03	98.76
Mauritius	4	0.12	98.87
Panama	2	0.06	98.93
Seychelles	4	0.12	99.05
Saint Martin	1	0.03	99.08
Suriname	13	0.38	99.45
Trinidad and Tobago	1	0.03	99.48
Turkey	1	0.03	99.51
United Arab Emirates (Dubai)	3	0.09	99.60
Switzerland	14	0.40	100.00
Total	3,466	100.00	

Table 3 Calculation of the average secrecy score from the Tax Justice Network between 2018, 2020 and 2022 for every offshore jurisdiction used to purchase a housing unit in the Netherlands between 2010 and 2022. Source: Dutch Land Registry 2023, Tax Justice Network, 2022.

	Offshore jurisdiction	**Average Secrecy Score**	**Description**
1	American Samoa	69.3	American Samoa only appeared on the Tax Justice Network list in 2022.
2	Andorra	59.8	66 (2018), 58.3 (2020), 55 (2022)
3	Anguilla	77.0	77.5 (2018), 78.2 (2020), 75.5 (2022)
4	Aruba	73.4	76.0 (2018), 73.3 (2020), 70.9 (2022)
5	Belize	74.7	75.2 (2018), 73.9 (2020), 75.0 (2022)
6	Bonaire	-	Not mentioned as an offshore jurisdiction on the Tax Justice Network list.
7	British Virgin Islands	70.2	68.7 (2018), 71.3 (2020), 70.7 (2022)
8	Bulgaria	52.2	54.2 (2018), 49.5 (2020), 52.8 (2022)
9	Cayman Islands	73.7	72.3 (2018), 76.1 (2020), 72.6 (2022)
10	Curacao	75.2	74.8 (2018), 74.8 (2020), 76.0 (2022)
11	Cyprus	61.3	61.3 (2018), 61.1 (2020), 61.5 (2022)
12	Ireland	48.6	50.6 (2018), 48.1 (2020), 47.2 (2022)
13	Channel Islands (Jersey)	64.8	65.5 (2018), 65.5 (2020), 63.5 (2022)
14	Liechtenstein	75.2	78.3 (2018), 75.0 (2020), 72.2 (2022)
15	Luxembourg	56.2	58.2 (2018), 55.5 (2020), 55.0 (2022)
16	Malta	58.9	60.5 (2018), 61.8 (2020), 54.5 (2022)
17	Isle of Man	64.4	63.6 (2018), 64.7 (2020), 65.0 (2022)
18	Marshall Islands	71.4	72.9 (2018), 70.1 (2020), 71.3 (2022)
19	Mauritius	71.4	72.3 (2018), 71.8 (2020), 70.1 (2022)
20	Panama	73.7	76.6 (2018), 71.9 (2020), 72.7 (2022)
21	Seychelles	72.6	75.2 (2018), 70.4 (2020), 72.2 (2022)
22	Saint Martin	-	Not mentioned as an offshore jurisdiction on the Tax Justice Network list.
23	Suriname	-	Not mentioned as an offshore jurisdiction on the Tax Justice Network list.
24	Trinidad and Tobago	66.3	65.3 (2018), 64.7 (2020), 69.0 (2022)
25	Turkey	62.9	68.0 (2018), 59.5 (2020), 61.1 (2022)
26	UAE (Dubai)	80.3	83.8 (2018), 77.9 (2020), 79.2 (2022)
27	Switzerland	73.5	76.5 (2018), 74.0 (2020), 70.0 (2022)

APPENDIX B: FIGURES & TABLES FOR REGRESSION ASSUMPTIONS

Table 1 Data selection procedure. Source: Dutch Land Registry, 2023.

Data selection	Housing units
All investor types	5,235
Only commercial investor selected	- 922
Variable portfolio transaction (no/yes) without missing information	- 260
Variable purchase after CRS (no/yes) without missing information	- 0
Variable municipality of Amsterdam (no/yes) without missing information	- 37
Variable apartment (no/yes) without missing information	- 6
Variable usable space (m2) without missing information	- 542
Variable usable space (m2) without errors	- 2
Variable secrecy jurisdiction (no/yes) without missing information	- 0
Total	**3,466**

Table 2 Descriptive statistics. Source: Dutch Land Registry, 2023.

Variable name	Mean	SD	Range	Description
Dependent variable				
Portfolio transaction	0.880	0.325	0-1	1=housing unit part of portfolio transaction, 0=housing unit not part of portfolio transaction
Independent variable				
Secrecy offshore jurisdiction	0.032	0.175	0-1	1=yes secrecy score 70 and >70, 0=no secrecy score <70
Control variables				
Apartment	0.984	0.125	0-1	1=yes, 0=no
Usable space 40 m2 and > 40 m2	0.767	0.423	0-1	1=yes 40 m2 and > 40 m2, 0=no < 40 m2
Purchase after implementation CRS	0.973	0.163	0-1	1=yes (2016-2022), 0=no (2010-2015)
Municipality of Amsterdam	0.511	0.499	0-1	1=yes, 0=no

Table 3 Spearman correlation matrix. Source: Dutch Land Registry, 2023.

	Secrecy jurisdiction	Apartment	Usable space 40 m2 or > 40 m2	Purchase after implementation CRS	Municipality of Amsterdam
Secrecy jurisdiction	1.000				
Apartment	-0.188	1.000			
Usable Space 40 m2 or > 40 m2	0.096	-0.070	1.000		
Purchase after implementation CRS	**-0.585**	0.332	-0.088	1.000	
Municipality of Amsterdam	-0.004	0.102	-0.234	0.037	1.000

Table 4 Chi square. Source: Dutch Land Registry, 2023.

	Housing unit part of portfolio transaction						
Variable	**Yes**	**%**	**No**	**%**	**X^2**	**P-value**	**Fisher's exact**
Secrecy offshore jurisdiction							
Yes – secrecy score 70 and > 70	45	1.5	65	15.6	237.718	< 0.001	< 0.001
No – secrecy score < 70	3,004	98.5	352	84.4			
Apartment							
Yes	3,028	99.3	383	91.8	130.890	<0.001	<0.001
No	21	0.7	34	8.2			
Usable space 40 m2 and > 40 m2							
Yes – 40 m2 and > 40 m2	2,253	73.9	407	97.6	115.538	<0.001	<0.001
No – < 40 m2	796	26.1	10	2.4			
Purchase after implementation CRS							
Yes – (2016-2022)	3,012	98.8	359	86.1	221.784	<0.001	<0.001
No – (2010-2022)	37	1.2	58	13.9			
Municipality of Amsterdam							
Yes	1,692	55.5	79	18.9	196.101	<0.001	<0.001
No	1,357	44.5	338	81.1			

APPENDIX C: FIGURES & TABLES FOR OUTPUT ANALYSES

Table 1 Extensive descriptive statistics. Source: Dutch Land Registry, 2023.

Variable	**Housing units**	**Housing unit part of portfolio transaction**	
	Total	Yes	No
	100 (3,466)	88.0 (3,049)	12.0 (417)
Secrecy offshore jurisdiction			
Yes – secrecy score 70 and > 70	3.2 (110)	1.5 (45)	15.6 (65)
No – secrecy score < 70	96.8 (3,563)	98.5 (3,004)	84.4 (352)
Apartment			
Yes	98.4 (3,411)	99.3 (3,028)	91.9 (383)
No	1.6 (55)	0.7 (21)	8.2 (34)
Usable space 40 m2 and > 40 m2			
Yes – 40 m2 and > 40 m2	76.8 (2,660)	73.9 (2,253)	97.6 (407)
No – < 40 m2	23.3 (806)	26.1 (796)	2.4 (10)
Purchase after implementation CRS			
Yes – (2016-2022)	97.3 (3,371)	98.8 (3,012)	86.1 (359)
No – (2010-2022)	2.7 (95)	1.2 (37)	13.9 (58)
Municipality of Amsterdam			
Yes	51.1 (1,771)	1,692 (55.5)	18.9 (79)
No	48.9 (1,695)	1,357 (44.5)	81.1 (338)

Table 2 Top-five offshore jurisdictions for offshore housing unit purchases between 2010 and 2022 by volume of purchases and type of jurisdiction. Source: Dutch Land Registry, 2023.

Secrecy jurisdiction		Non-secrecy jurisdiction	
Jurisdiction	Number of purchases	Jurisdiction	Number of purchases
Curacao	52	Luxembourg	3,313
Switzerland	14	Suriname	13
British Virgin Islands	13	Cyprus	7
Liechtenstein	8	Bulgaria	6
Mauritius	4	Channel Islands (Jersey)	4

Table 3 All offshore jurisdictions used to purchase housing units through a portfolio transaction between 2010 and 2022, by volume and type of jurisdiction. Source: Dutch Land Registry, 2023

Secrecy jurisdiction		Non-secrecy jurisdiction	
Jurisdiction	Number of purchases	Jurisdiction	Number of purchases
Curacao	30	Luxembourg	2,983
British Virgin Islands/ Switzerland	4	Suriname	10
Belize	3	Channel Islands (Jersey)/ Cyprus	4
Liechtenstein/ Mauritius/ Anguilla/ Panama	1	Bulgaria/ Malta/ Bonaire	1

Figure 1 Number of housing unit purchases by year, visualized by volume of all transaction, of all housing units that are part of a portfolio transactions, and all offshore jurisdictions between 2010 and 2022. Source: Dutch Land Registry, 2023.

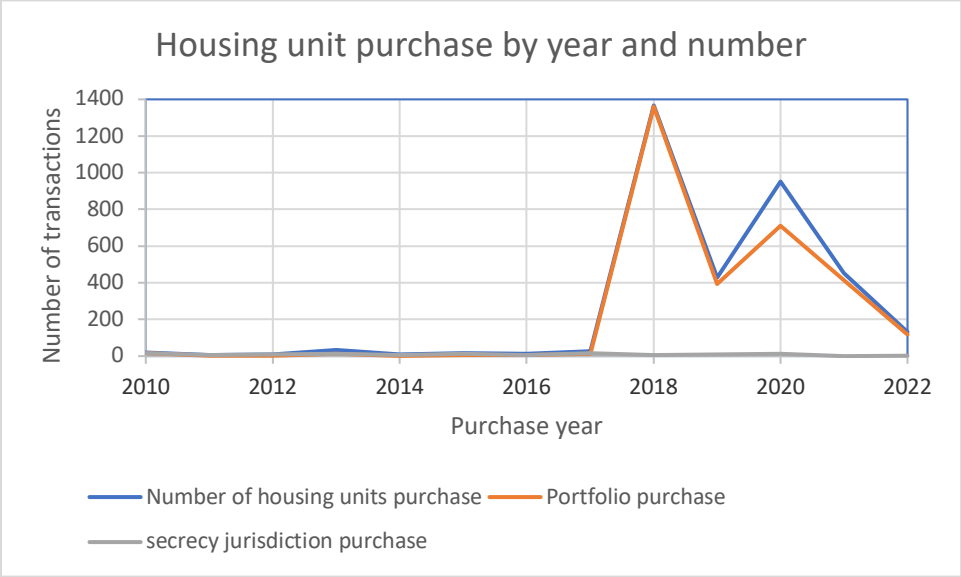

Table 4 Top-five municipalities for offshore housing unit purchases between 2010 and 2022 by volume of purchases and type of transaction. Source: Dutch Land Registry, 2023.

Housing unit part of portfolio transaction		Housing unit not part of portfolio transaction	
Municipality	Number of purchases	Municipality	Number of purchases
Amsterdam	1692	Groningen	212
Rotterdam	432	Amsterdam	79
The Hague	387	Rotterdam	16
Tilburg	285	The Hague	15
Helmond	84	Amstelveen	10

Table 5 Binary logistic regression output in three steps. Source: Dutch Land Registry, 2023.

	Step 1		*Step 2*		*Step 3*	
	Odds Ratio	**St. Err.**	**Odds Ratio**	**St. Err.**	**Odds Ratio**	**St. Err.**
Type of investment						
Secrecy offshore jurisdiction						
Yes – secrecy score 70 and > 70	0.081***	(0.0164)	0.123***	(0.0258)	0.143***	(0.0139)
No – secrecy score < 70	reference	reference	reference	reference	reference	reference
Housing characteristics						
Apartment						
Yes			6.947***	(2.1080)	3.202***	(1.045)
No			reference	Reference	reference	reference
Usable space 40 m2 and > 40 m2						
Yes – 40 m2 and > 40 m2			0.085***	(0.0274)	0.124***	(0.041)
No – < 40 m2			reference	reference	reference	reference
Location characteristics						
Municipality of Amsterdam						
Yes					4.978***	(0.719)
No					reference	reference
Purchase time characteristics						
Purchase after implementation CRS						
Yes – (2016-2022)					2.995***	(0.877)
No – (2010-2015)					reference	reference

St. Err. = Standard Error. ***p < 0.01 **p < 0.05 *p < 0.1 N = 3,466