Essays on the housing market

by

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Abstract

Housing represents the single most important asset, accounting for around 50% of global household wealth. At the household level, a house typically represents the largest asset most households will own through their lifetime. This is even more pronounced in emerging economies where household participation rates in real estate across the wealth distribution are higher than participation rates in financial assets. Most homes are purchased by means of a mortgage which typically constitutes the largest liability most households will have through their lifetime. Mortgages also make up a sizeable share of the asset base of banks. Moreover, the housing market is pivotal to the economy and the financial system, as illustrated by its central role in the Great Financial Crisis of 2007-2009. Despite this, the empirical housing literature in emerging markets is relatively underdeveloped relative to the literature in advanced economies. A major reason for this relates to the lack of detailed and reliable housing transaction data in emerging market economies. Leveraging a number of novel datasets, I explore two aspects of the housing market in Cape Town, South Africa, that are of academic and policy interest: foreign investment in the housing market and the discounts associated with home foreclosures.

I document sizeable foreign investment in the housing market in Cape Town between 2011 and 2018, showing that these investors sort into the wealthier suburbs in the city that have had historically large communities of foreign inhabitants. Despite these sizeable net inflows, foreign ownership, has in fact, decreased throughout the sample period, highlighting that foreign buyers are not crowding out local buyers. Turning to purchase and investment outcomes, I find that foreign buyers and sellers realize worse outcomes than local buyers and sellers, purchasing otherwise identical properties for a premium, leading to lower returns upon resale. This result can partly be explained by wealth effects and information asymmetries. I also highlight an important feature of foreign demand, so far overlooked by the existing literature: the tendency of foreign buyers to be cash buyers. I show that failing to control for the financing choices of the buyer leads to a sizeable underestimate of the foreign buyer premium driven by the fact that buyers who purchase properties using cash as opposed to a mortgage typically attract a sizeable discount.

In the following chapter, I examine the relationship between exchange rate depreciations and foreign non-resident investment in the housing market. I show that foreign non-resident transactions increase following exchange rate depreciations and are also increasing in the size of the depreciation. I find no evidence of similar effects for foreign born permanent residents in South Africa, highlighting that the exchange rate effect is linked to purchasing property in foreign currency and not to whether or not the buyer is a foreigner. I then use large and sudden exchange rate depreciations as a positive exogenous shock to foreign non-resident demand

to study the effect of foreign non-resident investment on house prices, leveraging an identification strategy that compares quality adjusted prices in geographically close suburbs that differ in their ex-ante attractiveness to foreign non-residents, and find a positive causal effect of foreign non-resident demand. While this may raise concerns about the impact of foreign non-resident demand on the affordability of homes for local buyers, the fact that foreign non-resident investment in housing appears to be counter-cyclical, increasing following large depreciations, suggests that these inflows may have important stabilizing effects on house prices.

Finally, I document the extent of home foreclosures in Cape Town and estimate the discounts that these properties sell for. Leveraging features of the institutional setting I study and the data I employ, I am able to provide a more complete characterization of the dynamics affecting foreclosure discounts by disentangling the foreclosure discounts when foreclosures sell at a foreclosure auction from the discounts that arise when these foreclosures sell in the private market outside of the auction. I find evidence that foreclosure discounts are substantial both in the private non-auction market and when sold at an auction. In the former, the discounts can be rationalized as a classic firesale discount driven by the financial distress of the seller. In the latter, I present evidence that limited competition at auctions driven by costs to participation could rationalize the foreclosure discounts at auctions, consistent with housing search theory. I also conduct an extensive robustness exercise to account for potential factors which could lead to an upward bias in the estimated foreclosure discount showing how various factors confound the true foreclosure discount.

Declaration

I, Allan Davids, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I empower the university to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Allan Davids

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Dedication

To all of the teachers who shaped my life.

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Chapter 1

Introduction

Real estate represents the single most important asset for households, with housing accounting for 55% of household wealth in developed countries and over 90% in emerging economies (Badarinza, Campbell and Ramadorai, 2016; Badarinza, Balasubramaniam and Ramadorai, 2019). Real estate also represents one of the most important asset classes in the modern economy, most clearly illustrated by it's pivotal role in the Great Financial Crisis (GFC) of 2008-09 (Mian, Sufi and Trebbi, 2015). Residential real estate in particular, has four key features which distinguish it from other types of assets.

Firstly, households typically purchase or rent a house to live in, and as a result, a house represents a home, in the most basic sense. Outside of the physical and psychological security a home brings (De Botton, 2008), homeownership is also typically associated with numerous benefits to households (Goodman and Mayer, 2018; Sodini et al., 2021), while losing one's home leads to numerous negative consequences for households (Currie and Tekin, 2015; Humphries et al., 2019; Guren and McQuade, 2020; Diamond, Guren and Tan, 2020). A home also has broader implications for the outcomes of children in adulthood. A recent research agenda studying the "Moving to Opportunity" programme in the United States, finds that after families are given the opportunity to move to a better neighbourhood, there is an improvement in inter-generational mobility (Chetty, Hendren and Katz, 2016; Chetty and Hendren, 2018*a*; Chetty and Hendren, 2018*b*).

Secondly, a house represents an asset. In particular, a house represents the single largest asset on a household's balance sheet.[1] This is true across advanced (Badarinza, Campbell and Ramadorai, 2016) and emerging economies (Badarinza, Balasubramaniam and Ramadorai, 2019).

[1] In South Africa, the total value of household wealth in housing in South Africa was sizeable, at around 99% of net national income (Chatterjee, Czajka and Gethin, 2021)

The role of housing collateral also has important implications for portfolio choice and allocation across the life-cycle (Cocco, 2005; Chetty, Sándor and Szeidl, 2017). As an asset, housing is also disproportionately more important in emerging markets like South Africa. Badarinza, Balasubramaniam and Ramadorai (2019) show that the participation rate for real estate are higher for households in emerging economies than in developed countries. For South Africa, the authors show that around 80% of households own some form of real estate, which is in line with participation rates in other emerging economies and higher than the participation rate in developed countries which stands at around 60%. From a macro perspective, Chatterjee, Czajka and Gethin (2021) show that in 2018, the total value of household wealth in housing in South Africa was sizeable, at around 99% of net national income, with owner-occupied housing representing 75% of net national income and tenant-occupied housing representing 24% of net national income. Furthermore, real estate represents a real asset (a durable asset which the owner has a right to possess and enjoy exclusively) as opposed to a financial asset, which only provides the owner with a claim to benefits from accrue from the ownership of an asset (Goetzmann, Spaenjers and Van Nieuwerburgh, 2021). This has numerous implications for asset pricing. Unlike financial assets, real estate is: traded infrequently, given households typically live in a home for many years; subject to search, whereby households need to exert effort to search for homes that meet their preferences; subject to negotiation, where the buyer and seller need to agree on a transaction price and; a private-value asset such that different potential buyers will typically be willing to pay different prices for the same home, based on their preferences. As a result, the market value of real estate is typically estimated with noise, unlike the market value of other financial assets.

Finally, houses are typically purchased using a mortgage. Much like the role of housing on the asset side of the household balance sheet, a mortgage typically represents the largest liability on household balance sheets, especially in advanced economies (Badarinza, Campbell and Ramadorai, 2016). Despite significantly lower participation rates for mortgages in emerging economies (Badarinza, Balasubramaniam and Ramadorai, 2019), the size of the mortgage market remains sizeable. For example, in South Africa, mortgages account for 46% of total liabilities in the household sector, the equivalent of 25% of net national income (Chatterjee, Czajka and Gethin, 2021). The discrepancy between high participation rates in real estate and low participation rates in the mortgage market can largely be explained by the large government sponsored housing programme in South Africa. Mortgages also account for a sizeable share of the asset base of banks, with mortgages making up 25% of the asset base of banks in South Africa.[2]

The housing market also represents the manifestation of decisions taken by households, be it

[2]Author's own calculations using SARB BA100 Balance Sheet data.

whether to rent a home or buy a home, where to buy a home, how large of a mortgage to take and how to negotiate with a potential seller. As a result, a study of the housing market also represents a study of the decisions households take in order to attain their objectives, or simply put, "household finance", a term coined by John Campbell in his 2006 American Finance Association Presidential Address (Campbell, 2006). The field of household finance represents one of the fastest growing and evolving fields of financial economics - Gomes, Haliassos and Ramadorai (2021) and Guiso and Sodini (2013) provide excellent overviews on the development of this literature. Despite this, the household finance literature in emerging market economies is under-developed relative to the literature in advanced economies, in a large part due to the lack of high-quality administrative data. Gaining a better understanding of household finance in emerging economies is important given it would test the external validity of the existing literature, given households in emerging market economies may be very different to households in developed economies in ways we do not yet understand and, given the fact that emerging economies have a large young population, many of whom will access and enter the housing market for the first time (Badarinza, Balasubramaniam and Ramadorai, 2019).

In South Africa, the housing market takes on additional significance given the historical legacy of segregation under Apartheid which still persists until today, the vast housing shortage in 1994 at the transition to democracy – with 12.5 million people without adequate housing (Franklin, 2020) – and the unprecedented scale of the government sponsored housing programme in the country, which has resulted in close to 3 million houses being provided to households.[3]

Apartheid, literally translated as "apartness", represented an ideology and system of institutionalized racism that existed in South Africa formally between 1948 and 1992. A key component of the apartheid regime was the institutionalization of racial segregation. Apartheid spatial planning was enacted through a range of legislation, most notably the Group Areas Act of 1950. The Group Areas Act served to institutionalize racial segregation – different races were permitted to live and own property in racially segregated zones, with any digression representing a criminal offense. Importantly, the Group Areas Act gave the Apartheid government the power to decide these racial zones and as a result, areas with highly desirable residential characteristics were reserved for White South Africans. These "White-only" areas received an excessive and disproportionate amount of funding to develop infrastructure including roads, schools, public parks, and other amenities. Urban development centered on the exclusion of black South African from economic opportunities, infrastructure, and other amenities, as illustrated in Panels (a) and (b) of Figure 1.1. White South Africans were assigned desirable areas close to the the central business district (CBD). Black South Africans were assigned residential areas on the outskirts

[3] See for example, "RDP housing in South Africa - A look at the numbers" - 71Point4, available here.

of the city, with either natural (mountains) or physical (roads, train lines) barriers which acted as buffer zones to make their entry into the CBD both difficult and expensive. In many cases, the enforcement of the Group Areas Act involved the forced removal of non-White South Africans from their suburbs, after these suburbs were designated as "White-only". These families were removed from their homes, relocated to other less desirable areas and their properties bulldozed to make way for new development without any compensation. The most notable example of this was District Six – an inner-city residential suburb where around 60,000 residents were forcibly removed, and their properties destroyed, to make way for white residents and newer property developments. This is an important distinction - many white-only suburbs were not white-only before the introduction of formalized apartheid segregation. As a result, it is not simply the case that apartheid spatial planning reinforced the existing residential patterns of white South Africans. Instead, these residential patterns were as the result of very deliberate and segregationist policy intervention. The Group Areas Act was finally abolished in 1991, with South Africans of all races being free to reside in any area.

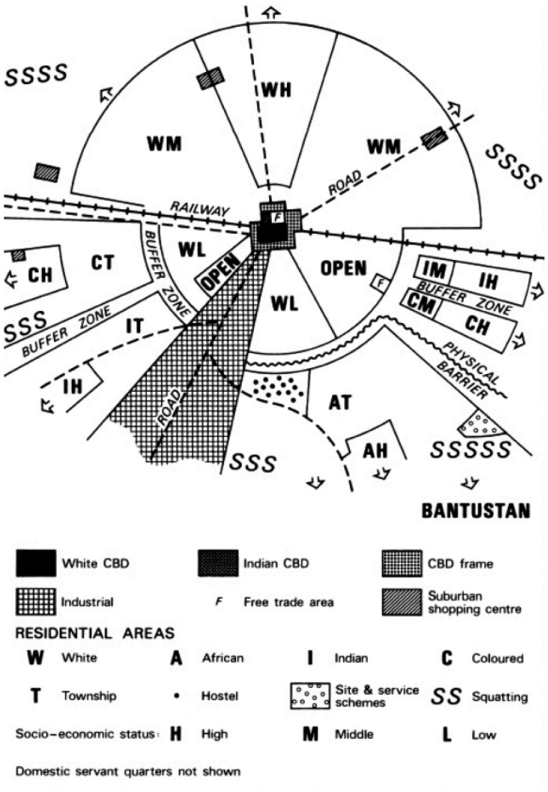
More than 30 years later however, the legacy of Apartheid spatial planning and the stark spatial boundaries between wealthy and poor suburbs, illustrated in Panel (c) of Figure 1.1, still plagues much of South Africa. In fact, using national census data from 1996 and 2011, I find that segregation has remained persistent. In 1996, around 81% of households would need to relocate in order to ensure a uniform distribution of population by race in Cape Town. By 2011, this share had only dropped to 78%.

Outside of segregation, Apartheid was also characterized by gross under-provision of basic infrastructure and services, such as housing, to people of color. By 1994, only 65% of all households lived in a formal residential structure, the equivalent of 12.5 million people without adequate housing (Franklin, 2020). In response to this, at the transition to democracy, the South African government enshrined the right to housing in the Bill of Rights in the South African constitution, using this as the basis to embark on one of the most ambitious government sponsored housing programmes in the world, which has resulted close to 3 million houses being provided to households. [4] This programme is not just large in absolute number – government sponsored housing accounts for 30% of all residential property in South Africa.[5] Despite the vast, provision of housing, by 2018, homeownership rates remain low, with only 35% of South Africans owned a home.[6] The juxtaposition of low home ownership rates in a country with a constitutional right to housing, remains one the of most pressing policy concerns in South Africa.

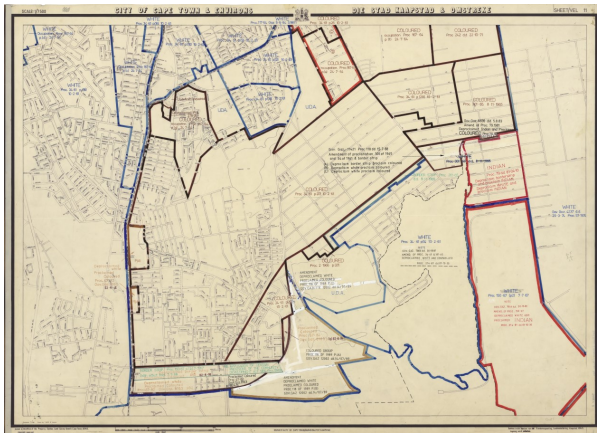
Given the importance of the housing market, it is unsurprising that there is a voluminous lit-

[4] See for example, "RDP housing in South Africa - A look at the numbers" - 71Point4, available here.
[5] Source: Centre for Affordable Housing Finance in Africa, South Africa Housing Market Report, available here
[6] See the Statistics South Africa General Household Survey for 2018.

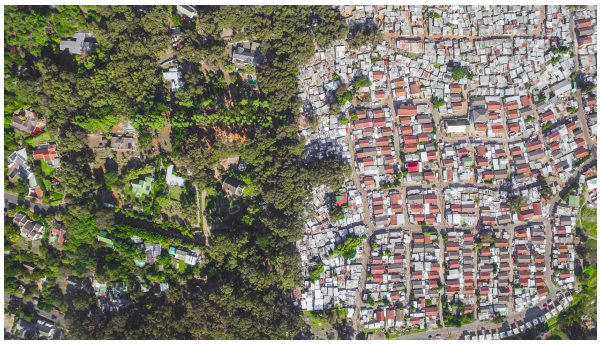
Figure 1.1: The legacy of Apartheid spatial planning



(a) Model of an apartheid city



(b) Group Areas Act map of Cape Town



(c) Hout Bay and Iziyamo Yethu

This figure shows three sub-figures indicating various aspects of Apartheid spatial planning and its legacy on Cape Town. Panel (a) illustrates a typical apartheid style segregated city as depicted in Davies (1981). Panel (b) shows a historical map of the race based assignment of suburbs in Cape Town circa 1965. Source: The City of Cape Town, available here. Panel (c) shows a recent photo of two neighbouring suburbs in Cape Town: the wealthy suburb of Hout Bay and the informal settlement of Imizamo Yethu. Source: Johnny Miller and Unequal Scenes, available here.

erature of policy reports which inform our understanding of the pertinent issues in the housing market in Cape Town and South Africa, two prominent examples being CAHF (2018) and Gardner (2018). Surprisingly, however, the academic literature on the housing market in South Africa, and more generally, developing countries, remains limited.[7] This is likely due to a number of factors, with the lack of high quality granular data, the type frequently found in advanced economies, being a major constraint. In this dissertation, I leverage novel housing data to answer three questions on the housing market in Cape Town, South Africa, which provides insights into the decisions taken by households when purchasing and selling homes and how this contributes to house price dynamics. In this dissertation I focus on the outcomes of two groups of

[7] Some notable recent exceptions include Franklin (2020), Picarelli (2019) and Brueckner, Rabe and Selod (2019)

actors when transacting in the housing market - foreign buyers and sellers, and sellers under financial distress. Studying these two sets of actors are important for two reasons.

Firstly, a growing literature has sought to study the behaviour of foreign buyers in the housing market given concerns that increases in foreign demand for residential real estate may lead to increases in property prices (Cvijanović and Spaenjers, 2021; Chinco and Mayer, 2016; Badarinza and Ramadorai, 2018; Gorback and Keys, 2020). These price increases may reduce housing affordability for locals and in some countries this has led to policy action in the form of taxes on foreign buyers.[8] These affordability concerns may be even more pronounced in emerging market economies and developing countries like South Africa where increasing home ownership rates is a policy priority.[9] In a basic sense, holding local housing demand and supply fixed, any increase in foreign demand for housing will lead to an increase in house prices. However, a key feature of foreign demand in the literature relates to the tendency of foreign buyers to pay higher prices than local buyers for otherwise identical properties due to informational asymmetries and wealth effects (Cvijanović and Spaenjers, 2021; Chinco and Mayer, 2016; Agarwal, Sing and Wang, 2018; Ling, Naranjo and Petrova, 2018). This could put further upward pressure on house prices and as a result, understanding the extent to which foreign buyers overpay is of academic and policy interest. In addition to concerns about affordability, foreign demand also poses concerns for financial stability (International Monetary Fund, 2018). If foreign buyers drive up local prices, the standard monetary policy and other macroprudential tools, such as loan-to-value and loan-to-income ratios, typically used to temper rising house prices may be rendered ineffective given the tendency of foreign investors to avoid the local mortgage market to finance their purchases, instead preferring to use cash. Despite these concerns, foreign investment into the housing market may have important stabilizing effects on house prices, especially if these inflows are counter-cyclical, as would be the case if foreign investment increases following large depreciations (International Monetary Fund, 2018).

While concerns about foreign buyers relate to upward pressure on house prices, a second area of interest relates to sellers under financial distress who are subject to home foreclosure, the discounts they sell their property for as a result of this foreclosure process, and how these discounts affect the prices of other homes. A number of papers find that during the 2008 Global Financial Crisis in the United States, home foreclosures lead to decreases in house prices given the negative externalites these transactions cause for neighbouring properties through lowering

[8] On affordability concerns, see for example "Foreign investors snapping up London homes suitable for first-time buyers" – 13 June 2017 and "Foreign property buyers are pricing locals out of the market" – *The Australian Daily Telegraph*, 13 March 2017. On foreign buyer property taxes, see for example "Vancouver Home Sales Break Record Despite Tax on Foreign Buyers" – *Bloomberg*, 5 January 2022

[9] On affordability concerns in South Africa, see for example "How tax on foreigners can help the Cape Town housing crisis" – *Moneyweb*, 29 May 2017

their prices (Gupta, 2019; Anenberg and Kung, 2014; Gerardi et al., 2015; Campbell, Giglio and Pathak, 2011). In South Africa, the topic of home foreclosures has additional significance. Until 2007 there was no legal requirement for home foreclosure auctions to include a reserve price in South Africa, and as a result, the norm in these auctions is for the auction to commence without a reserve price. In recent years, there has been increasing attention on the discounts that these homes sell for at foreclosure auctions, culminating in a R60 billion class action lawsuit against the major financial institutions in South Africa for the "unjust" selling of homes for a fraction of their market value.[10] The sale of homes for a fraction of their market value by banks represents a classic principal agent problem, given the banks incentive is simply recover the outstanding amount owed on the mortgage, which is typically a fraction of the value of the home. Given concerns that the lack of a reserve price was contributing to the foreclosure discounts, the Uniform Court Rules were amended in order to allow the court to set a reserve price for foreclosure auctions effective 22 December 2017.[11] Despite this significant policy intervention, we still do not have any rigorous evidence on the extent and magnitude of these foreclosure discounts and whether or not these discounts can be attributed to the auction mechanism or other factors. This is important given the introduction of reserve prices may introduce certain negative externalises such as higher interest rates on mortgages if the introduction of reserve prices reduces demand for foreclosed properties making it more difficult for financial institutions to liquidate these assets and thereby increasing the risk given mortgage default. As such, understanding foreclosure discounts are of academic and policy interest.

Given this backdrop, this dissertation contributes to our understanding of the price effects of foreign buyers and sellers in the housing market and through a detailed account of the extent of home foreclosures and the factors that contribute to the sizeable foreclosure discounts we typically observe empirically.

In Chapter 2, titled "Foreign buyers and sellers in the Cape Town housing market" I document the extent of foreign investment in the housing market in Cape Town. I find evidence of sizeable investment - foreign buyers account for 5.61% of all property transactions and 8.94% of the total monetary value of all transactions between 2011 and 2018. I find that these investors sort into the wealthier suburbs in the city that also have historically large communities of foreign inhabitants. Despite these sizeable net inflows, foreign ownership, has in fact, decreased throughout the sample period, highlighting that foreign buyers are not crowding out local buyers. I then study whether foreign buyers (sellers) pay higher prices (make lower returns) than local buyers (sellers). While I find that unconditional mean transaction prices are higher for

[10] See for example: "SA banks sued for R60bn in home repossession case" - *Fin24*, 16 August 2017 and "Banks face lawsuit over unjust sale of homes" - *IOL*, 25 January 2021

[11] The amendment is available here.

foreign buyers than local buyers, this cannot be used as evidence that foreign buyers pay higher prices. With this in mind, I estimate a hedonic regression, controlling for property characteristics, location and time fixed effects, and buyer financing, and I find that foreign non-resident buyers pay 8.3% more for otherwise identical properties relative to South African buyers, while foreign residents pay 3.7% more for otherwise identical properties relative to South African buyers, evidence of sizeable foreign buyer premia. I then study how the returns differ across sellers using a repeat sales approach and find that foreign non-residents realize a 1.4 percentage point lower annualized return than South African sellers upon resale while foreign residents realize a 0.5 percentage point lower annualized return than South African sellers upon resale. These results can partly be explained by wealth effects and information asymmetries.

Given the magnitude of foreign non-resident investment and the tendency of foreign buyers to pay higher prices for otherwise identical property, it is natural to wonder whether or not increases in foreign non-resident investment leads to increases in house prices. This is the question I answer in Chapter 3, titled "The Cape of Good Homes: Exchange Rate Depreciations, Foreign Non-Resident Demand and House Prices". In order to establish this, I treat large and sudden exchange rate depreciations as a positive exogenous shock to foreign non-resident housing demand to study the effect of foreign non-resident investment on house prices. Treating large and sudden exchange rate depreciations as a shock to foreign demand is intuitive, given the exchange rate discounts the price of property in a foreign currency, while leaving the price in local currency unaffected. I find that foreign non-resident transactions increase following exchange rate depreciations and are also increasing in the size of the depreciation. I find no evidence of similar effects for foreign born permanent residents in South Africa, highlighting that the exchange rate effect is linked to purchasing property in foreign currency, and not to whether or not the buyer is a foreigner. In order to estimate the impact of foreign demand on prices, I use an identification strategy that compares quality adjusted prices in geographically close suburbs that differ in their ex-ante attractiveness to foreign non-residents in the month following large and sudden exchange rate depreciations and find a positive causal effect of foreign non-resident demand. While this may raise concerns about the impact of foreign non-resident demand on the affordability of homes for local buyers, the fact that foreign non-resident investment in housing appears to be counter-cyclical, increasing following large depreciations, suggests that these inflows may have important stabilizing effects on house prices.

In Chapter 4, titled "Home foreclosure discounts in Cape Town" I document the extent of home foreclosures in Cape Town and estimate the discounts that these properties sell for. Leveraging features of the institutional setting I study, and the data I employ, I am able to provide a more complete characterization of the dynamics affecting foreclosure discounts, by disentangling the

foreclosure discounts when foreclosures sell at a foreclosure auction from the discounts that arise when these foreclosures sell in the private market outside of the auction. I find evidence that foreclosure discounts are substantial both in the private non-auction market and when sold at an auction. In the former, the discounts can be rationalized as a classic firesale discount driven by the financial distress of the seller. In the latter, I present evidence that limited competition at auctions driven by costs to participation could rationalize the foreclosure discounts at auctions, consistent with housing search theory. My preferred estimate of the foreclosure discounts attained outside of an auction are between 8.9% and 27.8% while my preferred estimate of the foreclosure discounts attained at an auction is between 16.9% and 24.7%. I also conduct an extensive robustness exercise account for potential factors which could lead to an upward bias in the estimated foreclosure discount showing how various factors confound the true foreclosure discount. Finally, Chapter 5 concludes by summarising the findings of the three chapters and by discussing ideas for further research.

All together, the work in this dissertation sheds new light and contributes to our understanding on important features of the housing market in Cape Town, while also establishing a number of results which provide insights into housing markets globally. Furthermore, the results in Chapters 2 and 4 also teach us about the decisions of buyers and seller when purchasing, selling and pricing property, which contributes to our understanding of household finance in emerging market countries.

Chapter 2

Foreign buyers and sellers in the Cape Town housing market

2.1 Introduction

Foreign non-resident investment in real estate is becoming an increasing feature of "superstar" cities, such as London, New York and Paris. Properties in these cities attract this investment due to a number of motives: property may act as a safe haven asset that can be used to protect or hedge investors against global economic uncertainty (Badarinza and Ramadorai, 2018; Fan et al., 2021); property in highly desirable areas acts as a "trophy" asset or a luxury consumption good for wealthy buyers (Cvijanović and Spaenjers, 2021); or due to the fact that some countries will reward real estate investment with preferential immigration benefits through so-called 'Golden Visas' (Duca, 2020).

A growing literature, for example Cvijanović and Spaenjers (2021) and Chinco and Mayer (2016), has sought to study the behaviour of these non-resident investors in the housing market. There are two main motivations for this. Firstly, it is a well established fact that local investors achieve higher returns on local assets than non-locals due to information asymmetries whereby local investors are better informed about local assets relative to foreign investors (Ivković and Weisbenner, 2005; Van Nieuwerburgh and Veldkamp, 2009). Secondly, if non-resident investors pay higher prices than locals for otherwise identical property and thereby increase local house prices, this raises concerns for affordability and financial stability.[1]

[1] On affordability concerns, see for example "Foreign investors snapping up London homes suitable for first-time buyers" – 13 June 2017 and "Foreign property buyers are pricing locals out of the market" – *The Australian Daily Telegraph*, 13 March 2017. On financial stability concerns, see International Monetary Fund (2018).

This literature has however focused solely on cities in developed countries and as a result, we still understand little about the extent of foreign non-resident investment on the housing market in cities in developing countries, and the purchase and investment outcomes of these investors. This is of particular interest given that the motives for non-resident investment in real estate identified in the literature, including safe-haven, luxury consumption and residential motives, are all potentially less likely to hold for cities in the developing world. Furthermore, increasing home ownership rates is a policy priority in many developing countries and as a result, if foreign non-resident investment leads to the crowding out of locals, this may warrant policy intervention.

Documenting and studying non-resident investment in real estate is, however, made challenging due to a number of factors, most notably due to the fact that granular transaction data, including nationality status is rare, even for developed countries. As a result, the existing literature typically makes use of aggregate data and various proxies for foreign real estate demand.[2] Moreover, even if such data can be sourced, there are fewer cities in developing countries that hold the same appeal as the "superstar" cities in the developed world, and attract notable foreign non-resident investment into housing.

In this chapter I document the extent of foreign non-resident investment in a major city in the developing world, Cape Town, using novel granular transaction data with information on the nationality status of buyers and sellers. Cape Town represents a unique setting for two reasons. Firstly, Cape Town represents an attractive destination for foreigners historically – in writing about Cape Town in 1897, Twain (1821) calls with city, "the paradise where the villas are" – and in recent time, given a favourable climate, especially for Northern Hemisphere buyers – and the relative affordability of luxury property in the city (Frank, 2017).[3] Secondly, despite these features which make Cape Town comparable to other superstar cities which typically attract sizeable foreign investment in property, South Africa remains an emerging market economy and as a result, purchasing motives in Cape Town unlikely reflect some of the key motivations for foreign investment in the developed world identified in the literature such as including safe-haven and residential motives.

I find that foreign investment in housing in Cape Town is comparable to the levels in other superstar cities, with foreign buyers accounting for 5.47% of all property transactions and 8.77% of the total monetary value of all transactions between 2011 and 2018.[4] This investment occurs

[2] To the best of my knowledge, only Cvijanović and Spaenjers (2021) and to some degree Ruf and Levi (2011), have been able to exploit transaction-level data to cleanly identify foreign ownership.

[3] On climate related motives, see "Cape Town: why foreign 'swallows' are swooping on homes in suburbs"—*The Financial Times*, 18 July 2016.

[4] For comparative purposes, Cvijanović and Spaenjers (2021) find that foreign buyers purchased 7.4% of all property in Paris, between 1992 and 2016. In Manhattan, Favilukis and Van Nieuwerburgh (2021) find that between 2004

in a subset of the city, with 39% of all suburbs not experiencing a single transaction involving a foreign buyer and over 70% of all foreign transactions occurring in 10% of all suburbs, indicative of a highly segmented market. This is unsurprising given the extent of segregation and spatial inequality that continues to persist in Cape Town. The suburbs that attract this investment are associated with higher household incomes, higher rates of tertiary education, and greater shares of secondary residences, and thus represent the wealthier suburbs in the city. Furthermore, I also highlight an important feature of foreign demand so far overlooked by the existing literature—the tendency of foreign buyers to be cash buyers. I find that 75% of all transactions made by foreign buyers occur without a mortgage. In comparison, only one third of all local buyers purchase properties without a mortgage.

In addition to transaction data, I also obtain a cross-sectional dataset of the complete property registry as of 2011. This dataset contains ownership information on every property in Cape Town recorded as of 2011 and allows me to observe who owns every property in the city, the price they paid as well as their nationality status, irrespective of when the property was purchased. In 2011, foreign buyers owned 6.35% of all residential property in Cape Town and by 2018, they owned 5.79%, despite net inflows being positive during this period. This indicates that on aggregate, foreign investors have not crowded local buyers out of the market. To the best of my knowledge, this is the first paper to document ownership patterns in the stock of properties globally.

Having established that foreign buyers do not crowd out locals buyers, I then document the existence of a foreign buyer premia in purchase prices, with foreign buyers paying higher prices than local buyers for otherwise identical properties. Importantly, the premia persists even after accounting for local price trends and heterogeneity in property level characteristics. In the same vein as Cvijanović and Spaenjers (2021), I am able to observe two groups of foreign buyers, namely *Foreign residents*, i.e persons who have a South African identity number but were born outside of South Africa and *Foreign non-residents*, defined as individuals, who provide their passport as an identifying document when purchasing property and therefore represent individuals who are in South Africa on a visiting or temporary status. I find that foreign non-residents pay 8.1% more for otherwise identical properties relative to South African buyers, while foreign residents pay 4.1% more for otherwise identical properties relative to South African buyers.

Importantly, I show that failing to control for the financing choices of the buyer would lead to a sizeable underestimate of the foreign buyer premia. Failing to control for buyer financing leads

and 2016, 'Out-of-town' buyers accounted for 10% of all transactions. Given 'Out-of-town' buyers refer to both foreign buyers and local buyers from outside of New York, the share of foreign buyers will be lower than 10%.

to an estimate of the premia that is 57% smaller for foreign non-residents and 68% smaller for foreign residents, relative to the the true premia. This can be explained by the fact that buyers who purchase properties using cash as opposed to a mortgage typically attract a sizeable discount, as in Bian, Lin and Liu (2018), Asabere, Huffman and Mehdiany (1992) and Lusht and Hansz (1994), which I estimate to be 10.4%. Given that foreign buyers predominantly finance their purchases with cash, failing to include financing as a control confounds the foreign buyer premia being estimated with the effect of financing. This highlights that studies which quantify premia across different groups of buyers and sellers in the housing market can potentially underestimate the premia by failing to control for the financing decision of the buyer. To the best of my knowledge, this is the first paper to quantify this effect.

I then present evidence that this premia likely occurs due to wealth effects and information asymmetries. Using property prices paid as a proxy for wealth, I find that the premia increases with wealth and is, in fact, smaller for foreign buyers who are in the lower tercile of the foreign buyer wealth distribution. One interpretation of this would be that wealthier investors have lower levels of bargaining intensity, whereby wealthier buyers may have a lower marginal utility of wealth and high opportunity costs of time (Harding, Rosenthal and Sirmans, 2003), consistent with findings in Cvijanović and Spaenjers (2021). In order to study the role of information asymmetries, I leverage the fact that there is historical persistence in the locational sorting of foreign buyers and I find that in areas where the 1991 share of foreign inhabitants is above the median level, the foreign premia is less than half the size as the premia estimated in below median suburbs. This finding would be consistent with the fact that the existence of historic foreign communities could in some way reduce the extent of information asymmetries through social network effects (Bertrand, Luttmer and Mullainathan, 2000).

Lastly, I show that when selling, foreign sellers realize lower capital gains than local sellers even after controlling for local price trends and market timing. Foreign non-residents realize a 1.5 percentage point lower annualized capital gain than South African sellers upon resale, while foreign residents realize a 0.5 percentage point lower annualized capital gain than South African sellers upon resale. Again, the differences across foreign non-residents and foreign residents appears to be consistent with information asymmetries. Given that I find little evidence that foreign sellers sell for lower prices than South African sellers, the differences in capital gains can be attributed to the premia paid when purchasing relative to South African buyers. I furthermore show that wealth effects are once again at play, with capital gain among foreign sellers decreasing with wealth. In fact, foreign sellers in the lowest tercile of the wealth distribution actually make higher capital gain than local sellers.

This chapter contributes to a growing literature quantifying the extent of foreign demand for

real estate. In Paris, Cvijanović and Spaenjers (2021) show that foreign investment is concentrated in the central, more expensive districts. In London, Badarinza and Ramadorai (2018) show that foreign transactions are clustered in the central, wealthier regions of city. In the United States, Li, Shen and Zhang (2021) documents a sizeable increase in foreign Chinese housing purchases post-2008, driven by a loosening of capital controls in China, and finds that these transactions typically occur in areas with high pre-existing shares of Chinese inhabitants. In British Columbia, Ruf and Levi (2011) find that foreign buyers are more pronounced in areas with more vacation properties, such as ski-resorts and oceanfront estates. I contribute to this literature by documenting the extent and features of foreign investment in a major city in the developing world. Furthermore, I also overcome a number of limitations of these papers in identifying foreign transactions, by identifying the nationality and residence status directly from the identifying documentation provided by the buyer, as opposed to existing approaches in the literature which use ethnic name-matching approaches (Li, Shen and Zhang, 2021), the mailing address supplied by the owner to receive their tax assessment (Ruf and Levi, 2011) or the primary address of the buyer provided on the day the title deed is signed by the notary (Cvijanović and Spaenjers, 2021).

This chapter also contributes to a number of papers which seek to study the investment behaviour of foreign buyers and sellers in the housing market. In the paper closest to this, Cvijanović and Spaenjers (2021) study the investment outcomes of foreign buyers and sellers in the housing market in Paris, finding evidence that foreign buyers pay a premium and sellers make lower capital gains upon resale. The authors show that this finding is consistent with wealth-related variation in bargaining intensity. My findings compliment this while also highlighting the role of information asymmetries. Chinco and Mayer (2016) document similar outcomes for out-of-town buyers in US cities and attribute this to information asymmetries.[5] Similarly, Agarwal, Sing and Wang (2018) and Ling, Naranjo and Petrova (2018) find that foreign buyers pay a premium to local buyers when transacting in commercial property markets. They also link this premium to information disadvantages of foreign investors and show that learning, experience and making use of a local property broker reduces this disadvantage and improves the efficiency of purchasing. These papers also form part of a larger literature studying investment outcomes in the housing market across a range of different types of buyers and sellers. For example, Goldsmith-Pinkham and Shue (2020) study housing returns across gender and find a sizeable gender gap in housing returns, while Andersen et al. (2021) find that men and women fare equally well when negotiating over real estate. Bayer et al. (2017) find evidence of sizeable

[5]The nomenclature "out-of-town" as opposed to "foreign" is deliberate - the authors consider non-resident out-of-town investment, namely non-resident investors from other cities within the US as opposed to foreign non-residents.

differences in outcomes across races, with minorities paying higher prices. This finding is robust to controlling for differences in property characteristics, income, access to credit and the race or ethnicity of the seller. There is also evidence of varying performance across buyer and sellers in the commercial property market. I contribute to this literature by highlighting the role of buyer financing, linking to a literature which studies price discounts associated with property transactions involving a cash buyer, such as Bian, Lin and Liu (2018), Asabere, Huffman and Mehdiany (1992) and Lusht and Hansz (1994). The results highlight that studies which quantify premia across different groups of buyers and sellers in the housing market can potentially underestimate these premia by failing to control for the financing decision of the buyer. This holds in particular in a context where regulation constrains the ability of certain groups of buyers to freely choose how they finance their purchase.

Finally, it is worth noting the large literature which studies the economic effects of foreign demand for property on house and rental prices, housing supply, employment and welfare, such as Badarinza and Ramadorai (2018), Favilukis and Van Nieuwerburgh (2021), Sá (2016), Cvijanović and Spaenjers (2021), Gorback and Keys (2020) and Li, Shen and Zhang (2021). Estimating the economics effects of foreign demand on house prices is however outside of the scope of this chapter but is addressed in Chapter 3.

2.2 Data and institutional setting

In this chapter I document the extent of foreign non-resident investment in a major city in the developing world, Cape Town, using novel granular transaction data with information on the nationality status of buyers and sellers. Cape Town represents an attractive destination for foreigners. Given South Africa's colonial history, the relationship between foreigners and Cape Town, also known as *The Cape of Good Hope*, has a historical precedence with various authors giving vivid testimony of this.[6] More recently, Cape Town has become popular as a destination for the purchase of vacation homes. As a Southern Hemisphere city, Cape Town represents an attractive destination for Northern Hemisphere buyers, who seek a summer vacation home for the winter months, a group of buyers the Financial Times refers to as property 'swallows'.[7] Together with this, Cape Town also represents one of the most affordable luxury property loca-

[6]The name, *The Cape of Good Hope*, reflects the optimism that voyagers attributed to Cape Town, as a result of the Cape's importance as a half-way stop for voyagers which facilitated travel to the West to India and East for the first time. In writing about Cape Town in 1897, Twain (1821) calls with city, "the paradise where the villas are" while Morris (1958), writing in 1922 describes Cape Town as "A little bit of San Francisco … and a whisper of France."

[7]See "Cape Town: why foreign 'swallows' are swooping on homes in suburbs"—*The Financial Times*, 18 July 2016.

tions.[8]

While a range of papers examine foreign demand for real estate, these studies typically make use of aggregate data and proxy for foreign real estate demand.[9] In this dissertation, I use novel and granular housing data for Cape Town to provide a detailed account of foreign demand for property in a major emerging market.

I collect data on the full universe of property transactions (commercial, residential and vacant land) in Cape Town, as recorded in the Deeds Registry, covering the period from January 2011 to December 2018, which is the period I am provided the data for by the City of Cape Town. The deeds registry records information on the transaction price and date of sale of every property, along with identifying information on the buyer and seller. In addition, the dataset also records whether or not a property is mortgaged, and information on the type of buyer and seller, be it a South African citizen, a company, a trust etc. I filter out all property transactions involving the government, such that I only include transactions by natural and non-natural (companies, trusts, close corporations) persons. I also exclude any transactions that are associated with home foreclosures. A number of transactions also involve multiple buyers and multiple sellers. These transactions typically represent properties bought in community of property and fractional ownership. In cases like this, I assign properties bought and sold in community of property and fractional ownership to a buyer/seller group, if, and only if, all participants in the joint ownership structure have the same buyer group. I assign all other cases to a separate buyer group called "multiple buyers". While I receive this data directly from the local government in Cape Town, transaction sale data for every property in Cape Town is publicly accessible and can be viewed and accessed via the local government's website.[10]

The transaction data is complimented with detailed property characteristic information for each property in Cape Town. This dataset is sourced from the local government, where it is used to inform the calculation of property values used in the determination of property tax. For each property, I observe the following variables in the dataset: zoning, plot size, dwelling size, number of bedrooms, number of bathrooms, year of construction, any renovations and the property's valuation (for the purposes of property taxes). Importantly, the data are recorded as of 2015 and are therefore time-invariant. As was the case with the transaction data, the property characteristic data for every property in Cape Town can also be viewed and accessed via the local government's website.[11] I make use of information provided on the zoning of each prop-

[8] In their *2017 Wealth Report*, the real estate agency Knight Frank shows that, across luxury property markets around the world, Cape Town represents the most affordable city, based on average price per square meter.

[9] To the best of my knowledge, only Cvijanović and Spaenjers (2021) and to some degree Ruf and Levi (2011), have been able to exploit transaction-level data to cleanly identify foreign ownership.

[10] The web portal can be accessed here.

[11] The web portal can be accessed here.

erty to select all residential properties. These properties correspond to properties zoned "Residential" and "Sectional Title". In doing so, I remove commercial properties and vacant land. I remove all properties and transactions with missing property characteristics as well as removing properties and transactions where variables take on nonsensical values, such as a property having a negative amount of bathrooms, given cases like these likely represent data capturing errors. I also remove all properties that are built before 1900. All together, these cases account for fewer than 1% of all observations. I then append this dataset to the property transaction data given common property identifiers. After joining the datasets, I filter the transaction data to exclude property transactions below R20,000. South Africa has a large government-sponsored housing programme which involves low-cost properties under R20,000. This has the additional benefit of removing transactions which represent transactions which are unlikely to be "arm's length transactions" such as transactions between parents and children. I also filter out all repeat transactions with a negative holding period as this likely represents an error in the data, as well as excluding property transactions with holding periods below the 1st percentile and above the 99th percentile. Then, in all of the regression specifications that utilize the return made by the seller of a given property, I winsorize the data to remove outliers at the 1% and 99% level. Finally, in all of the regression specifications that make use of mortgage information I remove all transactions where the mortgage amount is R0 or negative, cases which likely represent errors.[12] I furthermore filter out all transactions with multiple mortgages that likely represent cases where mortgages are refinanced. I report the full list of variables included in the property characteristic data in Table 2.1

[12] Properties bought without a mortgage have a missing value for the mortgage amount and the mortgage provider.

Table 2.1: Property characteristics - 2015

Variables	Description
Use code	Zoning rights of a parcel of land
Plot size	Size of plot of land
Dwelling size	Size of dwelling
Bedrooms	Number of bedrooms
Bathrooms	Number of bathrooms
Year of construction	Year property was built
Year of most recent renovation	Year property was last formally renovated
Quality	Qualitative variable indicating quality of property
Condition	Qualitative variable indicating condition of property
View	Qualitative variable indicating view associated with property
2012 valuation	Property's valuation as of 2012
2012 valuation contested	Was original 2012 valuation challenged by owner?
2015 valuation	Property's valuation as of 2015

This table describes all of the variables included in the property characteristic dataset used in this dissertation.

Finally, I also make use suburb level information from the South African National Census in 1991 and 2011. Throughout the paper I make use of two suburb definitions for Cape Town: mainplaces and subplaces. All subplaces are self-contained in a unique mainplace and there are 58 mainplaces and 921 subplaces. Mainplaces and subplaces refer to the suburbs/neighbourhoods as defined in the South African National Census. I plot these boundaries in Figure 2.1.

2.3 Features of foreign housing demand

In this chapter, I focus on three groups of individuals: (i) *South African residents*, i.e South African-born citizens who have a South African identity number (ii) foreign-born *South African residents*, or *Foreign residents*, i.e persons who have a South African identity number but were born outside of South Africa and (iii) *Foreign non-residents*, defined as individuals, who provide their passport as an identifying document when purchasing property and therefore represent individuals who are in South Africa on a visiting or temporary status. Foreign non-residents would, therefore, include any individual holding a (i) a work visa (ii) a study visa (iii) a travel

Figure 2.1: Mainplace and Subplace map of Cape Town

(a) Mainplace **(b)** Subplace

This figure depicts both the mainplace and subplace suburb boundaries for Cape Town. All subplaces are self-contained in a unique mainplace. There are 58 mainplaces and 921 subplaces.

visa or (iv) a temporary retirement visa.[13] While I am unable to distinguish between these visa types, the defining characteristic that distinguishes these identity types is that they are allowed residence for a specified time period, 3 months for a travel visa or typically the duration of a study program or a work contract, lasting up to a maximum of five years. Foreign residents are, however, granted permanent residency. In that sense, while the reason for foreign non-residents being in South Africa may differ, their stays are all of a temporary nature. I identify the nationality and residence status directly from the identifying documentation provided by the buyer as opposed to other approaches in the literature which use the mailing address supplied by the owner to receive their tax assessment (e.g. Ruf and Levi (2011) and Chinco and Mayer (2016)) or the primary address of the buyer provided on the day the title deed is signed by the

[13]Those individuals with a permanent retirement visa are issued a South African identity number and would therefore be classified as a foreign resident.

notary (e.g. Cvijanović and Spaenjers (2021)). One limitation of the data is that, while I am able to distinguish foreign residents and non-residents from South African residents, i.e. while I have the buyer and seller residence *status*, I am unable to distinguish the exact nationality of these foreign resident and non-resident buyers and sellers. I filter out all transactions made by non-natural (legal) persons as the nationality status of the owners are unclear.

Table 2.2 shows summary statistics across different buyer types between 2011 and 2018. Foreign buyers purchase more expensive properties, that tend to be larger. During the sample period, foreign buyers bought 5.47% of all property on the market, which made up 8.77% of the total local currency (South African Rand) value of all property transactions.[14] Foreign non-residents bought 1,739 (57%) more properties than foreign residents and invested more than twice as much (108%) in monetary terms. This is a difference to the extant literature which has typically studied cities with larger investment by foreign residents. For example, Cvijanović and Spaenjers (2021) show that in Paris, foreign residents made around 64% more transactions than foreign non-residents. This is possibly linked to stronger immigration motives in these settings. These motives could include (i) ease of immigration, especially within the Euro Area or (ii) policies which reward real estate investment with residency benefits through so-called 'Golden Visas'. These residency motives are arguably less pronounced in Cape Town and South Africa and as a result, the fact that foreign non-resident demand dominates foreign resident demand, suggests that buying motives in Cape Town likely reflect motives such as vacation homes as opposed to immigration. Foreigners also purchase a higher share of sectional title properties, which typically represent apartments. For each transaction, I also observe how the transaction was financed: with a mortgage or using cash. Cash transactions accounted for 63% and 81% of all transactions made by foreign resident and non-resident buyers, respectively. Meanwhile, cash purchases among South African resident buyers account for only a third of all South African transactions. The feature that foreign buyers are typically cash buyers is consistent with global survey evidence.[15]

[14] Throughout the paper, when I refer to 'foreigners', I refer to foreign residents together with foreign non-residents.

[15] For example, a survey completed by the National Association of Realtors finds that in 2018, 72% of of all non-resident foreign buyers were cash buyers in the USA.

Table 2.2: Summary statistics

	Full sample	South African	Foreign resident	Foreign non-resident	All foreign
Transaction price	1,361,405	1,313,859	1,822,413	2,413,745	2,183,270
	(1,267,601)	(1,218,637)	(1,395,451)	(1,879,242)	(1,731,164)
Land size	428	425	429	508	477
	(453)	(445)	(496)	(612)	(570)
Property size	119	117	129	149	141
	(76)	(75)	(80)	(99)	(92)
Bedrooms	2.71	2.71	2.65	2.73	2.70
	(0.96)	(0.95)	(0.98)	(1.09)	(1.05)
Bathrooms	1.85	1.84	1.98	2.16	2.09
	(0.97)	(0.96)	(1)	(1.18)	(1.11)
Number of transactions	144,219	136,332	3,074	4,813	7,887
Share of sectional title transactions	14.72%	13.86%	28.43%	30.38%	29.62%
Share of mortgaged properties	64.65%	66.88%	36.79%	19.28%	26.11%
Share of total transactions	100%	94.53%	2.13%	3.34%	5.47%
Share of total transaction value	100%	91.23%	2.85%	5.92%	8.77%

I report summary statistics across different types of buyers for transactions between 2011 and 2018. South African residents are defined as individuals holding South African citizenship who were born in South Africa; foreign residents are defined as individuals who are permanent residents but were born outside of South Africa; foreign non-residents are defined as individuals who do not hold a South African residence permit and hold either (i) a residence visa, (ii) a work visa, (iii) a study visa, or (iv) a travel visa. I report mean values and standard deviations in parenthesis.

2.3.1 Spatial distribution of foreign transactions

Next, I document the spatial distribution of foreign transactions, which I show in Figure 2.2. In Panel (a), we see a strong concentration of foreign non-resident transactions in the South-West of Cape Town.[16] In many of the suburbs where foreign non-residents are present, they account for over 15% of all transactions between 2011 and 2018. In fact, 39% of subplaces see no foreign non-resident transactions during the sample, with over 70% of all transactions occurring in

[16]The South-West of the city includes the central business district (CBD) and popular coastal areas.

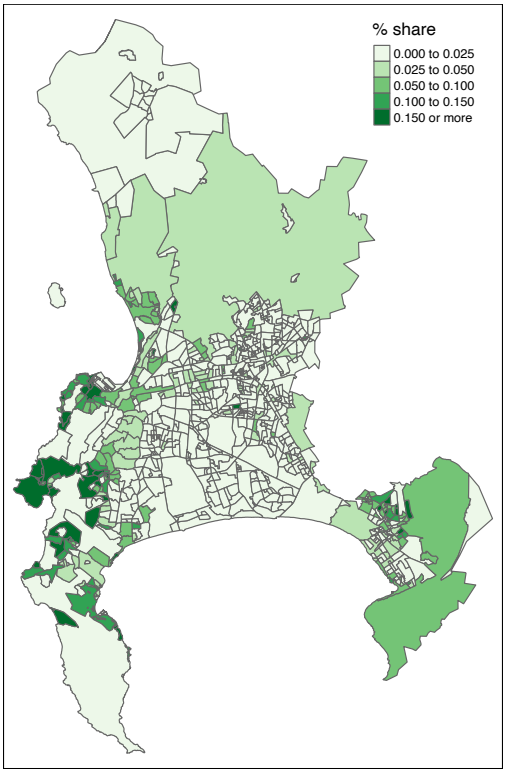
10% of all suburbs, as shown in the Lorenz curve for foreign non-resident and foreign resident transactions across subplaces in Panel (c) of Figure 2.2, translating to a Gini coefficient of 0.808. In Panel (b) however, there is much weaker evidence of concentration in the location of foreign resident transactions. Furthermore, the suburbs foreign buyers sort into are very different from the average suburb in Cape Town. In Table 2.3 I show that foreigners purchase property in areas which the household heads have higher income levels, are more likely to have a higher education qualification and where there are greater shares of secondary residences.

All of the descriptive evidence presented suggests that foreign ownership is sizeable, both in terms of the share of transactions and in terms of the share of property ownership, and is also targeted to very particular suburbs within Cape Town. This suggests a highly segmented housing market (Piazzesi, Schneider and Stroebel, 2020).

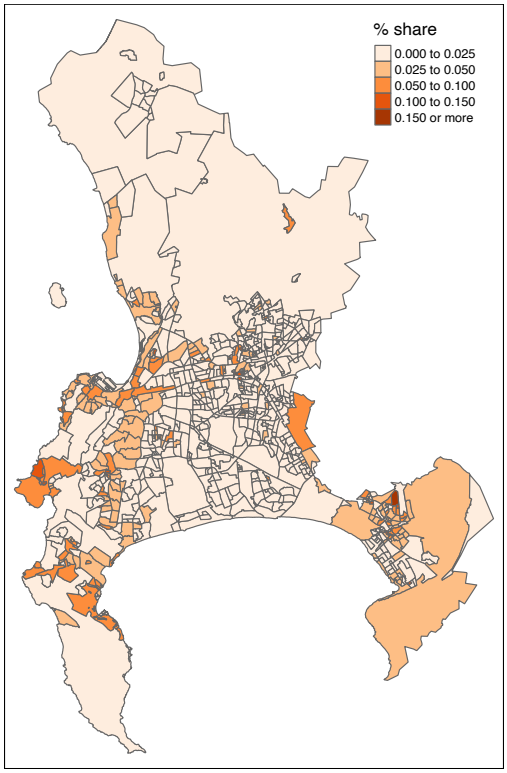
2.3.2 New evidence on the stock of foreign demand

Property transaction data facilitates the study of the flow of foreign transactions. Using this type of data, increases in the relative share of foreign transactions are typically interpreted as a crowding out of local buyers. Whether or not this leads to an increase in the share of foreign owned properties with respect to the property stock is, however, an open question, given that the property stock is constantly changing as new properties are added. For example, increased relative foreign demand could only result in minor changes in the composition of ownership of the property stock if the existing stock of foreign-owned properties is low or if the rate of new property development outstrips foreign transactions. Despite this, to the best of my knowledge, no paper has been able to study how the ownership of the property stock evolves in response to foreign demand given the scarcity of data that would facilitate such an analysis.

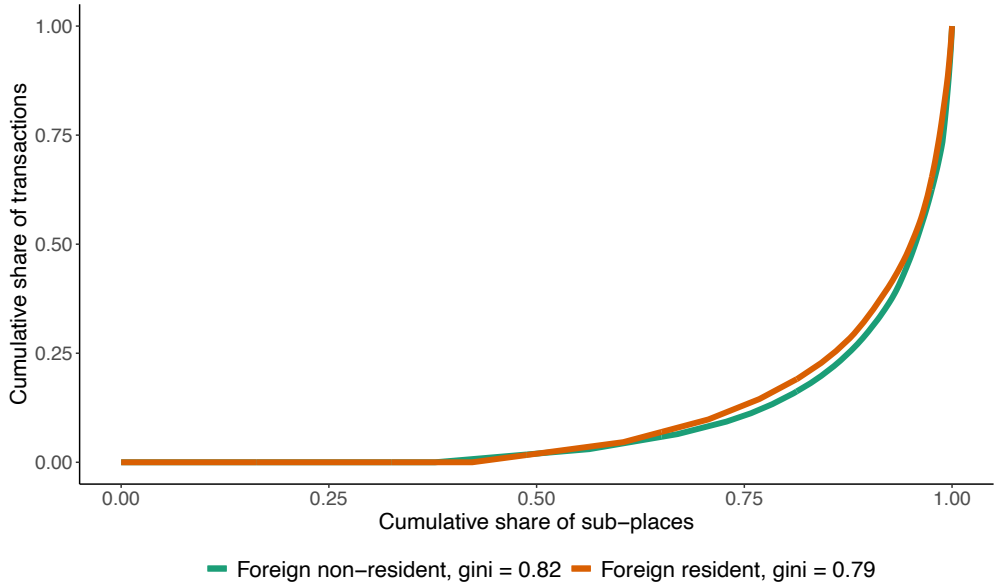
Figure 2.2: Spatial distribution of foreign transactions



(a) Foreign non-residents



(b) Foreign residents



(c) Lorenz curve showing concentration of foreign non-resident transactions

This figure shows the number of transactions by foreign non-residents, in Panel (a), and foreign residents, in Panel (b) as a share of total transactions between 2011 and 2018 across subplaces in Cape Town. Areas with a greater share of foreign resident and non-resident transactions are represented by darker colors. The figure in Panel (c) shows the Lorenz curve for the concentration of foreign non-resident and foreign resident transactions across subplaces in Cape Town, where I show the cumulative share of foreign non-resident transactions on the y-axis and the cumulative share of subplaces on the x-axis.

Table 2.3: subplace household characteristics and foreign demand

Decile	Age	Income	% higher education	% secondary residence
1	41.21	R200,124	0.15	0.09
2	39.19	R223,713	0.19	0.11
3	39.70	R192,776	0.15	0.11
4	39.63	R274,875	0.27	0.10
5	38.58	R268,231	0.23	0.05
6	39.91	R291,319	0.28	0.05
7	39.99	R370,263	0.34	0.06
8	41.30	R402,550	0.38	0.07
9	40.11	R407,133	0.36	0.09
10	39.11	R432,544	0.45	0.13

(a) Foreign non-residents

Decile	Age	Income	% higher education	% secondary residence
1	38.23	R213,204	0.18	0.05
2	40.78	R205,966	0.19	0.11
3	38.92	R173,200	0.12	0.11
4	38.93	R320,988	0.28	0.06
5	40.37	R255,746	0.21	0.09
6	39.84	R341,580	0.31	0.09
7	40.47	R405,904	0.37	0.06
8	42.37	R425,166	0.36	0.07
9	41.42	R378,081	0.37	0.07
10	37.42	R350,117	0.41	0.14

(b) Foreign residents

This table shows the subplace average (i) age, (ii) income, (iii) share of the population that has completed higher education, and the (iv) share of individuals who reported their South African address as being a secondary residence for each decile of the subplace share of transactions made by foreign non-residents between 2011 and 2018 in Panel (a) and foreign residents in Panel (b). Deciles are increasing in the foreign share of transactions, which means that decile 1 (10) represents subplaces where the foreign share of transactions was below the 10th (above the 90th) percentile of the total subplace foreign transaction distribution. The underlying data was taken from the 2011 South African national census.

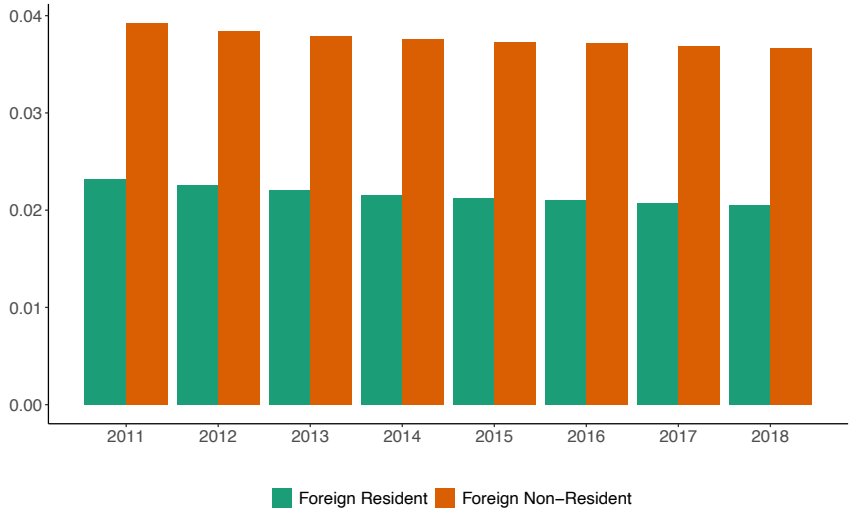
As discussed in Chapter **??**, in addition to data on the flow of transactions I utilize in this paper, I also collect a cross-sectional dataset reflecting the ownership of the property stock in Cape Town for 2011. Using the flow of deeds registry transaction data, I can amend this table going forward to adjust ownership information for existing properties and append information about newly developed properties. This allows us to document the percentage of properties owned by foreigners at any point in time.

Using the data on ownership of the property stock, I study how the evolution of foreign ownership at a city level has changed over our sample period. In Figure 2.3 I show this ownership share between 2011 and 2018, with the share recorded as of 1 January each year. In 2011, foreign non-residents owned 3.9% of all residential property in Cape Town, while foreign residents own around 2.3% resulting in 6.2% of all residential property owned by foreign buyers. By 2018, the share of foreign ownership is essentially unchanged, with a slight decrease to 5.8% with foreign non-residents owning 3.7% and foreign residents owning 2.1%.

The decrease in effective foreign resident ownership is perhaps unsurprising when you consider that net inflows of foreign residents in the housing market were minimal as illustrated

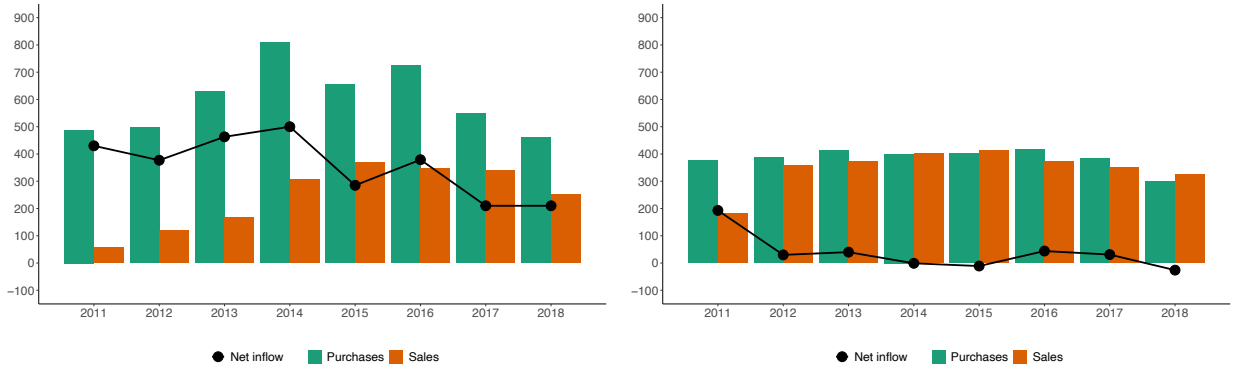
in Panel (b) of Figure 2.4, with a net inflow of 311 transactions during the period. Foreign non-resident net inflows are however substantial amounting to 2,873 transactions as shown in Panel (a) of Figure 2.4. As a result, it is perhaps surprising to see effective ownership of foreign non-residents declining. However, the foreign non-resident inflow has been offset by the development of new property with over 43,000 new properties coming onto the property market between 2011 and 2018.

Figure 2.3: Foreign ownership as a percentage of the total property stock



This figure illustrates the percentage of all properties in Cape Town owned by foreign non-residents and foreign residents between 2011 and 2018. Each bar corresponds to a snapshot of the total residential ownership stock as of 1 January in that specific year.

Figure 2.4: Foreign inflow and outflow



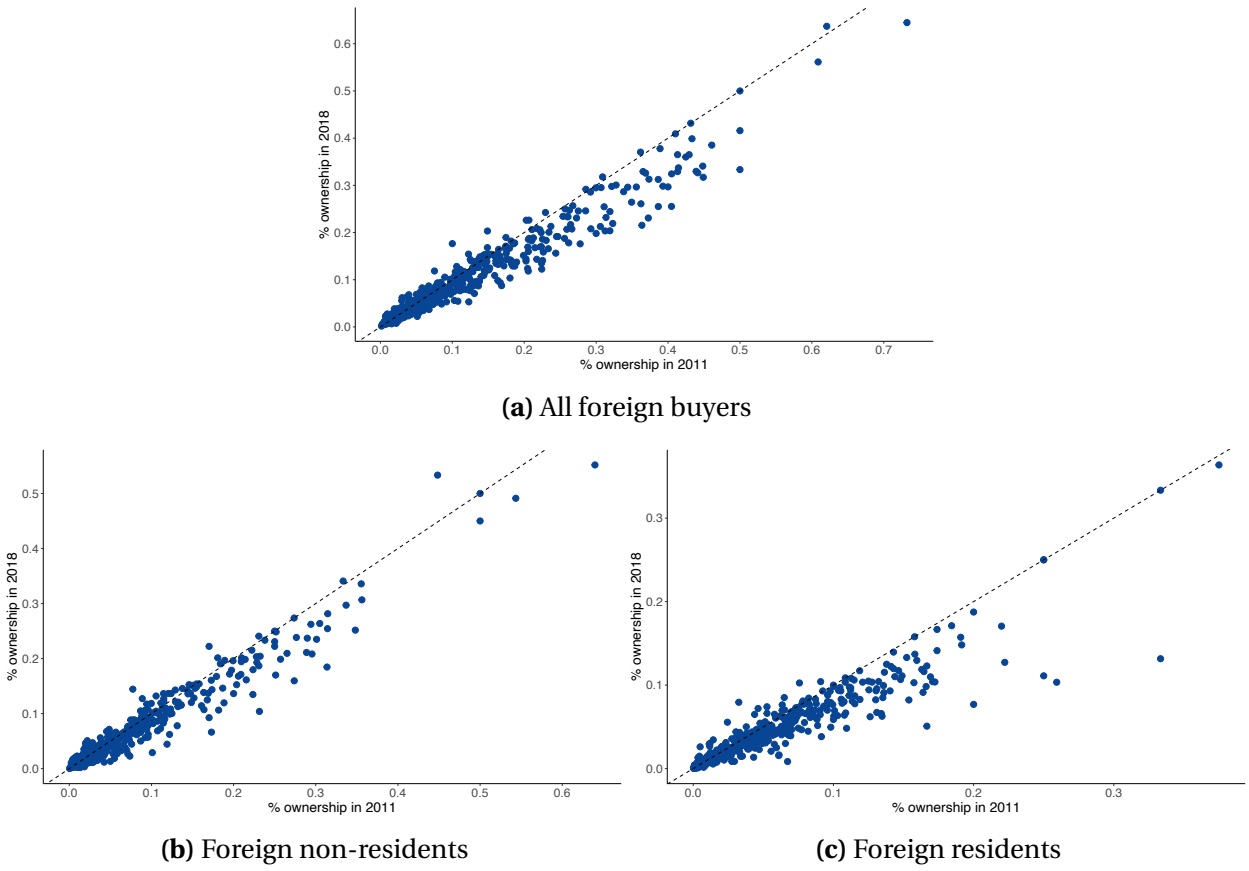
(a) Foreign non-residents

(b) Foreign residents

This figure shows the number of (i) properties bought (ii) properties sold and the (iii) net purchases of property for foreign residents and foreign non-residents. For readability, I keep the same y-axis across both figures.

Earlier however I established that foreign transactions occur in only a subset of suburbs in Cape Town and as a result, while aggregate foreign ownership has decreased, there could be differential trends at a suburb level. In Panel (a) of Figure 2.5 I show a scatter plot of foreign subplace level ownership in 2011 relative to their ownership in 2018. I include a 45 degree line such that any dots above (below) the line indicate suburbs which experience an increase (decrease) in foreign ownership. As is evident, the majority of subplaces experienced decreases in foreign ownership.

Figure 2.5: Change in subplace level foreign ownership



(a) All foreign buyers

(b) Foreign non-residents

(c) Foreign residents

This figure shows the share of subplace foreign owned properties as of 1 January 2011 plotted against the same share in 2018 in Panel (a). In Panels (b) and (c) I split Panel (a) into foreign non-residents and foreign residents, respectively. A 45 degree dotted line is added for reference.

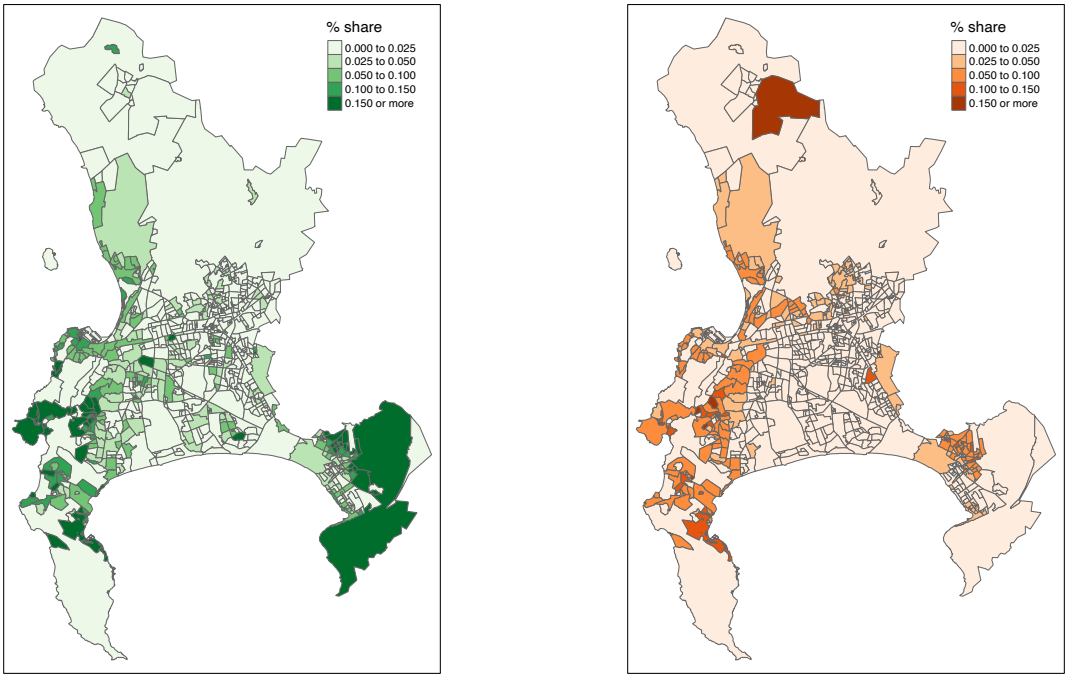
In fact, conditional on a subplace having foreign ownership (i.e a foreigner owning a property), only 24% of all subplaces experience an increase in foreign ownership. However, conditional on a subplace experiencing an increase, this increase is substantial, with the mean (median) increase in foreign ownership amounting to 26.7% (10.9%). In Panels (b) and (c) of Figure 2.5 I split the figure out by foreign non-resident and foreign resident ownership. On the extens-

ive margin, changes in foreign ownership are very similar, with 22.5% of subplaces experiencing increases in foreign non-resident ownership, compared to 21.5% for foreign residents. The changes on the intensive margin are however substantially different with the mean (median) increase in foreign non-resident ownership amounting to 33.7% (16.8%) while the mean (median) increase in foreign resident ownership amounts to 50.1% (25.5%).

In Figure 2.6 I show how this ownership is distributed across the city as of 1 January 2018. The patterns of foreign ownership are very similar to the flow of foreign transactions shown in Figure 2.2. Put differently, foreign property transactions between 2011 and 2018 have largely occurred in the areas which had many foreign inhabitants in 2011.

Figure 2.6: Spatial distribution of foreign ownership

This figure illustrates the percentage of all properties owned by foreign non-residents and foreign residents in as of 1 January 2018 across all subplaces in Cape Town.



(a) Foreign non-residents **(b)** Foreign residents

The results in this section highlight the importance of studying ownership patterns in the property stock to assess the extent to which foreign investment crowds locals out of the housing market. Despite apparent crowding out in transactions, with foreign buyers purchasing 5.45% of all transactions, the foreign ownership of the property stock actually decreases throughout the sample period, largely due to the speed of new construction outpacing the growth in foreign demand. Given the extant literature has up to this point been unable to observe the ownership

of the property stock, these papers have simply *assumed* a positive correlation between the flow and stock of foreign ownership. This evidence presented in this chapter however shows that the assumption of a positive correlation may be incorrect.

2.3.3 Historical persistence in residence patterns

A key feature of foreign investment in real estate is the tendency of foreign transactions to display a "home bias abroad" whereby investment from a given country is typically directed towards property in areas with a large share of inhabitants from that country (Badarinza and Ramadorai, 2018). This link could arise for a number of reasons including immigration motives whereby buyers may have an affinity for living in neighbourhoods with a pre-existing community of residents from their home country, or as a way to reduce information asymmetries through social network effects (Bertrand, Luttmer and Mullainathan, 2000).

In order to assess the extent of historical persistence in residence patterns in Cape Town, I utilize 1991 National Census data to identify the share of foreign born household heads in 1991 for each subplace and compare this to the share of foreign owned properties in each subplace in 2018 using the property tax assessment data. I plot these shares in Figure 2.7. There is a clear overlap in the residency patterns across the 27 year gap with a correlation of 0.66 between the 1991 and 2018 shares, indicating clear historical persistence in residence patterns. While I cannot disentangle the reasons for this correlation, it remains clear that the locational sorting of foreign buyers has remained remarkably consistent between 1991 and 2018.

2.4 Estimating foreign buyer premia

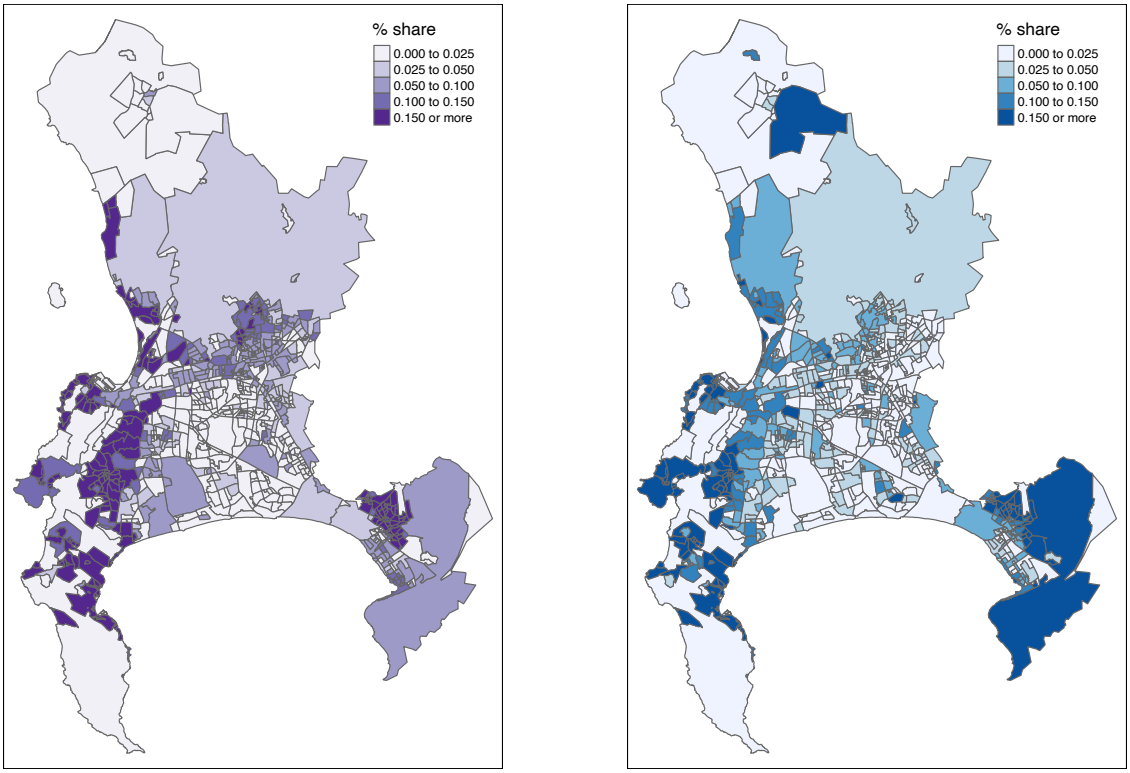
In order to establish whether foreign buyers pay a premium relative to local buyers, I implement a standard hedonic regression where the dependent variable is the log transaction price, $y_{i,s,t}$ of property i, in suburb s that sells in time t:

$$y_{i,s,t} = \alpha_{s,t} + \beta FR_{i,t} + \phi C_{i,t} + \gamma' X_i + \varepsilon_{i,s,t} \tag{2.1}$$

$\alpha_{s,t}$ represents year-month by subplace fixed effects, $FR_{i,t}$ captures the buyer's nationality status, namely South African vs foreign non-resident vs foreign resident, $C_{i,t}$ is a dummy variable which captures if a property was purchased without a mortgage and X_i is a vector of time invariant property characteristics, which include property size, type, bedrooms, bathrooms, age, property type, a dummy variable if any renovations have taken place and the property's value

as assessed by the local municipality for the purposes of property taxes. Finally, standard errors are clustered at the subplace level. Since the seminal work of Rosen (1974), hedonic regression techniques have been used widely to control for differences in property prices which can be attributed to observable differences in property prices. Recent examples include Campbell, Giglio and Pathak (2011) and Adelino, Schoar and Severino (2013).

Figure 2.7: Historical persistence in foreign ownership patterns



(a) Foreign born share of 1991 population

(b) Foreign resident ownership in 2018

This figure shows the spatial distribution of foreign residence patterns using two different sources of data. In Panel (a) I show the subplace share of the foreign born household head population in 1991 using census data. In Panel (b) I show the foreign share of total property ownership as of 2018 using property tax assessment data.

A few features of this specification are worth noting. First, throughout all specifications, the reference group is South African buyers, such that β captures the difference in transaction prices paid by foreign buyers relative to South African buyers. Second, the inclusion of property characteristics accounts for observable differences across properties that may be correlated to both foreign preferences and property prices. Finally, the inclusion of year-month by subplace fixed effects, $\alpha_{s,t}$, controls for local trends in property prices, such that β estimates the foreign buyer premia independent of local price trends in the suburbs where foreign buyers typically pur-

chase property.

I report the results from this specification in Columns (1) to (4) in Table 2.4 for different combinations of location and time fixed effects. Throughout all specifications we see that both foreign non-residents and residents pay higher prices on average than locals. Foreign non-residents also consistently pay higher prices than foreign residents. Under the assumption that foreign residents are likely to have better information about the local property market, this pattern of premia would be consistent with information asymmetries contributing to the premia we observe. As I include a mainplace fixed effect in column (2), and then a more granular subplace fixed effect in column (3), the foreign premia shrinks substantially from the specification with no location fixed effects in column (1). This is clear evidence that foreign buyers sort into suburbs with higher than average property prices, consistent with earlier evidence. In column (4), where I include a year-month by subplace fixed effect, we see the premia decreases further, suggesting that foreign buyers also sort into suburbs experiencing higher than average growth in property prices. Under this specification, foreign non-residents pay 6.9% higher prices than local buyers, while foreign residents pay 2.7% higher prices than local buyers, conditional on controls for location, market timing and property characteristics.

Table 2.4: Foreign buyers pay higher prices

	Log(Transaction Price)					
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign non-resident	0.318***	0.195***	0.081***	0.069***	0.035***	0.081***
	(0.049)	(0.057)	(0.011)	(0.013)	(0.006)	(0.008)
Foreign resident	0.215***	0.097***	0.029***	0.027***	0.013*	0.041***
	(0.029)	(0.021)	(0.008)	(0.009)	(0.007)	(0.008)
Log(Property valuation)					0.763***	0.765***
					(0.019)	(0.019)
Cash buyer						-0.104***
						(0.012)
Year x Month FE	Yes	Yes	Yes	Yes	Yes	Yes
MP FE	No	Yes	No	No	No	No
SP FE	No	No	Yes	No	No	No
Year x Month x SP FE	No	No	No	Yes	Yes	Yes
Observations	144,219	144,219	144,213	127,329	127,226	127,226
Adjusted R-squared	0.662	0.766	0.872	0.885	0.914	0.916

This table reports the premia for foreign buyers. In all cases, the reference group represents South Africans. All specifications include controls for year by month fixed effects. I vary the specifications to include, location (mainplace and subplace) fixed effects and location-by-time fixed effects. Standard errors are clustered at the subplace level and are reported in parentheses. Coefficients can be interpreted as percentage changes, for example, in specification (6), "foreign non-resident buyers pay 8.1% more for a property relative to South African who buy otherwise identical properties in the same subplace and in the same year and month". *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

Table 2.5: Foreign buyers pay higher prices - full hedonic specification

	Log(Transaction Price)		
Age: <10 years	0.047***	# Bedrooms: 3	0.054***
	(0.012)		(0.013)
Age: <20 years	0.014**	# Bedrooms: 4+	0.045***
	(0.006)		(0.014)
Age: <40 years	-0.001	# Bathrooms: 0	0.007
	(0.007)		(0.022)
Age: <5 years	-0.104***	# Bathrooms: 2	0.040***
	(0.026)		(0.004)
Age: new build	-0.126***	# Bathrooms: 3	0.046***
	(0.008)		(0.006)
Floor size: quartile 2	0.068***	# Bathrooms: 4+	0.051***
	(0.014)		(0.009)
Floor size: quartile 3	0.098***	Property has been renovated	-0.026**
	(0.015)		(0.011)
Floor size: quartile 4	0.119***	Sectional Title property	0.042**
	(0.017)		(0.017)
Plot size: quartile 2	0.078***	Buyer: Foreign non-resident	0.082***
	(0.013)		(0.008)
Plot size: quartile 3	0.105***	Buyer: Foreign resident	0.041***
	(0.015)		(0.008)
Plot size: quartile 4	0.127***	Log (Property Valuation)	0.754***
	(0.016)		(0.020)
# Bedrooms: 0	0.034	Buyer financing: cash	-0.105***
	(0.029)		(0.012)
# Bedrooms: 2	0.037***		
	(0.013)		

This table reports the full set of hedonic coefficients for specification (6) in Table 2.4. The reference property is a 1 bedroom, 1 bathroom freestanding home, that is older than 40 years and has not been renovated, with a floor and plot size in the lower quartile of the floor and plot size distribution, bought by a South African resident. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

2.4.1 Accounting for unobserved differences in quality

Despite the controls employed in the hedonic specification, I cannot rule out that there are factors unobserved in the data which are correlated with the quality of the property and the preferences of foreign buyers. Such a correlation would lead to a biased estimate of β. Despite robust controls for property characteristics and location-by-time fixed effects, hedonic estimates of premia can still suffer from omitted variable bias (Liu, Nowak and Smith, 2020). The omitted variable bias does not just affect hedonic estimates of premia, but also the construction of house price indices (Nowak, Price and Smith, 2021; Nowak and Smith, 2020). One way to address this is to incorporate text-based information from real estate agent remarks in property listings, as in the papers just mentioned. In the absence of such text-based information in this context, I account for unobserved heterogeneity by augmenting the original specification in three ways, by including the assessed value of the property, the buyer's choice of financing and qualitative assessments of the housing quality and the view associated with a property made my property valuers. I explain the motivation for these additions below.

2.4.1.1 The assessed value of the property

To reduce concerns about omitted variable bias, I include the properties assessed value as of 2015. The assessed value is calculated by the local municipality in order to estimate the property taxes the homeowner is eligible to pay. Under the assumption that property valuers are better informed as to estimating the value of a given property, including the valuation as an additional control should result in a cleaner estimate of β and control for any unobserved heterogeneity in property quality that could potentially be correlated with foreign demand. I report these results in column (5) of Table 2.4. As expected, the coefficient on the log of the property valuation is positive and highly significant, indicating that properties that have higher valuations sell for higher prices. Notably, the foreign premia more than halves - clear evidence that despite our extensive property characteristic controls and the location-by-time fixed effect in column (4), foreign buyers purchase higher quality properties.

However, by using the valuation as a control, I make an important assumption - namely, that the model used by the local government to produce the property valuation does not exhibit a valuation bias that leads to a systematic bias in the valuations produced for different types of property. This type of valuation bias is documented by Amornsiripanitch (2021) who finds higher valued properties tend to be undervalued relative to lower value properties, given the valuation methods used typically ignore house and neighborhood characteristics. Given foreign buyers sort into more expensive properties, this may raise concerns that even after the

inclusion of a property's valuation, the estimates of a foreign buyer premia may still be biased, if higher value properties are typically undervalued. Given these concerns, I consider additional controls, discussed below.

2.4.1.2 Financing

An important feature of the data I observe is the inclusion of information on buyer financing. This is important for two reasons. Firstly, buyers who pay in cash typically receive a discount relative to buyers with a mortgage, a fact well established in a number of papers, such as Bian, Lin and Liu (2018), Asabere, Huffman and Mehdiany (1992) and Lusht and Hansz (1994). Such a discount could arise for a number of reasons. However, the most frequently mentioned motivation is the mortgage-contingency clause standard in all sales contracts—if a buyer is unable to obtain mortgage finance for a transaction they are allowed to back out of the deal and receive a refund of their deposit. Cash transactions therefore reduce the risk to a seller that a deal may fail to materialize. Second, while cash purchases tend to make up a smaller share of transactions compared to mortgaged transactions, in Cape Town, foreign buyers make an overwhelming share of their purchases in cash. Between 2011 and 2018, cash transactions accounted for 63% and 81% of all transactions made by foreign resident and non-resident buyers, respectively, while cash purchases among South African resident buyers only accounted for around one third of all South African transactions. The decision to purchase a property in cash may reflect a number of factors, including the wealth of foreign buyers relative to South African buyers, or whether or not the property is purchased as an investment. However, for foreign non-resident buyers, local mortgage regulation restricts the ability to raise funding locally. If foreign non-resident buyers choose to make use of a local mortgage, they are only allowed to borrow a maximum of 50% of the value of a property. As a result, while foreign resident buyers are unconstrained by regulation in their financing decision, foreign non-residents are subject to legislation which ensures that at the minimum, 50% of the value of the property is financed with cash. Given the tendency of foreigners to purchase properties in cash and the fact that cash transactions typically attract a discount, failing to control for financing could lead to a downward biased estimate of β. I therefore augment the specification to include a dummy variable which captures if a buyer did not make use of a mortgage, and thus, purchased their property with cash.

I report the headline results from this, my preferred specification, in column (6) of Table 2.4 and the full set of hedonic coefficients from this specification in Table 2.5. I find that transactions involving a cash buyer sell for a 10.4% discount relative to mortgaged transactions, confirming the existence of a cash buyer discount. After controlling for financing, I find that the foreign

buyer premia more than doubles from column (5). Foreign non-residents pay 8.1% more for otherwise identical properties relative to South African buyers, while foreign residents pay 4.1% more for otherwise identical properties relative to South African buyers. The jump in the foreign buyer premia is consistent with the cash buyer discount and the fact that foreign buyers are more likely to finance with purchases with cash as opposed to mortgage finance. This highlights that studies which quantify premia across different groups of buyers and sellers in the housing market can potentially under- or overestimate the premia by failing to control for the financing decision of the buyer. This holds in particular in a context where regulation constrains the ability of certain groups of buyers to freely choose how they finance their purchase.

2.4.1.3 Additional qualitative controls

The concern about the estimated foreign premia is that foreign buyers may prefer certain property features which are difficult to observe. If these types of features are more prevalent in more expensive homes, then the foreign premia could be biased upwards. Leveraging the property assessor information, I consider two features which may likely be attractive to foreign buyers - namely the quality of the property and the type of views available from the property. These qualitative variables are determined by property valuers through a number of potential ways including site visits, aerial photography or local knowledge of the area. For each property, a valuer will assign the quality of the property to one of the following categories: fair, poor, average, good, very good and excellent. Similarly, the views available for a property will be assigned as: poor, below average, average, above average, partially obstructed, panoramic or excellent.

I report the results from including the qualitative controls in Table 2.6. The coefficients on the qualitative controls are intuitive and increase in magnitude in the way one would expect - for example, the premium on properties with a panoramic view is greater than the premium on properties with a partially obstructed view etc. However, despite the addition of these controls, the premia for foreign non-resident and foreign resident buyers is essentially unchanged from the headline estimate, which is encouraging evidence that the premia being estimated does not suffer from omitted variable bias.

While I cannot rule out omitted variable bias entirely, it is challenging to think of which property features over and above the controls employed could confound the foreign premia, and were I able to control for these unobserved confounds, it remains unclear whether or not these confounds are significant enough to entirely remove the foreign premia entirely (as opposed to reducing the magnitude thereof).

Table 2.6: Foreign buyers pay higher prices even after accounting for qualitative controls

	Log(Transaction Price)		
	(1)	(2)	(3)
Foreign non-resident	0.078***	0.075***	0.075***
	(0.008)	(0.008)	(0.008)
Foreign resident	0.038***	0.038***	0.038***
	(0.008)	(0.008)	(0.008)
View: below average		0.021	0.020
		(0.023)	(0.023)
View: average		0.043*	0.038*
		(0.023)	(0.023)
View: above average		0.070***	0.065***
		(0.024)	(0.025)
View: partially obstructed		0.095***	0.089***
		(0.029)	(0.029)
View: panoramic		0.134***	0.131***
		(0.027)	(0.027)
View: excellent		0.241***	0.239***
		(0.035)	(0.036)
Quality: poor			0.085***
			(0.027)
Quality: average			0.091***
			(0.034)
Quality: good			0.093***
			(0.035)
Quality: excellent			0.100**
			(0.043)
Quality: very good			0.157***
			(0.044)
Observations	125,557	125,557	125,557
Adjusted R-squared	0.919	0.919	0.919
Year x Month FE	Yes	Yes	Yes
MP FE	No	No	No
SP FE	No	No	No
Year x Month x SP FE	Yes	Yes	Yes

This table reports the premia for foreign buyers as estimated in specification (6) in Table 2.4 with additional qualitative controls which control for the (i) type of view a property has and (ii) the quality of the home. Both of these variables are recorded from site visits to properties by property valuers at the local government. In all cases, the reference group represents South Africans. The discrepancy in sample size between this specification and the results in Table 2.4 stem from a small number of properties for which the qualitative variables have missing values. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

2.4.1.4 Additional robustness test

Under the reasonable assumption that foreign non-resident buyers have similar property preferences as foreign non-resident sellers, if we expected the buyer premia in Table 2.4 to be confounded by unobserved differences in property quality or valuation bias, we would also expect to see a positive seller premia. In other words, if foreign buyers pay higher prices than local buyers because they prefer higher quality properties (on a dimension I do not observe in the data), it would be reasonable to expect that when these foreign buyers sell their properties, these quality differences should also result in higher selling prices relative to local buyers. In order to test this, I consider a robustness exercise where I repeat the empirical specification from before, but I now replace the dummy variable for buyer nationality status with a dummy variable for seller nationality status, such that β now captures differences in selling prices for foreign sellers relative to South African sellers.

I report the results in Table 2.7. In column (4), without any controls for the property valuation and for the financing of the buyer, I find that foreign non-resident sellers sell their property for higher prices than South African sellers, while there are no differences in the prices achieved upon sale between foreign resident sellers and South African sellers. However, after including the controls mentioned above, the foreign non-resident seller premia disappears and the foreign resident premia becomes negative and insignificant. As a result, there is no difference in the sale prices for foreign non-resident sellers and South African sellers, while foreign resident sellers sell for slightly lower prices. The finding of no positive premia is insightful as it gives us additional evidence that the buyer premia estimated in Table 2.4 are unlikely being confounded by any unobserved differences in property quality correlated with both prices and the preferences of foreigners or valuation bias. The lack of a seller premia therefore provides more evidence that our estimates of buyer premia are unlikely to be confounded by differences in property quality.

2.4.2 Potential mechanisms: wealth effects and information asymmetries

The existence of a sizeable foreign buyer premia raises the question as to what drives this premia? An extensive literature exists, for example Ivković and Weisbenner (2005) and Favilukis and Van Nieuwerburgh (2021), which attributes the worse investment outcomes by non-local investors relative to local investors within asset classes to information asymmetries. Another mechanism could be due to wealth effects and lower bargaining intensity among wealthier foreign buyers, given that wealthier buyers may have a lower marginal utility of wealth and high opportunity costs of time (Harding, Rosenthal and Sirmans, 2003).

Table 2.7: Foreigners do not sell properties for higher prices

	Log(Sale Price)					
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign non-resident	0.318***	0.190***	0.045***	0.043***	-0.005	0.002
	(0.034)	(0.051)	(0.012)	(0.013)	(0.008)	(0.008)
Foreign resident	0.254***	0.102***	-0.002	0.001	-0.014**	-0.010*
	(0.034)	(0.033)	(0.008)	(0.008)	(0.006)	(0.006)
Log(Property valuation)					0.764***	0.767***
					(0.019)	(0.019)
Cash buyer						-0.097***
						(0.012)
Year x Month FE	Yes	Yes	Yes	Yes	Yes	Yes
MP FE	No	Yes	No	No	No	No
SP FE	No	No	Yes	No	No	No
Year x Month x SP FE	No	No	No	Yes	Yes	Yes
Observations	144,219	144,219	144,213	127,329	127,226	127,226
Adjusted R-squared	0.660	0.766	0.872	0.885	0.914	0.916

This table reports the results from when I repeat the exercise from Table 2.4, this time replacing our buyer variable with a seller nationality variable to estimate foreign seller premia. Standard errors are clustered at the subplace level and are reported in parentheses. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

I consider two robustness exercises to better understand the extent to which these mechanisms are at play. To understand the role of information asymmetries, I leverage the historical persistence of foreign transactions and split the transaction sample into two sub-samples: subplaces where the 1991 share of foreign inhabitants is below and above the median subplace level. If the existence of historic foreign communities could in some way reduce the extent of information asymmetries through social network effects, we would expect the foreign premia to be smaller in subplaces with large pre-existing shares of foreign inhabitants. This is exactly what I find, when I re-estimate equation (2.1) on these two sub-samples in Table 2.8 where the foreign premia is nearly twice as large in areas with below median shares of historical foreign inhabitants compared to above median areas. While this is evidence of information asymmetries affecting the intensive margin of the foreign premia, it is important to note that the premia still remains sizeable at 5% in areas with above median shares of historical foreign inhabitants.

To better understand the role of wealth on the foreign buyer premia I would ideally require some measure of wealth or income for foreign buyers, which I do not observe in the data. In order to proxy for wealth, I assign foreign buyers to different terciles based on the property

prices they pay (I do this separately for foreign non-resident buyers and foreign resident buyers). This serves as a reasonable proxy for wealth under the assumption that wealthier foreign buyers will purchase more expensive properties relative to other foreign buyers. If wealth effects lead to foreign buyers paying a premium, we would expect the foreign premia to be higher for higher terciles of buyers. This is precisely what I find in Table 2.9 where I once again re-estimate equation (2.1) but now with more detailed buyer groups reflecting terciles of wealth. The foreign buyer premia increases in wealth and is 22.2% larger for upper tercile foreign non-residents and 14.6% larger for upper tercile foreign residents, relative to South African buyers, while the premia is smaller for lower tercile foreign resident and non-resident buyers. Importantly, since our hedonic model controls for observed property characteristics, the properties assessed value, buyer financing and location cross time fixed effects, this result is robust to observed and unobserved heterogeneity in property quality, financing related discounts and local property trends. As a result, wealth effects do appear to be contributing notably to the observed foreign premia.

Table 2.8: The foreign buyer premia is smaller in areas with historically large communities of foreign residents

	Log(Transaction Price)	
	Below median share of foreign residents in suburb in 1991	Above median share of foreign residents in suburb in 1991
Foreign non-resident	0.107***	0.050***
	(0.016)	(0.006)
Foreign resident	0.084***	0.012*
	(0.020)	(0.007)
Year x Month x SP FE	Yes	Yes
Observations	62,926	64,300
Adjusted R-squared	0.889	0.869

This table reports the results from an exercise where I re-estimate the model reported in Table 2.4 but where I split the sample into transactions that occur in suburbs where the share of foreign residents in the suburb in 1991 is below the median suburb share of foreign residents in 1991 in Panel (a) and transactions that occur in suburbs where the share of foreign residents in the suburb in 1991 is above the median suburb share of foreign residents in 1991. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

Table 2.9: The foreign buyer premia increases with wealth

	Log(Transaction Price)
Foreign non-resident - Tercile 1	-0.058***
	(0.016)
Foreign non-resident - Tercile 2	0.111***
	(0.010)
Foreign non-resident - Tercile 3	0.222***
	(0.014)
Foreign resident - Tercile 1	-0.068***
	(0.014)
Foreign resident - Tercile 1	0.051***
	(0.011)
Foreign resident - Tercile 1	0.146***
	(0.015)
Year x Month x SP FE	Yes
Observations	127,226
Adjusted R-squared	0.917

This table reports the results from an exercise where I re-estimate the model reported in Table 2.4 but where I interact the foreign buyer indicator with an indicator for the tercile of wealth of the buyer. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

2.5 Capital gains among foreign sellers

In order to establish whether foreign buyers pay a premium relative to local buyers, I implement the following regression where the dependent variable is the simple capital gain made by a seller upon resale, $r_{i,s,t}$ of property i, in suburb s that sells in time t and was bought in time u:

$$r_{i,s,t} = \alpha_{s,t} + \delta_{u,t} + \beta FR_{i,t} + \phi C_{i,t} + \gamma H_{i,t} + \rho RN_{i,t} + \varepsilon_{i,s,t} \tag{2.2}$$

where $\alpha_{s,t}$ represents sale year-month by subplace fixed effects, $\delta_{u,t}$ captures purchase year by subplace fixed effects, $FR_{i,t}$ captures the sellers' nationality status, $C_{i,t}$ is a dummy vari-

able which captures if a property was purchased without a mortgage, $H_{i,t}$ records the holding period of the seller and $RN_{i,t}$ is a dummy variable which records whether a property underwent a structural renovation. By utilizing capital gains, we are effectively estimating a repeat sales model, where we quantify changes in prices for the same property. Under the assumption that the underlying property-level characteristics are unchanged, controlling for any structural renovation, our estimation of our coefficients of interest should capture effects solely related to buyer characteristics. While the repeat-sale model is more robust to unobserved property characteristics confounding our results, it does come at the cost of a smaller sample size given we can only include properties which transaction twice during our sample.

I report the results from this estimation in Table 2.10. Throughout all of the specifications I estimate a negative premia for foreign sellers, indicating that foreign sellers make lower capital gains upon resale relative to South African sellers. In column (3) I find that foreign nonresidents realize a 1.5 percentage point lower annualized capital gain than South African sellers upon resale while foreign residents realize a 0.5 percentage point lower annualized capital gain than South African sellers upon resale. I also find that the longer the holding period, the lower the capital gain. Importantly, this result is robust to controlling for market conditions in the subplace at the time of sale, through sale year-month by subplace fixed effects, and at the time of purchase, through purchase year by subplace fixed effects. As a further robustness test, I re-estimate the model in column (4) with a sale year by purchase year-month by mainplace fixed effect, in order to compare transactions in which sellers purchased property in the same mainplace in the same year and sold that property in the same year-month and I find similar results. As a result, foreign sellers realize lower capital gains upon resale relative to local buyers controlling for financing and market timing. Given I find little evidence that foreign sellers sell for lower prices than South African sellers in Table 2.7, the differences in capital gains can be attributed to the premia paid when purchasing relative to South African buyers.

Table 2.10: Foreign realize lower capital gains when selling

	Seller Annualised Return			
	(1)	(2)	(3)	(4)
Foreign non-resident seller	-0.013***	-0.010**	-0.010**	-0.015***
	(0.004)	(0.004)	(0.004)	(0.005)
Foreign resident seller	-0.003	-0.003	-0.003	-0.005
	(0.003)	(0.003)	(0.003)	(0.004)
Holding period		-0.008***	-0.008***	-0.008***
		(0.000)	(0.000)	(0.003)
Renovated property			0.013***	0.017***
			(0.005)	(0.006)
SY x SP FE	Yes	Yes	Yes	Yes
BY x BM x SP FE	No	No	No	Yes
Observations	85,517	85,517	85,517	68,929
Adjusted R-squared	0.252	0.262	0.262	0.265

This table reports the difference in annualized capital gains for foreign sellers relative to South African sellers. I vary the specifications to include fixed effects for sale year x location, buy year x buy month x location and sale year x buy year x buy month. Standard errors are clustered at the subplace level and are reported in parentheses. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

2.5.1 Potential mechanisms: wealth effects

Much like the case with the foreign buyer premia effects, lower bargaining intensity among wealthier foreign sellers may also contribute to the lower capital gains I measure. In such a case, considerations about capital gains made may be less important to wealthier foreign sellers with a low marginal utility of wealth and high opportunity costs of time. In order to gain a sense of wealth effects in capital gains, I re-estimate our repeat sales specification in (2.2) interacted with wealth terciles of the seller. In a similar fashion to the robustness exercise with the foreign premia, I assign foreign sellers to different terciles of wealth dependent on the property prices they initially bought their properties for (I do this separately for foreign non-resident buyers and foreign resident buyers). I report the results from this exercise in Table 2.11. Consistent with a wealth effect, I find that capital gains decrease with the wealth of the seller. This provides

evidence that wealth effects do indeed contribute to the lower capital gains made by foreign sellers. Interestingly, capital gains for the lowest wealth terciles of foreign sellers are actually larger than the capital gains made by South African sellers. When you consider the fact that this tercile of foreign payers actually pay lower prices when purchasing relative to South African buyers as shown in Table 2.9, the improved capital gain is intuitive. This suggests that bargaining intensity may be higher for the lowest wealth terciles of foreign sellers, which could suggest that on average, these foreign sellers may be less wealthy than the average South African seller.

Table 2.11: Wealthier foreign buyers make lower capital gains

	Seller Annualised Return
Foreign non-resident - Tercile 1	0.021**
	(0.009)
Foreign non-resident - Tercile 2	-0.014**
	(0.006)
Foreign non-resident - Tercile 3	-0.069***
	(0.011)
Foreign resident - Tercile 1	0.016**
	(0.006)
Foreign resident - Tercile 2	0.001
	(0.006)
Foreign resident - Tercile 3	-0.036***
	(0.007)
SY x SP FE	Yes
BY x BM x SP FE	No
Observations	68,929
Adjusted R-squared	0.268

This table reports the results from an exercise where I re-estimate the model reported in Table 2.10 but where I interact the foreign seller indicator with an indicator for the tercile of wealth of the seller. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

2.6 Conclusion

Foreign non-resident investment in real estate is becoming an increasing feature of "superstar" cities in the developed world. In this chapter, I provide evidence that foreign investment in real estate is sizeable in Cape Town, a major city in the developing world using a granular transaction dataset with information on the nationality status of each buyer and seller between 2011

and 2018. Using data on the ownership of the property stock in the city, I show that not only are transaction flows sizeable but so too foreign ownership of the property stock. Throughout the sample however, the share of foreign ownership is relatively unchanged suggesting that foreign buyers are not crowding out locals, with the net inflow of foreigners being offset by the rate of new construction. The finding that foreign non-residents have not crowded out local buyers is notable. The existing research has been unable to observe the ownership of the property stock and as a result, needed to rely on the assumption that crowding in transaction flows was positively correlated with crowding out in the property stock. I show that this positive correlation need not hold, given rates of new construction, which has important implications for housing policy in response to rising foreign non-resident investment in housing.

I then document a sizeable premia in transaction prices paid, showing that foreign buyers pay higher prices for otherwise identical properties Importantly, the estimated premia is robust even after accounting for local price trends and heterogeneity in property level characteristics. I also highlight an important feature of foreign demand, so far overlooked by the existing literature—the tendency of foreign buyers to be cash buyers. I show that failing to control for the financing choices of the buyer leads to a sizeable underestimate of the foreign buyer premia driven by the fact that buyers who purchase properties using cash as opposed to a mortgage typically attract a sizeable discount which I estimate to be 10.3%. This highlights that existing studies which quantify premia paid by foreign buyers and fail to control for the financing decision of the buyer may potentially underestimate the premia. I then present evidence that this premia likely occurs due to wealth effects and information asymmetries. Foreigners also experience worse outcomes relative to locals when selling their property even after controlling for local price trends and market timing. Given I find little evidence that foreign sellers sell for lower prices than South African sellers, the differences in capital gains can be attributed to the premia paid when purchasing relative to South African buyers. I show that wealth effects are once again at play, with capital gains among foreign sellers decreasing with wealth.

As with any dissertation, there are many opportunities to improve the analysis in this chapter, which I leave to future work. One such extension would involve an analysis of how the foreign buyer premia varies over time and with macroeconomic and political conditions in South Africa and abroad. In future iterations of this paper, I also hope to extend the transaction dataset to cover the rest of the country, in order to understand whether the results for Cape Town can be generalized to other major cities in South Africa, or, whether, Cape Town is itself a “superstar” city within South Africa.

Given the extent of foreign investment in the residential real estate market in Cape Town, it is natural to wonder what the effect of these transaction inflows are on prices. This is particularly

relevant given the concerns raised regarding the effect of this global demand on property prices and affordability for local buyers in developed countries.[17] In many regions, these concerns have led to policy action, with numerous countries introducing buyer taxes for foreigners when purchasing property.[18] The increasingly global and interconnected nature of real estate also poses concerns for financial stability (International Monetary Fund, 2018). If foreign buyers drive up local prices, the standard monetary policy and other macroprudential tools, such as loan-to-value and loan-to-income ratios, typically used to temper rising house prices may be rendered ineffective given the tendency of foreign investors to avoid the local mortgage market to finance their purchases, instead preferring to use cash. In Chapter 3, I proceed to study how these foreign non-resident inflows into the housing market in Cape Town have affected prices.

Finally, in this chapter, I focus on estimating premia in the housing market, whereby a subset of buyers pay higher prices for otherwise identical property relative to other buyers in the same market. There are however also cases where certain transactions are associated with sizeable discounts, whereby certain types of property may sell for lower prices, relative to otherwise identical properties. One notable example of such a discount relates to the discounted prices foreclosed homes typically sell for. Studying these foreclosure discounts is the focus of Chapter 4.

[17] See for example "When the empty apartment next door is owned by an oligarch" – *The New York Times*, 21 July 2017; "Foreign Buyers Pump Up U.S. Home Prices" – *The Wall Street Journal*, 18 July 2017; "Foreign investors snapping up London homes suitable for first-time buyers" – 13 June 2017 and "Foreign property buyers are pricing locals out of the market" – *The Australian Daily Telegraph*, 13 March 2017.

[18] See for example: "Vancouver slaps 15% tax on foreign house buyers in effort to cool market" – *The Guardian*, 2 August 2016; "Toronto to impose 15% tax on foreign home buyers to regulate housing costs" – *The Guardian*, 20 April 2017 and; "Australia targets foreign homebuyers with property tax rise" – *The Financial Times*, 1 June 2017.

Chapter 3

The Cape of Good Homes: Exchange Rate Depreciations, Foreign Non-Resident Demand and House Prices

3.1 Introduction

International capital flows to emerging markets are sizable, volatile, and prone to large outflows and sudden stops (Calvo, Leiderman and Reinhart, 1996; Hannan, 2018). Consequences of these volatile capital flows include volatile exchange rates, frequent episodes of large, sudden depreciations and painful macroeconomic adjustments for emerging markets (Mendoza, 2010). Often, exchange rate depreciations are associated with foreign capital outflows. In this context, exchange rate adjustments are an important mechanism to act as a buffer against negative economic effects associated with capital outflows, as in Edwards (2004). They can, however, as Aguiar and Gopinath (2004) point out, also stimulate foreign direct investment. These types of counter-cyclical foreign capital inflows are particularly important in stabilizing the local economy.

Recent anecdotal evidence highlights a relatively undocumented source of foreign direct investment following large exchange rate depreciations: foreign investment in real estate. In Turkey for example, following an historically large depreciation in quarter 3 of 2018, where the Turkish Lira depreciated by around 30% year-on-year, real estate agents in Turkey reported a doubling of web traffic on online listing sites[1] while foreign transactions increased by 142% year-on-year,

[1] See for example: "Turkish lira plunge sees Gulf property investors flock to Istanbul - *Arab News*, 25 August 2018.

for August and September, from 3,920 transactions to 9,481 transactions.[2] Many of the accounts refer to how the large depreciation offered opportunities to foreign buyers. Outside of property, there are also anecdotal accounts of foreign buyers visiting the country as tourists, lining up outside of luxury retailers in order to take advantage of the weakened Lira.[3] Given that local prices were largely unchanged (or slow to change), foreign buyers were afforded large discounts in their domestic currency.[4] This combination of sticky prices and exchange rate depreciations therefore creates a temporary window for foreign buyers to purchase goods at a discount (Froot and Stein, 1991).

The extant literature (Cvijanović and Spaenjers, 2021; Ruf and Levi, 2011) finds evidence of a positive correlation between foreign real estate purchases and exchange rate depreciations. Importantly, however this literature studies this channel for moderate exchange rate depreciations in advanced economies. But the phenomenon of large and sudden exchange rate depreciations, the type referenced in the case of Turkey, are much more prevalent in emerging markets. Relative to regular sized exchange rate movements, large exchange rate depreciations are often associated with sizeable declines in output and consumption (Burstein and Gopinath, 2014).

There are two primary reasons why we should be interested in how foreign demand responds to exchange rate depreciations and affects dynamics in the housing market. As discussed in Chapter 2, foreign non-resident investment in real estate is becoming an increasing feature of not only "superstar" cities, such as London, New York and Paris, but also cities in the developing world such as Cape Town. This has attracted much media attention around the world, with concerns raised regarding the effect of this global demand on property prices and affordability for local buyers.[5] In many regions, these concerns have led to policy action, with numerous countries introducing buyer taxes for foreigners when purchasing property.[6] Furthermore, concerns about price increases are not limited to "superstar" cities, but have the potential to affect prices in other cities given spillovers in house price across cities, regions and even countries (see Duca, Muellbauer and Murphy (2021) for a summary of the empirical evidence in this literature). In addition to concerns about affordability, the increasingly global nature of real estate also poses concerns for financial stability. The International Monetary Fund (IMF) Global

[2] Authors' own calculations using data from the Turkish Statistical Institute, available here.

[3] See for example: "For a Lucky Few, Luxury Is Suddenly a Lot Cheaper in Turkey" - *Bloomberg*, 12 August 2018.

[4] See for example: "Property buyers dive in as Turkey's lira plunges" - *The Guardian*, 18 August 2018.

[5] See for example "When the empty apartment next door is owned by an oligarch" – *The New York Times*, 21 July 2017; "Foreign Buyers Pump Up U.S. Home Prices" – *The Wall Street Journal*, 18 July 2017; "Foreign investors snapping up London homes suitable for first-time buyers" – 13 June 2017 and "Foreign property buyers are pricing locals out of the market" – *The Australian Daily Telegraph*, 13 March 2017.

[6] See for example: "Vancouver slaps 15% tax on foreign house buyers in effort to cool market" – *The Guardian*, 2 August 2016; "Toronto to impose 15% tax on foreign home buyers to regulate housing costs" – *The Guardian*, 20 April 2017 and; "Australia targets foreign homebuyers with property tax rise" – *The Financial Times*, 1 June 2017.

Financial Stablity Report (GFSR) for 2018 highlights a striking feature of the housing market in recent time: the increasing synchronicity of global house prices (International Monetary Fund, 2018). The report identifies one contributor to this feature, namely, foreign investors, who act as conduits, increasing the exposure of local markets to global financial conditions. This increasing connectedness of the housing market to global conditions represents a macroprudential concern. In particular, if this connectedness is being driven by foreign investors, monetary policy also and other macroprudential tools typically used to temper rising house prices, such as loan-to-value and loan-to-income ratios, may be rendered ineffective given the tendency of foreign investors to avoid the local mortgage market, instead preferring to use cash, a fact I established in Chapter 2. Despite these concerns, foreign investment into the housing market may have important stabilizing effects on house prices, especially if these inflows are counter-cyclical, as would be the case if foreign investment increases following large depreciations (International Monetary Fund, 2018). Therefore, assessing the nature and extent of these counter-cyclical foreign inflows into the housing market is critical for economic policy.

It remains an open question whether large emerging market exchange rate depreciations act as a pull (discounted prices) or push (economic uncertainty) factor for foreign buyers.[7] There are two potential reasons for this paucity of evidence. Firstly, as noted in Chapter 2, detailed transaction data including nationality status is rare, even for developed countries, and as such, documenting foreign investment in real estate is challenging. Secondly, even if one could obtain such data, there are perhaps few cities that attract notable foreign non-resident investment into housing that are also located in countries with frequent episodes of large and sudden exchange rate depreciations.

In this chapter, I study the effect of large and sudden exchange rate depreciations on foreign demand and property prices in Cape Town, South Africa, using detailed transaction data on the universe of properties between 2011-2018 as introduced in Chapter **??**. Cape Town presents an apt location, given a large and established luxury secondary real estate market which consistently attracts foreign investment.[8] Secondly, the South African Rand has also consistently ranked as one of the most volatile currencies in the world.[9] Importantly for this study, while local institutional and economic conditions play their part, global conditions also play a major part in the volatility of the Rand. The Rand is the 20th most traded currency in the world, ac-

[7] On pull factors, see for example: "Property buyers dive in as Turkey's lira plunges" - *The Guardian*, 18 August 2018. On push factors, see for example: "Where are the world's riskiest property buys?" - *The Financial Times*, 29 October 2015.

[8] See: "Cape Town: Why foreign 'swallows' are swooping on homes in suburbs" - *The Financial Times*, 18 July 2016.

[9] See, for example: "Ruble Is Close to Unseating Rand as the World's Most Volatile Currency" - *Bloomberg*, 04 September 2018.

counting for around 1% of all global foreign currency trading.[10] Much of this trading happens outside South Africa, given the lack of capital controls for foreigners.

I show that foreign non-resident transactions respond strongly to changes in the Rand nominal effective exchange rate (NEER) — a one percentage point decrease in the year-on-year NEER is associated with a 2.9 percentage point increase in the year-on-year change in foreign non-resident transactions in the following month. Furthermore, the effect is only economically and statistically significant at the one-month lag. This supports the hypothesis that, in response to large depreciations, foreign demand is quick to materialize, which is especially important if these exchange rate induced discounts are short lived and "temporary" (Froot and Stein, 1991). In addition, I also present evidence that this effect is driven by large exchange depreciations. I only estimate economically and statistically significant changes in foreign non-resident transactions following lower quartile exchange rate events.[11] Consistent with the increase in demand being driven by changes in the relative prices of property induced by a depreciation of the Rand, I find no evidence of similar effects for foreign residents (i.e foreign born permanent residents in South Africa) highlighting that the exchange rate effect is linked to purchasing property in foreign currency and not to whether or not the buyer is a foreigner.

I then proceed to estimate the impact of foreign demand on house prices, using large exchange rate depreciations as an exogenous shock to foreign non-resident buyers which changes the relative price of property in a foreign currency. I then use an identification strategy which estimates quality adjusted price differences across geographically close and similar suburbs which differ in their ex-ante attractiveness to foreign non-resident buyers. To do this I implement a two step procedure. In the first step, I calculate differences in the subplace level house price index across subplaces with the highest shares of foreign non-resident ownership of the property stock in 2011 and subplaces with the lowest shares of foreign non-resident ownership of the property stock in 2011, *conditional* on being in the same mainplace. I show that using the foreign non-resident ownership of the property stock in 2011 as a proxy for the ex-ante likelihood a suburb attracts foreign non-resident transactions is sensible, given that foreign non-resident transactions are increasing in this instrument, to a far greater extent than foreign resident transactions. I then study the differences in this price spread in the month following a large exchange rate depreciation, which I define as a year-on-year change in the NEER which is in the lower quartile distribution of changes in the NEER throughout the sample period. In doing so, my identifying assumption is that the within-mainplace distribution of foreign non-residents in 2011 is correlated to the within-main-place price spread following large exchange rate depreciations between 2011 and 2018 *only* through its ability to predict variation in non-resident

[10] See: "2016 Bank of International Settlements (BIS) Triennial Central Bank Survey", accessible here.

[11] These lower quartile exchange rate events refer to year-on-year depreciations of greater than 12.9%.

demand following these depreciations.[12] I find evidence of price effects, with the within main-place price spread increasing by 1.6% in month following a large exchange rate depreciation. The price effect is also increasing in the size of the depreciation, with the price effects increasing to 2.4% following a lower decile exchange rate movement. I then show that this price effect can be decomposed into an extensive margin effect — foreign non-residents increasing prices through purchasing more property – and an intensive margin effect — conditional on entering the market, foreign non-resident buyers pay higher prices for otherwise identical property. The mechanism behind this intensive margin effect was already established in Chapter 2. I show that the intensive margin effect can account for between 12.5%-29% of the observed price effects. Lastly, I conduct two robustness exercises using bootstrap methods and show that the definition of treatment and control subplaces I employ is a necessary condition for the results and that the price effects I estimate are only evident following large exchange rate depreciations, highlighting that the results I estimate are not spurious nor a mere statistical artifact.

This chapter contributes to various strands of literature. One extensive strand of literature studies the relationship between foreign direct investment and exchange rate depreciations, such as Froot and Stein (1991), Harris and Ravenscraft (1991), Goldberg (1993) and Blonigen (1997). In this chapter, I focus on foreign investment in real estate and the friction at the heart of why exchange rate depreciations create opportunities for foreign buyers owing to sticky house prices as opposed to factors such as imperfect capital markets. Cvijanović and Spaenjers (2021) provide evidence on how the exchange rate depreciations are correlated with increases in foreign demand. The authors document the correlation between foreign demand and exchange rate depreciations in Paris but do not study resulting price effects. In a similar vein, Ruf and Levi (2011) study how changes in the exchange rate affects property prices in areas in the US and Canada which are likely to be attractive to foreign buyers relative to other areas, but do not directly study how foreign transactions respond. Ruf and Levi (2011) are unable to make the distinction between foreign resident and foreign non-resident demand and, as I show in this paper, this distinction matters because exchange rate depreciations only affect foreign non-resident demand. Furthermore, I focus on a very specific kind of large depreciation event, which is a distinctive feature of emerging markets and which has not been studied in the literature.

I also contribute more generally to the literature on international capital flows and house prices, such as Favilukis et al. (2012) and Aizenman and Jinjarak (2009). In particular, I provide novel evidence of this relationship in emerging markets, using granular transaction-based data, while

[12] It is natural to consider the possibility that these large depreciations may affect housing supply. Given the short time frame of the sample and the estimation strategy I use which focuses on short-term changes in prices, changes in supply, which take years to materialize given planning permissions, construction etc., are unlikely to invalidate the identification strategy.

the existing evidence, such as Cesa-Bianchi, Cespedes and Rebucci (2015), is largely based on aggregate data. By studying the impact of foreign demand on house prices this paper links closely to a growing literature on foreign investors in the housing market. Badarinza and Ramadorai (2018) study the housing market in London and document that foreign investment follows a "safe haven" pattern — following increases in economic and political risk abroad, house prices in areas with historically large populations of foreign residents experience price increases. These results are given credence by Sá (2016). In Paris, Cvijanović and Spaenjers (2021) show that foreign demand leads to positive but small increases in property prices. One explanation offered for this result is that there may be "mobile native price arbitrageurs" who move out of suburbs experiencing rising prices following foreign demand and thereby mute the price effects measured. This out-migration effect is highlighted in Saiz and Wachter (2011). Favilukis and Van Nieuwerburgh (2021) develop a structural spatial equilibrium model to study the effect of an inflow of out-of-town home buyers on housing market outcomes. The authors show how an increase in non-resident investment can lead to a decrease in overall welfare, driven by a reduction in the housing stock for local buyers, when out-of-town buyers do not rent their properties to locals. The authors also show how an increase in foreign demand in one part of a city can lead to increases in other parts of the city too. This highlights an important substitution effect with non-housing consumption, where, in equilibrium, residents anticipate the arrival of foreigners, reduce their housing consumption and relocate to the more affordable suburban areas. Furthermore, Gorback and Keys (2020), Li, Shen and Zhang (2021) and Sakong (2021) all study the impact of rising foreign Chinese housing purchases on house prices in the United States. All of these papers document positive price increases. However, those papers focus on cities in advanced economies, whereas I am the first to show evidence of this foreign demand channel in an emerging market context. My results indicate that foreign demand for real estate in an emerging market has counter-cyclical properties with foreign inflows into the property market occurring following large depreciations—periods which are typically associated with large outflows of foreign capital in the bond and equity markets. In this respect, while I find that foreign demand increases prices, it likely also has an important stabilizing effect on house prices. Lastly, I also highlight a novel extensive and intensive margin through which foreign non-resident demand affects house prices.

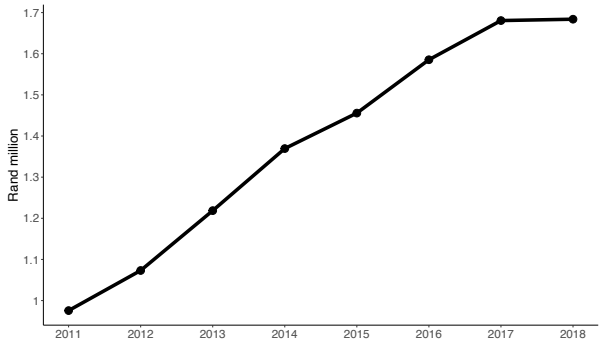
3.2 Data and institutional setting

In this chapter I once again leverage the transaction and property characteristic data introduced in Section 2.2. Given this chapter is concerned with documenting how foreign demand

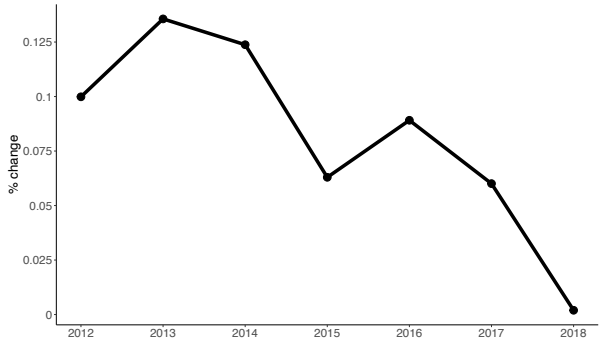
impacts house prices in Cape Town, I provide a brief overview of property price dynamics in Cape Town during the period being studied. I illustrate the evolution of property prices in Cape Town between 2011 and 2018 in Figure 3.1. While property prices have been rising throughout the period, the rate of growth in prices has been decreasing. In Panel (c) I show average transaction prices in Cape Town and as is evident, there is substantial variation in prices. Cape Town's property market has also been somewhat of an anomaly in the last 10 years. While house price growth has been sluggish in the rest of South Africa, prices have accelerated in Cape Town. A recent report published by First National Bank, one of the major banks in South Africa shows how property prices in the Western Cape, a provincial region of which Cape Town represents the major city, has seen house price inflation of around 50% between 2012 and 2017, with the next best performing region recording growth of just over 30%.[13]

[13] First National Bank *"Property Barometer Western Cape… strong, booming or bubbling?"*, 29 August 2017

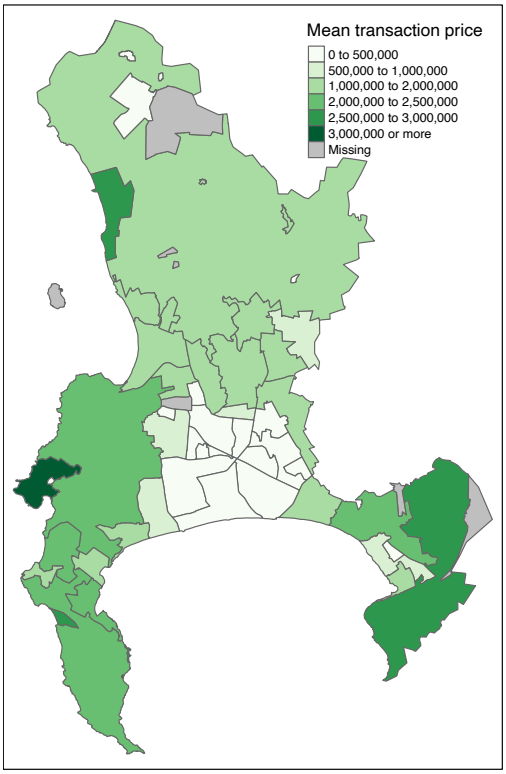
Figure 3.1: Property prices in Cape Town 2011 - 2018



(a) Mean transaction prices



(b) Year on year % change in mean transaction prices



(c) Mean mainplace transaction price

This figure documents the evolution of property prices in Cape Town between 2011 and 2018. In Panel (a) I report the yearly mean transaction price between while I show the year-on-year percentage change in Panel (b). In Panel (c) I report mean transaction prices across subplaces in Cape Town. Areas with darker colors are associated with higher average transaction prices. Areas marked missing refer to suburbs with no residential property transactions, which typically represent industrial areas or farmlands.

3.3 Exchange rate depreciations and foreign non-resident demand

It is intuitive that the exchange rate affects foreign demand. In the most basic sense, the exchange rate determines the price of real estate for foreigners in their home currency. *Ceteris paribus*, the weaker the exchange rate, the more affordable a property is in a foreign investor's home currency. Thus, changes in the exchange rate should be associated with changes in foreign demand. Ruf and Levi (2011) and Cvijanović and Spaenjers (2021) find evidence of this effect, and as I argue earlier, our setting is the ideal test bed for this mechanism due to the high

volatility of the South African rand.

In most developed countries where foreign investment has been touted as a driver of real estate prices, exchange rate volatility is low. As a result, large depreciations and appreciations are rare, as are large exchange rate-induced price discounts for foreign buyers. Emerging markets are, however, characterized by greater exchange rate volatility. Recent anecdotal evidence from Turkey provided earlier suggests that these exchange rate swings can have a large impact on foreign demand for real estate, especially given that real estate prices tend to be slow-moving. Thus, large depreciations can induce substantial changes in foreign demand, especially in highly desirable residential areas. However, these large depreciations can also act as push factors, which decrease foreign demand, especially if these events are associated with political and economic uncertainty.[14]

Cape Town, in particular, and South Africa, in general, are ideal locations to study this effect due to the fact that South Africa has one of the most volatile exchange rates in the world.[15] In Table 3.1, I show the standard deviation of the month-on-month change in the real effective exchange rate (REER) for a group of countries. South Africa consistently ranks high among these countries. While local institutional and economic conditions are not to be neglected, global conditions play a major role in the volatility of the rand. For example, the rand is the 20th most traded currency in the world, accounting for around 1% of all global foreign currency trading.[16] In Figure 3.2, I plot the Rand nominal effective exchange rate (NEER) in levels in Panel (a) and as a year-on-year change in Panel (b). As is immediately evident, the Rand has experienced a sustained and dramatic depreciation since 2011 of around 60 percentage points. Within this long term depreciation, there is also sizeable volatility as shown in the year-on-year change in Panel (b) with frequent episodes of depreciations larger than 10%.

[14] See for example: "Where are the world's riskiest property buys?" - *The Financial Times*, 29 October 2015.

[15] See Maveé, Perrelli and Schimmelpfennig (2016) and in the media, "Rand Volatility Tops Global Peers as South Africa Risks Mount"–*Bloomberg*, 14 February 2019

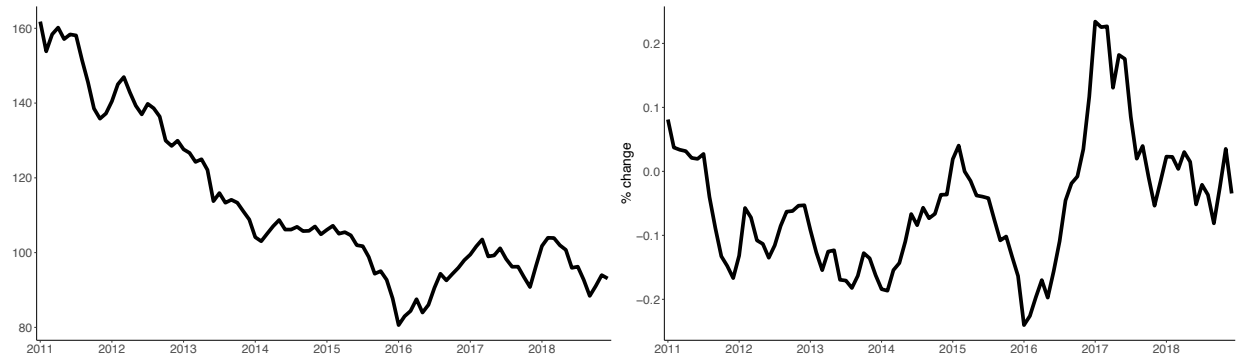
[16] See: "2016 Bank for International Settlements (BIS) Triennial Central Bank Survey", accessible here.

Table 3.1: Exchange rate volatility across a range of countries

Country	1995-2000	2000-2005	2005-2010	2010-2015	1995-2015
Brazil	3.52	2.32	2.79	2.32	2.82
Euro area	1.30	1.56	1.45	1.49	1.44
Russia	4.63	1.04	1.96	2.90	3.14
Singapore	0.94	0.78	0.78	0.81	0.84
Turkey	1.68	4.17	2.99	2.00	2.82
UK	1.62	1.50	2.02	1.30	1.75
USA	1.33	1.42	1.43	1.09	1.33
South Africa	2.82	3.26	3.27	2.11	2.85

This table reports the standard deviation of the month-on-month change in the real effective exchange rate (REER) for a group of countries. The results are broken down into four time periods and are shown for the sample as a whole in the final column. NEER data was obtained from the Bank for International Settlements.

Figure 3.2: Rand Nominal Effective Exchange Rate



(a) Levels **(b)** Year on year changes

This figure shows the evolution of the South African Rand Nominal Effective Exchange Rate between 2011 and 2018 in (a) levels and (b) as a year-on-year change.

To gain an understanding of the relationship between the exchange rate and foreign demand, I consider the following specification,

$$\Delta N_t^F = \alpha + \beta_1 \Delta ER_{t-1} + \varepsilon_t, \tag{3.1}$$

where ΔN_t^B represents the year-on-year change in transactions by a specific buyer group and ΔER_{t-1} represents the one-month lagged year-on-year change in the nominal effective exchange rate. As was the case in Chapter 2, I once again consider two groups of foreign buyers: foreign residents and foreign non-residents. This split is intuitive under the assumption that foreign non-residents hold most of their income and wealth in foreign currency and should therefore be more sensitive to changes in the exchange rate. On the other hand, while foreign residents may also hold wealth in foreign currency, given that they live and work in South Africa, they are closer to South African residents.

I report the results in Table 3.2. I observe a strong negative relationship between changes in the NEER and changes in foreign non-resident demand, such that depreciations lead to increases in transactions. The conditional correlation is also significant from an economic point of view — a one percentage point decrease in the year-on-year NEER is associated with a 2.9 percentage point increase in the year-on-year change in foreign non-resident transactions in the following month. Furthermore, the effect is only economically and statistically significant at the one-month lag. I interpret this as evidence which supports the hypothesis that, in response to large depreciations, foreign demand is quick to materialize. This is especially important given the volatility of the South African currency and the potential that large short-term depreciations revert quickly. Interestingly, the negative effect is more modest for foreign residents but statistically insignificant, which is in line with the hypothesis that these buyers earn in South African Rands and benefit much less from a change in the NEER. Notably, the regression also has a lower R-squared, suggesting that, while changes in the exchange rate have strong explanatory power for changes in the number of transactions by foreign non-residents, they are less apt at explaining foreign resident and South African resident transactions.

I then repeat the exercise, but regress on quartiles of the NEER. I present the results in Table 3.3. Transactions by foreign non-residents increase with the magnitude of the depreciation and are only significant following lower quartile changes in the NEER (i.e $Q1$), which represent the largest depreciations. This highlights an important nuance: foreign non-resident transactions increase as the exchange rate depreciates, but respond especially strongly following large exchange rate depreciations, consistent with with earlier anecdotal evidence from Turkey.[17] As before, there is no such relationship for foreign residents and the significantly lower R-squared also points to exchange rates holding less explanatory power for changes in foreign resident transactions.

[17] An important point to emphasize here is that concerns about reverse causality (i.e foreign non-resident investment inflows leading to depreciations) are less pronounced given the magnitude of foreign non-resident investment into real estate is relatively small in magnitude, unlike for example, foreign investment into government bonds or other financial assets.

Table 3.2: Exchange rate depreciations have an impact on foreign non-resident demand

	Foreign Non-Resident	Foreign Residents
ΔER_{t-1}	-2.905***	-0.848
	(0.994)	(0.787)
ΔER_{t-2}	1.242	0.782
	(1.190)	(1.208)
ΔER_{t-3}	-0.586	0.154
	(0.851)	(0.837)
Observations	84	84
R-squared	0.465	0.199

This table shows the coefficient results from the estimation of equation 3.1. Standard errors are White heteroskedasticity-robust and are reported in parentheses. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

Table 3.3: Large exchange rate depreciations are correlated with increased foreign demand

	Foreign Non-Resident	Foreign Residents
ΔER_{t-1}^{Q1}	0.534***	0.045
	(0.141)	(0.139)
ΔER_{t-1}^{Q2}	0.204	0.057
	(0.133)	(0.126)
ΔER_{t-1}^{Q3}	0.149	0.084
	(0.094)	(0.092)
Observations	84	84
R-squared	0.462	0.189

This table reports the coefficients results from the estimation of equation 3.1, where I replace the contemporaneous exchange rate with quartiles of the exchange rate distribution. Quartiles increase in the exchange rate distribution, i.e $Q1$ represents the largest depreciations. Standard errors are White heteroskedasticity-robust and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

I am also interested in understanding if the foreign non-residents who purchase following large depreciations differ from other foreign non-residents who purchase during other periods. To do this, I compare high-level features of foreign buyers across the exchange rate distribution and find similar characteristics. Foreign non-residents do not appear to change the location of their purchases following large depreciations with correlation between the subplace number of non-resident transactions following lower quartile exchange rate movements and the subplace number of non-resident transactions during all other times being 0.9. This suggests that large exchange rate depreciations simply intensify existing non-resident demand, but change neither the type of properties purchased, nor the location thereof.

Together, these results show that changes in the exchange rate play a key role in explaining changes in non-resident demand for property. Depreciations, and in particular large depreciations, are associated with large increases in non-resident transactions. This highlights the fact that, in addition to the price of the underlying property, changes in the exchange rate play an important role in explaining non-resident demand for real estate, to the extent that it determines the price of a given property in the home currency of the foreign buyer. Hence, large exchange rate depreciations are effectively a discount on local property prices, denominated in foreign currency. The lack of evidence of a relationship between changes in the exchange rate and changes in transactions by foreign residents is consistent with this view, assuming that foreign residents hold the majority of their wealth and capital in South African currency. In that sense, the exchange rate effect is linked to purchasing property in foreign currency and not to whether or not the buyer is a foreigner. These large depreciations do not, however, appear to change either the location or features of properties foreign non-residents purchase or the premium foreign non-residents pay.

3.4 Foreign non-resident demand and house prices

As discussed in the introduction to this chapter, understanding the relationship between exchange rate depreciations, foreign demand and house prices is of critical importance for economic policy. In this section, I study this question empirically. I develop a subplace level house price index for Cape Town given the lack of a house price index at this level of granularity.[18]

[18] Unlike the United States, where highly dissagregated house price indices by providers such as Zillow are readily available, house price indices in South Africa typically do not extend below the city level.

3.4.1 Developing a house price index

Since housing is a heterogeneous good, house prices reflect both the underlying aggregate price trends in a given market and the premia (or discounts) associated with the specific characteristics of a property, such as the number of bedrooms, bathrooms, the size of the property etc. As a result, two bedroom homes typically sell for more than one bedroom homes, all else equal, with the difference in price reflecting the additional bedroom. Properties do not just differ on physical characteristics, but also differ in the neighbourhood in which they exist, their location within that neighbourhood, and the externalities associated with that location. For example: certain neighbourhoods may have better schools, certain streets within a neighbourhood may have better access to public amenities, and certain properties may be exposed to more negative externalities than other properties in the same neighbourhood, such as a the quality of neighbouring houses. As Rossi-Hansberg, Sarte and Owens III (2010) show, these location based price externalities can be sizeable. As such, two otherwise identical properties situation in different neighbourhoods or even in different locations within a given neighbourhood may have very different market prices. As a result, when developing a house price index it is essential to control for these observable differences in property characteristics and location. The two most widespread methods for dealing with heterogeneity in housing are the repeat sales approach and the hedonic regression (OECD et al., 2013).

The repeat sales approach, largely acknowledged as being developed by Bailey, Muth and Nourse (1963), involves comparing changes in property prices for the same property, when it transacts at different points in time. By comparing transaction prices for the same property, property characteristics and location are kept constant, such that the differences in prices represent quality-adjusted differences. The major advantage of this approach is that fact that it is not data intensive - only property prices are required in order to estimate differences in prices. The most well know implementation of the repeat sales approach is the Case Shiller House Price Index in the United States (Case and Shiller, 1989). There are however two major disadvantages of the repeat sale approach: it requires that a property transacts twice and the longer the time elapsed between the two transactions, the more likely it is that the house is no longer comparable across the two transactions, given wear and tear and the possibility of renovations and alterations being made to the property (OECD et al., 2013).

The hedonic regression approach, largely acknowledged as being developed in the seminal work of Rosen (1974), is most widely used alternative to the repeat sales approach. The conceptual idea behind the hedonic approach is that the price of every house is a function of a number of property characteristics. If data on these characteristics is available, they can be explicitly controlled for in a regression where the house price is the dependent variable. These

regressions are then typically further augmented to include location and time fixed effects. Recent examples include Campbell, Giglio and Pathak (2011), Adelino, Schoar and Severino (2013) Badarinza and Ramadorai (2018) and Gorback and Keys (2020). The major advantage of the hedonic approach is that it retains all transactions, provided property characteristic data is available.

With this in mind, I make use of a hedonic regression approach to construct house price indices. Formally, I estimate the following regression where the dependent variable is the log transaction price, $\log(y_{i,s,t})$ of property i, in suburb s that sells in time t:

$$\log(y_{i,s,t}) = \alpha_s + \beta_{s,t} + \gamma' X_i + \varepsilon_{i,s,t} \tag{3.2}$$

where this specification is very similar to the main hedonic specification used in Chapter 2. α_s represents a subplace fixed effect, $\beta_{s,t}$ a subplace by time fixed effect and X_i represents a vector of time invariant property characteristics, which include property size, type, bedrooms, bathrooms, age, property type, a dummy variable if any renovations have taken place, the type of property and a control for the financing choice of the buyer. Our variable of interest is the subplace by time fixed effect $\beta s, t$ which captures subplace by time variation in property prices, holding property characteristics and subplace location fixed. I interpret this as quality-adjusted house price index for each subplace, formally $HPI = \beta_{s,t}$. I find the average HPI to be 0.018, suggesting that house prices across sub-places were growing positively throughout the period.

3.4.2 Using large exchange rate depreciations to establish the causal relationship between foreign demand and prices

Earlier, I show that large exchange rate depreciations can induce these types of large increases in foreign demand. Importantly, while this relationship holds strongly for foreign non-residents, the evidence is far weaker for foreign residents, suggesting that the exchange rate effect is not linked to being born outside of South Africa, but to the residence status of the foreign buyer and therefore, the likelihood that the purchase is made using foreign currency. This suggests that the mechanism driving increases in demand by non-residents relates to the extent to which exchange rate depreciations effectively discount the price of property in the buyer's (foreign) currency. Another key feature of these depreciations is uncertainty regarding how long they are likely to persist. This is especially true in a country like South Africa with an extremely volatile exchange rate. In this regard, the fact that foreign non-resident buyers typically purchase property in cash means that foreign non-resident buyers have the ability to react faster to these

depreciations, given that they do not need to rely on mortgage financing which would take some time to acquire.

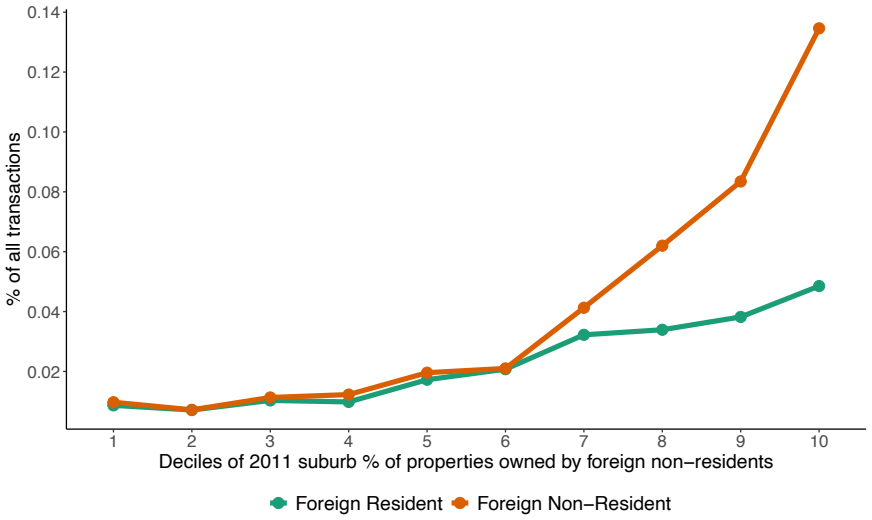
These large exchange rate depreciations therefore provide a rare demand shock to only one segment of the market, especially in the short run. However, it is not clear if these increases are sizeable enough to induce economically significant price effects. Identifying the causal effects of foreign demand on house price is challenging, as potential endogeneity arises from two sources. Firstly, foreign non-resident buyers could choose to purchase in areas that are experiencing price increases, and use the price increases as a positive signal to buy, inducing reverse causality. Secondly, there could be omitted variables. For example, new developments or amenities could arise, which simultaneously push up prices and increase foreign demand.

Ideally, we need a source of feasibly exogenous variation in the location of foreign transactions. To do that, the literature has typically used the share of foreign residents residing in a given suburb, seeing as there is a strong tendency for foreign buyers to purchase in areas where their counterparts are over-represented. In this chapter, I follow a similar strategy and use the subplace share of foreign non-resident owned properties as of 2011, $Share_s^F$. I construct this variable using data on the ownership of the property stock as described in Chapter **??** and used in Chapter 2. It is worth noting that other studies typically use census data to measure foreign ownership. However, given that I observe ownership directly, I do not have to make use of census data. To define our treatment and control suburbs, I use the native suburb hierarchy in Cape Town. For every mainplace, I split the subplaces contained in the main-place into two groups: a treatment group, which was in the upper quartile (top 25%) of all subplaces in the respective main-place with regards to our instrument, $Share_s^F$, and a control group, of subplaces in the bottom quartile (bottom 25%) of $Share_s^F$ within the same mainplace. Our treatment group then represents subplaces with the greatest shares of foreign non-resident owned property in 2011, *relative* to subplaces with the lowest shares of foreign non-resident owned property in 2011 *within a given main-place*.

Figure 3.3 plots the subplace share of foreign non-resident and resident transactions throughout our sample against deciles of $Share_s^F$. Both foreign resident and non-resident transactions are increasing in $Share_s^F$, but the rate of increase is much higher for foreign non-residents especially in the upper deciles. Put differently, our instrument for foreign non-residents, which picks up subplaces with high shares of existing foreign non-resident ownership in 2011, is unlikely to be confounded by resident foreign demand, which typically occurs in different subplaces, especially in the upper deciles of our instrument.

The empirical strategy I employ studies differences in quality-adjusted subplace prices across these treatment and control suburbs following large exchange rate depreciations. This empir-

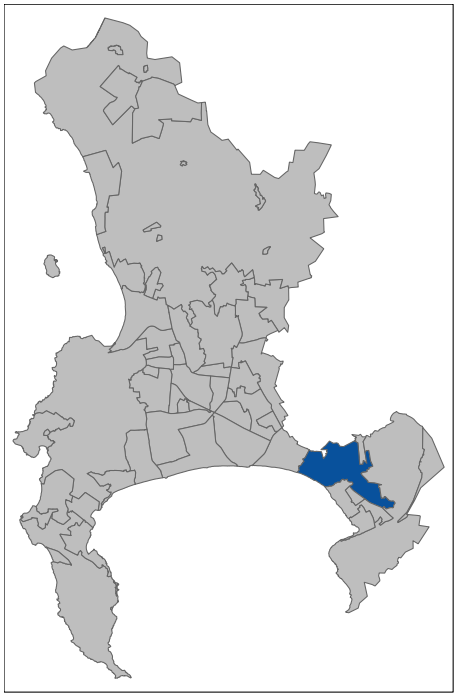
Figure 3.3: Foreign transaction deciles and the 2011 share of foreign non-resident property ownership



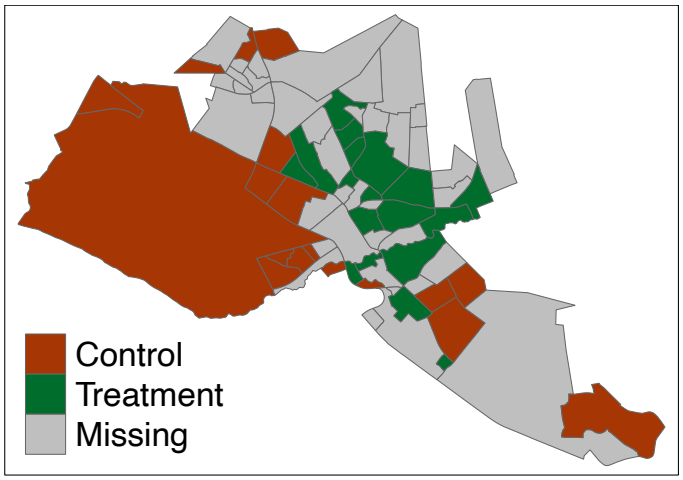
This figure illustrates the relationship between the subplace share of foreign non-resident and foreign resident transactions between 2011 and 2018 on the y-axis, against deciles of subplace share of foreign non-resident-owned property in 2011 on the x-axis.

ical strategy, namely using price spreads across suburbs which differ in the likelihood they attract foreign investment (proxied by pre-existing ownership patterns) to study the price effects of foreign demand, has been used by a number of papers in the literature. For example, Badarinza and Ramadorai (2018) study price spreads across suburbs with large shares of foreign born residents and suburbs with small shares of foreign born residents *from the same country* while Ruf and Levi (2011) study price spreads between suburbs which they define as "international" markets popular with foreign buyers and "local" markets which hold less appeal. The approach I employ differs from these papers in that I incorporate physical proximity into the determination of treatment and control suburbs. By conditioning that treatment and control subplace groups occur within the same mainplace, I effectively select treatment and control suburbs that are geographically close. The advantage of this approach is that I can ensure that the suburbs I compare are more likely to share similar characteristics, to the extent that geography and proximity influences this. I provide an illustration of the identification strategy in Figure 3.4. From an econometric perspective, this approach allows me to control for any effects which are spatially correlated when calculating price spreads. The ultimate goal then is to attribute cross-subplace price effects following these large exchange rate depreciations to foreign demand.

Figure 3.4: Illustration of identification strategy



(a) Somerset West on a map of mainplaces in Cape Town



(b) Assignment of treatment and control subplaces within Somerset West

This figure provides an illustration of the identification strategy in this chapter, using one mainplace in Cape Town, called Somerset West, highlighted in blue in Panel (a). In Panel (b) I focus on the Somerset West mainplace, depicting all of the subplaces within Somerset West. There are 3 groups of subplaces: the control group refers to subplaces within the bottom quartile (bottom 25%) of the within-mainplace subplace distribution of foreign non-resident property ownership $Share_s^F$; the treatment group which represents subplaces in the upper quartile (top 25%) of the distribution of $Share_s^F$ and; all other subplaces, which I indicate as "Missing".

In empirical terms, I proceed in two steps. Firstly, for each main-place, I split subplaces into treatment and control groups based on their share of foreign ownership in 2011, $Share_s^F$, and calculate the house price spread between these two groups using the subplace house price indices I estimate from (3.2), formally,

$$\gamma_{m,t} = \beta_{s,t}^{treat} - \beta_{s,t}^{control} \tag{3.3}$$

$\gamma_{m,t}$ therefore represents the difference in prices between treatment and control subplaces, within mainplace m in time t. In the second step, I use this spread in the final specification:

$$\gamma_{m,t} = \gamma_{m,t-1} + \beta \Delta ER_{t-1}^{Q1} + \eta + \alpha + \phi_m + \varepsilon_{m,t}, \tag{3.4}$$

where $\gamma_{m,t-1}$ is a lagged dependent variable, ΔER_{t-1}^{Q1} is a dummy variable which takes the value of one if a lower quartile exchange rate movement (equivalent to a year on year depreciation greater than 12.9%) occurred in the previous month, η represents a month of the year fixed effect, α a year fixed effect, and ϕ_m, a mainplace fixed effect. If the price spread has increased following a large depreciation, I expect our coefficient of interest, β, to be positive.

A few features of this approach are worth nothing. First, I include a lagged dependent variable to control for persistence in house price spread. Second, by defining treatment and control groups within main-places, I ensure the groupings are geographically close. By doing so, I eliminate any common trends and developments among our groups that are spatially correlated. Furthermore, I also eliminate any common effects that are correlated across time in both of our treatment and control groups. Third, I employ a set three of fixed effects: the month of the year fixed effect, η, controls for differences in the price spread which are driven by monthly seasonality; the year fixed effect, α controls for differences in the price spread which are driven by specific price trends across years and; the mainplace fixed effect, ϕ_m, controls for any time-invariant differences in the price spread across mainplaces. Finally, given the way I construct treatment and control groups, the within-main-place price outcomes are likely to be correlated and prices are also likely to be correlated across time. I therefore double-cluster the standard errors at the main-place and year level. For the motivations behind clustering standard errors, see for example Cameron, Gelbach and Miller (2011).

The major concern in interpreting β as causal is variation in our treatment and control subplaces that may be correlated with foreign demand. In this regard, the subplace treatment fixed effect, γ_s, in our first step, controls for any time-invariant differences in prices across subplaces. Nonetheless, there could be an omitted variable which varies by subplace and time. In this regard, given that I focus on within-main-place price spreads, these concerns are mitigated to the extent that the treatment and control subplaces are homogeneous, conditional on being in the same main-place. Given the boundaries of main-places are one of the primary geographical units used by Statistics South Africa to enumerate and report census information, main-places are designed in order to ensure a homogeneous graphic unit across observables which also aids the assumption of homogeneity across treatment and control sub-places within the same main-place. However, given that I study how price spreads change following large exchange rate depreciations, I only need to be concerned about an omitted subplace level variable correlated

with *both* large exchange rate depreciations and property prices. It is important to note that any general effects of these depreciations that are common to all subplace in a given main-place are removed in the first difference in (3.3). The coefficient of interest β is therefore estimated off subplace by time variation and the identifying assumption is that the within-main-place distribution of foreign non-residents in 2011 is correlated to the within-main-place price spread following large exchange rate depreciations between 2011 and 2018 *only* through its ability to predict variation in non-resident demand following these depreciations.

I present the results in Table 3.4. Following a large lower quartile depreciation, the within main-place price spread increases by 1.6% in the following month. Following a lower decile depreciation (equivalent to a year on year depreciation greater than 168%) the price spread in the following month increases by 2.4%.[19] I interpret this as the causal effect of foreign demand on house prices following large exchange rate depreciations.

Table 3.4: Foreign demand and property prices

	Cross suburb price spread	
	(1)	(2)
Lower quartile	0.016*	
	(0.008)	
Lower decile		0.024***
		(0.003)
Month FE	Yes	Yes
Year FE	Yes	Yes
MP FE	Yes	Yes
Observations	2,115	2,115
Adjusted R-squared	0.135	0.135

This table captures coefficients results from the estimation of equation 3.4. Standard errors are double clustered at the main-place and year level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

In Table 3.5 I repeat this exercise using a dummy variable which captures large upper quartile and decile depreciations. As the results show, there are now negative price spreads between the two groups of suburbs which highlight that just as depreciations lead to increased foreign demand which increases prices, large appreciations, which make the price of property more expensive for foreign buyers leads to decreases in foreign demand and house prices.

[19] For context, the average price spread during the sample period is 0.044, with a standard deviation of 0.30.

Table 3.5: Foreign demand and property prices: appreciations

	Cross suburb price spread	
	(1)	(2)
Lower quartile	-0.051***	
	(0.011)	
Lower decile		-0.020**
		(0.008)
Month FE	Yes	Yes
Year FE	Yes	Yes
MP FE	Yes	Yes
Observations	2,115	2,115
Adjusted R-squared	0.141	0.139

This table captures coefficients results from the estimation of equation 3.4 where I replace a dummy variable for large depreciations for a dummy variable capturing large appreciations. Standard errors are double clustered at the main-place and year level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

3.4.3 Robustness

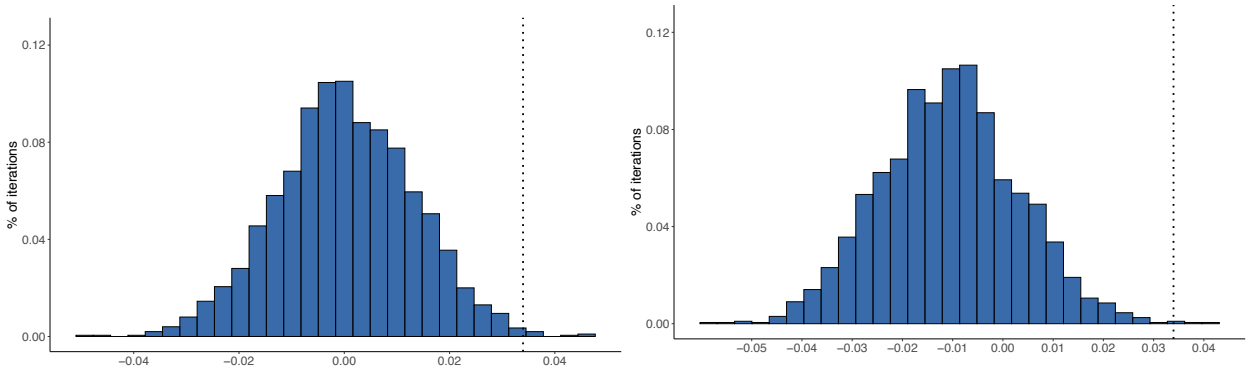
There are two major concerns to identification of the price effects I estimate. The first relates to the causal link between observed price effects and large exchange rate depreciations and concerns that this effect is spurious. Here, my identification strategy relies on the fact that large exchange rate depreciations represent an exogenous shock to foreign non-resident demand for property that is correlated to price movements only through foreign demand. The second relates to our assignment of treatment and control groups. Here, my identification strategy relies on demand increasing in areas with large pre-existing shares of foreign non-resident home owners relative to other geographically close areas. In order to test the robustness of these assumptions, I follow recommendations in Bertrand, Duflo and Mullainathan (2004) and implement a placebo test using bootstrap methods.

In the case of exchange rate depreciations, I implement a set of 2,000 random draws (with replacement) of upper quartile exchange rate movements and re-estimate the main specification to obtain a distribution of our coefficient of interest. If the effects estimated are not merely a statistical artefact, we would expect our coefficient to lie in the upper right tail of this distribution and be highly significant. This would provide evidence that the price increases I measure only occur following large exchange rate depreciations, and not at other times, reinforcing the link between exchange rate depreciations and house prices. I report the results from this exer-

cise in Panel (a) of Figure 3.5. As is evident, the coefficient I measure, indicated by the dotted line, lies in the upper right tail of the distribution of placebo coefficients and is highly significant with an associated p-value of 0.004. Put differently, if you were to look at the price differences between subplaces with large degrees of foreign non-resident ownership in 2011 and suburbs without large degrees of foreign ownership in 2011 within a given mainplace, you would only find a large positive differences in the quality adjusted prices between these suburbs in the month after a large exchange rate depreciation between 2011 and 2018. This means that I can reject the hypothesis that the price effect I estimate following a large exchange rate depreciation is random with a high degree of confidence.

This further strengthens the claims of causality of foreign demand increasing local prices following large exchange rate depreciations

Figure 3.5: Placebo tests across exchange rate events and treatment and control subplaces



(a) Random assignment of exchange rate events

(b) Random assignment of treatment and control subplaces

This figure illustrates the coefficient of interest from a bootstrap implementation of our main specification. In Panel (a), I implement a set of 2,000 random draws (with replacement) of upper quartile exchange rate movements and re-run the main specification to obtain a distribution of our coefficient of interest. In Panel (b) I implement a set of 2,000 random draws (with replacement) of treatment subplaces within each main-place and re-run our main specification using each of these groupings to obtain a distribution of our coefficient of interest. The figures shows this distribution, with a dotted line indicating our estimated coefficient from the main specification. The associated p-value of our coefficient of interest in is 0.004 in Panel (a) and 0.001 in Panel (b).

In the case of my assignment of treatment and control subplaces, I also implement a set of 2,000 random draws (with replacement) of treatment subplaces within each main-place and re-estimate the main specification to obtain a distribution of our coefficient of interest. In doing this, I randomly allocate treatment and control subplaces and test for price differences following large depreciations. As before, I would expect our coefficient to lie in the upper right tail of this distribution and be highly significant if the effects estimated are not merely a stat-

istical artefact. I report the results from this exercise in Panel (b) of Figure 3.5. As is evident, the coefficient I measure, indicated by the dotted line lies in the upper right tail of the distribution of placebo coefficients and is again highly significant with an associated p-value of 0.001. Put differently, if you were to look at the price differences between any two random groups of subplaces within a given mainplace in the month following a large exchange rate depreciation, you would only find a large positive differences in prices between subplaces with large degrees of foreign non-resident ownership in 2011 and suburbs without large degrees of foreign ownership in 2011. This would therefore provide evidence that the correct assignment of treatment and control suburbs is a necessary condition for our results, which strengthens the link between foreign demand, exchange rates and house prices. Furthermore, given that the the price differences between treatment suburbs (suburbs with large pre-existing communities of foreign residents) and control suburbs (geographically close suburbs without these communities) are on average 0, this provide evidences that on average there are no systematic price differences between these two groups of suburbs which provides evidence that hedonic-adjusted price trends are comparable across these suburbs

All together, these findings presents strong evidence that our identification is plausible, that price effects I measure following large depreciations is not spurious, that the correct assignment of treatment and control suburbs is a necessary condition for our results and thus, that the exchange rate effects I measure are very likely to represent the causal price effects of foreign demand.

3.4.4 Mechanisms

What are the channels that drive the increase in prices? Do foreigners merely increase aggregate demand or are there also intensive margin effects? For example, foreign or out-of-town buyers may pay higher prices than local buyers given differences in wealth, bargaining power and/or information asymmetries as in Cvijanović and Spaenjers (2021) and Chinco and Mayer (2016) and as established in Chapter 2.

To explore this mechanism, I augment the hedonic specification used to construct a house price index from before to include an additional variable — an indicator for the nationality status of the buyer. As was the case in Chapter 2, this variable controls for differences in transaction prices paid by foreign buyers relative to other buyers for otherwise identical property. As I established in that chapter, the estimated premia is positive and economically significant, indicating the presence of a sizeable foreign buyer premia. By including this variable, I remove the component of the suburb house price movements that are attributable to the tendency of

foreign buyers to pay higher prices for otherwise identical property.

I then re-estimate the main specification in this chapter in order to study how controlling for the foreign buyer premia affects the price effects I measure. I report these results in Table 3.6. The price effect remains significant and positive but is smaller than in the base specification. Accounting for the foreign buyer premia the price effect decreases from 1.6 percent to 1.4 percent following a lower quartile exchange rate event, a decrease of 12.5%. The decrease is larger in magnitude following a lower decile exchange rate event with the price effect decreasing from 2.4 percent to 1.7 percent, a decrease of 29.2%. This would be intuitive if the foreign buyer premia is larger following larger depreciations. Given that in Chapter 2 I identify wealth effects and a lack of bargaining intensity as a contributor to the premia measured, it is not unreasonable that following larger depreciations, where the buyer power of foreign buyers is even larger, that the foreign buyer premia increases.

Table 3.6: Foreign demand and property prices: controlling for foreign buyer premia

	Cross suburb price spread	
	(1)	(2)
Lower quartile	0.014**	
	(0.005)	
Lower decile		0.017***
		(0.001)
Month FE	Yes	Yes
Year FE	Yes	Yes
MP FE	Yes	Yes
Observations	2,115	2,115
Adjusted R-squared	0.132	0.132

This table captures coefficients results an alternative estimation of equation 3.4 following the inclusion of a buyers nationality status in the hedonic regression to calculate the subplace level price indices in equation (3.2). Standard errors are double clustered at the mainplace and year level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

All together, I interpret this as evidence of extensive and intensive margin in the causal effects of foreign demand on house prices. In the specification without controlling for the foreign buyer premia, the coefficient of interest captures both the extensive margin aggregate demand effect of foreign non-resident buyers — buying more property — and the intensive market effect—

conditional on entering the market, foreign non-resident buyers pay higher prices than other buyers for otherwise identical properties. The estimate decreasing after I control for intensive margin effect through using buyer nationality indicator is consistent with such an interpretation. The results therefore suggest that while the extensive margin effects dominated, around 12.5%-29% of the observed causal impact of foreign demand on house prices originates from their tendency to pay higher prices than locals would for otherwise identical property.

3.5 Conclusion

In this chapter, I show that foreign non-resident investors are very responsive to large exchange rate depreciations and increase their demand for real estate, an asset with sticky prices. These large exchange rate depreciations appear less important for other buyers, consistent with motives related to exchange rate price discounts for foreign non-residents. This demand leads to increases in house prices due to an increase in aggregate demand but also due to the tendency for foreign non-resident buyers to pay higher prices than other buyers for otherwise identical properties. The results provide novel evidence of foreign investment in the housing market in an emerging market context, whereas the extant literature has focused on developed countries where buyers' motives are likely very different. Amidst many concerns about the impact of foreign investment on house prices and affordability for local buyers, an important policy implication from the results in this chapter is that foreign demand may have important stabilizing effects on house prices in emerging markets during periods of exchange rate instability which are typically associated with adverse macroeconomic conditions.

A natural extension of the work in this chapter would be to study the longer term impact of foreign non-resident investment in the housing market on house prices, which would be made possible were I to be able to acquire transaction data that covers a longer time period. A second extension would involve studying the extent of price spillovers between suburbs. As documented in Chapter 2, non-resident demand is targeted to very specific suburbs in Cape Town, which poses the question: is the impact of foreign demand of house prices limited to the suburbs where foreigners invest or is the evidence of price spillovers to other suburbs. For example, there may be reasons to expect some spillovers if foreign buyers crowd out local buyers in a given suburb, such that this demand is re-directed to other suburbs.

Chapter 4

Home foreclosure discounts in Cape Town

4.1 Introduction

The widespread prevalence of home foreclosures was one of the defining characteristics and lasting legacies of the 2007-2008 Great Financial Crisis (GFC). In the United States, where at the peak of the crisis the mortgage default rate rose to above 10%, the wave of foreclosures had major macroeconomic effects. Mian, Sufi and Trebbi (2015) show that foreclosures can account for 33% of the decline in house prices, 20% of the decline in residential investment and 20% of the decline in vehicle sales between 2007 and 2009. An important mechanism through which foreclosures lead to decreases in house prices relate to the negative externalites they cause for neighbouring properties through lowering their prices (Gupta, 2019; Anenberg and Kung, 2014; Gerardi et al., 2015; Campbell, Giglio and Pathak, 2011). As a result, foreclosures can substantially exacerbate housing downturns given that they: cause losses for lenders which lead them to reduce mortgage credit; reduce the number of buyers in the market since foreclosed upon homeowners are unable to re-enter the housing market given the adverse effects of foreclosure on their credit record and; increase the substitutability between distressed and non-distressed sales given the abundance of distressed sellers in the market, leading potential buyers to become more selective and spend more time before purchasing (Guren and McQuade, 2020).

Home foreclosures are also associated with many negative consequences for households, including housing instability, reduced homeownership, financial distress, moves to worse neighborhoods, elevated rates of divorce (Diamond, Guren and Tan, 2020), increased crime in the neighbourhood following a rise in foreclosures (Ellen, Lacoe and Sharygin, 2013), and an increase in urgent, unscheduled and preventable visits to the hospital (Currie and Tekin, 2015). Arguably the most studied negative consequence for homeowners is with respect to adverse

financial outcomes. While there are numerous ways in which this can manifest, two important channels involve credit rationing and financial losses. Following a foreclosure, the credit record of homeowners is negatively affected, preventing them from accessing credit (Guren and McQuade, 2020), while these homeowners also experience decreases in durable consumption that lasts for several years (Humphries et al., 2019). Foreclosed homeowners may also suffer financial losses due to the fact that there is extensive evidence that foreclosed properties sell for sizeable discounts relative to other non-foreclosed properties (Campbell, Giglio and Pathak, 2011; Chinloy, Hardin and Wu, 2017; Zhou et al., 2015; Donner, 2017; Clauretie and Daneshvary, 2009). In that sense, home foreclosures represent a classic "firesale" - a forced sale of an illiquid asset that occurs at a dislocated price by a seller who cannot pay their creditors without selling assets (see Shleifer and Vishny (1992) for seminal work and Shleifer and Vishny (2011) for an excellent summary of the firesale literature). Given the urgent nature of such sales, distressed sellers will typically sell their homes at sizeable discounts. These discounts can then be amplified even further given foreclosed properties often sell at auctions. As Mayer (1995) shows, properties sold at an auction typically sell for lower prices than if they were to sell on the conventional non-auction market, given that auctions result in a "poorer" match between buyers and sellers. As documented in an extensive literature on housing search theory, the price of housing relates importantly to the quality of the match between buyer and seller.[1] Moreover, these foreclosure discounts are especially relevant in jurisdictions in which mortgages represent recourse loans. In such a setting, borrowers are liable for any outstanding amount on their mortgage account that remains after the sale of their property. If the foreclosure discounts are sizeable enough such that the price attained upon resale is less than the outstanding mortgage balance, the homeowner is left homeless, paying off a mortgage for a home they no longer own.

In South Africa, the home foreclosure market and in particular, the discounted prices at which foreclosures have sold, has received tremendous attention from civil society and policymakers. This is best illustrated in the R60 billion class action lawsuit against the major financial institutions in South Africa for the "unjust" selling of homes for a fraction of their market value.[2] As such, understanding foreclosure discounts are of academic and policy interest.

In this chapter, I document the extent of home foreclosures in Cape Town between 2011 and 2018 using a novel dataset of foreclosure auction notices. I do this through constructing a dataset based on publicly available data on foreclosure notices issued in pdf form by the South African government. In order to process this information, I parse the pdf documents to text

[1] See Wheaton (1990) for seminal work, Han and Strange (2015) for an extensive summary on this literature, and Piazzesi, Schneider and Stroebel (2020) for a recent example.

[2] See for example: "SA banks sued for R60bn in home repossession case" - *Fin24*, 16 August 2017 and "Banks face lawsuit over unjust sale of homes" - *IOL*, 25 January 2021

and use a range of text processing techniques to isolate the key information. Between 2011 and 2018, I find that over 9,000 unique foreclosure notices are issued. Of these notices, over 2,700 properties are sold, with the remainder being unsold. Interestingly, only 37% of properties are sold at an auction, with 27% of properties sold in the days before the auction occurs and the remaining properties selling after the auction. The latter group of properties represent cases where the seller was able to delay the auction itself through a payment to the bank to clear some of their arrears.

The second contribution of this chapter is to estimate foreclosure discounts in Cape Town. In doing so, I leverage the institutional setting and the features of the data to help to disentangle auction related foreclosure discounts from distressed sale foreclosure discounts which makes a more general contribution to the literature on home foreclosures.[3] I find that transactions involving properties that sell after having a foreclosure notice issued, sell for a 18.6% discount relative to otherwise identical non-foreclosed properties. Importantly, this finding is robust to controlling for potential property neglect on the part of foreclosed homeowners which would lead to an upward bias in the estimated foreclosure discount.

I then explore how discounts vary depending on how and when the property is sold. First, I explore foreclosure discounts for properties that sell outside of the foreclosure auction. In such cases, despite the foreclosure auction being scheduled, the homeowner is able to delay or stop the foreclosure auction, through a payment to the bank to clear some of their arrears or through obtaining a private sale prior to the auction itself. Post auction, I find that discounts decrease in the duration it takes for the property to sell. Properties sold in the 30 days after the auction sell for a 27.8% discount. These discounts persist all the way up to 180 days after the auction, but are imprecisely estimated and as a result, I do not have conclusive evidence of foreclosure discounts for transactions that sell more than 30 days after the foreclosure auction. One interpretation of this would be that homeowners who sell more than 30 days after the scheduled foreclosure auction have cleared their arrears and are no longer in distress. Notably however, if a homeowner is able to sell their property before the auction, the property sells at a vastly reduced discount of 8.9%. Importantly, these transactions represent private sales where the seller is able to find a buyer and they do not represent instances of a bank-assisted sale, given the default judgement has already been passed and the foreclosure auction has been scheduled. As such, while the homeowner is still distressed, these transactions sell for a substantially smaller discount that the post-auction distressed sales, indicating that it is in the homeowners best

[3] "Auction related foreclosure discounts" refer to the discounts on foreclosed property that are sold at an auction while 'distressed sale foreclosure discounts" refer to the discounts achieved on foreclosed property when sold by a seller in financial distress. The difference between the two relates to the sale mechanism, i.e an auction sale vs a sale in the conventional market.

interest to achieve a sale prior to the foreclosure auction.

I then turn my attention to foreclosure discounts that result from sales at a foreclosure auction. I find an economically significant foreclosure discount of 44.3%. Caution must however be exercised when interpreting this result. While a number of studies find sizeable foreclosure discounts, Clauretie and Daneshvary (2009) shows that an important reason for this relates to omitted variable bias leading to an upward bias in these estimates. Once accounting for these omitted variables, which include eviction costs, neglect of the property etc., the authors find that the foreclosure discounts reported by similar studies are around one third larger than the true estimates. To address these concerns, I implement a robustness exercise to account for three potential factors which would lead to an upward bias in the estimated foreclosure discount: auction fees, any outstanding property tax arrears and property levies which the buyer becomes liable for upon purchase, and the potential costs associated with evictions should the property be occupied. Employing these controls, my preferred estimate of the foreclosure discount for auctioned properties is between 16.9% and 24.7%, which is similar in magnitudes to the foreclosure discount estimated for properties that sell in the conventional market after the auction. This finding is in line with economic intuition. If sizeable foreclosure discounts exist at auctions, buyers can simply purchase these properties at a large discount and re-sell them immediately to make significant excess returns. However, as argued by Clauretie and Daneshvary (2009), while the housing market is not perfectly efficient, it is unlikely to be so inefficient such that excess returns can be generated so easily and consistently, given competition amongst buyers would eliminate that discount.

Nonetheless, an open question remains as to why the auction discount persists. In the case of a private sale, the discount can be rationalized through the fact that the homeowner has control over the transaction outcome and therefore agrees to the discount in return for much needed liquidity. In the case of the auction, neither the lender nor the homeowner can control the outcome and as such, financial distress cannot account for the entirety of the discount estimated. I present evidence that the foreclosure auction discounts can potentially be explained through limited competition at the auction driven by participation costs at the auction. This is in line with theory — Allen and Gale (1994) rationalize asset firesales discounts through costs of participation that prevent the entry of some buyers thereby limiting the extent of competition, leading to lower market prices.

This chapter contributes primarily to a voluminous literature estimating foreclosure discounts which can be split into studies that document the existence of sizeable foreclosure discounts (most prominently Campbell, Giglio and Pathak (2011)) and studies who find small or zero foreclosure discounts (most notably Harding, Rosenblatt and Yao (2012)). The reason for this diver-

gence relates to what exactly the foreclosure discount is measuring. Foreclosure discounts can arise due to a "stigma" effect or a "proxy" effect (Clauretie and Daneshvary, 2009). The stigma effect refers to the discount a property sells for due to its status as being foreclosed. Since this discount arises largely due to the financial distress of the seller, it can also be thought of as a firesale discount (Shleifer and Vishny, 2011). The proxy effect refers to the discount associated with foreclosed properties due to the fact that foreclosed properties have different characteristics to non-foreclosed properties. Clauretie and Daneshvary (2009) argue that while many studies claim to be estimating a stigma effect, they in fact estimate a proxy effect, given they fail to control for variables which are correlated to foreclosure status and price, such as the condition of the property. This omitted variable bias results in an estimation of a proxy effect, which subsumes the stigma effect, that is upwardly biased of the true stigma effect due to omitted variable bias. In that regard, this paper contributes to this literature through leveraging detailed property level data to illustrate how various factors confound the true foreclosure discount.[4] One example being the fact that I am able to include a property's valuation from property tax assessment data in the main hedonic specification I leverage in the same vein as Andersen and Nielsen (2017) who estimate death related home discounts. This allows me to control for any unobserved heterogeneity in location and property characteristics, based off the assumption of superior knowledge on the part of property tax assessors, which facilitates a cleaner estimation of foreclosure discounts.

This chapter's major contribution however relates to disentangling the foreclosure discounts at different horizons from the foreclosure discounts that arise at foreclosure auctions providing for a more complete characterization of the dynamics affecting foreclosure discounts. I am able to do so leveraging unique features of the data I collect and the institutional setting in South Africa. A large part of the extant literature focuses on foreclosure discounts in the United States, and as alluded to by Donner (2017), this has potentially led to a very nuanced mischaracterization of the term foreclosure discount. At foreclosure auctions in the US, the most common outcome is an unsuccessful auction, whereby the bid made does not meet the reserve price.[5] In this scenario, the lender takes ownership of the property and attempts to sell it in the conventional market. These properties are referred to as Real Estate Owned, or, REO properties, with an REO sale referring to the scenario where a lender sells a foreclosed property after it failed to sell at an auction. As noted in Chinloy, Hardin and Wu (2017), the literature has (arguably mistakenly) estimated the discounts associated with REO sales and called these discounts foreclosure discounts, thereby using these terms interchangeably. There are numerous

[4]Throughout this chapter, when I refer to the foreclosure discount, I am referring specifically to the discount associated with the stigma effect.

[5]Campbell, Giglio and Pathak (2011) report that in Massachusetts between 1987 and 2009, unsuccessful auctions and REO ownership accounted for 82% of all foreclosure auction outcomes.

reasons why this is problematic. The existing literature has typically explained the existence of foreclosure discounts given an urgency on the part of the seller to quickly liquidate the asset. For example, Campbell, Giglio and Pathak (2011) write that foreclosures typically sell at lower prices "because financial institutions have an incentive to sell them quickly". However, a distinct difference between an REO sale and a foreclosure is that the since the latter happens at an auction, the seller has no control over the outcome, unlike with an REO sale. In this chapter, I leverage a key institutional feature of South Africa, namely that REO sales are extremely uncommon, in order to estimate a true foreclosure discount that occurs at an auction.[6] In that sense, the setting in this paper is similar to that of Donner (2017) who studies the foreclosure market in Sweden. One distinct contribution I make over and above Donner (2017) is to document not only the foreclosure discount that materializes at the auction, but also the foreclosure discounts that materializes when the seller is able to sell the property *directly* before or after an auction (in the event they are able to delay the auction). In such as scenario, I can provide evidence on the discounts granted by homeowners themselves due to the fact that they, as in the words of Campbell, Giglio and Pathak (2011) again, "have an incentive to sell them quickly". Furthermore, I am also able to study the time series evolution of these discounts dependent on how far after the auction date they sell. This is important, as finding evidence of declining foreclosure discounts could be interpreted as evidence of an improvement in the financial condition of the homeowner, under the assumption that the discount they agree too when selling their property is inversely related to their financial health. Another interpretation of this would be that the longer the homeowner is able to delay a foreclosure, the more time they have to find a buyer who is willing to purchase the property at market prices. In studying the evolution of the discounts offered at different time horizons, my work is similar in spirit to Andersen and Nielsen (2017) who estimate death related home discounts at different time horizons.

Finally, my paper also makes a contribution by providing evidence that the foreclosure discounts estimated at auctions can potentially be explained through limited competition at the auction, driven by participation costs at the auction. In that way, I link the literature on home foreclosure discounts to the literature on asset firesale discounts, most notably the work of Allen and Gale (1994) who highlight this participation cost / limited participation mechanism.

[6] I find that in Cape Town between 2011 and 2018, REO sales make up only 11.9% of all auction related foreclosure sales with successful auction outcomes making up the remaining 88.1% of cases.

4.2 The home foreclosure process in South Africa

As is common internationally, when homeowners are unable to meet their mortgage obligations (typically more than 90 days in arrears) the lender may choose to initiate a process to repossess the property with the intention of selling the property through a foreclosure auction to cover the outstanding obligations (Davids and Kemp, 2017).[7] South Africa follows a process of judicial foreclosures, which involve the foreclosure process being executed with judicial supervision. The formal process involves numerous steps as outlined below:[8]

- A *letter of demand* is issued where the lender informs the homeowner of the arrears. The homeowner is then given an opportunity to settle the arrears.
- Should the homeowner not settle the arrears, the bank sends a *Section 129 letter* to the homeowner. The S129 letter gives the homeowner one final opportunity to settle the arrears. The issuance of the S129 letter is a requirement before the lender can approach the court to repossess the property.
- Thereafter, a *summons* is delivered to the homeowner. A summons represents a legal document issued by a court, informing the lender that legal proceedings have been initiated against them.
- A case is then heard in court and a *default judgement* is passed. The judgement is either in favour of the homeowner or the lender. In the case of the former, the homeowner needs to provide reasonable proof that they are in a position to address the arrears. At this stage of the foreclosure process however, the default judgement is typically granted in favour of the lender.
- Once a default judgement is passed, the lender can apply to have the property *attached*. Once the property is attached, the property is sold at a foreclosure auction. These auctions are referred to as *Sales in Executions* (SIE) and all SIEs are published publicly each week.

The sale in execution can be avoided if the homeowner is able to settle the arrears on their account or reach an agreement with the lender to have their debt restructured. In many cases, the homeowner, upon receipt of the letter of demand, S129 or summons, manages to sell their home privately and can then settle the mortgage account. In situations where the homeowner struggles to find a buyer, the lender can assist. In fact, many of the major banks in the country

[7] Throughout this chapter I will use the terms 'repossess' and 'foreclose' interchangeably.
[8] A description of the process can be found here.

have their own real estate divisions offering assistance in finding a buyer.[9] In many cases, these initiatives offer attractive benefits, including discounts on the outstanding loan balance, should the homeowner agree to let the lender sell the property.[10]

It is important to note, however, that once a default judgement is passed, the lender is under no obligation to accept a settlement of the mortgage account from the homeowner. One example of this could be a scenario where the homeowner obtains a signed purchase agreement from a buyer who has agreed to purchase the property. As noted by the Ombudsman of Banking Services in South Africa, "banks are routinely exposed to various attempts by debtors to delay sales in execution and are therefore very reluctant to entertain such notices" (Ombudsman of Banking Services in South Africa, 2018). Lenders will, however, typically agree to delay a sale in execution if the purchaser can provide a bank guarantee for the purchase price of the property.

Once a property has been sold, either through the conventional market or a foreclosure auction, the proceeds from the sale are subtracted from the mortgage account. In South Africa, mortgages represent a recourse loan, and as a result the homeowner is liable for any outstanding amount on the mortgage account that remains after the sale of a property. Furthermore, all legal costs incurred are at the homeowners expense and are added to the mortgage account.

When properties are bought at a foreclosure auction, the buyer incurs two additional costs. The first is the auctioneer's commission, which is typically structured as: 6% on the first R100,000 of the sale, 3.5% on R100,001 to R400 000, and thereafter, 1.5% on the balance of the sale capped at minimum of R3,000 plus Value Added Tax (15%) and a maximum of R40,000 plus VAT. The second cost incurred relates to any outstanding property taxes. Unlike conventional transactions, when a property is bought at a foreclosure auction, the purchaser is also liable for whatever outstanding property taxes remain on the property. Given these sellers are under financial distress at the time of the auction, owners of foreclosed properties are typically likely to be in arrears with their property taxes. Furthermore, the buyer is to pay a deposit of 10% of the purchase price immediately either in cash or through a bank guaranteed cheque.

Lastly, it is important to note that in a few cases, the foreclosure auction involves the lender purchasing the property. Lenders will typically purchase the property at the auction if the bids made are substantially below the reservation price of the lender which is typically the outstanding amount due on the mortgage. In cases like this, the lender will simply outbid the next highest bidder, purchase the property and look to re-sell it at a later date to recover the losses made. Of all auction sales, the lender purchases a property 11% of the time.

[9] See, for example, the "EasySell" initiative from Standard Bank, here, and the "Quicksell" initiative from First National Bank, here.

[10] The "Quicksell" initiative from First National Bank, claims to offer discounts of up to 25% of the outstanding loan balance, see here.

4.2.1 The role of reserve prices in foreclosure auctions

Until 2007 there was no legal requirement for home foreclosure auctions to include a reserve price in South Africa, and as a result, the norm in these auctions is for the the auction to commence without a reserve price. In recent years, there has been increasing attention on the discounts that these homes sell for at foreclosure auctions, culminating in a R60 billion class action lawsuit against the major financial institutions in South Africa for the "unjust" selling of homes for a fraction of their market value.[11] One egregious example of such abusive practices was documented in *Nxazonke v Absa Bank*.[12] In this case, the homeowner was liable for R28,000 in outstanding debt and had their property repossessed and sold at a foreclosure auction for R10 when the property's valuation was R81,000 leaving the homeowner homeless and liable for the shortfall. In this case, the court declared that the sale represented an abuse of process. The sale of homes for a fraction of their market value by banks represents a classic principal agent problem, given the banks incentive is simply recover the outstanding amount owed on the mortgage, which is typically a fraction of the value of the home.

Given concerns that the lack of a reserve price was contributing to the foreclosure discounts, the Uniform Court Rules were amended in order to allow the court to set a reserve price for foreclosure auctions effective 22 December 2017.[13] The amendment, however, left the decision to implement a reserve price at the discretion of the court, and in practice, reserve prices were rarely implemented given the complexities involved with determining the reserve price.[14] However, in late 2018, the Gauteng High Court mandated the setting of a reserve price.[15] Importantly, given the data sample I use in this paper ends in 2018, this amendment will not affect the findings in the paper.

4.2.2 The home foreclosure process in the United States

Given a large part of the extant literature focused on home foreclosures in the United States, it is worth discussing some salient institutional aspects of the foreclosure process in the US to the extent that it puts into context how the findings in this chapter can be contextualized relative to this literature.

[11] See for example: "SA banks sued for R60bn in home repossession case" - *Fin24*, 16 August 2017 and "Banks face lawsuit over unjust sale of homes" - *IOL*, 25 January 2021

[12] Judgement is available here: http://www.saflii.org/za/cases/ZAWCHC/2012/184.html

[13] The amendment is available here.

[14] See for example: "Judgment ends era of the R10 repossessed home in SA" - *The Sunday Times*, 13 September 2018.

[15] "Judgment ends era of the R10 repossessed home in SA" - *The Sunday Times*, 13 September 2018.

In the US, states either institute judicial or non-judicial foreclosures. In the case of the former, the foreclosure happens with judicial supervision, with the court executing the foreclosure with the local sherrif's office responsible for auctioning the property. In the case of the latter, the lender can directly foreclose the property and carry out the auction without any legal supervision (Lambie-Hanson and Lambie-Hanson, 2017). Of the 50 states, 18 states implement judicial foreclosures, while the remaining 32 states implement non-judicial foreclosures. It is generally acknowledged that the judicial foreclosure process provides for more protection for homeowners and makes foreclosures more difficult to implement. Mian, Sufi and Trebbi (2015) find that states who implement non-judicial foreclosures were twice as likely to foreclosure during the financial crisis between 2007-2009. The improved protection from judicial foreclosures does not, however, necessarily lead to better outcomes for homeowners. Gerardi, Lambie-Hanson and Willen (2013) find that homeowners in states with a judicial foreclosure system are no more likely to recover from delinquency and no more likely to be able to renegotiate their mortgage obligations with their lenders. Rather, they find that the judicial foreclosure process simply delays the inevitable foreclosure. In states which make use of nonjudicial foreclosures, there is also interesting variation in the time to foreclose. Lambie-Hanson and Lambie-Hanson (2017) find that in these states, vertically integrated law firms with their own in-house auctioneers take one to three months longer to schedule an auction relative to law firms who contract auctioning services in. The authors attribute this to poorly aligned incentives within law firms. Since firms schedule the auction date before contracting begins, external and independent auctioneers have stronger incentives to conform to the timeline proposed to secure the contract, whereas the internal integrated auctioneer does not have the same incentive to schedule quickly. In South Africa, all foreclosures follow the judicial foreclosure process. As a result, the results in this paper are directly comparable to the extant literature which studies the foreclosure process under the judicial foreclosure process, or to papers which control for the foreclosure process such that the differences between judicial and nonjudicial foreclosures do not affect the results.

A second institutional feature of the foreclosure process in the United States is the prevalence of Real Estate Owned (REO) properties. Foreclosure auctions can either be successful or unsuccessful. A successful auction represents a situation where the property attains a price above the reserve price and is sold to a private buyer. In an unsuccessful auction, the property does not meet the reserve price and the lender takes ownership of the property, transferring it to its REO department who will then attempt to sell the property on the open market. Unsuccessful auctions and REO ownership represents the overwhelming majority of auction cases in the US — for example, in Massachusetts, Campbell, Giglio and Pathak (2011) report that between 1987 and 2009, unsuccessful auctions and REO ownership accounted for 82% of all foreclosure auction outcomes. Given this, the literature has typically excluded the REO transaction

when estimating foreclosure discounts while including the subsequent sale of the property by the REO department of the lender. As such, when influential studies in the United States, such as Campbell, Giglio and Pathak (2011), Clauretie and Daneshvary (2009), Harding, Rosenblatt and Yao (2012) etc., refer to foreclosure discounts, they are typically referring to the discount associated with REO properties being resold by the lender. In South Africa on the other hand, REO cases, referred to as cases of "Property in Possession", are less common. I find that in Cape Town between 2011 and 2018, "REO" sales make up only 11% of all auction related foreclosure sales, with successful auction outcomes making up the remaining 89% of cases. As such, the foreclosure discounts I estimate in this chapter, predominantly pick up discounts associated with properties that sell at an auction. Given this, it is natural to expect the magnitudes of the discounts I estimate to be larger. There are three major reasons for this. Firstly, given the fact that buyers are liable for all costs currently in arrears associated with the property such as outstanding property taxes, the lender will internalize and settle these costs before re-selling the property. In the case of a successful auction, the private buyer is liable for these costs. Secondly, in many cases, foreclosed properties remain occupied after their sale and involve a costly and length eviction process. For REO properties, the lender will typically first evict the tenant before re-selling the property. Once again, in the case of a successful auction, the private buyer is responsible for the eviction. Finally, as discussed in the introduction, properties sold at an auction typically sell for lower prices than if they were to sell on the conventional non-auction market given auctions result in a "poorer" match between buyers and sellers. As a result of this, successful auctions will likely sell at an additional discount relative to REO transactions.

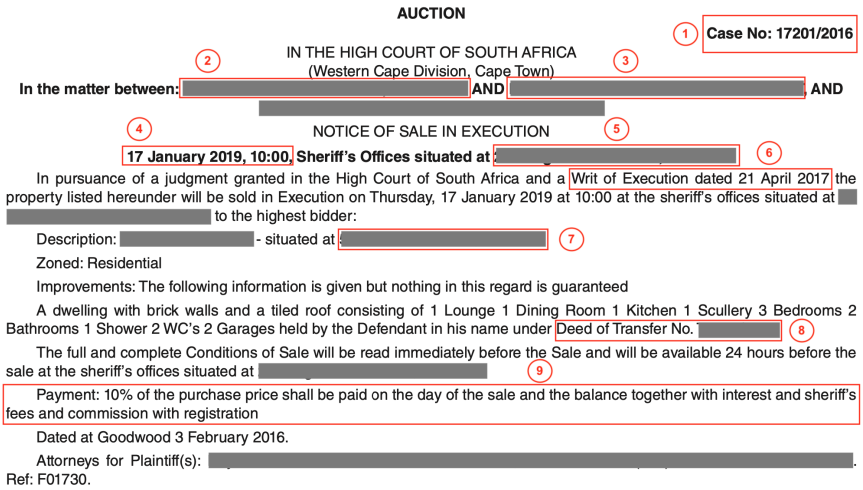
4.3 Documenting the extent of home foreclosures in Cape Town

Despite the increasing attention on the home foreclosure market in South Africa, research documenting the extent of foreclosures is scant. The first contribution of this chapter is to provide such an account. I identify and document foreclosures using publicly available data on foreclosures in South Africa. Every Friday the South African government releases a special Government Gazette which includes a notice for each home foreclosure auction happening in the upcoming two weeks. The Gazette is released as a pdf document and contains a wealth of information on each foreclosure auction including: the case number; the name of the defendant; the name of the plaintiff; the address of the property to be auctioned; the title deed number associated with the property; the date and time of the auction; any auction conditions; and the

address of the auction itself.[16]

The text is however largely unstructured, as can be seen in Figure 4.1. In order to process this information, I parse the pdf documents to text and use a range of text processing techniques to isolate the key information from each advert.

Figure 4.1: Sale in execution notice



AUCTION

(1) Case No: 17201/2016

IN THE HIGH COURT OF SOUTH AFRICA
(Western Cape Division, Cape Town)

(2) In the matter between: [redacted] AND (3) [redacted] AND [redacted]

NOTICE OF SALE IN EXECUTION

(4) 17 January 2019, 10:00, Sheriff's Offices situated at [redacted] (5)

(6) In pursuance of a judgment granted in the High Court of South Africa and a Writ of Execution dated 21 April 2017 the property listed hereunder will be sold in Execution on Thursday, 17 January 2019 at 10:00 at the sheriff's offices situated at [redacted] to the highest bidder:

Description: [redacted] - situated at [redacted] (7)

Zoned: Residential

Improvements: The following information is given but nothing in this regard is guaranteed

A dwelling with brick walls and a tiled roof consisting of 1 Lounge 1 Dining Room 1 Kitchen 1 Scullery 3 Bedrooms 2 Bathrooms 1 Shower 2 WC's 2 Garages held by the Defendant in his name under Deed of Transfer No. [redacted] (8)

The full and complete Conditions of Sale will be read immediately before the Sale and will be available 24 hours before the sale at the sheriff's offices situated at [redacted] (9)

Payment: 10% of the purchase price shall be paid on the day of the sale and the balance together with interest and sheriff's fees and commission with registration

Dated at Goodwood 3 February 2016.

Attorneys for Plaintiff(s): [redacted]
Ref: F01730.

This figure illustrates a sale in execution notice with the relevant information notated. (1) The case number (2) The name of the plaintiff (3) The name of the defendant (4) The date of the auction (5) The location of the auction (6) The date that the Plaintiff brought the case before the court (7) The address of the property (8) The title deed associated with the property (9) The special payment conditions which apply to the auction. I have redacted all personal information from the advert.

I download and process all of the foreclosure notices issued for Cape Town between 2011 and 2018 as these years correspond to the years for which I have property transaction data available. I then combine the auction information to property transaction and valuation data as introduced in Chapter 2.2, using the title deed number, which is a common identifier in both datasets. A match indicates that a property that was issued with a foreclosure notice was sold. I then use the date of sale, as recorded in the property transaction data, and the date of the auction, as reported in the auction notice, to distinguish different types of purchases.

Using the date information available in the joined foreclosure-transaction dataset, I am able to identify when a property sells relative to the foreclosure auction. When the date of sale corresponds to the date of the auction, I flag these cases as an *auction sale*.[17] With the remaining

[16] While some studies such as Campbell, Giglio and Pathak (2011) identify foreclosures through transaction data provided by a third party, the approach in this paper using court data, is similar in spirit to Aron and Muellbauer (2011).

[17] The underlying assumption here being that a property up for foreclosure that sells on the same date as the foreclosure auction is sold at the auction itself and not before the auction, but on the same day.

cases, I record the number of days between the auction date and the transaction date and flag transactions that occur before the auction date as a *pre-auction distressed sale* and transactions that occur after an auction as a *post-auction distressed sale*. Importantly, I still consider these sales as distressed sales, given that foreclosure notices were issued.[18] Finally, I classify all remaining notices that did not transact as *recoveries*. Importantly, in cases where multiple auction notices were issued, I only retain the most recent notice. Multiple auction notices would occur in a scenario where the homeowner is able to delay the foreclosure auction itself through a payment to the bank to clear some of their arrears, but ultimately fell into arrears again, prompting another notice.[19] Each category of sale can be therefore be summarized as follows

- *Auction sales* represent transactions that occurred at the auction itself. These transactions are subject to the rules of the auction.
- *Pre-auction distressed sales* represent transactions where the seller was able to negotiate a sale of the property with a buyer before the date of the auction. While these sales occur in the conventional market, the seller remains a distressed seller.
- *Post-auction distressed sales* represent transactions where the seller was able to delay the auction itself through a payment to the bank to clear some of their arrears. While these sales occur in the conventional market, I still classify the seller as distressed. Importantly, however, the longer the time elapsed between the auction date and the transaction date, the greater the probability that the seller has cleared their debt. In order to control for this, I record the number of day/months between the auction date and the transaction date and use this as an additional control.
- *Recoveries* represent cases where a foreclosure notice is issued but a property never sells. In such cases, the homeowner has been able to avoid the foreclosure and retain their home by settling the arrears on the mortgage.

I plot the number of unique foreclosure notices issued between 2011 and 2018 in Panel (a) of Figure 4.2. During the sample, there are 9,404 unique foreclosure notices issued with the largest number of foreclosure notices, 1,783 notices, being issued in 2013. I then show the share of realized foreclosure sales in Panel (b). Throughout the period, 44.7% of all issued notices resulted in a subsequent sale with this share again highest in 2013. Overall, both time series show a general downward trend in the number of foreclosure notices being issued. Put differently, not only

[18] In cases like this, the homeowner remains unable to meet their repayment obligations and are more than three months in arrears on their mortgage payments.

[19] In cases like this, the seller could have for example made a loan with a friend of family member.

is there is decrease in the number of foreclosure notices being issued, but of the issued foreclosure notices, fewer are resulting in transactions. There are two plausible reasons as to why this has happened. The first is a decline in mortgage delinquency and impairment. In Panel (c) of Figure 4.2, I show the share of all mortgages in South Africa that are more than 90 days in arrears. As can be seen, this share (or simply, the mortgage delinquency ratio) has decreased from around 5.5% in 2011 to around 3% in 2014, rising to around 4% by the end of 2018. This decrease therefore broadly matches the decline in foreclosure notices being issued. While this can explain the decrease in the number of foreclosure notices being issued, it is less relevant for decline in the share of foreclosure notices that result in sales. A potential reason for the decline in this share could relate to increasing hesitancy on the part of lenders to repossess a property given the increasing public and policy attention on the repossession market, the policy interventions in this space and the pending class action lawsuit against the major mortgage lenders in the country.

To gain a sense of the relative magnitude of foreclosure sales relate to total market activity, I plot the number of foreclosure related sales relative to total transactions in Panel (d) of Figure 4.2. Throughout the period, foreclosure related sales make up 1.18% of all residential transactions in Cape Town, with this share at it's highest in 2013, when foreclosure related sales made up 1.73% of all transactions. After the peak in 2013, foreclosures as a share of total transactions begin to decrease and by 2018, foreclosure related sales as a percentage of total sales are at 2011 levels. As such, we can infer that the number of transactions in the market have grown faster than the number of foreclosures.

In Table 4.1 I report summary statistics across non-foreclosed and foreclosed property. As expected, foreclosed properties sell for significantly lower prices and are also on average smaller. Furthermore, the shares of sectional title transactions (apartments) are of comparable magnitudes and also indicate that more than 85% of all foreclosed property represent freehold / freestanding homes.

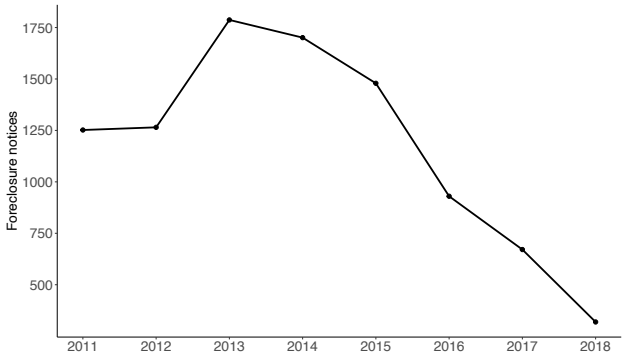
Table 4.1: Summary statistics

	Non-foreclosed property	Foreclosed property
Transaction price	1,689,779	753,839
	(5,397,478)	(1,038,472)
Land size	443	408
	(584)	(430)
Property size	122	111
	(87)	(83)
Bedrooms	2.70	2.77
	(0.99)	(0.92)
Bathrooms	1.86	1.72
	(1.05)	(0.99)
Share of sectional title transactions	15.45	14.41

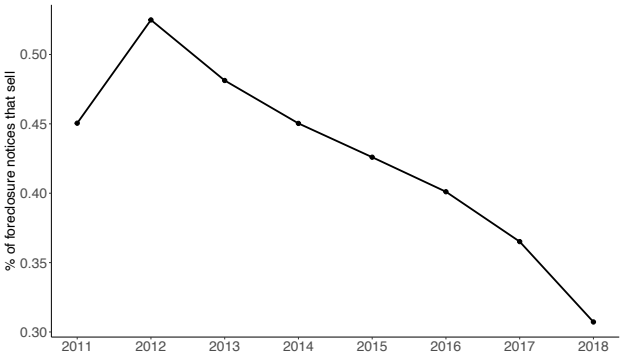
I report summary statistics across foreclosed and non-foreclosed property between 2011 and 2018. I report mean values and standard deviations in parenthesis.

Finally, to relate the realized foreclosures to the foreclosure categories defined earlier, I plot the yearly distribution of foreclosure sales across three types of sales: auction sales, pre-auction distressed sales and post-auction distressed sales in Panel (e) of Figure 4.2. Most notably, post-auction distressed sales account for the majority of foreclosure sales, indicating that in most cases, distressed homeowners are able to delay foreclosure auctions and sell their properties in the conventional market. I further disaggregate these categories in Table 4.2. Of all foreclosure sales, sales at auctions to private buyers account for 33% of all transactions, with the next most common transaction being a sale that happens before the auction date, which accounts for 27% of all transactions. As highlighted earlier, auction sales to the lender (i.e REO properties) are infrequent and account for only 4% of all foreclosed transactions.

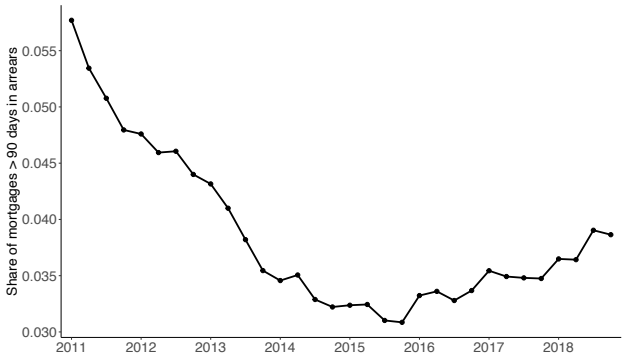
Figure 4.2: Foreclosure notices issued



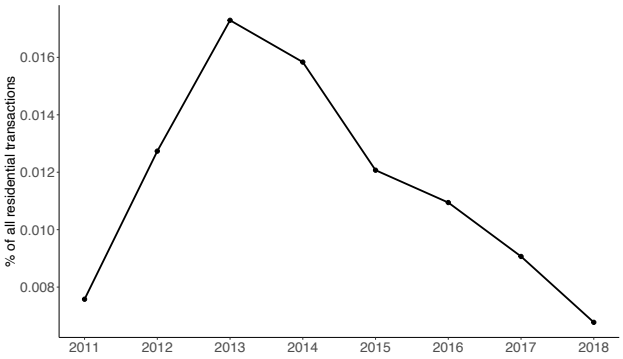
(a) Number of foreclosure notices issued



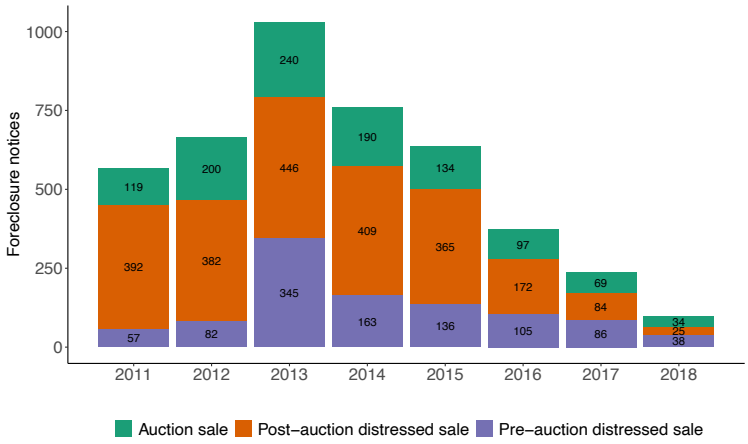
(b) Share of foreclosure notices that result in a sale



(c) Mortgage delinquency between 2011 and 2018



(d) Foreclosure sales as a share of total sales



(e) Foreclosure sales by type

Panel (a) shows the number of foreclosure notices issued for residential properties. Panel (b) shows the share of foreclosure notices that result in a sale. Panel (c) shows the quarterly % of all mortgages in South Africa which are more than 90 days in arrears calculated using publicly available data from the National Credit Regulator. Panel (d) shows the yearly number of foreclosure related sales as a percentage of all transactions. Panel (e) shows the number of foreclosure related transactions across three categories: auction sales, pre-auction distressed sales and post-auction distressed sales. Given our transaction data ends in December 2018, it is expected that the share of sold properties in 2018 is likely to be mechanically lower.

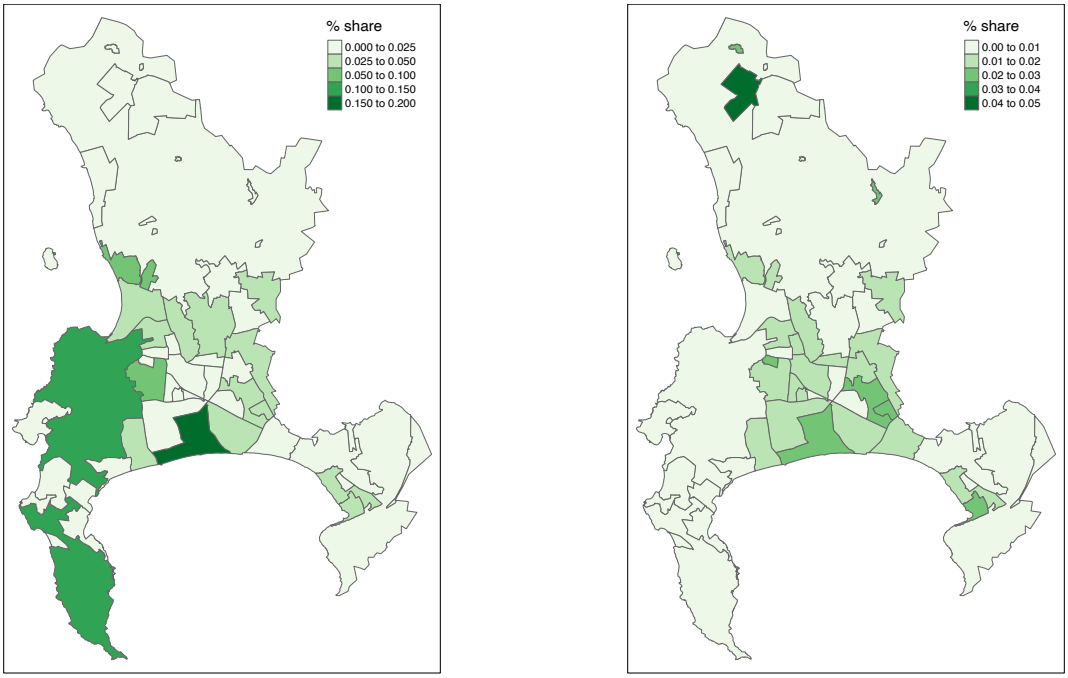
Table 4.2: Breakdown foreclosure outcome

Transaction type	N	%
Before auction	757	0.27
At auction	911	0.33
At auction - lender	108	0.04
30 days after auction	205	0.09
31 - 90 days after auction	153	0.06
181 - 360 days after auction	157	0.06
91 - 180 days after auction	121	0.04
361 days or more after auction	308	0.11
	2765	1.00

This table shows the different sale outcomes for all properties issued with a foreclosure notice and involved in a sale in Cape Town between 2011 and 2018.

In addition to aggregate trends, a novel feature of the dataset constructed is the ability to study the spatial distribution of foreclosures on a granular scale. In panel (a) of Figure 4.3 I show how foreclosures are distributed across the City, with darker areas corresponding to areas with a greater share of all foreclosure notices in the city between 2011 and 2018. Mitchells Plain, a low income area in the south of the city, accounts for over 15.8% of all foreclosure notices issued between 2011 and 2018, while the central business district accounts for 12.91% of all transactions. Relatedly, in panel (b) of Figure 4.3, I show the number of foreclosure related sales in suburbs around Cape Town as a share of all suburb transactions during 2011 and 2018. Strikingly, over 4% of all transactions are foreclosure related in Atlantis, a low-income suburb in the north of the city while there is also notable foreclosure activity in the south of the city, with 2.8% of all transactions in Mitchells Plain representing a foreclosure related sale.

Figure 4.3: Spatial distribution of foreclosure notices



(a) Suburb share of total foreclosures

(b) Share of foreclosure related suburbs sales

This figure shows the spatial distribution of foreclosure notices issued for residential properties across mainplaces in Cape Town. I report the suburb share of citywide foreclosures notices in Panel (a) and the share of suburb sales that are foreclosure related in Panel (b).

4.4 Estimating foreclosure discounts

In this chapter, I am ultimately interested in understanding the extent to which foreclosed property transact at a discount. One way to establish this would be to compare the mean or median price of foreclosure sales to the mean or median price of non-foreclosure sales. However, given foreclosed properties may differ in many important dimensions to non-foreclosed properties and since these differences are likely also correlated with prices, such a simple comparison would yield misleading results. In order to quantify foreclosure discounts, I implement a standard hedonic regression, in the vein of Andersen and Nielsen (2017) and Campbell, Giglio and Pathak (2011), where the dependent variable is the log transaction price, $y_{i,s,t}$ of property i in suburb s that sells in time t:

$$y_{i,s,t} = \alpha_{s,t} + \beta F_{i,t} + \gamma' X_i + \varepsilon_{i,s,t} \tag{4.1}$$

where $F_{i,t}$ captures if a transaction was associated with a foreclosure notice. In later specifications, $F_{i,t}$ takes the form of a vector of sale outcomes all related to a foreclosure notice. I also include year by subplace fixed effects $\alpha_{s,t}$ and X_i, a vector of property level controls, which include property size, type, bedrooms, bathrooms, age, a dummy variable if any renovations have taken place, the properties value as assessed by the local municipality for the purposes of property taxes, and a month of the year fixed effects to control for seasonality in prices and a control for the financing choice of the buyer.

The coefficient of interest β measures the difference in the price that foreclosed properties sell for relative to non-foreclosed properties conditional on the controls I employ. The major concern with drawing reliable inferences from β relates to the extent that foreclosure discounts may be confounded by other factors. To this extent, a few features of this specification are worth noting. Firstly, the inclusion of year by subplace fixed effects, $\alpha_{s,t}$, controls for temporal variation in house prices at the subplace level. This allows us to ensure that the foreclosure discounts I estimate are not being confounded by local price trends. One example of this would be if foreclosed properties are spatially concentrated in areas which are experiencing lower than average property price growth. In such a scenario, the inclusion of $\alpha_{s,t}$ ensures that temporal differences in suburb prices do not affect our estimation of β. In addition, the inclusion of a month of the year fixed effect also controls for differences in prices that relate to when in the year a property is sold. Secondly, the inclusion of property characteristics helps us control for differences in prices which materialize as a result of observable differences in property characteristics, which may be correlated with foreclosed properties. However, while I include a number of property characteristics as control variables, I cannot rule out that there are factors unobserved in the data which are correlated with the characteristics of the property and the likelihood a property is foreclosed. Such a correlation would lead to a biased estimate of β. To reduce these concerns, I include the properties assessed value as of 2015. The assessed value is calculated by the local municipality in order to estimate the property taxes the homeowner is eligible to pay. Under the assumption that property valuers are better informed as to estimating the value of a given property, including the valuation as an additional should result in a cleaner estimate of β. I also include a dummy variable which captures if a buyer did not make use of a mortgage, and thus, purchased their property with cash. This is important given buyers who pay in cash typically receive a discount relative to buyers with a mortgage, a fact I established in Chapter 2. Such a discount could arise for a number of reasons. However, the most frequently mentioned motivation is the mortgage-contingency clause standard in all sales contracts—if a buyer is unable to obtain mortgage finance for a transaction they are allowed to back out of the deal and receive a refund of their deposit. Cash transactions typically reduce the risk to a seller that a deal may fail to materialize. In cases where a distressed seller has found a buyer for their soon

to be foreclosed property and would like the lender to postpone the foreclosure auction, the certainty associated with a cash offer may result in a substantial discount being conceded by the seller. As a result, failing to control for financing could lead to an upaward biased estimate of β. Finally, I double cluster standard errors at the suburb and year level in order to correct for cross sectional correlation and time series dependence.[20]

I report the results from this specification in Table 4.3 and the set of hedonic coefficients in Table 4.4. Properties where the owner receives a foreclosure notice sell for a discount of 40.3% relative to other comparable properties that sell without a foreclosure notice being issued. In column (2), I amend the specification to include a subplace fixed effect, to control for any time-invariant subplace specific factors which could influence prices. Following this, the foreclosure discount nearly halves. This highlights the fact that foreclosures are spatially located in areas with lower than average property prices. The foreclosure discount becomes larger after allowing for year by subplace fixed effects in column (3), indicating that foreclosures tend to occur in suburbs experiencing higher than average property price growth. Finally, in column (4), our preferred specification, I see as expected, the properties value is strongly related to the property price attained. Under this, our preferred specification, properties where the owner receives a foreclosure notice sell for a discount of 22.4% relative to otherwise identical properties without a foreclosure notice.

Nonetheless, it is unclear what the foreclosure discount is measuring, given the fact that some foreclosures sell at an auction, while others may not. As a result, the foreclosure effects I measure jointly capture discounts that can be attributed to financial distress of the seller and discounts attributed to the auction mechanism itself. In Table 4.5 I split the foreclosure variable, $F_{i,t}$ into various groups relative to when the property sells. In order to do this, I compare the auction date reported in the foreclosure notice with the actual date of sale reported in the transaction data. In addition, for properties that sold at the auction, I distinguish between properties bought by the lender and properties bought by other parties outside of the lender.[21] As discussed earlier, if a property does not attract sufficient interest at a foreclosure auction, the lender will typically bid and purchase the property.

[20] On standard error clustering, see for example Cameron, Gelbach and Miller (2011).

[21] In order to establish whether a lender purchases a property, I simply compare the lender's identity under the mortgage information associated with the property to the identity of the buyer.

Table 4.3: Properties sell for a sizeable discount relative to market prices after a foreclosure notice is issued

	Log(Price)			
	(1)	(2)	(3)	(4)
Foreclosure notice issued	-0.403***	-0.215***	-0.235***	-0.224***
	(0.027)	(0.033)	(0.032)	(0.033)
Property valuation				0.845***
				(0.036)
Year FE	Yes	Yes	No	No
Month FE	Yes	Yes	Yes	Yes
SP FE	No	Yes	No	No
Year x SP FE	No	No	Yes	Yes
Observations	176,619	176,617	176,316	176,316
Adjusted R-squared	0.621	0.818	0.834	0.857

This table reports the results from the main hedonic specification in equation 4.1. I include various combinations of fixed effects across the columns as well as including a properties assessed value in column (4). Standard errors are double clustered at the subplace and year levels and are reported in parentheses. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

Table 4.4: Full hedonic specification

Log(Transaction Price)			
Age: <10 years	0.085***	# Bedrooms: 3	0.014
	(0.024)		(0.032)
Age: <20 years	0.068**	# Bedrooms: 4+	0.008
	(0.021)		(0.032)
Age: <40 years	0.005	# Bathrooms: 1	0.407**
	(0.007)		(0.141)
Age: <5 years	-0.199***	# Bathrooms: 2	0.461**
	(0.046)		(0.138)
Age: new build	-0.126***	# Bathrooms: 3	0.458**
	(0.008)		(0.138)
Floor size: quartile 2	0.119***	# Bathrooms: 4+	0.473**
	(0.028)		(0.137)
Floor size: quartile 3	0.174***	Property has been renovated	-0.017
	(0.038)		(0.016)
Floor size: quartile 4	0.166***	Log (Property Valuation)	0.845***
	(0.038)		(0.036)
Plot size: quartile 2	0.125***	Foreclosure notice issued	-0.224***
	(0.041)		(0.003)
Plot size: quartile 3	0.174***		
	(0.043)		
Plot size: quartile 4	0.177***		
	(0.048)		
# Bedrooms: 0	0.164***		
	(0.0Â§3)		
# Bedrooms: 2	0.013		
	(0.027)		

This table reports the results from the main hedonic specification in equation 4.1 which corresponds to column (4) of Table 4.3. Standard errors are double clustered at the subplace and year levels and are reported in parentheses. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

Throughout the various specifications, foreclosure discounts are the largest when properties

sell at an auction and are bought by the lender. In our preferred specification in column (4), with month and year by subplace fixed effects and controls for property characteristics and the properties' assessed value, properties with a foreclosure notice issued that sell at a foreclosure auction and are purchased by the lender, sell for a 51.4% discount relative to conventional transactions. When the property is purchased at the auction by a party that is not the lender, the discounts remains sizeable but drops to 44.3%. The fact that the foreclosure discount is largest when a property is bought at an auction by the lender is intuitive when you consider the fact that the lender purchasing a property is typically the last resort, and only occurs in cases where the property has struggled to generate sufficient interest in the pre-auction conventional market and at the auction itself. In cases like this, the lack of demand is likely correlated to features of the property and if this is the case, a large discount is expected.

If the homeowner is able to delay or stop the foreclosure auction, the discounts, while smaller, remain sizeable - properties sold one month after the auction sell for a 27.8% discount. These discounts persist all the way up to 180 days after the auction, but are imprecisely estimated and as a result, I do not have conclusive evidence of foreclosure discounts for transactions that sell more than 30 days after the foreclosure auction. One interpretation of this would be that homeowners who sell more than 30 days after the scheduled foreclosure auction have cleared their arrears and are no longer in distress. Another interpretation would be that conditional on being able to avoid the foreclosure auction, the longer it takes a property to sell, the longer time the property stays on the market and the more likely it is that the seller achieves the market price they are seeking. I am however unable to test these hypotheses. The major difference in discounts between auction sales and post-auction distressed sales highlights the role that auctions play in affecting the quality of matches between buyers and sellers and the effect this has on prices. In that sense, auction sales involve additional discount over and above the discount due to financial distress.

Notably however, if a homeowner is able to sell their property before the auction, the property sells at a vastly reduced discount of 8.9%. Importantly, these transactions represent private sales where the seller is able to find a buyer and they do not represent instances of a bank-assisted sale, given the default judgement has already been passed and the foreclosure auction has been scheduled. As such, while the homeowner is still distressed, these transactions sell for a substantially smaller discount that the post-auction distressed sales, indicating that it is in the homeowners best interest to achieve a sale prior to the foreclosure auction.

Table 4.5: Foreclosure discounts are largest when the property is sold at an auction

	Log(Price)			
	(1)	(2)	(3)	(4)
Before auction	-0.222***	-0.080**	-0.090**	-0.089**
	(0.036)	(0.028)	(0.030)	(0.035)
At auction	-0.624***	-0.430***	-0.451***	-0.443***
	(0.074)	(0.059)	(0.060)	(0.063)
At auction: lender	-0.742***	-0.458**	-0.531***	-0.514***
	(0.096)	(0.136)	(0.117)	(0.126)
30 days after auction	-0.397***	-0.252***	-0.296***	-0.278***
	(0.046)	(0.041)	(0.044)	(0.043)
31 - 90 days after auction	-0.281*	-0.134	-0.144	-0.139
	(0.124)	(0.101)	(0.095)	(0.103)
91 - 180 days after auction	-0.257**	-0.103	-0.112	-0.068
	(0.086)	(0.062)	(0.061)	(0.045)
181 - 360 days after auction	-0.111**	-0.062	-0.045	-0.039
	(0.035)	(0.042)	(0.043)	(0.034)
361 days or more after auction	-0.172***	-0.022	-0.015	-0.005
	(0.029)	(0.043)	(0.042)	(0.043)
Property valuation				0.845***
				(0.036)
Year FE	Yes	Yes	No	No
Month FE	Yes	Yes	Yes	Yes
SP FE	No	Yes	No	No
Year x SP FE	No	No	Yes	Yes
Observations	176,619	176,617	176,316	176,316
Adjusted R-squared	0.621	0.818	0.835	0.857

This table reports the results from the main hedonic specification in equation 4.1 with detailed groups for when the property sold relative to the foreclosure auction. For properties that sold at the auction, I distinguish between properties bought by the lender and properties bought by other parties outside of the lender. *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

4.4.1 Robustness tests

Despite extensive hedonic controls, the foreclosure discounts I measure remain sizeable and have major economic consequences. As argued by Harding, Rosenblatt and Yao (2012), "To the extent that such a discount exists, arbitrage opportunities exist and the associated market failure has significant policy implications". Given their magnitude, it is natural to consider the possibility that the foreclosure discounts are being confounded by unobserved factors correlated with prices and foreclosed properties. In this section I consider two factors which could confound the foreclosure discounts I estimate, namely unobserved neglect of property and auction related transaction costs.

4.4.1.1 Unobserved neglect of property

Despite the extensive controls I employ in our empirical specifications, unobserved neglect of the property could contribute to the discounts I measure. This is plausible to the extent that financially distressed homeowners who expect eviction from their home may be less likely to invest in their homes, conduct maintenance and repairs and ensure the property remains in a good condition. Campbell, Giglio and Pathak (2011) argue that the effects of neglect will be more pronounced in properties where the value of the building structure accounts for a greater share of the properties value than the land value.

I follow their two-stage approach in order to better understand how neglect affects the foreclosure discount. In the first step, I re-estimate equation (4.1) excluding the foreclosure indicator variable. Then, I calculate how much of the predicted log price of each property is composed of characteristics of the property and how much is composed of the size of the land of the property. The property component is merely the sum of all property related variables (bedrooms, bathrooms etc.), while the land component refers to the contribution of the erf size to the predicted log price. I then implement the following specification:

$$y_{i,s,t} = \alpha_{s,t} + \beta_1 F_{i,t} + \beta_2 L_{i,t} + \beta_3 P_{i,t} + \beta_4 F_{i,t} * L_{i,t} + \beta_5 F_{i,t} * P_{i,t} + \varepsilon_{i,s,t} \tag{4.2}$$

where as before $y_{i,s,t}$ represents the log transaction price of property i, in suburb s that sells in time t, $\alpha_{s,t}$ is a year by subplace fixed effect and $F_{i,t}$ captures if a transaction was associated with a foreclosure notice. $L_{i,t}$ refers to the level of the land component of the predicted log of the property price, $P_{i,t}$ refers to the level of the property structure component of the predicted log of the property price and $F_{i,t} * L_{i,t}$ and $F_{i,t} * P_{i,t}$ refer to interactions between the foreclosure

indicator and each respective component.[22] The coefficients of interest are therefore β_4 and β_5 which tell us the additional discount associated with the land component and property structure component of a property's value. Given these interactions, I choose to now interpret β_1 as the foreclosure discount associated with the financial distress of the seller. If neglect contributes to the foreclosure discount I estimate, I would expect β_5 to be negative and β_1 to be larger than in the original specification. It is unlikely that the land component of a properties value can be subject to neglect and as such a natural hypothesis would be for β_4 to be zero. I report the results from this specification in Table 4.6.

Firstly, we see that the foreclosure discount decreases from 22.4% to 18.6% suggesting that there is still a sizeable discount which can be attributed to the financial distress of the seller. I then find a precisely estimated zero coefficient on the interaction with the land component of price, suggesting that the land component contributes little to discounts associated with foreclosed property. I do however find strong evidence that the structural component of a foreclosed properties value is associated with a discount of 1%. This provides evidence of a positive, but small discount associated with neglect for foreclosed properties and also suggests that the foreclosure discount associated with financial distress of the seller is still sizeable.

Table 4.6: Foreclosure discounts across the land and structural components of property prices

	Log(Price)	
	(1)	(2)
Foreclosure notice issued	-0.224***	-0.186***
	(0.034)	(0.034)
Foreclosure notice issued interacted with land component of price		0.000***
		(0.000)
Foreclosure notice issued interacted with structure component of price		-0.010**
		(0.004)
Observations	176,315	176,315
Adjusted R-squared	0.857	0.856

This table reports the results from Equation (4.2) in Column (2) and the based specification in Column (1). *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

[22] I standardize $L_{i,t}$ and $P_{i,t}$ to have a zero mean and unit standard deviation

Table 4.7: Foreclosure discounts controlling for the land and structural components of property prices

	Log(Price)	
	(1)	(2)
Before auction	-0.089**	0.014
	(0.035)	(0.036)
At auction	-0.443***	-0.300***
	(0.063)	(0.053)
At auction: lender	-0.516***	-0.147*
	(0.127)	(0.067)
30 days after auction	-0.278***	-0.190***
	(0.044)	(0.038)
31 - 90 days after auction	-0.139	-0.089
	(0.103)	(0.062)
91 - 180 days after auction	-0.068	0.166*
	(0.045)	(0.073)
361 days or more after auction	-0.006	0.090
	(0.044)	(0.051)
Controls for land + structural component of price	Yes	Yes
Observations	176,315	176,315
Adjusted R-squared	0.857	0.856

This table reports the results from Equation (4.2) in Column (2) and the based specification in Column (1). *, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

4.4.1.2 Auctioneer's commissions, costs of eviction and outstanding property taxes and levies

As discussed earlier, the buyers of properties at an auction are subject to additional costs, the first being the auctioneer's commission. In anticipation of these costs, buyers may reduce the price they are willing to bid and this could therefore confound the foreclosure discount I estimate. In order to incorporate these costs, I calculate the auctioneer's commission for each auctioned property, add it to the transaction price and re-estimate the foreclosure discount. I report the results from this exercise in column (2) in Table 4.8. The foreclosure discount for auc-

tioned properties bought by a private party drops from 44.3% in the base specification to 35.8%, indicating that the auctioneers commission can account for around 7.1 to 8.5 percentage points of the observed foreclosure discount. Nonetheless, the discount remains sizeable.

The second cost typically incurred by buyers at an auction is any current arrears on unpaid property taxes. Unlike conventional transactions, when a buyer purchases a property at a foreclosure auction, they also become liable for any property tax arrears of the seller. Given these sellers are under financial distress, owners of foreclosed properties are likely to also be in arrears with their property taxes. While I do not observe the property tax outstanding on each property, I am able to construct reasonable values for property taxes. As in many other countries, property taxes in South Africa are calculated on a property's assessed valuation, which gets multiplied by a "rate-in-the-rand" amount to calculate yearly property taxes due. For example, in 2018, the rate-in-the-rand in Cape Town was R0.007154. In Cape Town, properties typically get re-valued each three to four years. Using the property valuation I observe for 2015 and the prevailing rate-in-the-rand I can therefore calculate the property taxes due for each property. In columns (3) - (4), I consider two scenarios: one year and two years worth of tax arrears and add the amount of arrears to the transaction price which already includes the auctioneers commission.[23] Even after assuming two years worth of outstanding property tax arrears, the discount still stands at 33.9% for private buyers . As such, while outstanding property taxes reduce the foreclosure discount, the discount still remains sizeable. This is perhaps unsurprising given the relative magnitude of property taxes relative to the auctioneers commission. For example, a property that sells for R800,000 at an auction but is valued at R1,000,000 will attract an auctioneers commission of approximately R25,800, while the property taxes due each year will be approximately R5,700.

Outside of transaction costs and outstanding taxes, an additional factor which could contribute to the foreclosure discount I measure relates to whether or not a property is occupied by the homeowner at the time of repossession. If the property is occupied, the responsibility to evict the homeowner rests with the buyer. The legal eviction process is costly and time consuming, in many cases taking up to and over one year to complete. In addition, the buyer can only start the eviction process once the property has been registered in their name. At the time of writing, the deeds office in South Africa currently reports that the average time to register a property is 17 days from the time all documents are lodged with the deeds office.[24] To compound matters, the buyer is liable to pay property taxes while waiting for the eviction process to resolve. Given this, it is likely that the occupancy status of a property and the associated costs of eviction likely

[23]For simplicity, I assume no interest is charged on any late penalties, although in practice, interest is often charged. Details surrounding the interest rate and late penalties are not readily available.

[24]The deeds office reports the average time to register property on their home page, here.

contributes notably to the foreclosure discounts I estimate.

Given that I cannot observe occupancy status nor the associated eviction costs in the event of occupation, I develop a proxy for it using estimated auction costs available online.[25] Evictions can either be uncontested or contested and eviction costs are estimated at between R5,000 and R25,000 for an uncontested eviction and up to R100,000 for a contested eviction. Over and above these costs, the homeowner is liable to pay sherrif's costs of between R1,000 and R10,000. In order to proxy for eviction costs I randomly assign 50% of foreclosures which sell at the foreclosure auction as occupied, which is reasonable given anecdotal evidence suggests that 90% of foreclosed homes bought at an auction are occupied.[26] I then consider a scenario where all of these randomly assigned transactions involve uncontested evictions and another scenario where all of the transactions involve contested evictions. In the case of each, I take the midpoint of the cost estimates from earlier and add that to the transaction price including the auctioneers commission and two years of tax arrears. I report these results in columns (5) and (6) in Table 4.8. When accounting for the estimated costs of uncontested auctions, the foreclosure discount drops from 33.9% to 27% and when accounting for contested auctions, this discount drops even further to 19.4%. It is important to emphasize that these evictions costs are simply proxies. Nonetheless, it is clear that eviction costs have the potential to significantly reduce the observed foreclosure discount.

The final cost a buyer is eligible to pay is any outstanding levies due. While I do not observe levies in the data, I leverage the fact that levies are typically only applicable for sectional title properties, such as apartments, and not for freehold properties, such as freestanding houses. I then proceed to re-estimate all of the specifications separately for freehold properties and sectional title properties. If levies are indeed contributing to the foreclosure discounts we would expect to see a lower foreclosure discount for sectional title properties than foreclosed properties. This is precisely what I find in Table 4.8. Including commission costs, assuming there are two years of property arrears and that 50% of all transactions involve eviction costs associated with uncontested evictions, I find that the foreclosure discount associated with freehold properties is 11.8 percentage points (or 32 percent) smaller than for sectional title properties. Under the assumption that conditional on the controls I employ, the only difference between freehold and sectional title properties is that the latter involves the payment of levies, this would suggest that outstanding levies contribute a sizeable portion of the estimated foreclosure discount. Despite this however, I still estimate a foreclosure discount of 24.7% for freehold properties. Given the evidence presented, my preferred estimate of the foreclosure auction discount,

[25] I use auction costs as reported by Le Roux Attorneys, available here.

[26] See, for example, "How to buy a distressed property in SA - while avoiding the many, many pitfalls" - *Business Insider South Africa*, 19 December 2020.

which accounts for commission costs, two years of outstanding property taxes, eviction costs and outstanding levies, is between 16.9% and 24.7%.

The evidence in this section therefore highlights the robustness of the discounts I measure. Notably however, this discount is similar in magnitude to the discounts observed when a property sells in the conventional market post auction, as measured in Table 4.5. Given these sales occur in the conventional market, the discounts in price that result from the auction mechanism itself are not at play, and as a result, should better represent the discount associated with financial distress on the part of the seller. I choose to interpret this as evidence that after accounting for all of the hidden costs associated with purchasing foreclosed properties at auctions, the discounts achieved are in line with the discounts associated with financial distress. Put differently, auctioned properties do not sell for an additional discount, over and above the more general discount that arises from the financial distress of the seller.

This finding is in line with economic intuition. If sizeable foreclosure discounts exist at auctions, buyers can simply purchase these properties at a large discount and re-sell them immediately to make a significant excess returns. However, as argued by Clauretie and Daneshvary (2009), while the housing market is not perfectly efficient, it is unlikely to be so inefficient such that excess returns can be generated so easily and consistently, given competition amongst buyers would eliminate that discount.

Nonetheless, an open question remains as to why the auction discount persists. In the case of a private sale, the discount can be rationalized through the fact that the homeowner has control over the transaction outcome and therefore agrees to the discount in return for liquidity. In the case of the auction, neither the lender nor the homeowner can control the outcome and as such, financial distress cannot likely not account for the entirety of the discount estimated. One explanation that could explain the persistence of such large discounts would be the existence of participation costs that prevent the entry of some buyers consistent with the rationale for the existence of firesales in Allen and Gale (1994). In South Africa, should a buyer be successful in acquiring a property, they are required to pay a deposit of 10% of the purchase price immediately either in cash or through a bank guaranteed cheque. These participation costs are not unusual. In Massachusetts for example, the deposit to participate in an auction is $5,000 (Campbell, Giglio and Pathak, 2011). The 10% deposit may therefore serve to exclude potential buyers with little liquidity, reducing the extent of competition. In fact, ignoring complicated ownership cases where multiple buyers are involved in the purchase of a property (which accounts for 25% of all auction sales), I find that a large proportion of foreclosed properties which sell at the auction, 27.5% to be exact, involve a buyer who has purchased more than one property at an auction during the time period (i.e repeat buyers), indicative that a lack of competition may

indeed be contributing to the discounts I find. Naturally, a more thorough investigation of the nature of competition at auctions, which documents the number of bidders and the number of bids would be required to conclusively establish this, but this falls outside of the scope of this dissertation.

4.5 Conclusion

In this chapter, I provide novel evidence documenting the extent of home foreclosures in Cape Town between 2011 and 2018. I find sizeable foreclosure activity which is geographically concentrated in lower income areas of the city. Overall, the number of foreclosure notices issued between 2011 and 2018 and the share of foreclosure notices that result in sales are both decreasing. This is likely explained by an improvement in the financial status of mortgage holders, reflected in an improvement in the mortgage delinquency ratio and reduced foreclosure activity by lenders in the light of increasing policy and media attention on the fairness of the foreclosure process and a major class action lawsuit currently facing lenders.

I then show that foreclosed properties sell at a substantial discount consistent with theory. These discounts are largest when a property is sold at an auction. Again, this is very much consistent with theory, as the discount due to the financial distress of the seller is compounded by the discount brought about by the relatively 'poor' match between buyers and sellers which happens at auctions. I however show that after accounting for numerous costs applicable to the buyers of auctioned property, including commission fees, outstanding property taxes and levies and potential eviction costs, that the foreclosed discounts at an auction become significantly smaller and similar in magnitude to the discounts attained when sellers of foreclosed property sell their homes in the conventional market post auction date. I choose to interpret this as evidence that auctioned properties do not sell for an additional discount, over and above the more general discount that arises from the financial distress of the seller. I then present evidence that the existence of the auction discount is potentially explained through a lack of competition given a limited number of potential buyers and auction participants.

The findings in this chapter have important policy implications. Firstly, the sizeable discounts measured at auctions have formed the basis of policy amendments of the auction process in South Africa. My results show that the estimation of these discounts is very sensitive to the controls employed and that a failure to account for factors such as property neglect and the financial costs incurred by the buyer upon purchase would lead to a sizeable over-estimate of the true foreclosure discount. Secondly, I highlight that participation costs to attend auctions may prohibit the entry of potential buyers, leading to lower competition and lower prices. This

is an especially important finding given the policy response to sizeable auction discounts has been to impose reserve prices. If the discounts attained at auctions indeed reflect the costs a buyer is liable for, the introduction of a reserve price, if set higher than the reservation prices of buyers may lead to less interest at auctions and a greater share of properties bought by the lender, which involve even greater discounts. Moreover, if participation costs are indeed the driving force behind these discounts, the introduction of reserve prices does little to address this. A key takeaway from this chapter is therefore that a reduction in the costs associated with attending auctions, in particular, eliminating the requirement that a cash deposit be paid at the auction itself which limits the participation of liquidity constrained buyers, could in fact lead to greater attendance at the auctions, more competition amongst bidders and higher prices.

Future extensions and refinements to the work in this chapter will involve more a more detailed digitizing of the auction notice text data in order to extract more information contained in the notices. One example would be to extract information related to where the property is auctioned. Typically the auctions either take place at a sheriff's office or at the property itself and digitizing the location information would allow us to study how outcomes vary by auction location. This may be especially pertinent if auctions that take place at the property helps to address any information asymmetries on the part of bidders by giving them an opportunity to view the property. Furthermore, controlling for the location of the auction or the sherrif's office may reveal interesting patterns in discounts achieved which may be correlated to the auction location and personnel. Related to the idea of information asymmetries, since there is no requirement as to where the property should be auctioned, one study how foreclosure discounts vary dependent the proximity of the auction location to the property being auctioned itself. For example, I was able to observe at least one case where a property located in Cape Town was being auctioned in a different city all together. An entirely separate research question would involve studying the resale of foreclosed properties to understand whether buyers of foreclosed properties 'flip' the properties at a short time horizon, the returns they make, and how these returns vary with the experience of the buyer / how frequently they purchase and sell foreclosed property.

Table 4.8: Auctions discounts remaining large even after accounting for transaction costs

	Log(Price)					
	(1)	(2)	(3)	(4)	(5)	(6)
	Base specification	Including commission	Including commission and one year of tax arrears	Including commission and two years of tax arrears	Including commission, two years of tax arrears and uncontested eviction costs	Including commission, two years of tax arrears and contested eviction costs
Full sample						
At auction	-0.443***	-0.358***	-0.348***	-0.339***	-0.270***	-0.194***
	(0.063)	(0.059)	(0.057)	(0.056)	(0.053)	(0.052)
At auction - lender	-0.514***	-0.443***	-0.432***	-0.423***	-0.362**	-0.288**
	(0.126)	(0.116)	(0.114)	(0.113)	(0.106)	(0.104)
Freehold properties						
At auction	-0.425***	-0.337***	-0.327***	-0.318***	-0.247***	-0.169**
	(0.066)	(0.063)	(0.062)	(0.060)	(0.059)	(0.059)
At auction - lender	-0.482**	-0.406*	-0.395*	-0.386*	-0.327*	-0.256
	(0.197)	(0.182)	(0.180)	(0.179)	(0.165)	(0.156)
Sectional title properties						
At auction	-0.503***	-0.438***	-0.428***	-0.420***	-0.365***	-0.296***
	(0.095)	(0.083)	(0.080)	(0.077)	(0.061)	(0.048)
At auction - lender	-0.568***	-0.514***	-0.504***	-0.497***	-0.435***	-0.349***
	(0.075)	(0.071)	(0.069)	(0.069)	(0.055)	(0.048)

This table reports results from a modified version of our main specification in equation 4.1 where I add various costs to the transaction price which are incurred when purchasing a foreclosed property at an auction. Column (1) represents our base specification and in column (2) I add the auctioneers commission to the transaction price for auctioned properties. In columns (3) through (4), I also include one and two years worth of property tax arrears to the transaction price. The details for how these amounts are calculated can be found in-text. In columns (5) and (6) I add the costs of contested and uncontested evictions randomly to 50% of all transactions, respectively. The details for how these amounts are calculated can be found in-text. I then report the results for three estimation samples: the full sample, freehold properties only and sectional title properties. For brevity, I only report the coefficients on properties sold at auction and not report the coefficients from other non-auction foreclosed transactions given these coefficients are unchanged. ...*, **, *** represents significance levels of 0.1, 0.05 and 0.01, respectively.

Chapter 5

Conclusion

The housing market in South Africa is of fundamental importance given the relative magnitudes of housing and mortgages on the balance sheet of households in South Africa, and the unprecedented scale of the government sponsored housing programme, which has provided close to 3 million homes to poor households. Outside of the sheer magnitude, housing represents a fundamental right for all South Africans, enshrined in the Bill of Rights in the South African constitution. Despite this importance, home ownership rates remain low. This juxtaposition remains one the of most pressing policy concerns in South Africa. Within this context, a key policy priority involves increasing home ownership rates. There are two challenges to this goal which I explore in this dissertation: The first relates to housing affordability and the second being adequate protection for homeowners in financial distress.

In Chapters 2 and 3 I explore foreign investment in the housing market in Cape Town, a topic which has received considerable attention globally. The two primary concerns about foreign investment in housing relate to housing affordability and the crowding out of locals in the housing market. In this dissertation I do indeed find evidence that foreign investment leads to increases in house prices and that part of this price effect stems from the tendency for foreign buyers to pay higher prices than local buyers for otherwise identical property. Concerns about rising prices need to however be contextualized within the broader economic conditions in a given country. As I show in Chapter 3, foreign investment increases, leading to increases in house prices, following large exchange rate depreciations. This counter-cyclical pattern of investment can have stabilizing effects on house prices, especially if large exchange rate depreciations dampen local demand for housing. Furthermore, as Chapter 2 illustrates, foreign investment into housing need not be distributed evenly across the city, and can often be targeted to a small subset of suburbs in a city. In such a scenario, the extent to which foreign investment affects prices across the city, is likely a function of the extent of price externalities between these

suburbs and the rest of the city. In a highly segregated city like Cape Town, these externalities may be less of a concern. In addition to price externalities, the extent to which foreign investment affects prices across the city will also depend on the extent of substitutability of housing and non-housing consumption as illustrated in Favilukis and Van Nieuwerburgh (2021). If local buyers who would typically purchase in areas popular to foreigners anticipate the entry of foreign buyers, the extent to which they may reduce their housing consumption and relocate to the more affordable suburban areas will depend on the their willingness to substitute from housing to non-housing consumption. The findings in Chapter 2 also illustrate that the extent to which large flows of foreign investment into housing lead to a crowding out of locals in the housing market is a function of the extent of housing development and construction.

In Chapter 4 I document the extent of home foreclosures and estimate that foreclosed properties sell for sizeable discounts relative to otherwise identical non-foreclosed properties. While a sizeable part of this discount can be explained by the costs incurred by the buyer upon purchase, a sizeable discount of between 17%-25% persists even after accounting for these costs. I put forward participation costs to the auction process as one potential reason for these discounts, given these costs may inhibit the entry of potential buyers thereby limiting the extent of competition. This is especially pertinent given concerns about the low prices attained at auctions and the implications for homeowners. In response to this, the policy response has been to introduce a system of reserve prices in the auction. The results from Chapter 4 would suggest that by reducing the participation costs at auctions, leading to a greater number of bidders, could also improve the prices attained at foreclosure auctions.

All together, these results have two major implications. First, despite concerns raised internationally about the effects of foreign buyers on housing affordability, these concerns are less pertinent in Cape Town. Given the segmented housing market, foreign demand occurs in a small subset of suburbs in the city and as a result, the price externalities or spillovers of this demand to other suburbs are likely to be limited. Furthermore, foreign demand may also have an important role to play in stabilizing house prices. Second, in response to the "unjust" selling of homes for a fraction of their market value the rules surrounding home foreclosure auctions have been amended to mandate the courts to set a reserve price in order to ensure that foreclosed homes sell for market-related prices. However, as I show in this dissertation, there are a number of factors which contribute to this discount, such as auction costs, property tax arrears and eviction costs. Furthermore, there is evidence suggestive of limited competition at these auctions which further depress prices. As a result, the introduction of reserve prices which aims to remove the foreclosure discount will likely further reduce demand and perhaps explains the decrease in the number of foreclosures in the data. The introduction of reserve prices may also

introduce certain negative externalities such as higher interest rates on mortgages if the introduction of reserve prices reduces demand for foreclosed properties making it more difficult for financial institutions to liquidate these assets and thereby increasing the risk given mortgage default. Understanding the effects of the introduction of reserve prices on foreclosures and mortgage lending is a topic of future research.

Outside of the ideas for future research outlined in each chapter, three areas of future research using similar data as the data used in this dissertation are of particular interest. Firstly, an exciting area for future research involves questions which sit at the intersection of public economics and housing. Property taxes typically constitute a large share of local government tax revenues across the world (Löffler and Siegloch, 2021). It is also widely established that property taxes tend to be regressive with expensive homes typically being undervalued relative to cheaper homes (Sirmans, Gatzlaff and Macpherson, 2008; Amornsiripanitch, 2021). One explanation for this regressivity, is that of infrequent property valuations (Paglin and Fogarty, 1972). One research question would involve assessing the extent to which the frequency of property valuations affects the revenue raised and the progressiveness of the property tax system. If property valuations, and the property taxes these valuations create, are infrequent, property taxes may be indexed to outdated property values, which has implications for revenue collection. Another research avenue focuses on the effects of Covid-19 and remote work on the residential choices of households. For example, Gupta et al. (2021) document declines in house and rental prices in city centers in the United States, and increases in these prices in areas further away from the city centre, leading to a flattening on the bid-rent curve, following Covid-19 and the transition to remote work. Given I am able to observe the ownership information for each property in the city, one avenue for future research would be to document the extent of residential reallocation among homeowners following Covid-19. Furthermore, given I am also able to observe the age and gender of all South African buyers and sellers, as well as establishing the martial status, I would also be able to document changes in the composition of home ownership across the city. As mentioned in Chapter 4, until 2007 there was no legal requirement for home foreclosure auctions to include a reserve price in South Africa. As a result of this, auctions typically commence without a reserve price. Given concerns that the lack of a reserve price was contributing to the foreclosure discounts, the auction rules were amended in order to allow the court to set a reserve price for foreclosure auctions. The amendment was however not binding across the country, and different courts across the country introduced the reserve price requirement at different times, leading to a staggered roll out. If national transaction data could be sourced, it would allow for a study of how the implementation of reserve prices in the auction itself affects the number of foreclosures issued and the discounts achieved using an identification strategy which exploits the staggered implementation of reserve prices in different parts of the country.

Outside of these topics, a major area for future research involves studying the persistent racial and income segregation in South African cities. While a notable literature exists documenting the patterns, characteristics and evolution of residential segregation in South Africa (Christopher, 2005, 2001; Turok, Visagie and Scheba, 2021; Ballard and Hamann, 2021), there is less applied work specifically with respect to using the end of Apartheid as a shock to study the phenomena of tipping points. In seminal work, Schelling (1969) shows how preferences for the colour of one's neighbour can lead to extreme and persistent segregation. Specifically, once a suburbs minority racial share increases beyond a tipping point, the majority race begins to leave. Importantly, Schelling's work shows that segregation can be a stable outcome even in the absence of explicit segregationist policies. Card, Mas and Rothstein (2008) find empirical evidence of tipping points among the white population using census tract data for the US between 1970 and 2000 - census tracts where the minority population exceeds the tipping point see sizable out-migration of whites, while census tracts where the minority population is below the threshold, experience white in-migration. Papers like Card, Mas and Rothstein (2008) focus on the endogenous evolution of segregation as households move. Another approach would involve finding a setting where a policy change either enacts and/or removes formal segregation and studying pre-and-post outcomes. South Africa, it's historical legacy of Apartheid and the removal of formalized segregation provides one such setting. In future work I intend to document the extent of racial segregation using detailed census data from 1991 to 2011 at a granular suburb level. Much of the research on the evolution of racial segregation in South Africa happens at the level of the city and as of yet, very little is understood of within-city dynamics. The reason for this stems from the fact that in South Africa, different census years have different suburb boundaries. Using a range of shape files of different suburb boundaries across census years, I could use GIS techniques to construct a consistent suburb boundary which can be used to evaluate the evolution of key variables in the census data at a granular suburb level. To the best of my knowledge, such a dataset does not yet exist and this alone would be a meaningful contribution. Using this dataset, I would be able study the evolution of within city segregation in South Africa. Specifically, using regression discontinuity techniques, I could test for discontinuities in the relationship between the suburb share of non-white residents and subsequent white migration to test for the existence of a tipping point, where non-white in-migration leads to white out-migration in a similar fashion to Card, Mas and Rothstein (2008). South Africa's setting provides a novel testing ground. In the US, given the white population represents the majority population group, the literature studies out-migration by the majority population in response to in-migration by the minority population. In South Africa the inverse is true, given the white population represents the minority population group.

The empirical literature on segregation also typically makes use of census data. The major dis-

advantage with this data is that it is typically recorded at 10 year intervals, creating a long lag between data points. Using the census suburb definitions, I would able to aggregate the deeds registry data to these suburb boundaries to create a monthly panel of transaction prices, transaction number and a range of other statistics, which I can use to supplement the census data. This provides a set of variables recorded at a shorter frequency than the census data, which can be used to provide information on population flows into and out of suburbs in between the gaps of the census data. This allows a more detailed understanding as to the speed of suburb change. Secondly, using house price information, I can relate the prices households pay for homes to features of the suburb, specifically the racial composition. Given property transaction data records the exact address of each property, one could calculate the distance from each property to the closest suburb boundary. This may be important in majority white suburbs that bordered a majority non-white suburb during Apartheid. Following the removal of the formal segregation under the Group Areas Act and controlling for differences in property characteristics using a repeat-sales methodology, I could test if house prices in these suburbs display a price gradient where prices decrease with distance to the boundary. Furthermore, I could also examine if such a gradient exists in a majority white suburb which only has majority white neighbouring suburbs. This research agenda would have important insights for urban policy in South Africa where the provision of public housing for the poor households is a policy priority with approximately 3 million homes being provided by the state to low income households since 1994. The major challenge however involves the provision of homes in a way that does not reinforce the racial segregation imposed under in Apartheid, to create better integrated cities. This requires an understanding as to the dynamics of segregation, the speed of suburb change, household preferences and the property market. This project would provide empirical evidence to better inform policy and set the foundation for future research in this direction.

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