Home Foreclosure Discounts in Auctions Without Reserve Prices*

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Abstract

This paper estimates foreclosure discounts in Cape Town, South Africa, where, until 2019, foreclosure auctions occurred without reserve prices. Using newly constructed data linking sheriff auction notices to the universe of property transactions, rich property characteristics, and municipal service request records, I document large foreclosure discounts that vary by empirical approach. In a cost-adjusted hedonic framework, properties sold at foreclosure auction transact at a discount of 14.5 per cent relative to comparable non-foreclosed sales; repeat-sales estimates yield substantially larger discounts of 30.2 per cent. These estimates bracket the plausible range of the true discount: the hedonic provides a conservative lower bound after netting out buyer-incurred transaction costs, while the repeat-sales provides an upper bound that additionally captures time-varying deterioration not fully observed in cross-sectional data. The magnitudes documented here are large relative to settings with reserve prices, reflecting an institutional environment where the absence of a reserve price leaves auction outcomes effectively unbounded on the downside. The implications are especially severe in South Africa's recourse mortgage system: foreclosed borrowers who lose their homes at auction may also remain liable for any balance between the sale price and the outstanding mortgage, compounding the household-level costs of foreclosure. The findings contribute to an understanding of how foreclosure-price formation operates in a no-reserve-price auction environment, and of the implications of that institutional design for realised prices and homeowner outcomes.

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1 Introduction

The widespread prevalence of home foreclosures was a defining characteristic of the Global Financial Crisis (GFC). In the United States (U.S.), where, at the peak of the crisis, the mortgage default rate rose above 10%, the wave of foreclosures had major macroeconomic effects: depressing house prices, curtailing residential investment, and reducing durable consumption (Mian et al. 2015, Guren & McQuade 2020). A key mechanism behind these effects is the fact that foreclosures typically sell at a 'foreclosure discount' — a lower price relative to similar non-foreclosed property (Campbell et al. 2011, Harding et al. 2012, Zhou et al. 2015).[1] A growing literature has sought to understand the source and size of this discount, with much of the focus on the U.S. housing market.

In the U.S., foreclosures typically proceed through a judicial or non-judicial process that ends in a public auction. However, these auctions are rarely successful. In most cases, the property fails to sell at auction and reverts to the lender, becoming what is known as Real Estate Owned (REO). The lender must then resell the property through a conventional transaction. In this institutional setting, the literature has typically interpreted foreclosure discounts as a firesale — a situation in which financial institutions, facing pressure to liquidate, sell assets at a price below their intrinsic value (Shleifer & Vishny 1992, 2011).[2]

Outside of the United States, there are many settings where foreclosure auctions are more successful and where foreclosed property is often sold directly to third-party buyers.[3] However, to prevent excessively low sale prices, many countries implement legislative safeguards, most notably reserve prices, which set a minimum acceptable bid. These are typically based on the outstanding mortgage balance, unpaid taxes, or the appraised property value. Additional protections may exist—for example, Swedish auctioneers are required to reject offers if they believe a substantially better price can be obtained at a later date (Donner et al. 2016). These protections are important: an extensive literature shows that auctions result in lower sale prices than would be attained in the non-auction market, given that auctions result in a poorer match between buyers and sellers compared to the non-auction market (Mayer 1995), a result consistent with housing search theory (Wheaton 1990, Han & Strange 2015, Piazzesi et al. 2020). Despite the prevalence of reserve prices internationally, we lack evidence on foreclosure discounts in

[1] When they occur in large enough numbers, foreclosures also create negative price externalities, driving down prices of neighboring non-foreclosed properties (Gupta 2019, Anenberg & Kung 2014, Guren & McQuade 2020).

[2] As Campbell et al. (2011) write: "Foreclosed houses are likely to sell at low prices, both because they may have been physically damaged during the foreclosure process, and because financial institutions have an incentive to sell them quickly"

[3] Notable examples being China (Qu & Huang 2024, Qian 2024), Germany (Just et al. 2020), Italy (Amoruso et al. 2020), Korea (Park & Bang 2014), Malaysia (Wong et al. 2015) and Sweden (Donner et al. 2016).

settings without such safeguards. This gap matters not only because such settings are unusual, but because the absence of a reserve price fundamentally changes the downside risk of the foreclosure process: without a floor on auction prices, homeowners have no institutional protection against extremely low sale outcomes. The concern is especially acute in recourse mortgage systems, where a low auction price does not merely impose a capital loss — it may also leave the borrower liable for any balance between the sale price and the outstanding mortgage, compounding the household-level costs of foreclosure and potentially amplifying negative effects on the housing market and the broader economy (Guren & McQuade 2020, Gupta 2019, Anenberg & Kung 2014, Mian et al. 2015).

This paper fills that gap by studying foreclosure auctions in Cape Town, South Africa, where, until 2019, auctions occurred without any reserve price requirements.[4] This institutional setting permitted homes to be sold to the highest bidder, regardless of how low the bid was, and there has been considerable anecdotal evidence of large foreclosure discounts, resulting in a R60 billion, or about $4.2 billion USD in 2018, class action lawsuit against the major financial institutions in South Africa for selling homes at a fraction of their market value.[5]

I study the magnitude of foreclosure discounts in this unique setting using newly constructed data linking the universe of Cape Town property transactions with sheriff auction notices and rich property-level characteristics. Notably, the South African foreclosure process allows sales (i) before the auction—if the homeowner manages to sell in time, and (ii) after the auction—if the homeowner settles their arrears and the bank suspends the auction. This staggered timing enables me to examine the size of foreclosure discounts and how they vary by sale mechanism: before, at, or after the auction.

This paper makes three main contributions. First, I estimate large foreclosure discounts in a setting where auctions lacked reserve prices. Using a hedonic regression with extensive property controls, suburb-year fixed effects, and direct measures of time-varying property distress based on municipal property complaints, I find that properties sold at foreclosure auctions transact at a substantial discount of 56.1% relative to comparable non-foreclosed properties. Once transaction costs borne by buyers, such as auction commissions, unpaid municipal rates, and eviction costs, are incorporated, the estimated auction discount falls to approximately 14.5%. I interpret this cost-adjusted estimate as a conservative lower bound on the economic foreclosure discount.

[4] Until 2019, 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 September 2018, reserve prices were mandated in foreclosure auctions in Cape Town. Given the data I use in this paper ends in 2018, this amendment will not affect the findings in the paper

[5] 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

Second, I complement the hedonic analysis with a repeat-sales specification that differences out all time-invariant property characteristics. In this framework, foreclosure discounts remain sizeable even after accounting for transaction costs, with an auction discount of 30.2%. The larger magnitudes in the repeat-sales estimates are consistent with the presence of time-varying deterioration or distress that is imperfectly captured by observable service requests. Taken together, the hedonic and repeat-sales results bracket a plausible range for foreclosure discounts in this setting.

Third, I show that foreclosure discounts vary sharply by the timing of sale relative to the auction. Properties sold at auction experience the largest discounts, while properties sold before or after the auction sell at significantly smaller discounts. Moreover, among post-auction sales, discounts decline with time elapsed since the scheduled auction date, and properties that sell more than a year later transact at prices indistinguishable from non-foreclosed properties. These patterns are inconsistent with foreclosure discounts being driven solely by underlying property condition and instead point to the auction mechanism itself as a key driver of price discounts.

This paper contributes primarily to a voluminous literature estimating foreclosure discounts (Campbell et al. 2011, Chinloy et al. 2017, Zhou et al. 2015, Donner et al. 2016, Clauretie & Daneshvary 2009, Harding et al. 2012) by providing what is, to the best of my knowledge, the first evidence on foreclosure-price formation in a non-REO, no-reserve-price auction setting. The paper's contribution is to carefully document how foreclosure discounts arise and are distributed in this institutional environment, and to examine the implications of that design for realised prices and homeowner outcomes in a recourse mortgage system — rather than to provide a causal evaluation of reserve-price policy itself. My estimates, among the largest in the literature, reflect the combined effect of thin auction participation, high buyer-side risk, and the absence of any floor on prices.[6] My paper is also closely related to Lambie-Hanson (2015), who documents the relationship between property neglect, as measured by publicly available property complaints data, and foreclosure. Finally, to the best of my knowledge, I am the first to explore foreclosure discounts in a developing country setting. In high-income settings such as South Africa and many other developing countries, the consequences of foreclosure can exacerbate wealth gaps and depress long-term homeownership.

The rest of the paper proceeds as follows. In Section 2, I explain the institutional setting of the home foreclosure market in South Africa and introduce the novel data I employ in this paper. In Section 3, I report the foreclosure discounts I estimate. Section 4 discusses the implications

[6] In Table 9 I report a number of foreclosure discounts from the literature and contrast these to the estimates from this paper.

of these findings. Section 5 concludes.

2 Institutional setting and data

The home foreclosure process in South Africa is executed with judicial supervision and the local sheriff's office is responsible for auctioning the property. In that sense, the foreclosure process is very similar to the foreclosure process in judicial foreclosure states in the United States.[7] When homeowners are unable to meet their mortgage obligations (when they are typically more than 90 days in arrears) the lender will initiate a process to repossess the property with the intention of selling the property through a foreclosure auction to cover the outstanding obligations (Davids & Kemp 2017).[8] Once a foreclosure judgment is passed in court, an auction date is set, with the auction typically taking place at the local sheriff's office.

All foreclosure auctions are advertised every Friday in the Government Gazette and are free to attend. Importantly, until end-2018, 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. The lender is allowed to bid and the highest bidder wins. As is standard abroad, the property is sold 'as-is' and the buyer is therefore responsible numerous costs including any outstanding property taxes on the property and any costs involved in the event of an eviction.[9] The buyer must also pay the auctioneer's commission, which is capped a maximum of R40,000 plus VAT and must also make a deposit of 10% of the purchase price immediately at the auction either in the form of cash or through a bank guaranteed cheque.[10] Once a property has been sold at 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. It is important to note that despite an auction date being set, an auction sale is not necessarily guaranteed. The homeowner can sell a property before the auction and in the event a homeowner can settle all or a significant portion of

[7] In the US, 18 states implement foreclosures with judicial supervision. It is generally acknowledged that the judicial foreclosure process provides for more protection for homeowners - Mian et al. (2015) find that states who implement non-judicial foreclosures were twice as likely to foreclosure during the financial crisis between 2007-2009

[8] In South Africa, mortgages represent a recourse loan which rules out any incentives for strategic default.

[9] Given foreclosed homeowners 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.

[10] The auctioneers commission is 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 mortgage arrears, the lender can choose to suspend the foreclosure auction.[11] In the event of a foreclosure being suspended, should the homeowner fall into arrears once more, the lender will apply to have a new foreclosure notice issued, with a new auction date.

Given the lack of reserve prices, all auctions are in effect guaranteed to be successful as long as at least a single buyer bids. In some cases where the bids made by private bidders are too low relative to the outstanding principal and arrears on the mortgage, the bank itself will make a bid and acquire the property to re-sell it. These REO type foreclosures are however small - in the sample period of 2011 to 2018 in this paper, only 3.3% of all auctioned foreclosures are bought by the bank. This low prominence of REO foreclosures represent the major institutional difference between South Africa and the United States, where REO foreclosures are the dominant type of foreclosure — for example, in Massachusetts, Campbell et al. (2011) report that between 1987 and 2009, unsuccessful auctions and REO ownership accounted for 82% of all foreclosure auction outcomes. One important factor underlying this contrast is the structure of mortgage contracts. In South Africa, residential mortgages are recourse loans, meaning that borrowers remain liable for any outstanding balance after the foreclosure sale. As a result, lenders face weaker incentives to strategically withhold properties from sale or to bid aggressively to protect collateral values, since losses can, in principle, be recovered from the borrower. In contrast, in many US states, mortgages are non-recourse, which limits lenders' ability to pursue borrowers for deficiencies and increases incentives to retain properties through REO when auction prices are low.

South Africa is not unique in this regard, with several other settings also featuring a dominance of private/non-REO sales at foreclosure auctions, such as Sweden and Korea. What makes the South African setting unique however, is the lack of legislative protections such as reserve prices for homeowners in these auctions. In Sweden, Donner et al. (2016) explains that auctioneers at foreclosure auctions cannot accept a bid that does not cover the costs of the sale and the cost of all debt that is more senior to the debt being triggered. Moreover, an auctioneer can also not accept a bid if they believe it to be likely that a considerably higher price can be achieved at a later date. In Korea, foreclosed properties are auctioned with a reserve price equal to the appraised value of the property (Park & Bang 2014). If an auction is unsuccessful, another auction is scheduled and the reserve price is reduced to 80% of the appraised value. This process continues, with the reserve price being incrementally lowered, until a property attracts a bid that is above the reserve price.

These legislative protections effectively put a bound on the magnitude of foreclosure discounts.

[11] In such cases, lenders will, however, typically, require a bank guarantee from the homeowner for the purchase price of the property.

No such protections existed in South Africa until 2019, and as a result, the extent of foreclosure discounts are unbounded. Combined with recourse lending and the absence of reserve prices, foreclosure auctions in South Africa expose homeowners to potentially unbounded price discounts. As a result, there has been increasing attention on the evidence of the large discounts that homes sell for at foreclosure auctions.[12]

2.1 Data and summary statistics

Despite the increasing attention on the home foreclosure market in South Africa, there is no research documenting the extent of foreclosures or foreclosure discounts. In this paper, I provide novel evidence on the extent of foreclosures in Cape Town, a major city in South Africa, 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.[13] The text is largely unstructured, as can be seen in Figure 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.

I download and process all foreclosure notices issued for Cape Town between 2011 and 2018 and append it to rich property transaction data on the universe of all residential property transactions covering the period January 2011 to December 2018 using the title deed number, which is a common identifier in both datasets. This dataset is constructed from two sources, namely the Deeds Registry, which records information on the deeds registry records information on the transaction price and date of sale of every property, along with information on the buyer and seller. The second source is a detailed dataset on property characteristics for each property in Cape Town, sourced from the local government. This dataset is used to inform the calculation of property values used in the determination of property tax and contains rich property characteristic information for each property where I observe the following variables: 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

[12] 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

[13] While some studies such as Campbell et al. (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 & Muellbauer (2011).

are recorded as of 2015 and are therefore time-invariant.

In the merging process, a match indicates that a property that was issued with a foreclosure notice was sold. In cases where multiple auction notices are issued, I only retain the most recent notice. In this joined foreclosure-transaction dataset, I 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 determine when a property sells relative to the foreclosure auction and to create four different types of properties:

- *Auction sales* represent cases where the date of sale corresponds to the date of the auction. These transactions that occurred at the auction itself and are subject to the rules of the auction.[14]

- *Pre-auction distressed sales* represent transactions that occur before the auction date. These transactions represent cases where the seller was able to negotiate a sale of the property with a private 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 that occur after an auction date. These transactions represent cases 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.

- *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.

Finally, I also incorporate a novel dataset on municipal service requests submitted by residents to the City of Cape Town. These service requests provide a rich, structured record of complaints related to public infrastructure (such as blocked sewers, power outages, and road maintenance) as well as complaints that directly relate to the condition of individual properties (such as reports of derelict buildings, structural defects, pest infestations, unhygienic living conditions, or illegal occupation).[15] Each request contains the date logged, the location of the problem (recorded using GPS coordinates), a textual description of the issue, and a broad categorisation assigned by the municipality.

[14] 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.

[15] These service requests reflect both complaints made by residents about their own properties and complaints about other properties and the neighbourhood more generally.

In order to process the full set of complaints between 2011 and 2018, I follow an approach similar to Lambie-Hanson (2015) where I classify each complaint into a small number of interpretable categories using pattern recognition of certain keywords applied to the complaint descriptions. I report the complaint categories and keywords used in Table 1. Of particular relevance to this paper is a category of "general/structural condition" complaints, which captures issues such as unsafe building structures, collapsing walls, cracked foundations, derelict or abandoned buildings, illegal occupation, and severe damp or mould. These requests serve as a proxy for the time-varying physical condition of properties, complementing the property characteristics dataset, which is largely time-invariant. For each property, I construct measures capturing the presence and frequency of complaints within a 12-month window prior to the transaction. These variables allow me to test whether observed foreclosure discounts simply reflect underlying deterioration, neglect, or structural distress at the property itself.[16]

Because the service-request data do not contain structured address information, I spatially link complaints to properties using geographic coordinates recorded by the municipality for each request. To do so, I round the latitude–longitude coordinates of every complaint to the nearest metre and match these to the coordinates contained in the property characteristics dataset. This procedure yields a highly accurate match for freehold properties, whose GPS locations are unique and precisely recorded in the valuation roll. However, this approach cannot reliably distinguish between individual units within multi-unit buildings. All apartments within a sectional-title scheme share the same coordinates, which makes it impossible to identify which unit a given service request pertains to. For this reason, and to avoid misattribution of complaints across units, I restrict the analysis in this paper to freehold properties only. While this reduces the sample size, it ensures that measures of property-level deterioration derived from service-request data are correctly assigned.

In Table 2, I present summary statistics for foreclosed properties and non-foreclosed properties. These are 2,497 foreclosed properties that sold between 2011 and 2018, amounting to 1.7% of all transactions in Cape Town. On average, foreclosed properties sell for less than half the price of non-foreclosed properties and are smaller. Foreclosed properties are around 1.8 times more likely to have had been subject to a service request in the 12 months preceding a sale than non-foreclosed properties. When dissaggregating by the nature of the service request, almost all variation comes from differences in admin/billing related service requests, with 59% of foreclosed properties being subject to service requests, relative to only 15% for non-foreclosed property. This is intuitive given that foreclosed homeowners are in financial distress such that they are more likely to make service requests that relate to payment related

[16]The use of property complaint data to identify time-varying changes in the condition of a property was inspired by Lambie-Hanson (2015).

issues. Crucially, however, there is little difference in the incidence of service requests related to property condition between foreclosed and non-foreclosed property. This is an important observation for interpretation of the foreclosure discounts: if distressed sellers systematically allowed their homes to fall into disrepair in ways observable to the municipality, we would expect to see meaningful differences in the frequency of condition-related complaints (for example, requests concerning structural damage, damp, unsafe buildings, or pest infestations). The fact that these categories occur at almost identical rates across foreclosed and non-foreclosed properties suggests that observable deterioration prior to sale is not mechanically higher for foreclosures. In other words, while financial distress manifests clearly in administrative service-request behaviour, there is no evidence in the municipal data of systematically worse physical condition among foreclosed properties. This provides reassurance that the estimated foreclosure discounts are unlikely to be driven by simple differences in property condition captured through the municipal service-request system.

In Table 3, I report where and how the 2,497 foreclosed properties are sold. The most common type of sale is to a private buyer at a foreclosure auction, accounting for 34% of all foreclosure-related sales. This is also the group of properties associated with the lowest average transaction prices. 29% of foreclosures sell before the auction date and these transactions are associated with average transaction prices that are nearly double those attained at auction. 33% of properties are sold at some point after the auction and once again prices attained are higher for these transactions compared to prices attained at auction. Interestingly, transaction prices increase the greater the time between the transaction date and the scheduled foreclosure auction date - properties that sell more than a year after the foreclosure auction was due to take place are associated with transaction prices that are roughly twice as larger as properties that sell in the month after the scheduled foreclosure auction date. Finally, only 3.8% properties are purchased by the lender at auction, highlighting how uncommon REO purchases and sales are in the South African context.

Visually, foreclosures are widespread across Cape Town during the sample period rather than being confined to a small number of locations, as can be seen in Figure 2. Even when disaggregating by whether the property ultimately sells at auction or before or after the scheduled auction date (Figure 3), there is good representation across both types of foreclosure-related transactions across Cape Town, with no clear visual evidence that auction sales are disproportionately concentrated in a small subset of suburbs relative to non-auction distressed sales. Figure 4 presents a more formal view of spatial concentration by showing, for each suburb, the share of transactions that involve foreclosures. This figure reveals meaningful heterogeneity with many suburbs experiencing no foreclosures over the sample period, while a subset of sub-

urbs exhibit foreclosure shares exceeding 5 per cent of all transactions. This pattern indicates that foreclosures are indeed spatially correlated at the suburb level, consistent with the idea that local housing-market or socioeconomic conditions shape foreclosure risk.

Turning to prices, Figure 5 plots a histogram of foreclosure sale prices. Panel (a) shows the distribution for all foreclosed transactions, while panel (b) disaggregates the sample by whether the property sold at the foreclosure auction or before or after the scheduled auction date. The overall distribution is right-skewed, with a clear modal mass between roughly R300,000 and R1,000,000. Extremely low transaction prices do exist, including rare cases where properties sell for only a few thousand rand or less, but these observations form a thin left tail rather than dominating the distribution.[17] Panel (b) reveals a clear first-order shift in the price distribution for properties sold at auction relative to those sold before or after the auction: the entire auction price distribution is shifted left, showing lower prices across the distribution, rather than differing only in the lower tail. This pattern indicates that large foreclosure discounts at auction are not driven by a small number of extreme outliers, but instead reflect a systematic downward shift in prices associated with the auction mechanism itself.

Finally, in Table 4 I present evidence that buyers of foreclosed property and their likely motives differ from those of buyers of non-foreclosed property. I show summary statistics for buyers and resale behavior across three categories: non-foreclosed property, non-auctioned forecloses and auctioned foreclosures. Close to 27% of all auctioned foreclosures are resold within 6 months of the auction, compared to only 10.9% for non-auctioned foreclosures and less than 1% of non-foreclosed property. This rises to over 50% after 18 months for auctioned foreclosures and only 22% for non-auctioned foreclosures and 4.7% for non- foreclosures. This presents strong evidence that buyers of auctioned foreclosures (and to some extent also non-auctioned foreclosures) flip the properties they buy. The shares of properties sold to non-natural persons is also substantially higher for auctioned foreclosures at 27%, relative to 18.9% for non-auctioned foreclosures and 8.2% for non-foreclosures. Lastly, the share of repeat buyers, defined as buyers who have purchased more than two properties, is also higher for auctioned foreclosures at 24.7%, compared to only 7% for non-auctioned foreclosures and 8.46% for non-foreclosures.

[17] While rare, the existence of extremely low-price outcomes is economically and legally salient and has attracted significant public attention. One widely cited example is Nxazonke v Absa Bank, in which a property valued at R81,000 was sold at foreclosure auction for just R10 despite outstanding mortgage arrears of only R28,000, leaving the homeowner liable for the shortfall. The court ultimately ruled that this sale constituted an abuse of process.

3 Empirical model and results

In this paper I am interested in understanding the extent to which foreclosed properties transact at a discount relative to comparable non-foreclosed property. In order to quantify these foreclosure discounts, I implement a standard hedonic regression, in the vein of Campbell et al. (2011) and Andersen & Nielsen (2017), where the dependent variable is the log transaction price, $y_{i,s,t}$ of property i in suburb s that sells in time t:

$$y_{i,s,t} = \alpha + \beta F_{i,t} + \gamma' X_i + \phi SR_{i,s,t} + \delta_{s,t} + u_{i,s,t} \tag{1}$$

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: X_i, a vector of time-invariant property level controls, which include property size, type, bedrooms, bathrooms, age, a dummy variable if any renovations have taken place, the property's value as assessed by the local municipality for the purposes of property taxes, $SR_{i,s,t}$ which is binary variable that takes a value of 1 if the property was subject to any service request in the 12 months preceding it's sale, and, a suburb-year fixed effect, $\delta_{s,t}$.[18]

The coefficient of interest, β, captures the price discount associated with foreclosure-related transactions. Identification requires that, conditional on observable property characteristics and the suburb–year and month fixed effects, the foreclosure indicator $F_{i,t}$ is uncorrelated with all other remaining determinants of transaction prices. To better understand the identifying assumption, it is helpful to decompose the unobserved component of prices into a time-invariant property effect (μ_i), a time-varying property-specific component ($\psi_{i,t}$), and idiosyncratic error $\varepsilon_{i,s,t}$:

$$u_{i,s,t} = \mu_i + \psi_{i,t} + \varepsilon_{i,s,t} \tag{2}$$

In this setting, bias in β arises if foreclosure events are systematically related to the time-varying component of property quality, $\psi_{i,t}$. This is precisely the concern raised in the literature (e.g. Lambie-Hanson (2015)): distressed owners may reduce maintenance or allow significant deterioration in the period preceding foreclosure, generating a negative correlation between $F_{i,t}$ and $\psi_{i,t}$.

Each set of controls in Equation (1) is designed to restrict the extent to which such confounding variation can bias β. Property characteristics and the municipal (time-invariant) valuation

[18] In this paper, suburbs refer to *sub-places* as defined in the 2011 South African National Census. There are 921 sub-places in Cape Town.

primarily absorb the time-invariant component μ_i and ensure that foreclosed properties are compared to non-foreclosed properties with similar structural characteristics and tax-assessed values. The suburb time fixed effects, $\delta_{s,t}$ absorb all local market conditions that vary over time, including neighbourhood trends, amenities, crime shocks, local economic conditions, and any systematic geographic clustering of foreclosures. With $\delta_{s,t}$, β is identified from within-suburb, within-year variation, comparing foreclosed and non-foreclosed sales exposed to the same neighbourhood-year market conditions. Finally, the service request measure, $SR_{i,s,t}$ directly target the potential correlation between foreclosure and unobserved, time-varying quality $\psi_{i,t}$, which is the central threat to identification. Complaints related to structural damage, illegal occupation, unsafe buildings, and severe damp/mould capture exactly the dimensions of deterioration documented in the international foreclosure literature. By conditioning on these indicators of neglect and distress, the specification absorbs meaningful variation in $\psi_{i,t}$ that would otherwise bias β downward.

Together, these controls substantially limit the scope of confounding variation in both μ_i and $\psi_{i,t}$. The identifying assumption for β is that, after conditioning on observables, neighbourhood-time effects, and measured pre-sale deterioration, the remaining unobserved time-varying quality shocks are uncorrelated with foreclosure status.

The results from this specification are reported in Table 5. Properties that receive a foreclosure notice sell for a discount of 23.3% compared to other comparable properties that sell without a foreclosure notice being issued in the same year and suburb. Once all controls are added, the foreclosure discounts decrease slightly to 27.7%. The relative stability of the estimates across specifications is informative. The fact that the estimated foreclosure discount changes little after conditioning on both sets of controls suggests that neither compositional differences across suburbs nor structural differences across properties drive the main results. Moreover, adding the service-request measures (a proxy for time-varying deterioration and distress) also leaves the estimated discount essentially unchanged. This indicates that the large price reductions observed at foreclosure are not merely a reflection of pre-sale neglect or worsening physical condition, but instead are likely to reflect a genuine discount associated with the foreclosure process itself.

3.1 Estimating foreclosure discounts at auctions

Despite these findings, it is unclear what the foreclosure discount is measuring, given the fact that some foreclosures sell at auction, while others may not. As a result, the foreclosure discounts I measure jointly capture discounts that can be attributed to financial distress of the

seller and discounts attributed to the auction mechanism itself. I therefore re-estimate my main specification, this time splitting the foreclosure variable, $F_{i,t}$ into various groups relative to when the property sells and also who buys it at the auction. I report these results in Table 6.

I find that foreclosure discounts are the highest when a property is sold at auction, especially when sold to the lender. In my preferred specification in column (5), I find that while properties sold to a private buyer at auction sell for a discount of 56.1%, while properties that are bought by the lender at auction sell for a discount of 58.7%. The discounts are considerably smaller when a property scheduled for foreclosure sells outside of the foreclosure auction. When a property is sold before the auction, the discount drops to 8.7% and when a property is sold after the auction (in the event the homeowner can delay the auction) the discount is estimated at 12%. Exploiting the richness of my data, I then split post-auction sales by how much times passes after the auction before the property sells and report these results in Figure 6. I find that these post-auction discounts decrease over time. In fact, properties that sell more than a year after the auction date sell for identical prices to otherwise observable non-foreclosed property.

A key question is whether these patterns merely reflect underlying differences in property condition: for example, that only the most severely distressed homes make it to the auction stage, or that lender purchases capture particularly deteriorated properties. If these deeper discounts simply reflected worse physical condition among properties that reach the auction stage, then the inclusion of the service-request controls in column (5) should materially attenuate the coefficients. Instead, the auction and lender-purchase discounts remain large and virtually unchanged. This is not because the service-request controls are uninformative: properties that received any general or structural condition complaint sell for 70.3% less, and those with multiple such complaints sell for 86.2% less, indicating that these measures strongly capture economically meaningful variation in time-varying property condition. Combined with the summary statistics showing no systematic differences in condition-related service requests across the timing groups, this strongly suggests that auction-stage discounts are not generated by selective deterioration. Rather, the large auction discounts appear to arise from the mechanics of the auction itself, thin bidding, uncertainty, the absence of reserve prices, and bidder aversion to eviction or arrears, rather than from properties being in substantially worse condition. Importantly, this pattern also rules out the alternative explanation that only the "worst" properties are selected into auction or lender purchase, as such selection would mechanically predict stronger attenuation once time-varying condition controls are included.

Together, these findings reinforce the core interpretation: foreclosure discounts in South Africa arise primarily from institutional features of the auction process and not from observable or unobservable differences in the physical condition of properties across sale types.

3.2 Accounting for transaction costs

As discussed earlier, the buyers of properties at an auction are subject to additional costs that would not be incurred were the sale to happen outside of an auction, such as the auction commission, any arrears of unpaid property taxes and in some cases the costs of eviction when a foreclosed homeowner refuses to vacate their property. 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 this section, I incorporate the costs into the transaction prices attained at the auction and then re-estimate the auction discounts. While I can directly observe some costs, other costs need to be proxied; I detail what these costs are and how they are calculated below.

The first cost a buyer of an auction property is liable for is the auctioneers commission which is capped a maximum of R40,000 plus VAT and calculated as follows: 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. Given I directly observe the transaction price at the auction, I am able to calculate the auctioneer's commission for each transaction at auction.

The second cost incurred by buyers at an auction is any current arrears on unpaid property taxes, given the property is sold 'as-is'. Given that foreclosed homeowners are in financial distress, they are also likely to be in arrears with their property taxes. While I do not observe the property tax outstanding on each property, I can construct reasonable values thereof. 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.[19] Using the property valuation I observe for 2015 and the prevailing rate-in-the-rand, I calculate the monthly property taxes due for each property, multiply that by 24 to get two years worth of unpaid property taxes, under the assumption that a homeowner is two years in arrears, and add that to the transaction price.

The final cost facing auction buyers relates to any eviction costs. The legal eviction process is costly and time-consuming, in many cases taking up to and over one year to complete. Given that I cannot observe which properties are subject to evictions, nor do I know the costs associated with them, I approximate these costs in the following way. I start by finding publicly available eviction costs from a legal firm in South Africa.[20] Evictions can either be uncontested or contested, and eviction costs are estimated at between R5,000 and R25,000 for an uncontested

[19] For example, in 2018, the rate-in-the-rand in Cape Town was R0.007154. In Cape Town, properties typically get re-valued every three to four years.

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

eviction and up to R100,000 for a contested eviction. As a conservative estimate, I assume all foreclosed properties are subject to a contested eviction and add the eviction costs.[21]

I report these results in Table 7 and visually in Figure 7. In the most conservative estimate, where the buyer is liable for the auction commission, two years of property tax arrears and the costs of a contested eviction, the foreclosure discount decreases more than threefold to 14.5%. I interpret this estimate as a conservative lower bound on the foreclosure discount faced by buyers, as it assumes that all foreclosure transactions incur the maximum possible eviction costs. Under this assumption, any remaining price discount cannot be attributed to unaccounted transaction costs.

This exercise shows that a substantial portion of the raw auction discount can be rationalised by the transaction costs and risks borne by buyers. Importantly, once these costs are accounted for, auction and non-auction foreclosure discounts are of similar magnitude and statistically indistinguishable, as shown by the overlapping confidence intervals in Figure 7. This convergence suggests that the large headline discounts observed at auction reflect the compensation required by buyers for assuming eviction risk, tax arrears, and other transaction costs, rather than additional losses uniquely associated with the auction mechanism itself. In this sense, while buyers at auction still transact at a discount even under conservative assumptions, the remaining price differences are economically consistent with the cost structure of foreclosure sales rather than indicating excess losses beyond those costs.

Taken together, these estimates imply that the true economic foreclosure discount plausibly lies between the raw hedonic estimate and the most conservative cost-adjusted specification. The baseline auction discount of 56.1% provides an upper bound on the total price discount associated with foreclosure auctions, while the fully adjusted estimate of 14.5% provides a lower bound that nets out a comprehensive set of transaction costs borne by buyers, assuming that all foreclosure transactions incur the maximum eviction costs. Within this range, the foreclosure discount reflects a combination of institutional features of the auction process and the compensation required by buyers for assuming foreclosure-specific risks and costs.

Then, to assess whether this estimate is driven by a small number of extremely low-priced sales (visible in the lower tail of the distribution in Figure 5), in Column (4) of Table 7 I re-estimate the model after excluding the bottom 1% of all foreclosure sales. The resulting discount remains robust, decreasing slightly to 13.6%. This confirms that the estimated foreclosure discounts are not driven by a handful of extreme outliers, but instead reflect a systematic price effect associated with foreclosure auctions.

[21] I take the midpoint of the cost estimate of R100,000, i.e R50,000

However, even under these conservative assumptions, the implied foreclosure discount remains economically large. This persistence suggests that foreclosure discounts in this setting cannot be fully rationalized by buyer-incurred transaction costs alone, raising the possibility that part of the remaining discount reflects unobserved deterioration or other persistent property-level factors that are difficult to fully control for in cross-sectional data. To shed light on this issue, I complement the hedonic estimates with a repeat-sales specification, reported in Table 8. Unlike the hedonic model, the repeat-sales design differences out all time-invariant property characteristics and therefore provides a useful benchmark for assessing the extent to which foreclosure discounts reflect persistent unobserved quality rather than the foreclosure process itself. When transaction costs are incorporated, the auction discount in the repeat-sales model remains sizeable at 30.2%, notably larger than the corresponding hedonic estimate of approximately 14.5%.

Taken together, the evidence implies that foreclosure auctions in South Africa generate economically large price discounts, plausibly bounded between approximately 14.5% and 31.4%, with the lower bound reflecting buyer compensation net of transaction costs and the upper bound incorporating residual deterioration not fully captured by observable measures. The repeat-sales specification captures both foreclosure-related price effects and time-varying deterioration that is not fully measured by observed service requests, while the hedonic model more closely isolates the price impact faced by buyers net of these factors. In this sense, the larger magnitudes estimated in the repeat-sales specification are not only consistent with the hedonic results, but are also expected. Because repeat-sales estimates pick up any unobserved deterioration that occurs between sales, such as gradual neglect or deferred maintenance that is imperfectly captured by service request data, they are likely to overstate the pure price discount attributable to the foreclosure mechanism itself. By contrast, the cost-adjusted hedonic estimates abstract from these accumulated effects and therefore provide a more conservative benchmark.

4 Discussion and implications

The foreclosure discounts I estimate in this paper are large and robust across a range of specifications. A key takeaway from the results section is that the implied magnitude depends on whether one interprets observed auction prices as reflecting only foreclosure-related price effects, or also the substantial costs and risks that buyers assume at auction. Once I explicitly account for plausible buyer-incurred transaction costs, the estimated auction discount falls sharply but remains economically meaningful. Taken together with the repeat-sales estimates,

the results suggest that the economically relevant foreclosure discount plausibly lies between a conservative lower bound implied by the cost-adjusted hedonic estimates and a larger upper bound implied by the repeat-sales specification, which may additionally load on time-varying deterioration not fully captured by observable measures of property condition.

These discounts have gained increasing public attention and outcry.[22] One egregious example of such abusive practices was documented in *Nxazonke v Absa Bank*.[23] In this case, the homeowner was liable for R28,000 ($1,944 USD) in outstanding debt and had their property repossessed and sold at a foreclosure auction for R10 ($0.69) when the property's valuation was R81,000 ($5,625 USD), leaving the homeowner homeless and liable for the shortfall. While such cases illustrate the legal and social stakes of foreclosure auctions, the distribution of foreclosure sale prices in my data indicates that very low prices are rare and that the auction price distribution is shifted left more broadly rather than being driven only by a handful of extreme outliers.

These discounts are especially consequential in South Africa's institutional setting because mortgages are recourse loans. When a highly leveraged homeowner loses their home and the auction price is far below comparable market values, the household can remain liable for a substantial shortfall. This amplifies the welfare consequences of depressed auction outcomes relative to settings where default is effectively non-recourse. 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.[24] In practice, however, reserve prices were not systematically applied in the period covered by this paper, and the data do not permit a clean causal evaluation of the later shift toward more routine reserve-price setting. As a result, the evidence in this paper should be interpreted as describing auction outcomes in an environment where reserve-price protections were largely absent, rather than as a direct estimate of the policy effect of introducing reserve prices.

A final implication of the results emerges when situating the estimates from this paper within the broader foreclosure literature summarized in Table 9. The vast majority of U.S. studies estimate foreclosure discounts using REO sales, reflecting the fact that foreclosure auctions in the United States are rarely successful. In this institutional environment, foreclosure discounts primarily reflect the pricing behavior of financial institutions disposing of REO inventory, rather than prices formed directly at auction. As a result, the U.S. evidence largely speaks to fire sale

[22] 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.

[23] The court judgment is available here.

[24] The amendment is available here.

behavior by lenders under pressure to liquidate, rather than to the auction mechanism itself.

By contrast, the South African setting studied in this paper is characterized by a predominance of successful foreclosure auctions in which properties are sold directly to third-party buyers, typically without any reserve price. This distinction is critical for interpreting both the magnitude and the nature of foreclosure discounts. Because properties do not revert to lender ownership in most cases, the discounts documented here reflect prices formed in an auction environment with thin participation, high bidder risk, and limited institutional safeguards for sellers, rather than the downstream pricing of REO assets. In this sense, the results are not directly comparable to REO-based estimates from the United States, but instead capture a different—and previously understudied—margin of foreclosure outcomes.

International evidence further underscores the institutional uniqueness of the South African case. While several studies examine foreclosure auctions outside the United States, for example in Sweden and Korea, these settings typically feature explicit reserve prices or procedural safeguards that constrain how low auction prices can fall. The absence of comparable protections in South Africa during the period studied here implies that foreclosure discounts are effectively unbounded on the downside, creating a markedly different risk environment for both homeowners and buyers.

This institutional contrast also interacts with the legal structure of mortgage lending. In the United States and many other advanced economies, mortgages are effectively non-recourse in practice, limiting the financial exposure of homeowners once a property is repossessed. In South Africa, mortgages are recourse loans, meaning that borrowers remain liable for any shortfall between the auction price and the outstanding mortgage balance. As a result, low auction prices carry far more severe consequences for foreclosed households, amplifying the welfare implications of foreclosure discounts in this setting. Taken together, these institutional differences help explain why the discounts estimated in this paper are among the largest in the literature, and why they should be interpreted not as outliers, but as outcomes generated by a foreclosure system operating without reserve prices in a recourse lending environment.

5 Conclusion

This paper provides a careful study of how foreclosure-price formation operates in a no-reserve-price auction environment, and of the implications of that institutional design for realized prices and homeowner outcomes. Using newly constructed data from Cape Town, I document sizable foreclosure discounts that are robust across a range of specifications and persist even

after accounting for an extensive set of transaction costs borne by buyers at auction, including auction commissions, unpaid municipal taxes, and eviction costs. Using both hedonic and repeat-sales specifications, I show that foreclosure discounts in this setting plausibly lie within a bounded range: the cost-adjusted hedonic estimates provide a conservative lower bound, while the repeat-sales estimates provide an upper bound that also captures time-varying deterioration not fully observed in cross-sectional data.

A key finding of the paper is that foreclosure discounts are largest when properties are sold at auction, and substantially smaller when properties sell before or after the auction. These differences persist even after controlling directly for time-varying property distress using detailed service-request data, suggesting that auction-stage discounts are not driven solely by worse property condition among auctioned homes. Instead, the results point to the institutional features of foreclosure auctions, thin participation, uncertainty, risk associated with eviction and arrears, and the absence of reserve prices—as central determinants of the observed price discounts.

The foreclosure discounts estimated in this paper are substantially larger than those documented in settings where reserve prices or other legislative safeguards are in place. This contrast is institutionally informative: in the absence of a reserve price, auction outcomes are effectively unbounded on the downside, and the resulting discounts reflect a fundamentally different risk environment for homeowners compared with settings in which a floor on auction prices limits worst-case outcomes. The implications are especially severe in South Africa's recourse mortgage system. Unlike in many advanced economies where mortgages are effectively non-recourse in practice, South African borrowers remain liable for any deficiency balance between the sale price and the outstanding mortgage. Consequently, a low auction price does not merely impose a capital loss — it compounds the household-level harm by leaving an already financially distressed borrower responsible for a residual debt, exacerbating financial hardship and wealth inequality. These features help explain why the discounts documented here rank among the largest in the literature, and suggest that the findings are of relevance beyond South Africa to any recourse mortgage environment where foreclosure auctions lack effective price floors.

The introduction of reserve prices in South African foreclosure auctions therefore represents a potentially important policy development. While the data used in this paper preclude a direct evaluation of this reform, the results underscore the relevance of institutional design in shaping foreclosure outcomes. Future work could use post-reform data to study how reserve prices affect foreclosure discounts, bidding behavior, bank incentives to foreclose, and the pricing of mortgage risk. More broadly, the findings suggest that foreclosure institutions play a critical

role in determining how financial distress is translated into housing market outcomes, with important implications for household welfare and wealth inequality.

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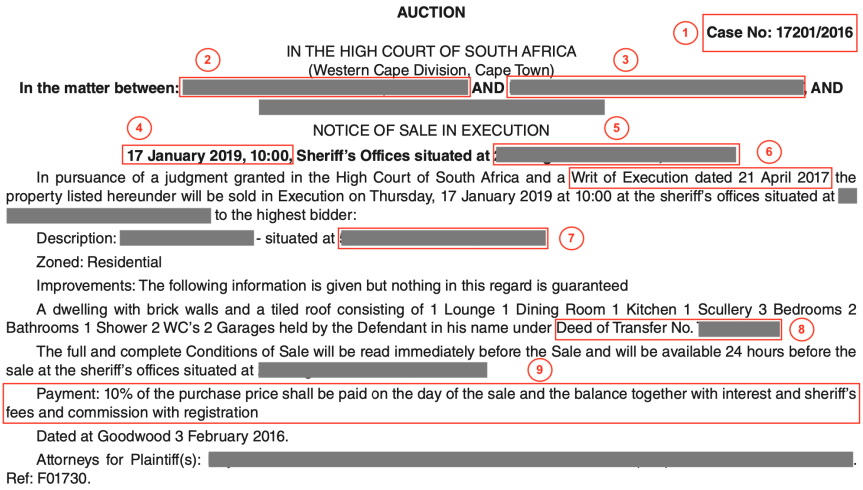
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AUCTION

(1) **Case No: 17201/2016**

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

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

[redacted]

NOTICE OF SALE IN EXECUTION

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

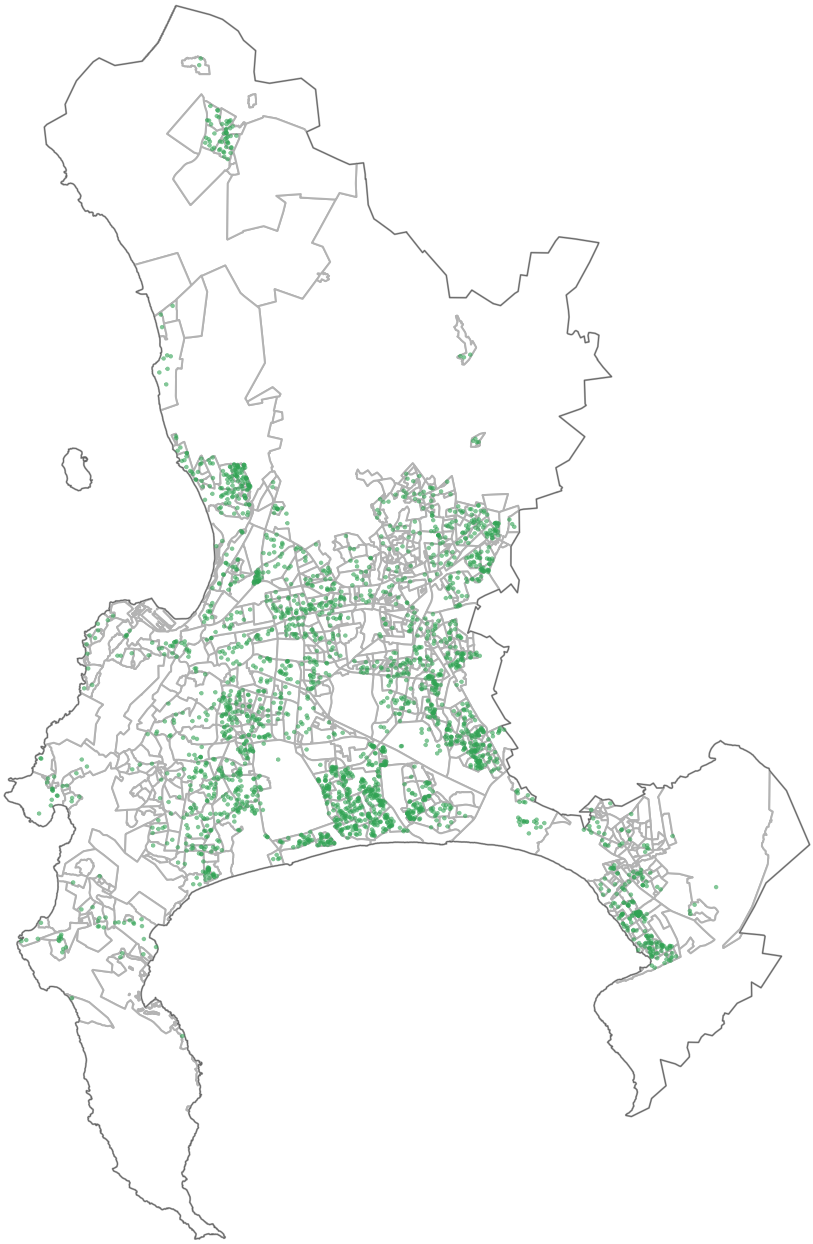
Payment: 10% of the purchase price shall be paid on the day of the sale and the balance together with interest and sheriff's fees and commission with registration

Dated at Goodwood 3 February 2016.

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

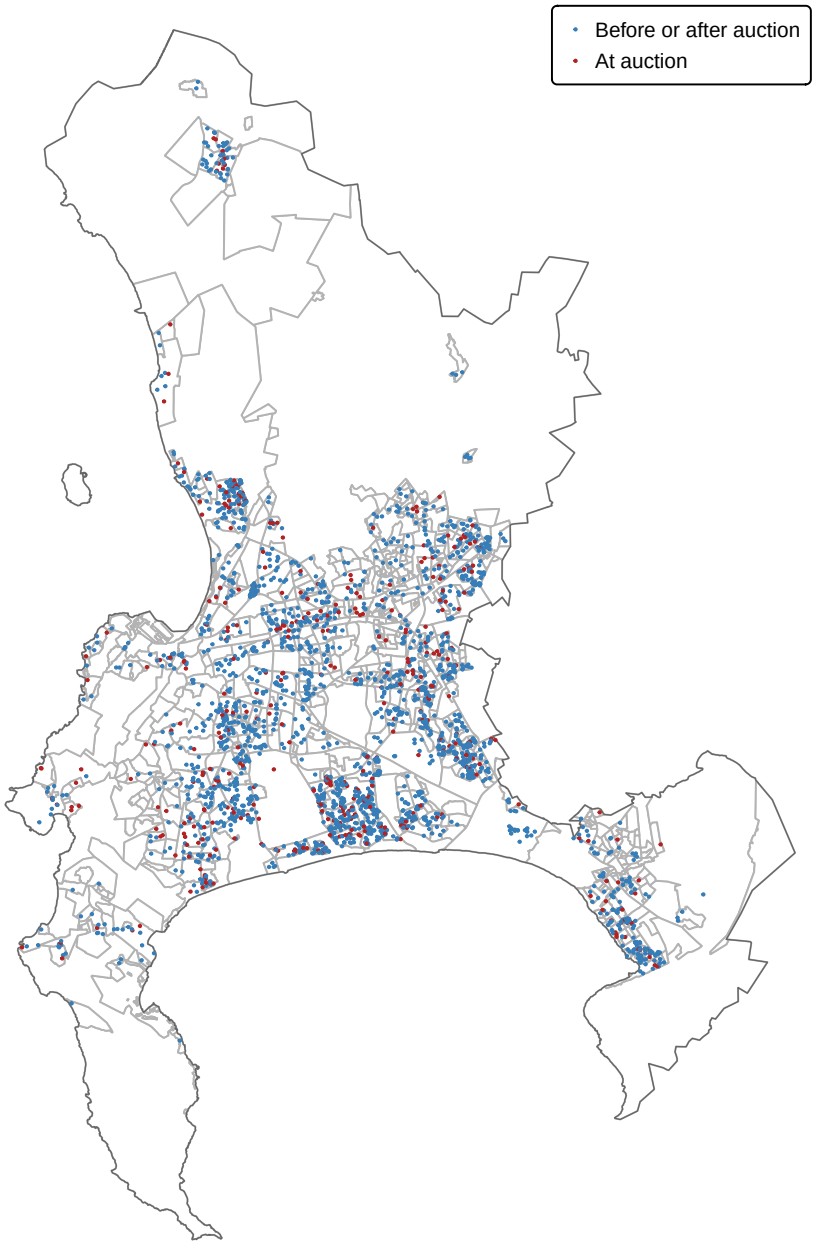
This figure illustrates a sale in execution notice with the relevant information notated. (1) The case number (2) The name of the plaintiff (3) The name of the defendant (4) The date of the auction (5) The location of the auction (6) The date that the Plaintiff brought the case before the court (7) The 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.

Figure 1: Sale in execution notice



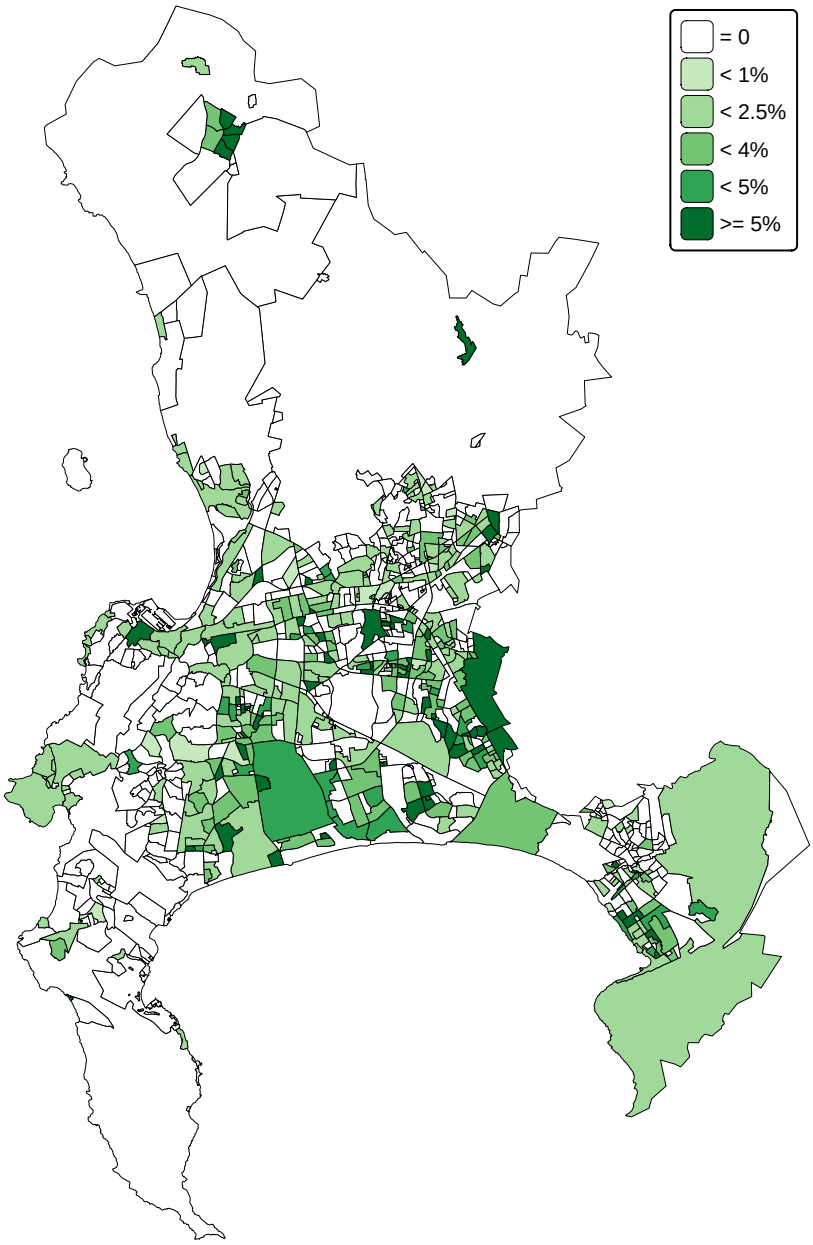
This figure shows the spatial distribution of foreclosures between 2011 and 2018, where each dot represents a foreclosure.

Figure 2: Spatial distribution of foreclosures



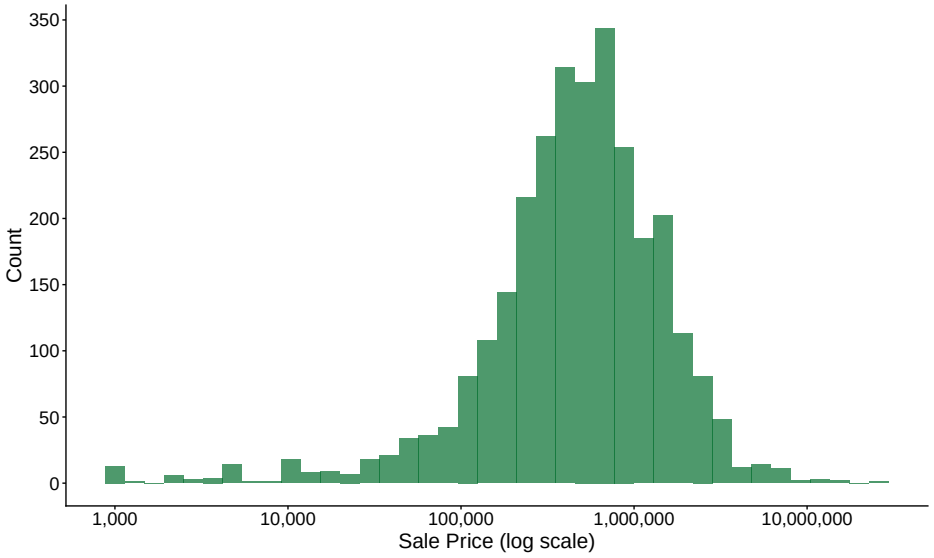
This figure shows the spatial distribution of foreclosures between 2011 and 2018, where each dot represents a foreclosure. Foreclosures are separated by whether the foreclosure sells at an auction (a red dot) or before or after an auction (blue dot).

Figure 3: Spatial distribution of foreclosures by when sold

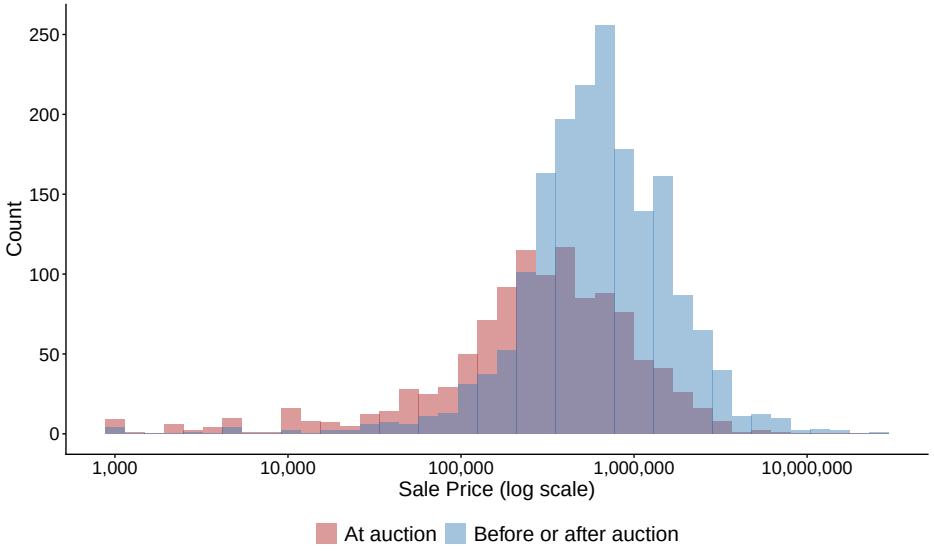


This figure shows the spatial within suburb distribution of foreclosures between 2011 and 2018. The colour of each suburb corresponds to the share of foreclosures for each suburb relative to all transactions in that suburb. Darker colours represent suburbs where the share of foreclosures relative to all other transactions is higher. Suburbs shaded in white correspond to suburbs where no foreclosures took place.

Figure 4: Spatial distribution of foreclosure intensity



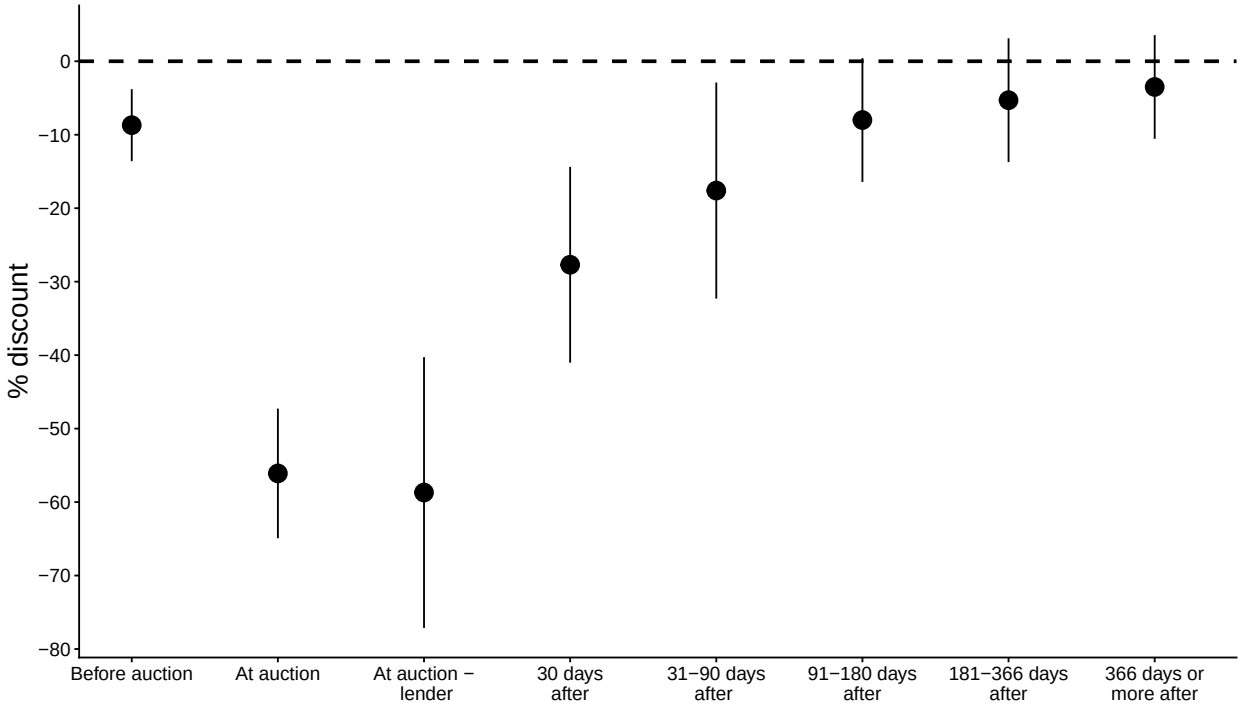
(a) Foreclosure price distribution



(b) Foreclosure price distribution by where a propert was sold

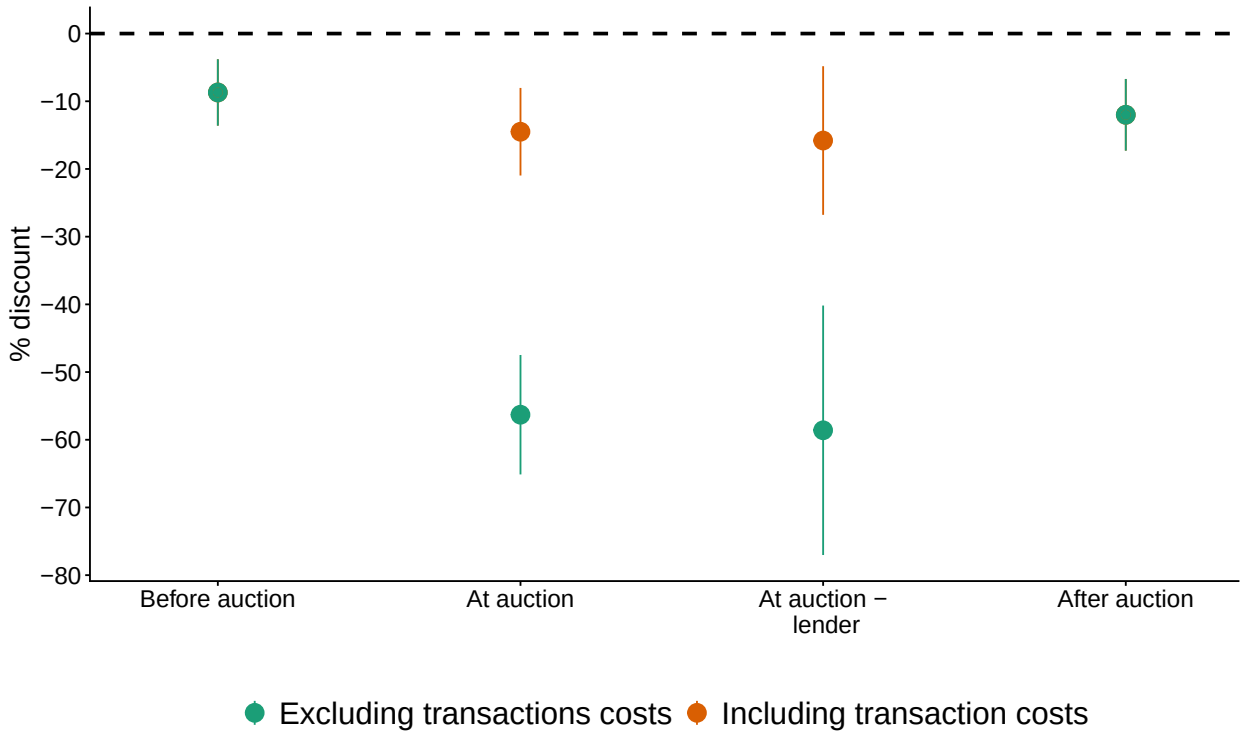
These figures show histograms of sale prices for foreclosed property between 2011 and 2018. Panel (a) shows the histogram for all foreclosures, whereas panel (b) splits the sample between foreclosures that sold at auction (red) and before/after auction (blue). The x-axis is represented on a log scale.

Figure 5: Sale price distribution of foreclosures



This figure reports the estimates of foreclosure discounts from the main hedonic specification in equation (1) based on the time between the auction date and the eventual sale date. The vertical bars indicate the 95% confidence interval.

Figure 6: Estimated foreclosure discounts across time



This figure reports estimates of foreclosure discounts from the main hedonic specification in equation (1) with and without transaction costs. The vertical bars indicate the 95% confidence interval.

Figure 7: Accounting for transaction costs

Table 1: Keywords used to identify categories of service requests

Category	Representative Keywords / Phrases
Trash / Waste	dumping, illegal dumping, refuse, rubbish, waste, trash, litter, bin, 240l bin, non-removal of refuse, stolen bin, damaged bin
Pests & Environmental Health	vermin, rodent, rat, mouse, mice, cockroach, flies, maggots, infestation, carcass, dead animal, septic tank, unhygienic, unhealthy
Utilities (Water, Sewer, Electricity)	blocked sewer, blocked drain, overflowing sewer, sewerline, pipe burst, leak, underground leak, no water, low water pressure, water meter, stopcock, no power, power failure, electricity, street light, wires down, substation
Public Space / Non-Property	pothole, road surface, roadway, traffic signal, robot, intersection, speed hump, traffic calming, stop sign, public open space, park, playground, pavement, sidewalk, verge
General / Structural Condition	problem building, derelict building, abandoned building, vacant building, illegal occupation, squatter, squatting, vagrant, unsafe structure, dangerous structure, cracks, cracking, damaged wall, boundary wall, fence, roof, ceiling, plaster, damp, mould, mold
Administrative / Non-Physical Issues	billing, invoice, tariff, rebate, payment arrangement, arrears, meter reading, consumption complaint, account, transfer of payment, master data, application form, escalated query

This table reports the set of keywords and phrases used to classify raw municipal service-request descriptions into six categories: Trash/Waste, Pests and Environmental Health, Utilities, Public Space, General/Structural Condition, and Administrative/Non-Physical Issues. Each complaint submitted to the City of Cape Town between 2011 and 2018 is mapped to one of these categories using pattern-recognition techniques applied to the free-text description of the request. The General/Structural Condition category captures issues directly related to the physical condition of individual properties, such as derelict buildings, structural damage, damp, mould, or illegal occupation, and serves as a proxy for time-varying deterioration at the property level. Administrative/Non-Physical Issues include billing, payment, account queries and related matters, which reflect financial distress rather than physical neglect. Classification is based on matching any of the listed terms within the complaint description.

Table 2: Summary statistics

	Full sample	Non-foreclosed transactions	Foreclosed transactions
Transaction price	1,704,211	1,719,185	826,103
	(5,417,778)	(5,460,361)	(1,185,245)
Land size (m^2)	510	511	480
	(611)	(613)	(495)
Property size (m^2)	130	130	122
	(90)	(90)	(88)
Bedrooms	2.86	2.86	2.95
	(0.96)	(0.96)	(0.9)
Bathrooms	1.96	1.97	1.85
	(1.08)	(1.08)	(1.06)
% with any service requests (< 12 months)	40.09%	39.54%	72.33%
% with any any property condition related service requests (< 12 months)	0.25%	0.25%	0.2%
% with any admin/billing related service requests (< 12 months)	15.41%	14.66%	59.07%
% with any trash related service requests (< 12 months)	3.88%	3.89%	3.6%
% with any utilities related service requests (< 12 months)	19.44%	19.37%	23.59%
% with any pest related service requests (< 12 months)	0.61%	0.61%	0.8%
% with any suburb related service requests (< 12 months)	0.53%	0.53%	0.64%
% with any other service requests (< 12 months)	15.6%	15.51%	20.82%
N	148,925	146,428	2,497
Share of total transactions	100%	98.32%	1.68%
Share of total transaction value	100%	99.19%	0.81%

This table reports summary statistics across foreclosed and non-foreclosed properties between 2011 and 2018. I report mean values and standard deviations in parentheses.

Table 3: Summary statistics: foreclosure outcomes

Transaction type	N	Share	Mean price
Before auction	731	29.3%	R904,405
At auction	844	33.8%	R517,775
At auction - lender	96	3.8%	R572,238
30 days after auction	189	7.6%	R644,483
31 - 90 days after auction	127	5.1%	R1,238,271
91 - 180 days after auction	105	4.21%	R1,110,939
181 - 360 days after auction	132	5.3%	R1,133,170
361 days or more after auction	273	10.9%	R1,334,898
	2,497	100%	R826,103

This table provides a breakdown of all foreclosure-related transactions with respect to when they transact relative to the auction date. I include the number of transactions, the share of all foreclosed transactions and mean prices.

Table 4: Who buys foreclosed property and when are they sold?

	Non-foreclosures	Non-auction foreclosures	Auctioned foreclosures
% sold in 6 months	0.97%	10.89%	26.69%
% sold in 12 months	2.65%	18.60%	44.33%
% sold in 18 months	4.66%	22.42%	51.55%
% sold to non-natural persons	8.22%	18.82%	27.00%
% of buyers who purchase 2+ properties	8.46%	7.00%	24.60%

This table reports a number of summary statistics across non-foreclosed property, non-auctioned property, and auctioned foreclosed property, which reflect who the buyers of these properties are and when these properties are resold.

Table 5: Estimated foreclosure discounts

	Log transaction price				
	(1)	(2)	(3)	(4)	(5)
Foreclosed	-0.233***	-0.278***	-0.270***	-0.279***	-0.277***
	(0.027)	(0.026)	(0.027)	(0.025)	(0.026)
Any complaints			-0.028***		
			(0.010)		
Any general condition complaints				-0.703***	
				(0.145)	
Multiple general condition complaints					-0.862***
					(0.189)
Year x Suburb FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes
Property Features	No	Yes	Yes	Yes	Yes
Observations	148,518	148,518	148,518	148,518	148,518
Adjusted R-squared	0.804	0.852	0.852	0.852	0.852

This table reports the results from the main hedonic specification in equation (1). Standard errors are clustered at the suburb level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

Table 6: Foreclosure discounts across time

	Log transaction price				
	(1)	(2)	(3)	(4)	(5)
Sold before the auction	-0.055**	-0.087***	-0.081***	-0.089***	-0.087***
	(0.026)	(0.025)	(0.026)	(0.024)	(0.024)
Sold at the auction	-0.520***	-0.562***	-0.554***	-0.563***	-0.561***
	(0.045)	(0.045)	(0.047)	(0.045)	(0.045)
Sold at the auction: lender	-0.413***	-0.587***	-0.577***	-0.586***	-0.587***
	(0.106)	(0.094)	(0.094)	(0.094)	(0.094)
Sold after auction	-0.077**	-0.120***	-0.114***	-0.121***	-0.120***
	(0.032)	(0.028)	(0.029)	(0.027)	(0.027)
Any complaints			-0.027***		
			(0.010)		
Any general condition complaints				-0.702***	
				(0.145)	
Multiple general condition complaints					-0.856***
					(0.191)
Year x Suburb FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes
Property Features	No	Yes	Yes	Yes	Yes
Observations	148,518	148,518	148,518	148,518	148,518
Adjust R-squared	0.805	0.852	0.852	0.853	0.852

This table reports the results from the main hedonic specification in equation (1) with detailed groups for when the property was 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. Standard errors are clustered at the suburb level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

Table 7: Foreclosure discounts accounting for transaction costs

	Base specification	Including commission and contested eviction costs	Including commission, contested eviction costs and two years of tax arrears	Including commission, contested eviction costs and two years of tax arrears
	(1)	(2)	(3)	(4)
Sold at auction	-0.563***	-0.157***	-0.145***	-0.136***
	(0.045)	(0.033)	(0.033)	(0.033)
Sold at auction: lender	-0.586***	-0.173***	-0.158***	-0.158***
	(0.094)	(0.057)	(0.056)	(0.056)
Year × SP FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Property Features	Yes	Yes	Yes	Yes
Property Valuation	Yes	Yes	Yes	Yes
Drop bottom 1% of foreclosure sales	No	No	No	Yes
Observations	148,519	148,519	148,519	148,495
Adjusted R-squared	0.853	0.890	0.890	0.854

This table reports the results from the main hedonic specification in equation 1 where I add various costs to the transaction price which are incurred when purchasing a foreclosed property at an auction. Column (1) represents my base specification and in column (2) I add the auctioneer's commission to the transaction price for auctioned properties. In column (3), I also include 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 (4) and (5), I add the costs of uncontested and contested evictions randomly to 90% of all transactions, respectively. The details for how these amounts are calculated can be found in-text. For brevity, I only report the coefficients on properties sold at auction and do not report the coefficients from other non-auction foreclosed transactions, given that these coefficients are unchanged from Table 5. Standard errors are clustered at the suburb level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

Table 8: Foreclosure discounts estimated with property fixed effects

	(1)	(2)	(3)	(4)	(5)
	Log transaction price	Log transaction price including transaction costs			
Sold before auction	-0.418***	-0.417***	-0.417***	-0.417***	-0.398***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.041)
Sold at auction	-0.735***	-0.314***	-0.314***	-0.314***	-0.302***
	(0.047)	(0.021)	(0.021)	(0.021)	(0.021)
Sold at auction: lender	-0.345***	0.077	0.075	0.077	0.077
	(0.074)	(0.047)	(0.047)	(0.047)	(0.047)
Sold after auction	-0.496***	-0.495***	-0.496***	-0.495***	-0.436***
	(0.053)	(0.053)	(0.053)	(0.053)	(0.043)
Any general condition complaints			-0.155		
			(0.096)		
Multiple general condition complaints				-0.069	-0.073
				(0.058)	(0.058)
Property Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year x Month FE	Yes	Yes	Yes	Yes	Yes
Suburb FE	Yes	Yes	Yes	Yes	Yes
Drop bottom 1% of foreclosure sales	No	No	No	No	Yes
Observations	43,769	43,769	43,769	43,769	43,476
Adjusted R-squared	0.823	0.826	0.826	0.826	0.825

This table repeats the estimation in Table 6, with the addition of a property-level fixed effect. Standard errors are clustered at the suburb level and are reported in parentheses. *, **, *** represent significance levels of 0.1, 0.05 and 0.01, respectively.

Table 9: Foreclosure discounts from the literature

Paper	Type of sale	Methodology	Foreclosure discount	Reserve Prices	Country	Time Period
This paper	Auction	Hedonic & repeat sales	14.5%-30.2%	No	South Africa	2011-2018
Shilling et al. (1990)	REO	Hedonic	24%	No	United States	1985
Forgey et al. (1994)	REO	Hedonic	23%	No	United States	1991-1993
Springer (1996)	REO	Hedonic	4-6%	No	United States	1991-1993
Pennington-Cross (2006)	REO	Repeat sales	22%	No	United States	1995-1999
Clauretie & Daneshvary (2009)	REO	Hedonic	7.5%	No	United States	2004-2007
Campbell et al. (2011)	REO	Hedonic	27%	No	United States	1987-2009
Harding et al. (2012)	REO	Hedonic	18-25%	No	United States	2001-2009
	REO	Repeat sales	8.4%	No		1990-2008
Anenberg & Kung (2014)	REO	Hedonic	16%	No	United States	2007-2009
Zhou et al. (2015)	REO	Hedonic	14.7%	No	United States	2000-2012
Donner et al. (2016)	Auction	Hedonic	20.1-24.6%	Yes	Sweden	2006-2013
Chinloy et al. (2017)	REO	Hedonic	15.3%	No	United States	2010-2013
	Auction	Hedonic	19.0%	Yes	United States	2010-2013
Conklin et al. (2023)	REO	Appraisal fixed effects	5%	No	United States	2013-2017

This table reports a number of estimates of foreclosure discounts in the literature and contrasts them with the estimates from this paper. For each paper, I indicated the type of sale (Auction or REO), the methodology (Hedonic or Repeat sales), the foreclosure discount, whether or not the specific setting employs reserve prices, the country in which the foreclosure discounts were estimated, and the time period of the study.