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Keeping investors at bay: the impact of uniform and preferential transaction tax reductions

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Abstract

This paper studies how transaction tax reductions affect housing market outcomes, distinguishing between uniform reductions that benefit all buyers and preferential reductions targeted at owner-occupiers. We exploit two reforms implemented in 2018 in Belgium's two largest regions, which introduced a uniform cut for all houses in Wallonia and a preferential cut for about half of the housing stock in Flanders. Using administrative data covering all single-family houses and a difference-in-differences strategy, we document three main findings. First, uniform cuts generate large and symmetric responses in sales and prices relative to past evidence on tax hikes. Second, preferential reductions have much weaker effects on sales and prices, but stronger effects on rents and buy-to-rent activity. Third, the two policies reshape tenure dynamics differently: uniform cuts expand the rental stock, whereas preferential cuts reduce it by stimulating transitions into owner-occupation. The results highlight important efficiency and distributional trade-offs in the design of transaction tax reforms.

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1 Introduction

A growing body of literature shows that transaction taxes are highly distortionary in housing markets. In response, international organizations have recommended lowering such taxes (OECD, 2022). However, while there is extensive evidence on the effects of transaction tax hikes, empirical evidence on the effects of tax cuts remains scarce. Meanwhile, research on other taxes suggests that tax decreases and tax increases need not be symmetric (Benzarti et al., 2020).

Whether the effects of transaction tax cuts mirror those of tax hikes is not only a question of direction; it also concerns all aspects of the design of the tax reduction. For example, the search model developed by Han et al. (2025) suggests that a tax increase that raises rates more for buy-to-rent (BTR) investors than for owner-occupiers entails a smaller deadweight loss. Their findings raise the question of whether transaction tax cuts generate larger welfare gains when the tax is reduced more for homeowners than for investors.

This paper provides new evidence on how transaction tax reductions affect the housing market and compares the effects of uniform reductions—where the tax is lowered equally for all buyers—with preferential reductions, where the tax is reduced more for homeowners. We exploit a unique natural experiment in Belgium that allows us to identify the effects of both types of reductions for closely comparable treatment groups.

Prior to 2018, sales in the country's two largest regions were taxed in very similar ways. A property's cadastral income (CI), an estimate of its annual net rental value in 1975, was the primary determinant of the tax rate. Properties with a CI of 745 euros or less ("low-CI") were taxed at a reduced rate when purchased by an owner-occupier. Sales of properties with a CI above 745 euros ("high-CI") or sales to other types of buyers were subject to the higher standard rate.

In 2018, Wallonia, the second-largest region, introduced two reforms that together

lowered the average tax rate for all sales by just over 1 percentage point. Shortly afterward, Flanders, the largest region, implemented reforms that reduced the average transaction tax rate for sales of high-CI properties to homeowners by 3.30 percentage points, while leaving the average tax rate for low-CI properties unchanged.

Using a panel of single-family houses constructed from detailed land registry records, along with the universe of registered sales deeds and rental contracts, we exploit this variation in a series of difference-in-differences analyses. Three main findings emerge.

First, the effects of uniform transaction tax cuts are largely symmetric to the effects of uniform hikes previously studied in the literature. The 1.1-percentage-point uniform reduction in Wallonia increased sales by 19% and prices by 2.4%. These responses align with predictions from macroeconomic models used to study the welfare effects of such reductions (Määttänen and Terviö, 2022; Cho et al., 2024; Schmidt, 2024). An exception to the symmetry concerns effects on BTR sales: we find that the uniform cut increased BTR sales by 13%, which is comparable to the 9–11% increase documented by Han et al. (2025) for Toronto's uniform tax hike.

Second, preferential transaction tax reductions affect many housing market outcomes in the same direction as uniform reductions, but with substantially smaller magnitudes. Our estimates indicate that preferential reductions raise buy-to-occupy (BTO) sales by less than half as much as similarly sized uniform reductions, and have no significant effect on BTR sales or prices. The difference in the average treatment effects on rents is smaller: the uniform reduction lowered rents by nearly 1%, and an equally sized preferential reduction would generate a 13% larger decrease. However, the event-study suggests that the impact of the uniform reduction on rents may have been only temporary.

Third, uniform reductions appear to affect owner-occupied and rental housing quite differently, whereas preferential reductions have more homogeneous effects.

The uniform reduction significantly increased the sale probability of owner-occupied units but not of rental units. It also appears to have lowered the BTR ratio for owner-occupied units and raised it for rental units, though these latter estimates are imprecise. By contrast, preferential reductions increased the sale probability for both owner-occupied and rental units, and decreased the BTR ratio for both types of properties.

The empirical estimates in this paper do not allow us to compute the net welfare effect of the transaction tax reductions. Given the substantially larger effect on sales, calculations based on the Harberger-triangle approach would imply that uniform reductions have a lower cost of public funds than preferential reductions. Yet this approach does not account for the potential misallocation of properties across the rental and owner-occupied stocks highlighted by Han et al. (2025). Our estimates do allow us to compute the counterfactual flows into and out of the rental stock. The results suggest that preferential treatment of owner-occupiers may mitigate this distortion by increasing the outflow more than the inflow.

That said, the two types of reductions have markedly different distributional implications. Because prices represent transfers from sellers to buyers and rents represent transfers from tenants to landlords, buyers and tenants appear to benefit more from a preferential reduction than from a uniform one, relative to sellers and landlords.

Related literature - We contribute to the literature on transaction taxes in housing markets in several ways. First, we present what is, to our knowledge, the first empirical evidence on the impact of permanent transaction tax reductions. Much of the existing work examines tax hikes using variation across space (Dachis et al., 2012; Bérard and Trannoy, 2018; Fritzsche and Vandrei, 2019; Dolls et al., 2025), across housing segments (Eerola et al., 2021), or around notches in the tax scheme (Kopczuk and Munroe, 2015; Slemrod et al., 2017; Hilber and Lyytikäinen, 2017).

Exceptions include Besley et al. (2014) and Best and Kleven (2017), who study the effects of a temporary tax holiday in the UK.

Second, we provide some of the first evidence on the impact of preferential treatment of owner-occupiers in transaction taxes. To our knowledge, the only other paper examining preferential treatment is Lai and Milcheva (2023), who study a 3-pp. increase in the U.K. stamp duty on BTR sales. While the effects of this preferential hike on prices and rents are symmetric to those of the preferential cut we examine, the authors find that the hike reduces BTR sales, whereas our results indicate that a preferential cut has only a negligible impact on BTR sales.

Lastly, we estimate the effect on several outcomes beyond prices and total sales, which have received most attention in prior empirical work. Like Han et al. (2025), we separately estimate effects on BTO and BTR sales, but we are the first to report estimates of the effects of uniform tax changes on rents.[1] This finding is important because it suggests that the burden of the transaction tax is not borne solely by buyers and sellers but is partly passed on to tenants through rents. Moreover, the implied effects on the rental stock's size offer the first—albeit indirect—evidence on the impact of transaction taxes on homeownership. The positive effect of the uniform reduction challenges predictions from overlapping-generations models, which generally imply that lowering the tax should increase homeownership (e.g. Kaas et al. (2021)).

Organization - This paper is organized as follows. In Section 2 we present a theoretical framework that will form the basis of our empirical analyses. Section 3 describes the reforms in Flanders and Wallonia in 2018. Section 4 presents the data and Section 5 the research design. Section 6 reports the results. We conclude in Section 7.

[1] See Buettner (2017) for empirical estimates of the effect on revenue.

2 Theoretical framework

In this section, we first present a simple model of a housing market with transaction taxes, and then use this model to study the effects of uniform reductions, in which both owner-occupiers and investors benefit from a reduction of similar size, and preferential reductions, in which only homeowners receive a tax relief.

2.1 A model of the housing market

Assume the housing stock consists of a fixed number of properties of varying quality h. These properties are owned either by homeowners, i.e. households that live in their own house, or by landlords, who rent out the properties to tenants, i.e. households that live in a rented house. We start with a description of the decision problem of households, after which we discuss the buy decision of investors, potential future landlords, and the sell decision of landlords.

Households live in a house of quality $h \in [0, 1]$ and consume a numeraire consumption good. They maximize their lifetime utility:

$$U_t(h_t) = \sum_{t=1}^{T} \beta^{t-1} u(h_t, c_t(h_t)) \tag{1}$$

Houses are indivisible and preferences over housing and the numeraire consumption good can vary over households and time.

Each period, households decide how much of the numeraire good they want to consume, in which house they want to live, and whether they want to own or rent the house. They solve this problem recursively. First, they determine whether it is cheaper to own or rent a house of type h:

$$\min \left\{ \tau_t P_t(h) + \sum_{t=1}^{\mathbb{E}_{i,t}[N_i]} ((1-\gamma_t)m_t + (\gamma_t + \tau)e_t - \mathbb{E}_{i,t}[g_t])P_t(h), \sum_{t=1}^{\mathbb{E}_{i,t}[N_i]} R_t(h) \right\} \tag{2}$$

In which τ_t denotes the transaction tax rate in period t, $P_t(h)$ the sales price of a house of quality h, $\mathbb{E}[N_i]$ the expected holding period of household i, γ the down payment ratio, m_t the mortgage interest rate, e_t the return on the best alternative investment, $\mathbb{E}_{i,t}[g_t]$ the expected house-price growth rate, and $R_t(h)$ the annual rent.[2]

Important to note is that owner-occupiers do not have to pay transaction tax on the house they currently own. So τ_t is zero when they determine the cost-minimizing tenure for their current house. Tenants, on the other hand, face the same minimization problem as in (2) for the property they currently rent.

After determining the minimum cost of living for each housing type h, households decide whether they want to move or not. A household moves to a different house if the difference in the present value of expected future utility from living in a house with quality h is larger than the difference in the expected cost of living.

Investor j buys a property when the present value of the return on the property is larger than the present value of the return on the sum of the down payment and transaction tax if it was invested in the alternative asset with the highest return:

$$\sum_{t=1}^{n_j}[R_t(h) - (1-\gamma)m_t P_t(h)] + ((1+E_{j,t}[g_t])^{\mathbb{E}_{j,t}[N_j]} - 1)P_t(h) > \\ [((1+e_t)^{n_j} - 1)\gamma + (1+e_t)^{n_j}\tau)]P_t(h) \qquad (3)$$

The first term on the left hand side captures the direct return from the rental unit, and the second term the indirect return.

Landlords sell their property when the right hand side of Equation (3) is larger than the left hand side. However, there is one important difference with investors. In the decision of landlords, τ has to be set to zero. As is the case for owner-occupiers, the tax becomes a sunk cost after the property is bought.

[2]To keep the exposition as simple as possible, we make abstraction of other costs like maintenance costs and the property tax.

We now turn to equilibrium rents and prices. Standard capital investment theory states that landlords set the rent in accordance to the user cost of the property. We define the user cost of a property as follows:

$$UC_t(h) = \left((1-\gamma_t)m_t + \gamma_t e_t - E_{k,t}[g_t]\right) P_t(h). \tag{4}$$

As is standard in the literature, the user cost does not include the transaction tax (Himmelberg et al., 2005). However, from Equations (2) and (3), it is clear that if rents just equal user costs, households would strictly prefer renting houses and investors would not buy any properties. In other words, demand for rental units would rise and supply would decrease, pushing rents upward until they reflect the transaction tax as follows:

$$R_t(h) = UC_t(h) + \frac{\tau}{a(e_t, n_j)} P_t(h). \tag{5}$$

In which $a(e_t, n_j)$ is an annuity that depends on the return e_t and the expected holding period of investors. Transaction taxes not only drive a wedge between user costs and rents, but raising the transaction tax will increase the rent-to-price ratio. We can rewrite the equilibrium condition in Equation (5) as follows:

$$\frac{R_t(h)}{P_t(h)} = (1-\gamma)i_t + \gamma e_t - E[g_t] + \frac{\tau}{a(e_t, n_t)}. \tag{6}$$

The expression for equilibrium prices simply follows from Equation (5):

$$P_t(h) = \frac{R_t(h)}{\left((1-\gamma)i_t + \gamma e_t - E[g_t] + \frac{\tau}{a(e_t, n_t)}\right)}. \tag{7}$$

2.2 The effects of transaction tax reductions

A uniform transaction tax reduction increases demand in the sales market. For households, ownership more often becomes the cost-minimizing tenure choice. Consequently, more homeowners will want to move to a different house, and more tenants will prefer buying to renting. For investors, a lower transaction tax reduces the opportunity cost of purchasing property. Supply in the sales market also rises, but less sharply than demand. Only homeowners who move sell their current dwelling; the tax reduction does not induce landlords to sell. Landlords start selling only when rents fall below user costs. Because demand increases more than supply, prices rise. In the rental market, demand decreases as more tenants choose homeownership, and supply increases as more investors become landlords. As a result, rents fall. Prices and rents will continue to rise and fall, respectively, until the equilibrium conditions in Equations (5) to (7) are restored.

A preferential tax reduction will affect these outcomes in the same direction, but the magnitude of its effects will be smaller. The increase in sales and prices will be smaller, as will the reduction in rents. A preferential reduction does not affect the buy decision of investors. Hence, demand in the sales market will increase by less, and supply in the rental market will not increase at all. On the contrary, the decrease in the rent-to-price ratio will lower demand of investors in the sales market, and therefore the supply in the rental market. This will further amplify the differences in the effects. A preferential reduction will unambiguously lower the share of sales that are buy-to-rents.

In our simple model, the effect of a uniform reduction on the BTR ratio is ex ante ambiguous. However, the search model in Han et al. (2025) indicates that uniform hikes raise the BTR ratio. If uniform cuts have the opposite effects, they should reduce the BTR ratio—like preferential cuts, though to a lesser extent.

3 Institutional background

The transaction tax in Belgium has been a regional responsibility since 2002. The regions receive the revenue and determine all institutional features of the tax, such as the tax base, the tax rate, and potential tax reductions. In 2018, Flanders and Wallonia, the two largest regions, reformed their transaction tax systems.[3] In what follows, we outline the key features of the tax systems prior to 2018, as well as the main components of the reforms.

Prior to the reforms, the transaction tax systems in the two regions were quite similar. Column (1) in Table 1 summarizes their key features. Both regions applied a reduced tax rate to houses with a cadastral income (CI) below or equal to 745 euros when purchased by owner-occupiers.[4] Flanders taxed these transactions at 5%, while Wallonia applied a 6% rate on the first 151,000 euros of the sales price, with the remainder taxed at 12.5%. For houses with a CI above 745 euros, and for purchases by other buyers, Flanders applied a 10% rate. In Wallonia, the standard rate was 12.5%, except for buyers who already owned two properties, in which case the rate was 15%. We will refer to houses with CI below or equal to 745 euro as 'low-CI' houses, and to houses with a CI above 745 euro as 'high-CI' houses.

The key features of the transaction tax systems after the reforms of 2018 are summarized in Column (2) of Table 1. Flanders no longer used the cadastral income as a criterion for the transaction tax. All sales to owner-occupiers were taxed at 7%. However, owner-occupiers received a reduction of 5,600 euros if the sales price did not exceed 200,000 euros. Importantly, the transaction tax for other buyers remained fixed at 10%. Wallonia, on the other hand, introduced an exemption of 20,000 euros

[3] Belgium has three regions: Flanders, Wallonia and the Brussels-Capital region. We exclude the Brussels-Capital region because they reformed the transaction tax and the mortgage interest deduction simultaneously in 2017.

[4] The cadastral income is an estimate of a property's annual net rental value. In addition to serving as a criterion for the transaction tax, it is also the tax base for the property tax. The cadastral income has not been re-estimated since 1975.

for all sales to owner-occupiers, regardless of the cadastral income of the properties. In addition, it lowered the 15% tax rate on purchases by other buyers who already own two properties to 12.5%.

Table 1. The transaction tax in Flanders and Wallonia before and after the reforms

	Before reforms of 2018	After reforms of 2018
	(1)	(2)
A. Flanders		
1) Owner-occupiers		
i) Cadastral income $\leq$ €745		
Sale price $\leq$ €200K	$0.05 \times P$	$(0.07 \times P) - €5.6K$
Sale price $>$ €200K	$0.05 \times P$	$0.07 \times P$
ii) Cadastral income $>$ €745		
Sale price $\leq$ €200K	$0.10 \times P$	$(0.07 \times P) - €5.6K$
Sale price $>$ €200K	$0.10 \times P$	$0.07 \times P$
2) Other buyers	$0.10 \times P$	$0.10 \times P$
B. Wallonia		
1) Owner-occupiers		
i) Cadastral income $\leq$ €745		
Sale price $\leq$ €151K	$0.06 \times P$	$0.06 \times (P - €20K)$
Sale price $>$ €151K	$0.06 \times €151K$	$0.06 \times (€151K - €20K)$
	$+0.125 \times (P - €151K)$	$+0.125 \times (P - €151K)$
ii) Cadastral income $>$ €745	$0.125 \times P$	$0.125 \times (P - €20K)$
2) Other buyers		
1st and 2nd property	$0.125 \times P$	$0.125 \times P$
3rd or more	$0.150 \times P$	$0.125 \times P$

Notes: This table shows how the transaction tax is computed in Flanders (Panel A) and Wallonia (Panel B), before (Column 1) and after (Column 2) the reforms of the 2018.

To qualify as an owner-occupier—and thereby benefit from the preferential tax treatment—a number of requirements must be met. The first key condition is that

the buyer must not own any other properties at the time of purchase or must sell all other properties within two years following the purchase. The second requirement is that the buyer must register the property as their main residence within three years of the purchase.[5] If either of these criteria is not met within the specified time frames, the buyer must pay the additional transaction tax along with a financial penalty. The regional tax administrations can easily verify compliance with both conditions. Property ownership in Belgium is recorded in the Cadaster, and a person's main residence is listed in the Population Register.

Some investors might attempt to circumvent the rules by registering the property as their main residence without actually residing in it, instead renting it out. Detecting residence fraud falls under the responsibility of the local municipal police. Although no systematic data exist on the enforcement of these rules, anecdotal evidence suggests that the level of scrutiny varies considerably across municipalities.

However, renting out a property without leaving a paper trail is not straightforward.[6] First, a tenant may wish to register the property as their own main residence. Second, Belgian law requires landlords to register rental contracts within two months of signing. If they fail to do so, they may be fined—especially if the tenant registers the contract themselves.[7] If neither party registers the contract, the tenant may terminate the lease without a notice period.[8] Conversely, if the landlord sells the property and the contract is unregistered, the new owner may evict the tenant without notice.

Finally, it is theoretically possible to avoid transaction tax by purchasing a property

[5] In Flanders, this deadline was shortened to two years with the reforms in 2018, but then turned back to three years in 2020.

[6] The transaction tax rules do not prohibit renting out part of the property, provided the buyer uses it as their main residence.

[7] Alternatively, tenants can take legal action to compel the landlord to register the contract, although this may be more costly. Registering a rental contract is otherwise free of charge.

[8] In Wallonia, tenants must first notify the landlord of their intention to register the contract before they can terminate it without providing notice.

through a private sales agreement rather than a notarial deed. However, this practice is highly inadvisable, as it does not offer formal legal protection. For ownership to be officially transferred, the sale must be recorded in a registered notarial deed, which will only be registered after the transaction tax has been paid. If a property is purchased via a private agreement and the original owner subsequently sells it to another buyer through a registered notarial deed, the second buyer becomes the legal owner. In such a case, the first buyer is left with only a financial claim against the seller, with no legal claim to the property.

4 Data

In this section, we present the data that we use to test the theoretical predictions in Section 2. We use three datasets from the General Administration of Patrimonial Documentation (GAPD) to construct a panel of all single-family houses in Belgium with monthly information on sales and rental contracts.

The first dataset consists of annual extractions from the Cadaster.[9] The Cadaster includes a unique identifier for the parcel on which the property is located, the property's address, its cadastral income, and a set of approximately fifteen characteristics. The second dataset contains the registered notarial deeds documenting property transactions. It records the type of transaction, the date of the deed, and, if applicable, the sales price.[10] The third dataset includes registered rental contracts. It provides the property's address along with contract details such as the signing date, the start date of the rental period, the rental price, the deposit, and any additional costs.[11]

To construct the monthly panel, we first expand the annual extractions from the

[9]The annual extractions reflect the situation as of January 1st each year.
[10]This dataset also incorporates information from the Cadaster.
[11]This dataset also includes a few characteristics of the property, though these are often missing.

cadaster into a monthly panel, assuming the properties' characteristics remain unchanged throughout the year. We then link the information from the notarial deeds and rental contracts using property addresses. Before linking, we exclude multifamily units from the panel — since the unit number is often missing from the address — and remove non-arm's-length transactions such as inheritances and gifts from the notarial deed dataset. For each single-family house we know when it is sold, at which price it is sold and when it is rented and at which price it is rented.

Our sample period runs from January 2016 through December 2019. It is bounded by preceding and subsequent reforms in the transaction tax, which were accompanied by changes to the mortgage interest deduction in both regions. The period begins in January 2016, when Wallonia increased the transaction tax on purchases by other buyers who already own two properties from 12.5% to 15%, and simultaneously reformed the mortgage interest deduction. It ends in December 2019, after which Flanders further reduced the transaction tax for owner-occupiers from 7% to 6% and fully repealed their mortgage interest deduction.

We use four outcomes in the empirical analyses: 1) the probability that a house is sold, 2) prices, 3) rents and 4) the probability that a sale is a buy-to-rent (BTR). We classify a sale as BTR if a rental lease is registered within three years of the acquisition. If the house is not registered as their main address within three years after the purchase, owner-occupiers forfeits the preferential treatment and must retroactively pay the higher transaction tax plus any applicable surcharges. Table 2 reports the means and standard deviations for these four outcomes.

Table 2. Descriptive statistics

	Flanders			Wallonia		
	All	Low-CI	High-CI	All	Low-CI	High-CI
	(1)	(2)	(3)	(4)	(5)	(6)
A. Before 2018						
Sale	0.0021	0.0026	0.0017	0.0019	0.0021	0.0016
	(0.0458)	(0.0512)	(0.0407)	(0.0431)	(0.0453)	(0.0396)
Price	270,774	214,356	346,573	190,524	150,085	263,739
	(205,010)	(185,570)	(205,468)	(160,756)	(154,149)	(145,944)
Rent	8,672	7,767	9,973	8,099	7,384	9,301
	(3,454)	(2,317)	(4,298)	(3,142)	(2,069)	(4,118)
BTR	0.0749	0.0796	0.0687	0.0627	0.0646	0.0588
	(0.2633)	(0.2707)	(0.2529)	(0.2423)	(0.2457)	(0.2353)
B. After 2018						
Sale	0.0023	0.0028	0.0019	0.0020	0.0022	0.0017
	(0.0480)	(0.0533)	(0.0433)	(0.0447)	(0.0469)	(0.0414)
Price	288,003	226,567	364,759	205,757	158,436	287,052
	(189,430)	(150,335)	(204,631)	(159,151)	(116,323)	(187,473)
Rent	8,796	7,980	9,933	8,246	7,553	9,463
	(3,599)	(2,476)	(4,499	(3,174)	(2,189)	(4,127)
BTR	0.0718	0.0804	0.0611	0.0619	0.0631	0.0596
	(0.2582)	(0.2719)	(0.2395)	(0.2410)	(0.2432)	(0.2368)

Notes: This table reports the mean and standard deviation (in parentheses) for the outcomes that we use in the empirical analyses. The first three columns present summary statistics for Flanders, and the last three columns present those for Wallonia. Panel A covers the period from January 1, 2016, to December 31, 2017, while Panel B covers the period from January 1, 2018, to December 31, 2019.

5 Research design

This section presents our empirical strategy. Section 5.1 describes the variation in the transaction tax and how we exploit it in a difference-in-differences design. Section 5.2 explains how we compute the difference-in-differences estimand and assess the validity of the identifying assumptions.

5.1 Variation

The reforms of the transaction tax in Belgium created variation across regions, housing segments and type of buyers. Table 3 documents this variation using the sales in 2017. Columns (1) to (3) report average transaction tax rates if all properties were bought by owner-occupiers. Column (4) reports the average transaction tax rate if all properties were bought by buyers other than owner-occupiers. The last three columns report what we refer to as the 'preferential treatment'. It is defined as the difference between the average tax rate in Column (4) and the average rates in the first three columns. An increase in the preferential treatment implies that other buyers face an increase in the transaction tax rate relative to the average rate for owner-occupiers.

We exploit this variation in a series of difference-in-differences analyses to identify the effects of uniform and preferential transaction tax reductions. To identify the effect of a uniform reduction, we use the full housing stock in Wallonia as the treatment group and the low-CI housing stock in Flanders as the control group. The average transaction tax on low-CI housing in Flanders remained unchanged for both owner-occupiers and other buyers (third row, Columns 1 and 4). However, since the descriptive statistics in Table 2 indicate that the low-CI housing stock in Wallonia has a more comparable sale and BTR probability before the reforms, we perform a robustness check with only low-CI housing as treatment group.

Table 3. The variation in transaction tax rates and the preferential treatment

	Change in average tax rate				Preferential treatment		
	Owner-occupiers (%)			Other			
	Low-CI	High-CI	All	(%)	Low-CI	High-CI	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Flanders	0.00	-3.30	-1.42	0.00	0.00	3.30	1.42
Wallonia	-1.13	-1.12	-1.13	-1.25	-0.12	-0.13	-0.12

Notes: In this table we report the change in the average transaction tax rate for sales by owner-occupiers in Column (2) to (4), and for sales by other buyers in Column (4). Columns (5) to (7) shows the change in the preferential treatment, which equals the difference between the average tax rate for owner-occupiers and the average tax rate for other buyers.

The most straightforward way to identify the effect of a preferential reduction, is to use the high-CI housing stock in Flanders as the treatment group and the low-CI housing stock as the control group. However, the preferential reduction for the high-CI stock in Flanders is substantially larger than the uniform reduction in Wallonia. Table 3 shows that the reforms lowered the average transaction tax for owner-occupiers by about 3.30 pp. Consequently, any difference between the estimates for these two types of reductions may reflect the difference in magnitude rather than the difference in policy design.

We identify the effect of a more comparable preferential reduction in two steps. We first compute difference-in-differences estimates using the complete housing stock in Flanders as the treatment group and the complete housing stock in Wallonia as the control group. The average transaction tax rate for owner-occupiers in full housing stock in Flanders decreased by approximately 1.42 pp., which is only slightly larger than the 1.13 pp. reduction in Wallonia. As the two reductions are almost equally sized, the estimates primarily reflect the effect of the difference in design. We therefore refer to these estimates as 'preferential treatment' effects.

We then sum the preferential treatment effects and the estimates of the effect of the uniform reduction (using the full housing stock as both control and treatment groups) to obtain the total effect of the preferential reduction. We will refer to these estimates as the 'small preferential reduction' effects.

5.2 Estimation and identification

Since there is always only one treatment and one control group, we can compute the difference-in-differences in population means with the following two-way fixed effects (TWFE) model estimated using ordinary least squares (OLS):

$$Y_{i,t} = \alpha \times \text{Treat}_i + \beta \times \text{Treat}_i \times \text{Post}_t + \theta_t + \mu_m + \varepsilon_{i,t} \tag{8}$$

In which $Y_{i,t}$ is the outcome of unit i in period t, Treat_i is a binary indicator for whether the property belongs to the treatment group, Post_t equals 1 from June 2018 onward, the vector θ_t are month fixed effects, the vector μ_m are municipal fixed effects and $\varepsilon_{i,t}$ is the residual.

The difference-in-differences in population means can be interpreted as the average treatment effect on the treated (ATT) over the post treatment period under four assumptions. We now discuss these assumptions and show how we ensure their validity.

A first assumption is the so called no anticipation assumption, which states that the observed outcome only depends on the treatment received in period t. It rules out responses to future as well as past treatments. There are two important aspects of the regional reforms that have to be taken into account to make sure this assumption is not violated. First, the timing of the reforms differed slightly between regions: Wallonia's reforms took effect on January 1, 2018, whereas the Flemish reforms came into force on June 1, 2018. The period between these two dates—January through

May—is therefore uninformative for our research questions. Second, the Flemish reforms were announced in late December 2017, giving households approximately five months to anticipate the upcoming changes. Investors may have accelerated buy-to-rent (BTR) purchases to avoid the less favorable conditions post-reform, while prospective owner-occupiers may have delayed purchases in anticipation of lower transaction taxes.

To address both issues, we add two interactions with the Treat_i indicator:

$$\begin{aligned} Y_{i,t} = \alpha_0 + \alpha_1 \times \text{Treat}_i + \beta_1 \times \text{Treat}_i \times \text{Pre}_t + \beta_2 \times \text{Treat}_i \times \text{Post}_t \\ + \beta_3 \times \text{Treat}_i \times \text{First}_t + \theta_t + \varepsilon_{i,t} \end{aligned} \tag{9}$$

The interaction with Pre_t, which equals 1 from December 2017 through May 2018, will capture the effects of the Walloon reform and any anticipation effects before the Flemish reform came into force. The interaction with First_t, which equals 1 from June 2018 through August 2018, accounts for any remaining anticipation effects during the initial months following the implementation of the Flemish reform.

A second identification assumption asserts that the observed data consists of a sample which is independent and identically distributed (iid). It implies that we have access to T cross-sections of i.i.d. data and we observe each unit's outcome and dose. As long as the reforms did not affect the registration of notarial deeds and rental contracts, this random sampling assumption will hold for the sale probability. However, it might not hold for the other three outcomes. We only observe the price and rent of houses that are actually sold or rented. The reforms may affected the timing when certain properties are sold, at least during the months when households could anticipate the reform and shortly after. To adjust for changes in the composition of sales and rentals over time, we estimate Equation (9) with the property characteristics from the Cadaster.

The third assumption is the parallel trends assumption. To assess its validity, we estimate a group-specific linear time trend using the data up to November 2017[12]:

$$Y_{i,t} = \alpha \times \text{Treat}_i + \delta \times \text{Treat}_i \times \text{Time}_t + \theta_t + \varepsilon_{i,t}. \tag{10}$$

In which Time_t is a continuous time variable. Table A.2 in the Appendix presents the estimates of δ. An insignificant estimate can be considered as suggestive evidence that the average outcomes would have followed a similar trend in case the transaction tax was not reformed. The estimates are significantly different from zero for the sale probability and prices. To account for these significant pretrends, we apply the two-step strategy proposed by Goodman-Bacon (2021). Specifically, we subtract the pretrend from the outcomes of the units in the control group, and estimate Equation (9) with these trend-adjusted outcomes. We do this for all outcomes with a pretrend significant at the 5%-level, and plot estimates of β_t from the following specification:

$$Y_{i,t} = \alpha \times \text{Treat}_i + \beta_t \times \text{Treat}_i + \theta_t + \varepsilon_{i,t}. \tag{11}$$

A last assumption is the so called Stable Unit Treatment Value Assumption (SUTVA). While the reforms in Flanders will not have had a large effect on outcomes in Wallonia, and visa versa, the reduction for high-CI housing in Flanders may affected outcomes in the low-CI segment. However, the direction of this bias is ambiguous. It seems intuitive that low- and high-CI houses are substitutes, but it is also possible that they are complements. A reduction in the transaction tax on high-CI houses decreases housing costs over the entire life cycle, potentially increasing demand for low-CI houses as households change the way they climb the housing ladder.[13]

[12] We truncate the sample to avoid bias from anticipation to the reforms in Wallonia.

[13] Rather than saving longer to directly purchase a high-CI house, prospective owner-occupiers might first enter the market with a low-CI house and upgrade later.

6 Results

This section presents the results from our empirical analyses. In Section 6.1, we report the effects on the sale probability, prices, rents and the BTR probability. Section 6.2 examines whether the effects on the sale and BTR probabilities differ between owner-occupied and rental houses. Section 6.3 uses the estimates presented in Sections 6.1 and 6.2 to compute the effects on BTO and BTR sales, and the flows in and out of the rental stock.

6.1 Main outcomes

Table 4 presents the estimated effects of the transaction tax reductions. The first row reports estimates using the entire housing stock as the treatment group, while the third row of Panel A reports estimates using only the low-CI housing stock as the treatment group. Recall that we consider the estimates from the low-CI sample more credible for the sale and BTR probability. Panel B presents the estimated effects of preferential reductions. The first row reports the estimates of the effect of the large preferential reduction for high-CI housing in Flanders. The fourth row presents the sum of the estimates in the first row and the preferential treatment effects, reported in Table A.3 in the Appendix. We interpret these sums as the effects of a preferential reduction of similar size as the uniform reduction in Wallonia. In addition to the estimates and their standard errors, we also report relative differences between the effects of preferential and uniform reductions computed as follows:

$$\frac{\Delta\beta^*}{\beta_U} = \frac{\beta^P}{\beta^U}\frac{\Delta\tau^U}{\Delta\tau^P} - 1$$

The first two columns of Panel A show that the uniform transaction tax reduction in Wallonia increased both sales and prices. The effects are positive and precisely estimated. Column (1) implies that reducing the average tax rate by slightly more

than one percentage point increases the probability of a sale by nearly 20%. Column (2) indicates that prices rose on average by about 2.4%.

The estimate in the first row of Column (3) suggests that the uniform reduction lowered rents by almost 1%. This pattern is consistent with theory: demand for rental housing should fall, while supply increases. However, combined with the estimated 5% increase in prices, it implies that the rent-to-price ratio fell by roughly 0.30 percentage points.[14] This decline is substantially larger than the 0.12 percentage point decrease predicted by Equation (6), assuming a 6% required return and a 15-year expected holding period.[15]

There are, however, two things we want to point out. First, while we do not consider the low-CI estimate more credible for the effect on rents, the estimate in the third row of Column (3) is considerably smaller and not significantly different from zero. Second, the estimates in Panel (d) of Figure 1 suggest that the reduction in rents may have been temporary. The dynamics contrast sharply with the more stable patterns for sales and prices shown in Panels (a) and (c).

The estimates in Column (4) are negative, and suggest that the uniform reduction decreased the probability that a sale is a BTR by 4.2% to 4.7%. This is consistent with the proportionally large reduction in the rent-to-price ratio, which will have dampened demand by investors. However, both effects are very imprecisely estimated, so we cannot draw any definitive conclusions.

The results in Panel B of Table 4 indicate that preferential reductions affect most outcomes in the same direction as uniform reductions, but with markedly different magnitudes. Like uniform reductions, preferential reductions increase sales and decrease rents and the probability that a sale is a BTR. However, the increases in

[14]The estimates imply that the observed rent-to-price ratio is 5.9% lower than it would have been absent the tax reduction: $\left(\frac{1-0.0098}{1+0.0509}\right) - 1 = -0.059$. Given the observed ratio of approximately 4.77% (7,553 / 158,436) in Table 2, the counterfactual ratio is roughly 5.07% (0.0477 / 0.9693).

[15]We assume that the average transaction tax for investors decreased by 1.25 percentage points (see Table 3).

sales and prices are substantially smaller, whereas the reductions in rents and the BTR probability are larger.

Specifically, Column (1) of Panel B shows that the effect of a preferential reduction on the sale probability is roughly 57% smaller than the effect of a similarly sized uniform reduction. The relative differences in price effects, reported in Column (2), are even larger since preferential reductions do not have a significant effect on prices.[16] Column (3) and (4) indicate that the reductions in rents and the BTR probability are about 21% larger.

The results in Table 4 are broadly consistent with the predictions of our simple model in Section 2, with one notable exception: the difference in the effects on rents. The model predicts that uniform reductions lower rents more than preferential reductions because they reduce demand and increase supply. A possible explanation for the empirical divergence is that uniform reductions may decrease rental demand less than preferential reductions. The increase in prices may keep more, credit- and liquidity constrained, tenants in the rental market.

This raises the question why the differences in the effects on sales and prices are so large? In the theoretical model, we treated investors and landlords as absentee agents. In practice, however, most investors and landlords are also homeowners. As a result, a preferential tax reduction does not only not increase demand from investors, but it also generates a smaller increase in demand from homeowners.

[16] This remains true even after adjusting for the marginally significant pretrend shown in Table A.2: once we account for the pretrend, the effect of the large reduction increases to a precisely estimated 0.0227, implying a relative difference of –85%.

Table 4. The effects of transaction tax reductions: main results

	Sales	Prices	Rents	BTR
	(1)	(2)	(3)	(4)
A. Uniform transaction tax reductions				
Full sample	0.00030***	0.0236***	-0.0098***	-0.0019
	(0.00002)	(0.0032)	(0.0035)	(0.0025)
Obs.	90,000,000	180,689	149,546	203,604
Low-CI	0.00030***	0.0246***	-0.0054	-0.0029
	(0.00003)	(0.0038)	(0.0036)	(0.0029)
Obs.	69,800,000	149,691	121,850	170,924
B. Preferential transaction tax reductions				
Large	0.00033***	0.0001	-0.0370***	-0.0106***
	(0.00002)	(0.0034)	(0.0046)	(0.0027)
Obs.	85,700,000	178,161	126,783	183,126
	[-62%]	[-100%]	[+29%]	[+25%]
Small	0.00018***	-0.0015	-0.0139***	-0.0043
	(0.00004)	(0.0043)	(0.0048)	(0.0033)
	[-52%]	[-100%]	[+13%]	[+18%]

Notes: This table present estimates of the effects of uniform (Panel A) and preferential (Panel B) transaction tax reductions. The first row in Panel A reports estimates of β_2 in Equation (8) using the full housing stock in Wallonia as the treatment group and the third row reports estimates based on the low-CI housing stock. The estimates in the first row of Panel B use high-CI housing in Flanders as the treatment group. In all three cases, low-CI housing in Flanders is used as the control group and heteroskedasticity-robust standard errors are reported within parentheses. The third row of Panel B reports the sum of the estimates in the first row of Panel A and the estimates reported in the first row of Table A.3 in the Appendix. The standard errors are computed using the standard errors of the summed estimates assuming the two estimates are independent. Relative differences between the effects of the preferential reductions and the uniform reduction in the first row are reported in brackets.

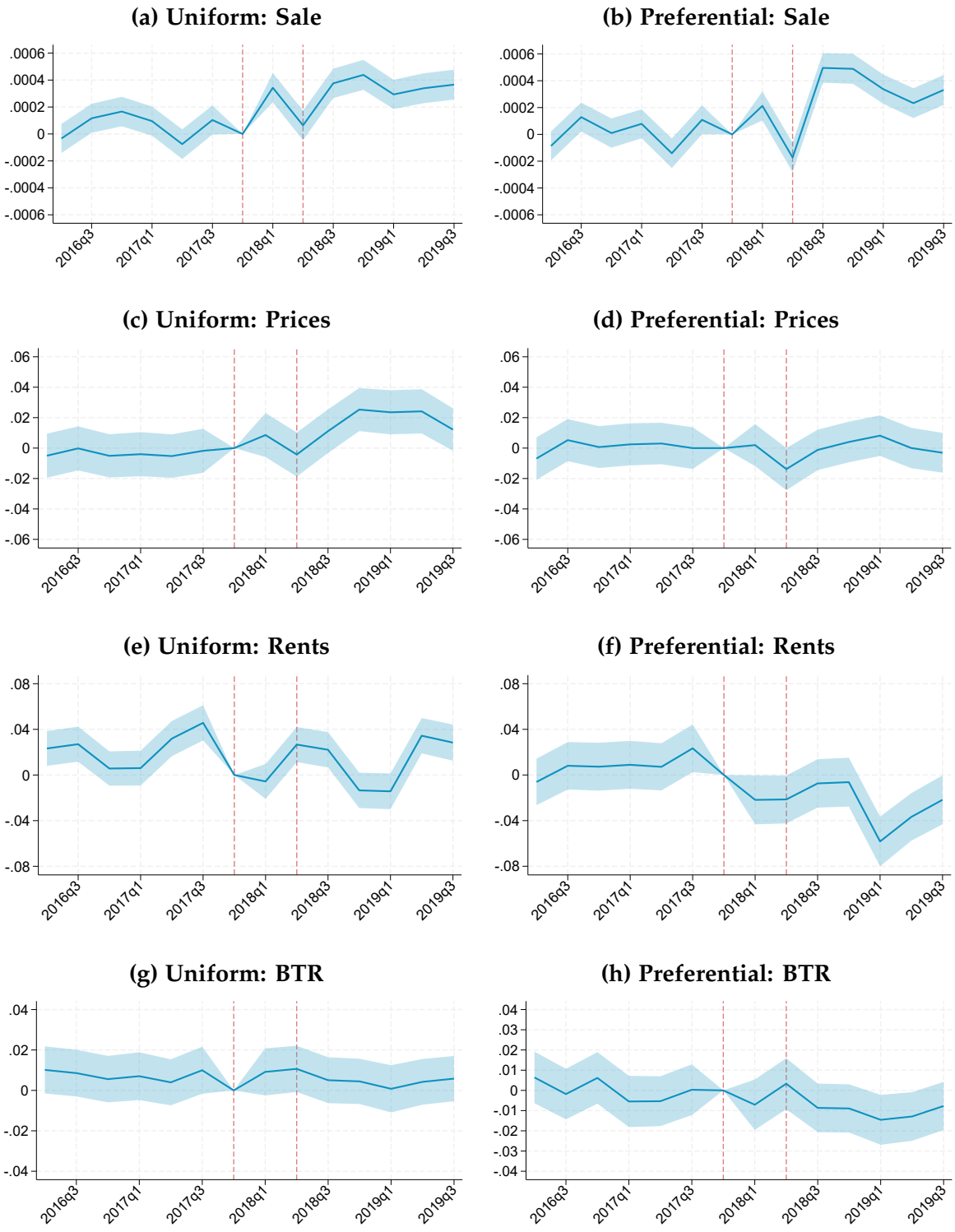

Figure 1. The effects of transaction tax reductions: event-studies

Notes: This figure plots the estimates of β_t in Equation 11. In the first column we use the entire housing stock in Wallonia as treatment group and in the second column high-CI housing in Flanders. The control group is always low-CI housing in Flanders. The two dashed vertical lines indicate the quarters before the reforms in Wallonia and Flanders took effect, i.e. 2017Q4 and 2018Q2. The margins indicate the 95% confidence interval.

6.2 Heterogeneity

We now examine whether the transaction tax reductions affect owner-occupied and rental housing differently. We classify a dwelling as a rental unit if the most recent rental contract we observe for that property is less than nine years old. Although landlords are free to choose the contract length, contracts are legally presumed to have a nine-year duration when none is specified.[17] Table A.1 in the Appendix reports descriptive statistics for the sale and BTR probabilities for owner-occupied and rental units separately.

Panel A of Table 5 suggests that the effects of uniform reductions vary substantially across the two market segments. First, they significantly increase the probability that owner-occupied houses are sold but have no detectable effect on the sale probability of rental properties. This pattern is consistent with the idea that landlords only sell when rents drop below user costs, and transaction taxes and other costs allow them to earn returns above the user cost. Second, uniform reductions significantly lower the BTR probability among owner-occupied sales, whereas it does not reduce—and may even slightly increase—the BTR probability for rental sales.

Panel B indicates that the effects of preferential reductions are more homogeneous. These reductions appear to increase the sale probability of both owner-occupied and rental properties, and to decrease the BTR probability for both types. The results raise the question why preferential reductions induce landlords to sell their properties more than uniform reductions? It seems possible that landlords are more responsive to decreases in rents than to increases in prices, though the latter increases user costs conform Equation (4). Plot (f) in Figure 1 suggests that the large preferential reduction in Flanders induced a large permanent reduction in rents.

[17] According to the 2018 Housing Survey in Flanders, 31% of rental contracts had a duration of three years or less, 39.6% had a duration of nine years or more, and 29.4% did not specify a duration.

Table 5. The effects of transaction tax reductions: heterogeneity

	Sale probability		BTR probability	
	Owner-occupied	Rental	Owner-occupied	Rental
	(1)	(2)	(3)	(4)
A. Uniform reductions				
Full sample	0.00035***	-0.00001	-0.0037	0.0169
	(0.00003)	(0.00008)	(0.0025)	(0.0122)
Obs.	82,500,000	7,489,563	185,257	18,347
Low-CI	0.00035***	0.00002	-0.0046	0.0121
	(0.00003)	(0.00010)	(0.0028)	(0.0139)
Obs.	63,700,000	6,092,076	155,494	15,430
B. Preferential reductions				
Large	0.00038***	0.00020**	-0.0114***	-0.0039
	(0.00003)	(0.00009)	(0.0027)	(0.0121)
Obs.	79,100,000	6,588,845	166,747	16,886
Small	0.00021***	0.00012	-0.0046	-0.0009
	(0.00004)	(0.00011)	(0.0033)	(0.0162)

Notes: This table shows how the effects of uniform transaction tax reductions on the sale and BTR probability vary across owner-occupied and rental housing. The first row reports estimates of β_2 in Equation (8) using the full housing stock in Columns (1) and (2) and using all sales in Columns (3) and (4). The third row reports these estimates based on the low-CI housing stock in Columns (1) and (2) and using low-CI sales in Columns (3) and (4). Heteroskedasticity-robust standard errors reported in parentheses. See Figure A.1 in the Appendix for the corresponding event-studies.

6.3 Sales and rental stock

We use the estimates presented in the two previous sections to compute counterfactual sale and BTR probabilities for both types of houses and, in turn, compute the effects on BTO and BTR sales. In addition, we derive the flows into and out of the rental stock. The sizes of the owner-occupied stock and the rental stock are determined by the flow from the owner-occupied stock to the rental stock,

$$H_t^{NR} = H_{t-1}^N \times S_t^N \times \text{BTR}_t^N, \tag{12}$$

and the flow from the rental stock to the owner-occupied stock,

$$H_t^{RN} = H_{t-1}^R \times S_t^R \times (1 - \text{BTR}_t^R). \tag{13}$$

In which H_t^N and H_t^R are the number of owner-occupied and rental houses in period t, S_t^N and S_t^R are the probabilities that a owner-occupied and rental house are sold, and BTR_t^N and BTR_t^R are the probabilities that a sale of an owner-occupied or a rental property is a buy-to-rent (BTR).

Table 6 reports the results of this exercise. Columns (1)–(3) present the effects on total sales, BTO sales, and BTR sales, respectively. Although both types of tax reductions increase total sales, uniform reductions raise sales substantially more than preferential reductions. This pattern holds for both BTO and BTR transactions. The effect of a similar sized preferential reduction on BTR sales is even negligible.

Columns (4)–(6) show that uniform and preferential reductions differ markedly in their effects on the rental stock. While uniform reductions expand the rental stock by increasing the inflow and reducing the outflow, preferential reductions decrease the size of the rental stock by increasing the outflow. We interpret these findings as suggestive evidence that preferential reductions may encourage homeownership,

whereas uniform reductions may instead reduce it.

Table 6. Effects of transaction tax reductions: sales and rental stock

	Sales			Rental stock		
	All	BTO	BTR	Inflow	Outflow	Size
	(1)	(2)	(3)	(4)	(5)	(6)
Uniform	+19.05%	+19.47%	+13.13%	+13.49%	-2.56%	+0.0216%
Preferential	+7.71%	+8.24%	+0.73%	+0.48%	+2.73%	-0.0117%

Notes: This table reports the effects on sales and the rental stock (in %) computed using the estimates in Tables 4 and 5, and the size of the housing stock in Wallonia (uniform) and Flanders (preferential) at the start of 2019.

7 Conclusion

This paper provides the first evidence on the effects of permanent transaction tax reductions and compares the impact of uniform and preferential designs. A modest uniform reduction produces sizable increases in sales and prices and modest declines in rents, broadly mirroring the effects of previously studied tax hikes. In contrast, preferential reductions—despite being comparable in size—generate considerably smaller sales and price responses but lead to stronger reductions in rents and buy-to-rent activity. These differences matter for policy: uniform reductions lower the cost of public funds but expand the rental stock, whereas preferential reductions shift properties out of the rental sector and toward owner-occupation. Preferences over efficiency, distributional goals, and homeownership therefore determine which design is more desirable. Future work could quantify welfare effects explicitly and examine whether these patterns generalize to other markets with heterogeneous tax treatment across buyer types.

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Appendix A Additional tables and figures

Table A.1. Descriptive statistics: non-rental and rental units

	Flanders			Wallonia		
	All	Low-CI	High-CI	All	Low-CI	High-CI
	(1)	(2)	(3)	(4)	(5)	(6)
A. Before 2018						
1) Non-rental houses						
Sale	0.0021	0.0026	0.0016	0.0018	0.0020	0.0015
	(0.0455)	(0.0511)	(0.0402)	(0.0429)	(0.0452)	(0.0391)
BTR	0.0668	0.0696	0.0630	0.0555	0.0573	0.0519
	(0.2496)	(0.2545)	(0.2430)	(0.2290)	(0.2325)	(0.2217)
2) Rental units						
Sale	0.0025	0.0027	0.0023	0.0021	0.0022	0.0021
	(0.0499)	(0.0517)	(0.0474)	(0.0460)	(0.0464)	(0.0454)
BTR	0.1569	0.1743	0.1302	0.1384	0.1441	0.1280
	(0.3637)	(0.3794)	(0.3366)	(0.3454)	(0.3513)	(0.3342)
B. After 2018						
1) Non-rental units						
Sale	0.0023	0.0028	0.0018	0.0020	0.0022	0.0017
	(0.0477)	(0.0533)	(0.0428)	(0.0445)	(0.0467)	(0.0409)
BTR	0.0649	0.0716	0.0566	0.0544	0.0553	0.0526
	(0.2464)	(0.2579)	(0.2311)	(0.2268)	(0.2286)	(0.2232)
2) Rental units						
Sale	0.0027	0.0028	0.0026	0.0023	0.0024	0.0022
	(0.0520)	(0.0533)	(0.0504)	(0.0480)	(0.0487)	(0.0468)
BTR	0.1407	0.1633	0.1089	0.1428	0.1483	0.1327
	(0.3478)	(0.3697)	(0.3116)	(0.3499)	(0.3554)	(0.3393)

Notes: This table reports the mean and standard deviation (in parentheses) for the outcomes that we use in the empirical analyses.

Table A.2. Pretrend estimates

	Sales	Prices	Rents	BTR
	(1)	(2)	(3)	(4)
A. Uniform transaction tax reductions				
Full sample	0.00001***	0.0022***	-0.0002	0.0001
	(0.00000)	(0.0005)	(0.0004)	(0.0003)
Low-CI	0.00001***	0.0024***	-0.0004	0.0002
	(0.00000)	(0.0006)	(0.0005)	(0.0004)
B. Preferential transaction tax reductions				
Large	0.00001***	0.0001*	-0.0003	0.0006
reduction	(0.00000)	(0.0005)	(0.0007)	(0.0004)
Preferential	-0.00001***	-0.0018***	0.0003	0.0001
treatment	(0.00000)	(0.0004)	(0.0004)	(0.0003)

Notes: This table presents the estimates of δ from Equation (10) for the probability that a sale is a buy-to-rent in Panel A, and for the probability that a house is sold in Panel B. Heteroskedasticity-robust standard errors reported in parentheses.

Table A.3. The effects of preferential treatment: main results and heterogeneity

	(1)	(2)	(3)	(4)
A. Main outcomes				
Outcomes	Sales	Prices	Rents	BTR
$\hat{\beta}_2$	-0.00012***	-0.0251***	-0.0041	-0.0026
	(0.00002)	(0.0028)	(0.0033)	(0.0022)
Obs.	137,000,000	258,649	201,976	
B. Heterogeneity				
Outcomes	Sale probability		BTR probability	
	Owner-occupied	Rental	Owner-occupied	Rental
$\hat{\beta}_2$	-0.00014***	0.00010	-0.0008	-0.0191*
	(0.00002)	(0.00007)	(0.0022)	(0.0106)
Obs.	126,000,000	10,400,000		

Notes: This table present the estimates of the effects of preferential treatment. These are estimates of β_2 from Equation (9) using all housing in Flanders as treatment group and all housing in Wallonia as control group. Heteroskedasticity-robust standard errors are reported in parentheses.

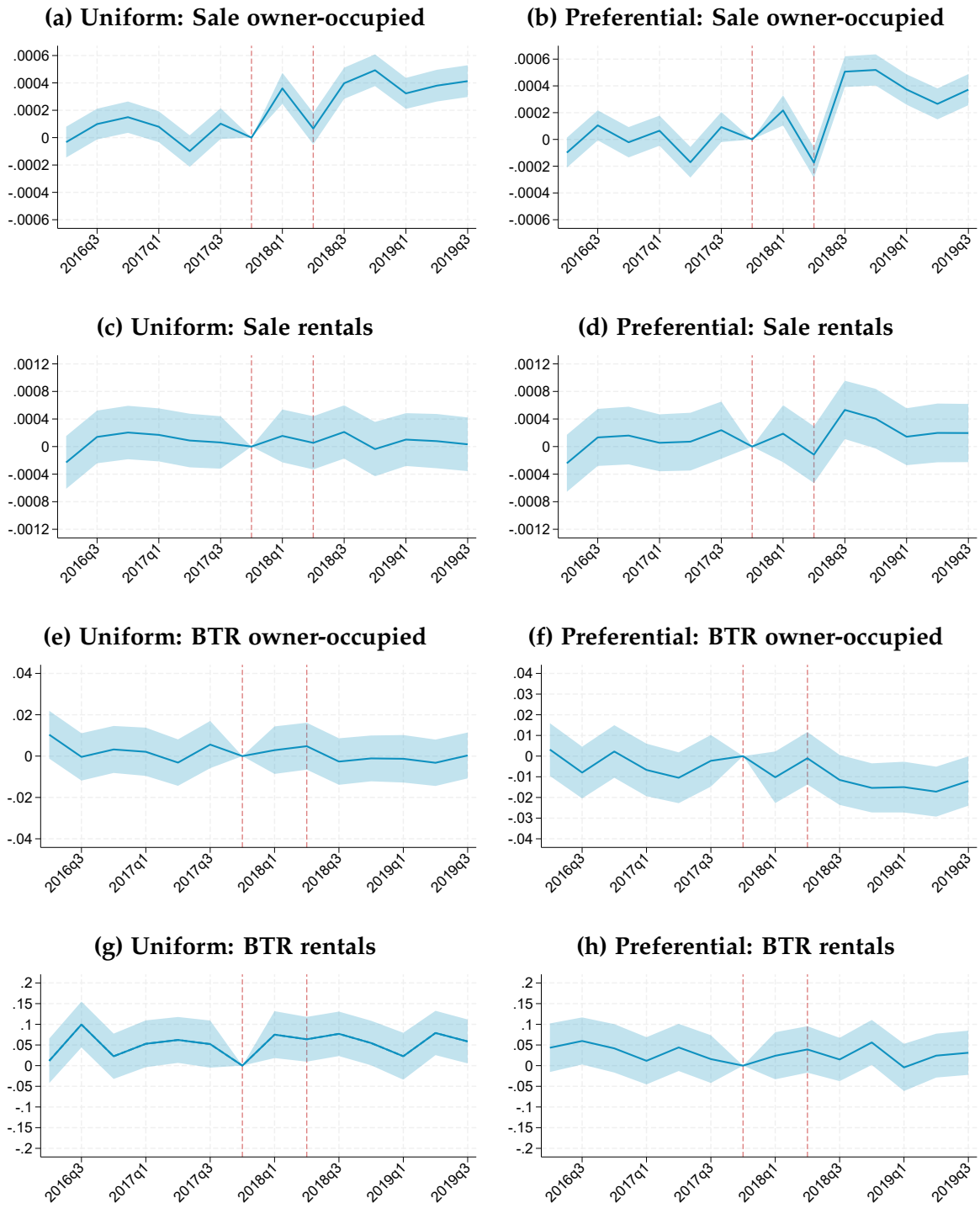

Figure A.1. The effects of uniform transaction tax reductions: heterogeneity

Notes: This figure plots the estimates of β_t in Equation 11. The first column uses the entire housing stock in Wallonia as treatment group while the second column uses the high-CI housing stock in Flanders as treatment group. The two dashed vertical lines indicate the quarters before the reforms in Wallonia and Flanders took effect, i.e. 2017Q4 and 2018Q2. The margins indicate the 95% confidence interval.

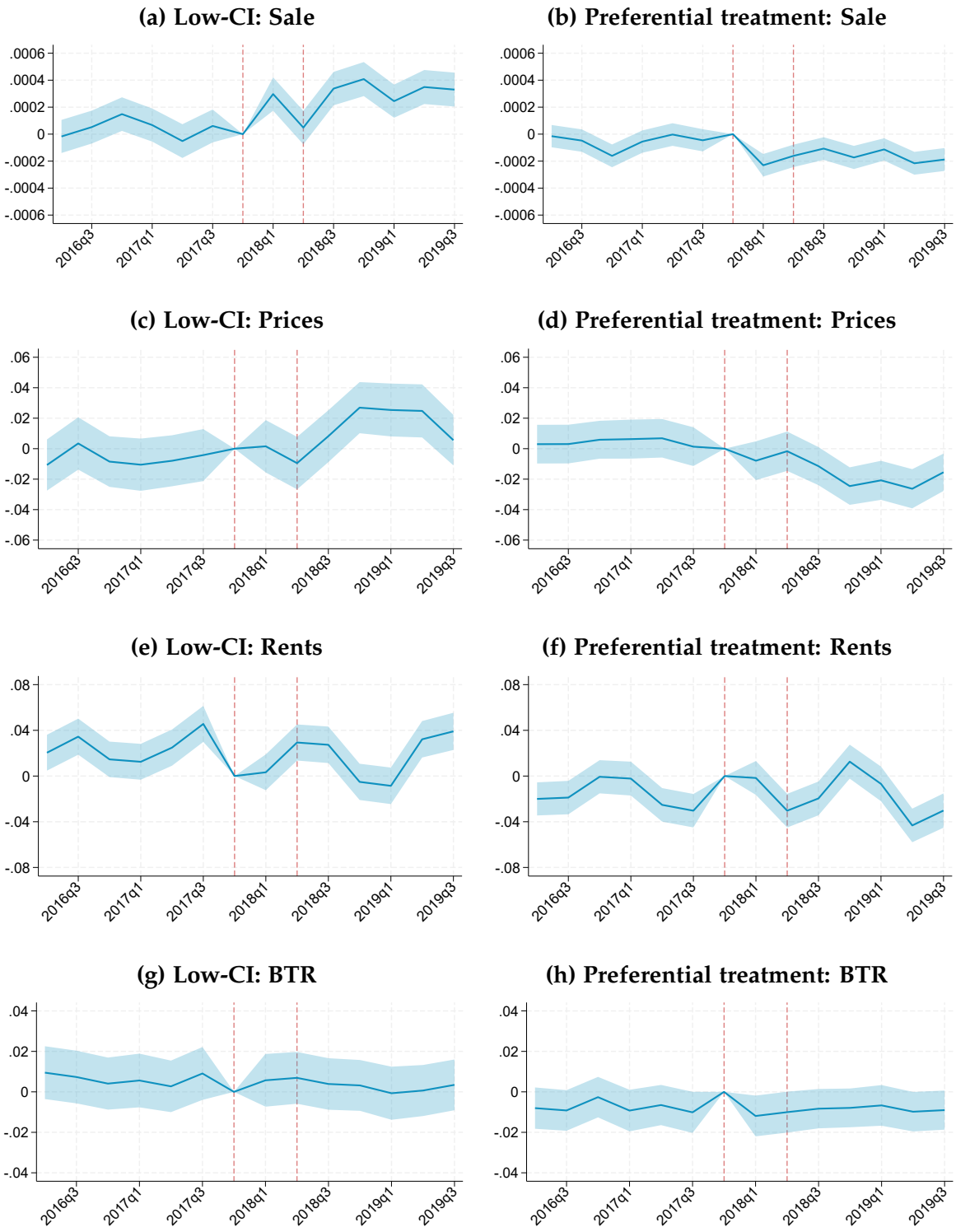

Figure A.2. The effects of transaction tax reductions: robustness and preferential treatment

Notes: This figure plots the estimates of β_t in Equation 11. The first column uses the low-CI housing stock in Wallonia as treatment group and the low-CI housing stock in Flanders as the control group. The second column uses the entire housing stock in Flanders as treatment group and the entire housing stock in Wallonia as control group. The two dashed vertical lines indicate the quarters before the reforms in Wallonia and Flanders took effect, i.e. 2017Q4 and 2018Q2. The margins indicate the 95% confidence interval.

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