



# **The German Land Transfer Tax: Evidence for Single-Family Home Transactions**

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# The German Land Transfer Tax: Evidence for Single-Family Home Transactions

## Abstract

This paper uses recent data for single-family home transactions to study the effects of the German land transfer tax. Our goal is to separate the short-term anticipatory effect from the long-term effect on real estate transactions. The data indicate that an increase in the transfer tax is negatively correlated with the number of transactions that take place on the market for single-family homes. We estimate that a one percentage point higher transfer tax goes along with massive anticipation effects as well about 6% fewer transactions in the long run.

JEL-Codes: H20, H71, R30

Keywords: Land transfer tax, housing markets, property taxation, anticipation effects

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## 1. Introduction

This paper uses a recent dataset of single-family home transactions to study the effects of the German land transfer tax. These new data provide a powerful method for assessing the effects of the land transfer tax by investigating tax increases in different German states for the period from 2005 to 2015. Our goal is to separate the short-term anticipatory effect from the long-term effect on real estate transactions. We do this by including dummy variables before and after the tax increase which capture when transactions are brought forward. By excluding this bunching around the tax increase from the sample, we are able to measure the long-term effects on transactions. In our analysis we focus on single-family home transactions as those are very unlikely to be subject to tax avoidance: These dwellings have a high rate of owner-occupation (see Table 7 in the appendix) and therefore mainly private transactions are included; commercial transactions could bias our results as commercial buyers are entitled to set the land transfer tax off against the tax liability.

Land transfer taxes can be considered as a form of transaction costs. This form of taxation is quite common in most countries. However, little is known about their impact on the real estate market. It is assumed that higher transaction costs discourage property sales and purchases which may lead to a less active market for immovable property (European Commission 2015, Deutscher Bundestag 2016). Furthermore, high land transfer taxes may decrease workers' mobility adding imperfections in the labor market and giving rise to potentially larger economic distortions (Andrews et al. 2011). The positive effects of a land transfer tax, namely less speculation on the market (see Catte et al. 2004), is empirically ambiguous (Aregger et al. 2013). The results of our study indicate that an increase in the transfer tax is negatively correlated with the number of transactions that take place on the market for single-family homes. We find significant evidence that transfer tax increases cause massive bunching of transactions just before an increase is in place and a close to equally large hole of transactions afterwards. On top of that, market activities drop by 6%.

We begin the paper with a short discussion of the existing literature on the topic. We next give a short overview over the institutional background in Germany and the data we are using. Afterwards, we present a theoretical framework which allows us to explain the effects of a tax increase. In the subsequent sections, we provide the detailed results of our study of the effects of the land transfer tax in Germany using conventional econometric methods and applying different robustness exercises. In the final section, we discuss possible effects for the tax revenue due to changes in the land transfer tax.

## 2. Literature Review

Despite its economic relevance, there is only a small body of literature that focuses on the effect of land transfer taxes on the functioning of the real estate market.<sup>1</sup>

One of the first studies dealing with the effects of an increase in the land transfer tax was conducted by Benjamin et al. (1993) for the case of Philadelphia. Philadelphia has been granted the exception to impose higher tax rates than other cities in Pennsylvania. Their sample consists of about 350 transactions between 1987 and 1989. The authors estimate a hedonic price model and find that sales prices of properties inside of Philadelphia decreased relative to properties outside the metropolitan area. Further, this drop in prices is much larger than the tax increase. In a more recent study, the impact of Toronto's imposition of a land transfer tax in early 2008 on the single-family homes market has been exploited by Dachis et al. (2012). The dataset consists of transactions in the greater Toronto area for 25 months before and 7 months after the imposition of the tax. While using a difference-in-differences regression discontinuity design (comparing house values within and outside the Toronto border before and after the imposition of the tax), they estimate that the 1.1% land transfer tax led to a 15% decline in transaction volumes. Further, the decline in sale prices was about equal to the imposed tax. Kopczuk and Munroe (2013) examine the effects on house prices of the 1% land transfer tax on residential transactions above the value of \$1 million in New York and New Jersey. They use administrative records of property sales between 1996 and 2011. The authors theoretically explore the bunching at the tax notch with an equilibrium bargaining model and conclude that market participants have the incentive to not pursue a transaction close to the threshold. Empirically, Kopczuk and Munroe (2013) apply a maximum likelihood approach and find evidence of significant bunching just below the price notch. Due to the land transfer tax, price reductions during the search process happen more often and there is a greater difference between the listing and the sales price. Quite similarly, Slemrod et al. (2016) analyze different policy reforms of the land transfer taxes in 2003 and 2006 in Washington D.C. The authors find that there was manipulative sorting around the price notch but not around the time notch. They also use a difference-and-differences empirical strategy to measure the lock-in effect of the land transfer tax away from the price and time notches. In their empirical setting, they find no evidence for this effect.

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<sup>1</sup> There are more studies regarding the effects of higher transactions costs (which may be due to higher land transfer taxes). For example, van Ommeren and van Leuvensteijn (2005) look at the effects of transaction costs on residential mobility in the Netherlands. However, it is useful to focus on one specific type of transaction cost as we do in here: When summarizing transaction costs empirical examination is hampered as the different costs are usually due at different points in time and the incidence lies upon different market participants. Further, the definition of transaction costs varies greatly among existing studies making a comparison of results much more complicated. In order to distinguish from this strand of the literature, we only discuss studies which directly measure the effects of a change in the land transfer tax in this section.

For the case of Europe, there only exist studies regarding the effects of the land transfer tax in the U.K. Best and Kleven (2013) take advantage of notches in the stamp duty system in the U.K. and study the impact of a tax holiday between 2008 and 2009 on residential transactions. Their data is obtained by the Land Registry office and the sample spans from 2004 to 2012. They show in a difference-in-difference approach that there is bunching just below the price notches and thus there exist distortions of the price, volume and timing of transactions. Additionally, they consider the role of down-payment constraints and show how leverage amplifies the effects of land transfer taxes. With regard to temporary policy changes, the authors report positive effects of the tax holiday as a fiscal stimulus. This unanticipated stamp duty tax holiday in the U.K. from 2008 to 2009 has also been exploited by Besley et al. (2014). The authors concentrate on its impact on house transactions between £125,000 and £175,000. They find a significant decrease in sales price and an increase in transactions. However, the latter effect reversed just after the land transfer tax has been reintroduced.

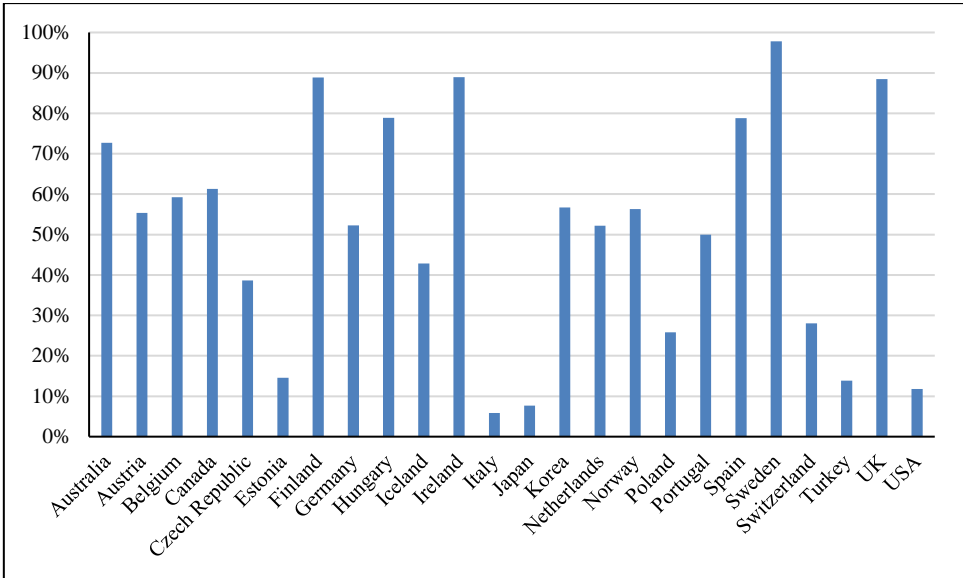
To our knowledge, there are no empirical studies on the effects of the land transfer taxes in Germany. This paper is most closely related to Dachis et al. (2012) as we are also concerned with the effects of a higher land transfer tax on the number of transactions in the market for single-family homes. Our analysis, however, is different from previous studies: The empirical research so far mainly focused on North American metropolitan areas. Due to a much higher transaction volume, it might be the case that implications out of these results cannot simply be applied to rural regions in continental Europe. Further, the dynamics of an increase in the land transfer tax might be different compared to the studied tax holiday in the U.K. by Best and Kleven (2013) and Besley et al. (2014). Additionally, land transfer tax systems vary greatly among countries (see section 3) and thus an adaptation of the results to the German real estate market might be limited. In contrast to other studies, our unique dataset also allows to explore different degrees of tax increases in a truly long-term study of real estate transactions.

### **3. Institutional Background**

In order to highlight the economic relevance of land transfer taxes and to provide supporting information for our empirical strategy, we now present some institutional background facts on land transfer taxes in Germany.

Land transfer taxes are commonplace and an important source of government revenues in many OECD countries (Andrews et al. 2011).<sup>2</sup> Tax rates show a significant variation across different countries; Belgium, for example, imposes with 10% one of the highest tax rates on real estate transactions in Europe (although some forms of exceptions apply) (European Commission 2015). In some countries, progressive rate structures are common such as in the U.K. and in Portugal. However, it has to be stated that almost half of the member states in the EU have land transfer tax rates below 5%. Germany fits right in the middle with a median rate of currently about 5%. The share of land transfer taxes on transactions costs<sup>3</sup> varies consequently greatly among countries (see Figure 1). With regard to Germany, the land transfer tax amounted in 2011 to about 52% of the average transaction cost.<sup>4</sup>

FIGURE 1. AVERAGE SHARE OF LAND TRANSFER TAXES ON TRANSACTIONS COSTS OF PROPERTY TRANSACTIONS IN OECD COUNTRIES, 2011



Notes: The figure shows the average share of land transfer taxes on total transaction costs of property transactions in OECD countries in 2011 where data has been available. Transaction costs include notary and legal fees, real estate agent fees and land transfer taxes. Data: Andrews et al. (2011).

Generally, everything that needs to be spent in order to purchase a property is subject to the land transfer tax in Germany including the purchase price, encumbrances on the property, usage right, abatement costs and broker fees. The term ‘property’ also includes fractional shares of the property, land rights (such as leaseholds) and condominiums. Next to the land itself, everything that is an inherent part of the

<sup>2</sup> In 2012, the tax revenue from land transfer taxes was equivalent to 0.8% of GDP in the European Union (European Commission 2015).

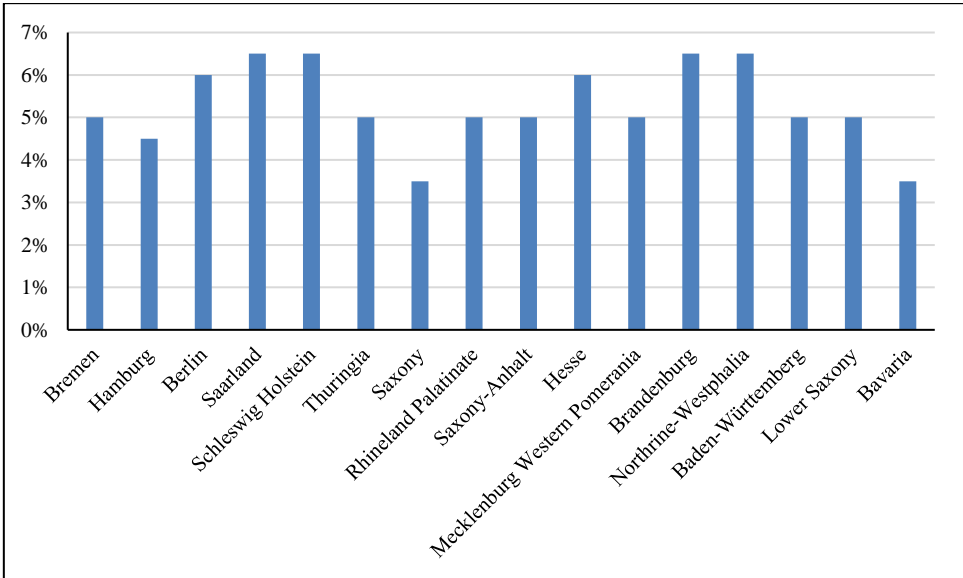
<sup>3</sup> Following Andrews et al. (2011), transactions costs include notary and legal fees, real estate agent fees and land transfer taxes.

<sup>4</sup> For more details on transaction costs in Germany, see Figure 10 and the respective explanations in the appendix.

property is taxable, i.e. also a house built on the land. Transactions up to the value of € 2,500, inheritances and transfers within families are exempted from the tax. After the sales contract is concluded, the respective tax office of the district where the transaction took place sends the tax assessment notice to the buyer. After the tax has been paid, the attesting notary requests the registration in the land register and sends a copy of each sales contract to the relevant Property Valuation Committee.

The German land transfer tax system went through some major changes in history: In 1983, a standardization of the tax rate took place where the tax rate has been set to 2% for all German states which constitute the second layer of government beneath the federal level. This rate was raised to 3.5% in 1997. Since 01.09.2006, the German states can set their tax rates individually and almost all states with the exception of Bavaria and Saxony have increased their rates since then. Usually, the increased taxation is justified with the consolidation of budgets due to high public debt and the ‘debt brake’ anchored in Germany’s Basic Law which will be effective as of 2020 (RWI 2012, IW Köln 2015). Furthermore, the tax changes usually come into effect by January – presumable for practical reasons and not because real estate transactions are especially high in this month.<sup>5</sup> Therefore, it can be assumed, that a change in the tax rate is independent of the number of real estate transactions. None of the German states decreased the tax rate up until today. Today, it ranges between 3.5% and 6.5% (see Figure 2).

FIGURE 2. TAX RATE OF THE LAND TRANSFER TAX IN GERMAN STATES AS OF JANUARY 2016



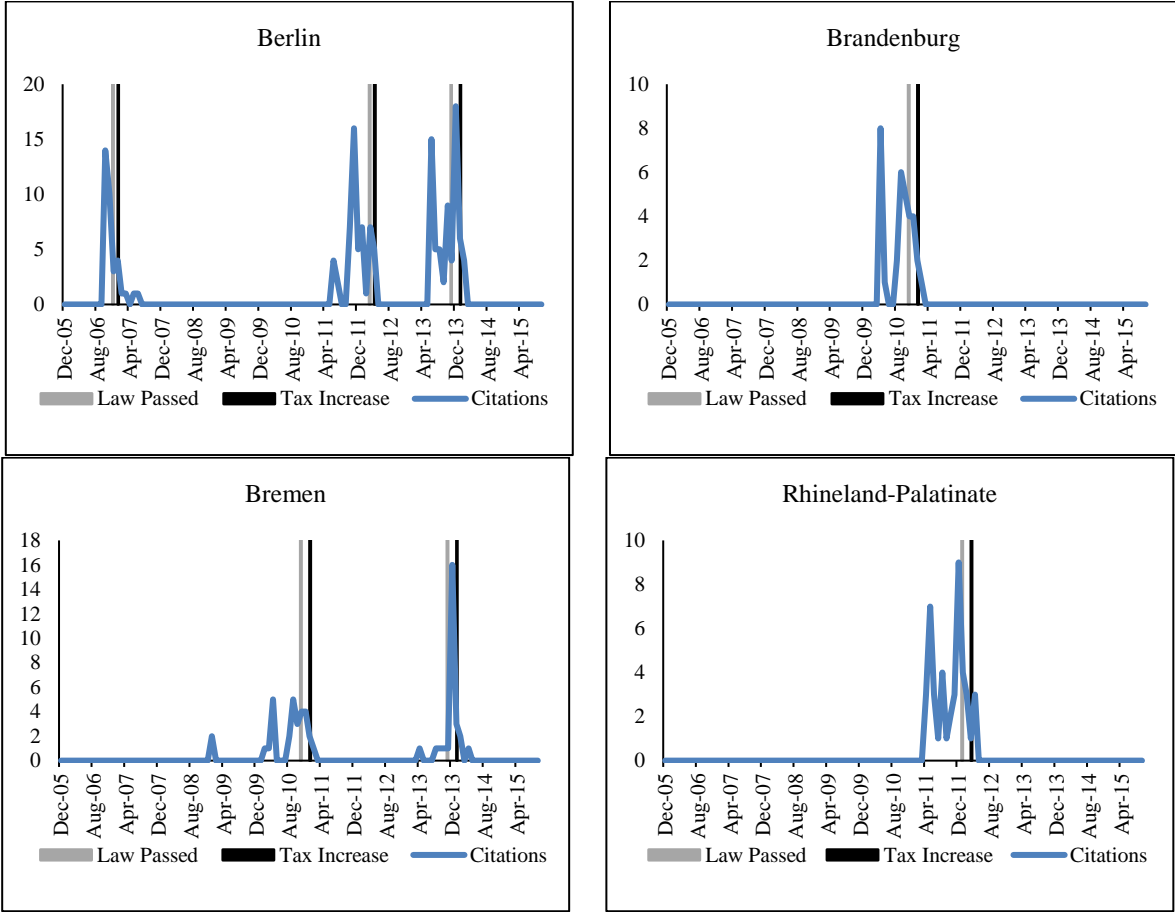
Notes: The figure shows the tax rate of the land transfer tax for all German States as of January 2016. Apart from Bavaria and Saxony, all German states increased the land transfer tax since 2007.

<sup>5</sup> In fact, our analysis shows that the number of transactions of single-family homes is especially low in January (see section 4).

Even though the tax rate does not seem to be very high, it causes a relatively high tax amount to be paid due to the substantial taxable base (i.e. the property). Therefore, even small changes in the tax rate may cause buyers to bring forward a planned transaction in order to still profit from a lower tax rate. Figure 12 in the appendix shows the average land transfer tax paid per transaction and its share on the average annual disposable income per capita in 2012 for each German state.

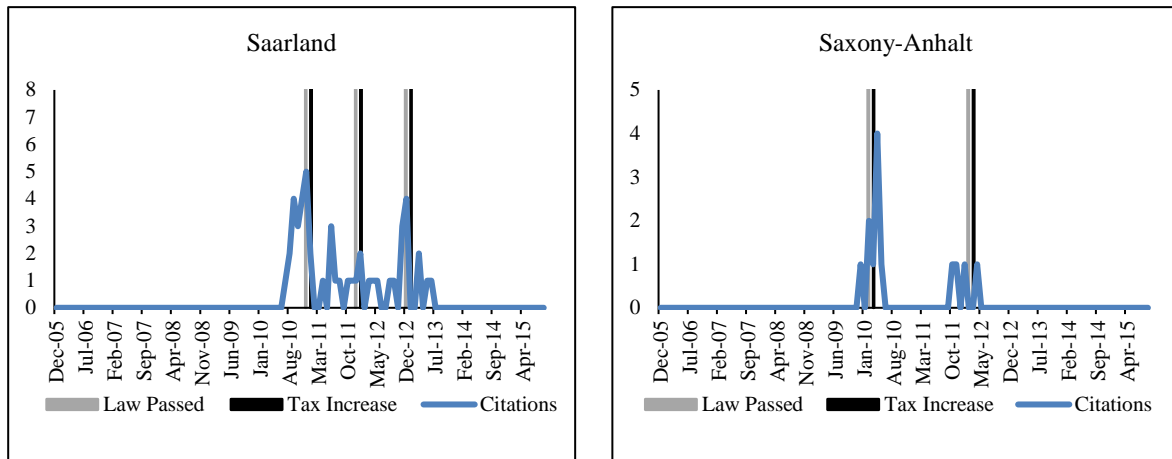
The tax changes are usually announced several months in advance as they need to be passed by the respective state parliament. Figure 3 charts the media coverage on the topic and the respective tax increases. According to the data, it can be assumed that the timing of the tax changes in most cases is largely anticipated.<sup>6</sup> In the next, section, we illustrate a theoretical framework in order to investigate this anticipation effect.

FIGURE 3. MEDIA CITATIONS OF LAND TRANSFER TAX INCREASES IN DIFFERENT GERMAN STATES



<sup>6</sup> The only exceptions here seem to be Saarland and Saxony-Anhalt where media coverage has been relatively low. In Saarland, a stepwise increase of the land transfer tax on a yearly basis has been announced in 2009 which might explain this issue.





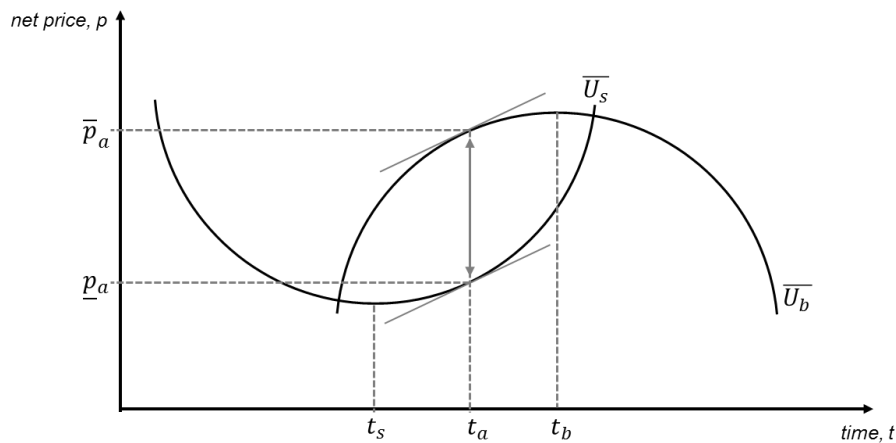
Notes: The figure gives the media citations of ‘*Grunderwerbsteuer Erhöhung*’ (‘Land Transfer Tax increase’) plus the respective state name. Media coverage has been especially profound at the end of a legal year as many newspapers present special issues with major tax changes in the upcoming year. If there have been simultaneous tax increase in different states, media coverage has generally been higher, too. Further, media speculation on further tax increases can be especially observed after elections. Media citations from The Financial Times, Frankfurter Allgemeine Zeitung, Frankfurter Allgemeine Sonntagszeitung, Handelsblatt, Die Welt, Die Welt am Sonntag, Die Zeit, Süddeutsche, Spiegel Online, Wirtschaftswoche, Focus, Focus-Money, Immobilien Zeitung, Immobilienwirtschaft, dapd Nachrichtenagentur, news aktuell, vdi Nachrichten, Börse Online, Euro am Sonntag, die tageszeitung, Der Tagesspiegel, Berliner Morgenpost, Berliner Zeitung, Berliner Kurier, Frankfurter Rundschau, Westfalen-Blatt, Rhein-Zeitung, General-Anzeiger, Sonntag Aktuell, Münchner Abendzeitung, Stuttgarter Zeitung, Stuttgarter Nachrichten, Kölner Stadtanzeiger, Kölnische Rundschau, Nürnberger Nachrichten, Saarbrücker Zeitung, Meininger Tageblatt, Aachener Nachrichten, Märkische Allgemeine, Schweriner Volkszeitung, Mitteldeutsche Zeitung, Potsdamer Neuste Nachrichten, Leipziger Volkszeitung, Lampertheimer Zeitung, Darmstädter Echo. Data: <http://www.genios.de>.

#### 4. Conceptual Framework

In this section we refer to the theoretical framework proposed by Slemrod et al. (2016) in order to distinguish between different economic effects of an increase in the land transfer tax. Slemrod et al. (2016) deal with both a price and a time discontinuity for when taxes are introduced. Since there is no price notch in Germany, we limit our analysis to the time notch (see Slemrod et al. (2016), pp. 14 ff.).

Potential buyers and sellers on the housing market are matched exogenously. Both the buyer’s and the seller’s valuation of the house is determined by exogenous outside options. Both parties have preferences regarding the transaction date. Moving the transaction away from the preferred sale or buy date reduces the utility of either party according to convex cost functions. Thus, utility is a combination of the transaction price and the transaction date, where the preferred transaction date yields the highest utility for a given price. Figure 4 depicts the price/date combinations (indifference curves) for both the seller and the buyer, which yield the lowest acceptable utility levels in a scenario without land transfer taxes. The seller would gain a higher utility from higher prices at a given transaction date. Thus, higher indifference curves represent higher utility levels for the seller, whereas lower indifference curves represent higher utility levels for the buyer.

FIGURE 4: BARGAINING SOLUTION IN A SCENARIO WITHOUT TAXES

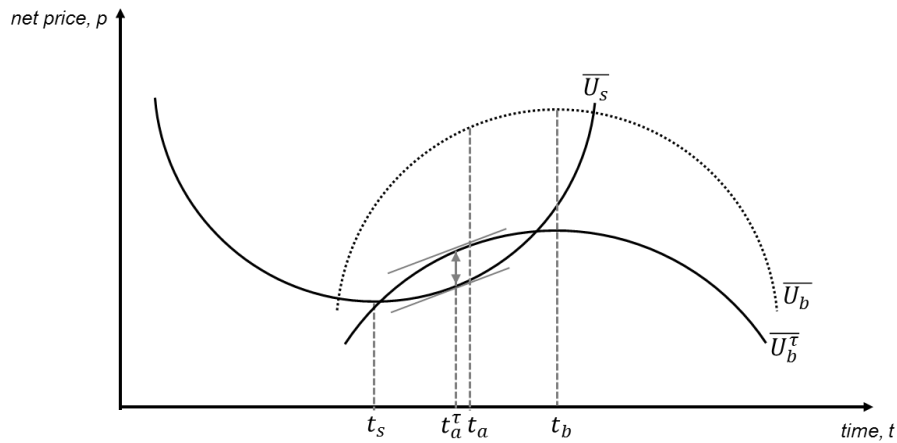


*Notes:* The figure depicts the bargaining solution of a matched pair of buyer and seller.  $t_s$  ( $t_b$ ) is the seller's (buyer's) preferred transaction date. The indifference curves,  $\overline{U}_s$  and  $\overline{U}_b$ , show the seller's reservation price and the buyer's willingness to pay as functions of the transaction date. The arrow marks the highest possible bargaining surplus and thus the actual transaction date.  $\underline{p}_a$  and  $\overline{p}_a$  represent the lower and upper boundaries for the transaction price.

Buyer and seller engage in a Nash bargaining situation well in advance of the actual transaction. The transaction date is uniquely defined by the Pareto-optimality condition. In the interior solution the indifference curves are tangent, thus maximizing the bargaining surplus. Subsequently, the price is determined according to the individual bargaining power of either party.

Figure 5 illustrates a scenario with land transfer taxes. The dotted line marks the highest prices for each transaction date that the buyer is willing to pay. With a tax in place, his net willingness to pay drops by the amount of the tax liability. The tax is assessed on the basis of the sales price. Thus, with a lower price, the buyer not only profits from paying less to the seller but also from having to pay fewer taxes. To a certain extent, he profits more from a lower price than the seller suffers. In the bargaining solution, the party will pick a lower transaction price, while compensating the seller by moving the transaction date slightly towards his preference. The same argumentation holds for postponing the transaction if the buyer prefers to transact earlier than the seller.

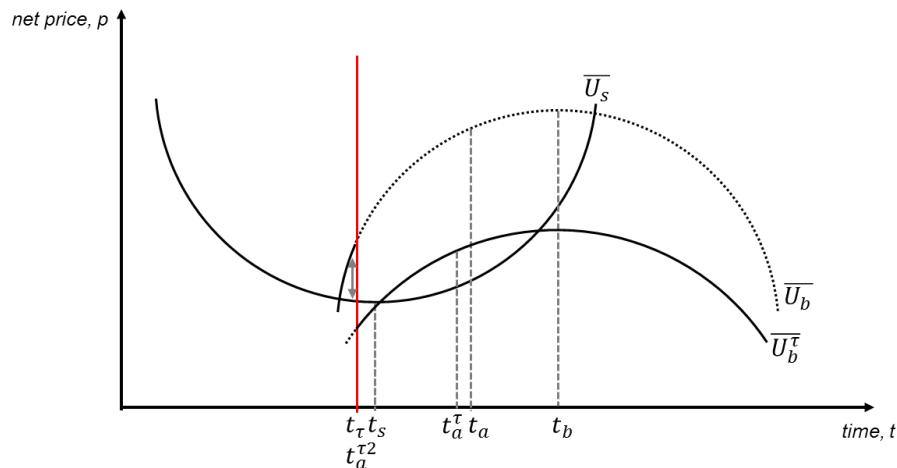
FIGURE 5: TRANSACTION WITH TAXES



Notes: The figure shows the bargaining solution in a scenario with land transfer taxes. With the same gross willingness to pay, the buyer's net willingness to pay drops from  $\overline{U}_b$  (dotted line) to  $\overline{U}_b^\tau$  (solid line), since the buyer has to pay the tax. The new indifference curve is also flatter because the tax amount depends on the assessment basis. The actual transaction date is slightly shifted towards the seller's preference.

Up until now, we have compared the scenario without transfer taxes to one where taxes are already in place. In the following, we consider the introduction of a transfer tax close to the preferred transaction dates (see Figure 6). If the time period between the introduction of the tax and the transaction date in the scenario without a time notch is sufficiently short, the transaction will be put forward. This leads to the bunching of transactions just before the tax introduction as well as a hole in transaction numbers for some time after the notch.

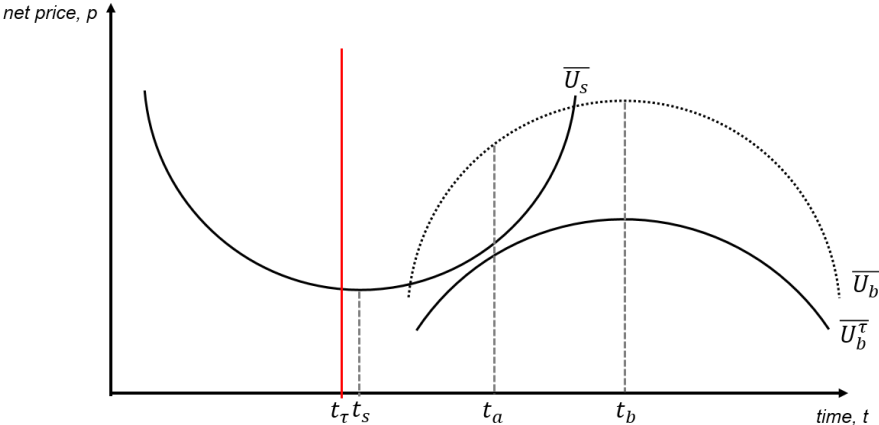
FIGURE 6: TRANSACTION WITH TAX INTRODUCTION – ANTICIPATION EFFECT



Notes: The land transfer tax is increased in  $t_\tau$ . Here, the buyer's indifference curve shows a discontinuity. Since he has to pay a higher price after the tax introduction, his net willingness to pay drops at that date.  $t_a^{\tau 2}$  marks the last possible date to transact without transfer taxes. In the depicted scenario, the time period between  $t_a^{\tau 2}$  and  $t_a^\tau$  is sufficiently short so that the bargaining surplus is maximized in  $t_a^{\tau 2}$  and the transaction takes place here.

A second effect is that transactions might not take place at all due to transfer taxes. This is the case if the bargaining surplus in a situation without taxes is smaller than the tax liability at all times. The reasons for this is either that the price spread in the willingness to pay and the reservation price is fairly small or the transaction date preferences are wide apart (see Figure 7) or a combination of the two. If this is the case, a transfer tax could lead to a negative maximal bargaining surplus. Thus, not transacting at all yields the highest utility for both parties.

FIGURE 7: TRANSACTION WITH TAXES – LONG-TERM EFFECT



Notes: The figure depicts a scenario where no transaction takes place due to the land transfer tax. The buyer's willingness to pay does not exceed the seller's reservation price at any given time. Thus, no surplus can be generated by transacting.

For an announced and not yet implemented land transfer tax increase, we expect temporal substitutions. In order to maximize the bargaining surplus, bringing transactions forward is profitable if the saved tax amount compensates the utility loss from the time deviation. All the transactions that would have taken place sufficiently close after the tax increase get pulled to a transaction date marginally before the tax increase.

**Hypothesis 1:** More transactions take place just before the tax increase (Bunching).

On the other hand, those transactions which are brought forward do not take place after the implementation of the higher land transfer tax.

**Hypothesis 2:** Less transactions take place right after the tax increase (Lag).

With land transfer taxes in place, the sale of a property yields less utility as lower prices can be obtained. At the same time, buying a property also yields less utility as higher prices need to be paid. Therefore, the number of transactions might drop after the tax increase.

**Hypothesis 3:** The higher the land transfer tax, the less transactions take place (Liquidity).

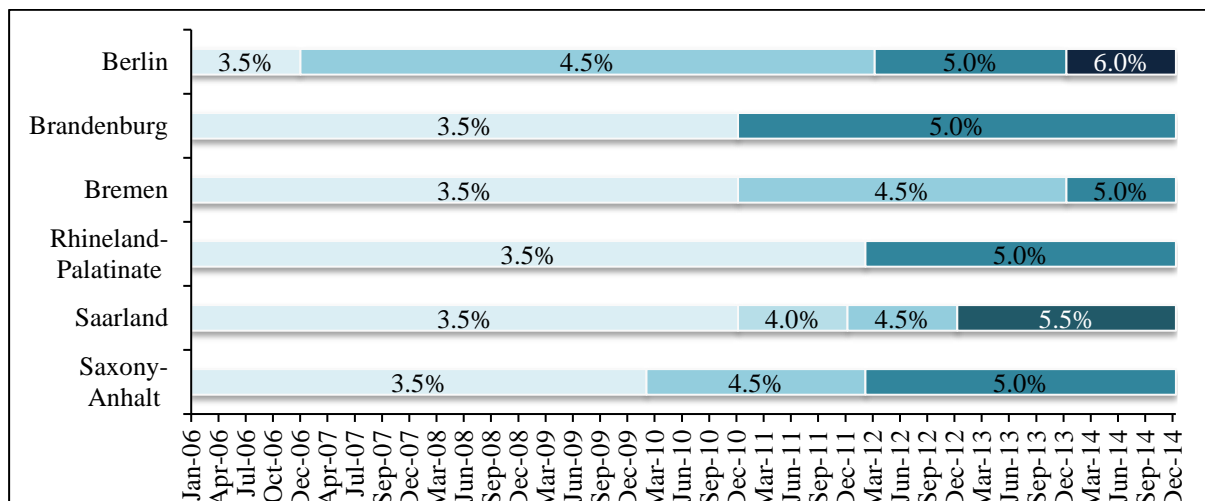
## 5. Data

In this section, we investigate the conceptual framework we presented above empirically. Unfortunately, figures on real estate transactions in Germany are rare. However, we can rely on a unique dataset provided by the Property Valuation Committees of Berlin, Brandenburg, Bremen, Rhineland-Palatinate, Saarland and Saxony-Anhalt. Our data only contains transactions of single-family homes. First, these dwellings have a high rate of owner-occupation and are used for private housing; therefore mainly private transactions are included in our sample. Commercial transactions could bias our results as commercial buyers are entitled to set the land transfer tax off against the tax liability. Furthermore, it can be assumed that single-family homes are less affected by real estate speculations: Speculators typically eye on inner-city dwellings whereas single-family homes are usually found in the periphery or in more rural areas. The data covers the number of single-family home transactions since the year 2005 on a monthly basis for each German state respectively. Our sample spans the period from January 2005 to December 2014 for almost all states which allows us to include all tax increases during that time frame.<sup>7</sup> We included two years prior to the actual possibility to change the tax rate. By looking at transactions where no tax increases took place we are able to control for seasonal and common factors that are likely to affect transactions on a range of relatively similar property. Figure 8 gives an overview of the effective dates of each increase. While Berlin, Bremen, Saarland and Saxony-Anhalt increased the land transfer tax stepwise, Brandenburg and Rhineland-Palatinate had only one but a substantial augmentation in the level of the land transfer tax from 2006 to 2014.

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<sup>7</sup> The only exception is Saarland where only data between 2010 and 2013 was available and therefore the latest land transfer tax increase is not included.

FIGURE 8: LEVEL OF THE LAND TRANSFER TAX IN DIFFERENT GERMAN STATES FROM 2006 TO 2014



Notes: The figure gives the levels of the land transfer tax in different Germany states from January 2006 to December 2014. Changes in the tax usually took place at the beginning of a month; only the first increase in Saxony-Anhalt took place at the 2<sup>nd</sup> of March in 2010. Data: Property Valuation Committee of Berlin, Brandenburg, Bremen, Rhineland-Palatinate, Saarland and Saxony-Anhalt (2015).

The sample is restricted to observations which are considered as ‘suitable’ by the Property Valuation Committees, i. e. if the sale price and the property size lie within specific thresholds.<sup>8</sup> As a result, the impact of outliers is minimized. Overall, 12 tax increases are covered by the sample. Altogether, these restrictions give us a sample size of 655 observations which are summarized in Table 1. In addition to data on the level of the land transfer tax, we aggregate economic and fiscal controls which may drive the number of transactions of single-family homes. The dataset comprises also information on the introduction or abolishment of public funding instruments on the housing market (see Table 9 in the Appendix).

<sup>8</sup> For example, in Rhineland-Palatinate, the sale price of the property has to lie between € 40,000 and € 2,000,000 and the property size needs to be greater than 300 m<sup>2</sup> but less than 2,000 m<sup>2</sup>.

TABLE 1. DESCRIPTIVES

<i>Variable</i>	<i>Time Frame</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>	<i>Obs.</i>
<i>Number of transactions per month<sup>a</sup></i>	01/2005-08/2015	317	185	20	1,157	665
<i>... in Berlin</i>	01/2005-08/2015	253	56	84	417	126
<i>... in Brandenburg</i>	01/2005-12/2014	480	112	168	1,128	120
<i>... in Bremen</i>	01/2005-12/2014	98	33	20	214	120
<i>... in Rhineland-Palatinate</i>	01/2005-03/2015	545	157	120	1,157	123
<i>... in Saarland</i>	01/2010-12/2013	210	48	99	329	48
<i>... in Saxony-Anhalt</i>	01/2005-06/2015	253	56	84	417	126
<i>Level of Land Transfer Tax</i>	01/2005-08/2015	4.17	0.74	3.50	6.00	665
<i>Level of Tax Increase</i>	01/2007-01/2014	0.875	0.361	0.5	1.5	12

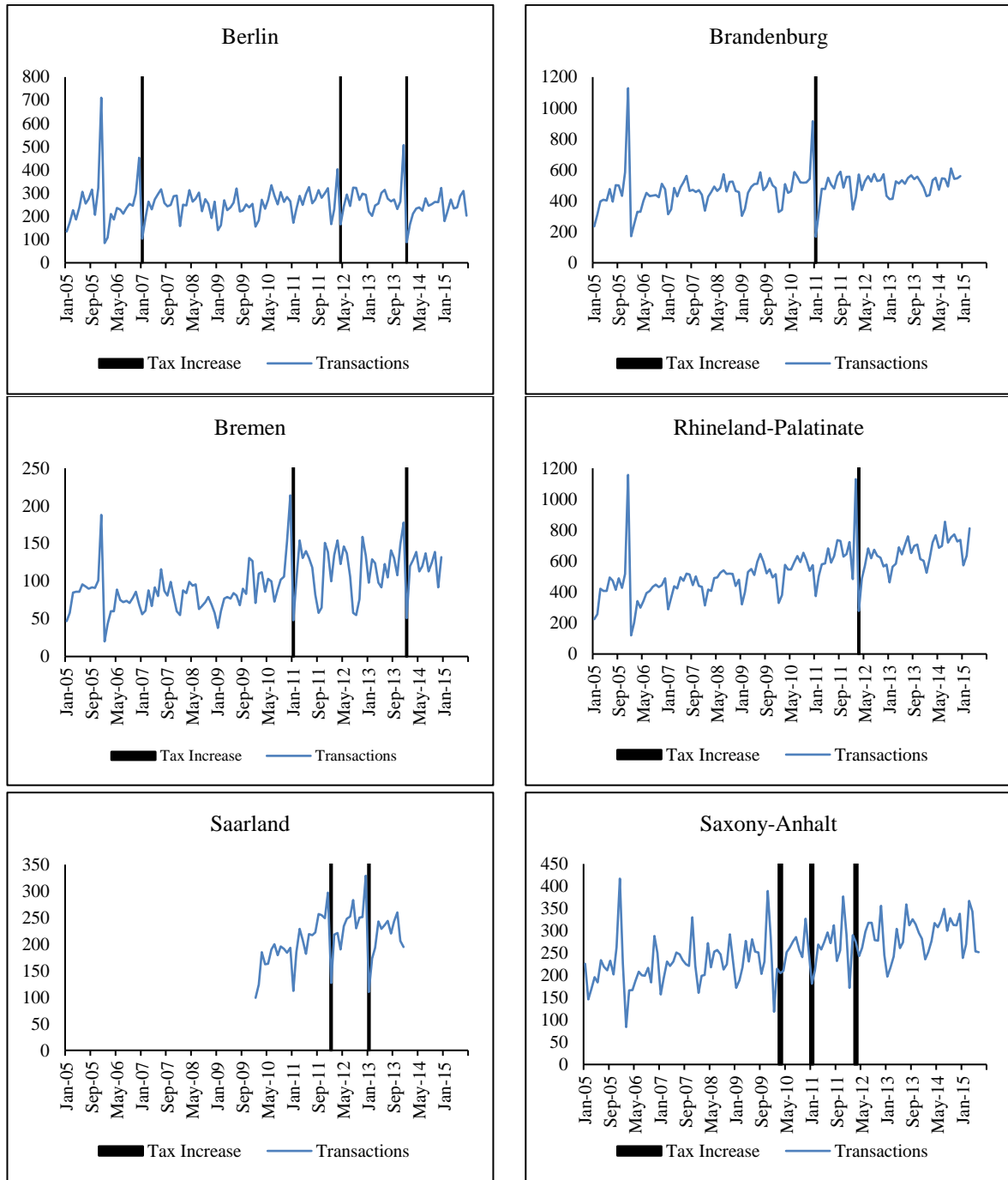
*Notes:* The table gives the descriptives of the data set. a) Data for Berlin, Rhineland-Palatinate and Saxony-Anhalt covers the whole time frame from 2005 to 2015. For Brandenburg and Bremen, only data until December 2014 is available. For the case of Saarland, transactions from January 2010 to December 2013 are included. The data provided by Rhineland-Palatinate does not cover transactions in the cities of Kaiserslautern, Koblenz, Ludwigshafen am Rhein, Mainz, Trier and Worms.

Some interesting features emerge from the descriptive statistics: The number of transactions per month varies greatly among states reflecting that we included both rural and urban (i. e. the city states) areas in Germany. We have months with as little as 20 observations but at the same time months with the number of transactions surpassing 1,000. The level of the land transfer tax is equally distributed in the sample with an average of about 4.2%.

Figure 9 plots the number of transactions per month for each German state included over time. It suggests that some transactions have been brought forward just before the tax increases. There clearly seems to be a bunching around the date of the tax increase. Apart from bunching at the tax increase notches, we notice bunching on an even bigger scale at the end of 2005. This observation can be explained with the abolishment of a large public funding instrument, the ‘*Eigenheimzulage*’.<sup>9</sup>

<sup>9</sup> The funding instrument ‘*Eigenheimzulage*’ was one of the largest public funding instrument in Germany. It has been introduced in 1996 in order to support the acquisition of owner-occupied residential property for low-income households (Heitel et al. 2011). The financial burden for the federal budget associated with the ‘*Eigenheimzulage*’ was relatively high while the number of completions of new homes was not as high as expected (Dorffmeister et al. 2011). As a result, the federal government considered abolishing the funding instrument which led to massive anticipation effects for three years until the ‘*Eigenheimzulage*’ has been abolished in January in 2006 for good (Dorffmeister et al. 2011).

FIGURE 9. NUMBER OF TRANSACTIONS OF SINGLE-FAMILY HOMES IN DIFFERENT GERMAN STATES



Notes: The figure gives the number of transactions for each German state included in the sample over time. Data: Property Valuation Committees in Berlin, Brandenburg, Bremen, Rhineland-Palatinate, Saarland and Saxony-Anhalt.

Compared to the bunching effects around the tax increases, a decrease in the overall real estate market activity is less obvious in Figure 9. A comparison of transactions in states with tax increases with those without shows that in states where there has been a change in the tax rate, the transactions per capita were lower than in states without a tax increase (see Figure 13 in the appendix). However, this may be due to other factors like a change in the overall market activity or regional specifics in the respective



states. Therefore, a formal econometric analysis is needed in order to isolate this bunching of the tax change as well as to control for macroeconomic conditions and regional developments.

## 6. Estimating the effects of a tax increase

### 2.1 Empirical Strategy

As we showed in Section 3, all German states start off with the same land transfer tax levels at the beginning of our observed time frame. State governments are authorized to set the tax level for their state individually. Whenever a state alternates its tax level, the remaining states function as control groups. In our sample, different states have raised their taxes levels by different amounts and at different times. Since state governments justify tax changes with household consolidation, we can assume the changes to not be linked to the number of transactions of single-family homes (see Section 3). However, an interdependency between states might be possible: When one state increases transfer taxes, households might choose to not move in this state but to migrate to another one. We are not able to control for this particular rise of transactions in that other state. However, there are but a few urban areas of different states which are sufficiently close to be considered geographical substitutes for migration decisions.<sup>10</sup> On top of that, state specific characteristics (administrative divisions, educational systems, availability of nurseries or public social expenditures) can be assumed to be more crucial for migration decisions than transfer taxes.<sup>11</sup>

Altogether, we are provided with a setting suitable to identify the causal effects of land transfer taxes on the number of transactions.

Our regression design is a two-way least squares dummy variable estimation. The fixed-effects panel regression is important to control for state-specific characteristics in our panel. We control for time-variant specifics affecting all states by including a date dummy for every month in our sample. The baseline estimation takes the following form:

$$T_{i,t} = \alpha_i + \beta R_{i,t} + \sum_{h=1}^2 \gamma_h \text{before}_{h,i,t} + \sum_{j=1}^2 \delta_j \text{after}_{j,i,t} \\ + \sum_{k=1}^2 \eta_k (\text{before}_{k,i,t} * \text{raiselevel}_{k,i,t}) + \sum_{l=1}^2 \theta_l (\text{after}_{l,i,t} * \text{raiselevel}_{l,i,t})$$

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<sup>10</sup> This issue might be particularly relevant for so-called twin metropolitan areas like Mannheim and Ludwigshafen am Rhein, Ulm and Neu-Ulm and Mainz and Wiesbaden. Those cities are not included in our sample.

<sup>11</sup> However, we do conduct a robustness check, where we omit observations which might be influenced by border effects (see Section 7.3).

$$+ \sum_{m=1}^{128} \lambda_m date_{m,t} + controls_{i,t} + \varepsilon_{i,t}.$$

$T_{i,t}$  denotes the log number of transactions in state  $i$  at time  $t$  as the dependent variable. On the right-hand side, we include the level of the land transfer tax,  $R_{i,t}$ . Furthermore, we add dummy variables for  $h$  months before the respective tax changes,  $before_{h,i,t}$ , and for  $j$  months after the tax changes,  $after_{j,i,t}$ . We then interact these dummies with the level of the corresponding tax increase in percentage points. This way, we can test whether the anticipation effect depends on the extent of increase. In order to control for any effects affecting all states at the same time, we include  $m$  dummy variables,  $date_{m,t}$  for each month of our panel. In another specification, we substitute the date dummies with dummies for the twelve months of the year to control for seasonal effects and dummies for each year to control for the time trend. The equation comprises group-specific constants  $\alpha_i$  and the error term  $\varepsilon_{i,t}$ . To allow heteroscedasticity, we employ Huber-White sandwich standard errors (see Huber 1967, White 1980).

In order to control for changes in other transaction costs, we include dummy variables for the change in notary fees in our baseline model (see Figure 10 and the respective explanations in the appendix). In order to capture possible bunching for this change as well as the drop in transaction numbers, we use two dummies: July and August 2013.

We do the same for the implementation or abolishment of public funding instruments on the housing market (see Figure 9 in the appendix).<sup>12</sup> We thereby only control for the bunching effects of further public funding instruments, not the level of funding. However, those instruments mostly comprise loans, which should have a rather small impact on housing decisions in times of low interest rates. The ‘*Eigenheimrente*’ and particularly the ‘*Eigenheimzulage*’ presumably have a higher influence on the number of transactions. However, as they apply for all states at the same time, they have no effect on the regressions including date dummies.

## 2.2 Results

Table 2 lists the results of the fixed effects panel regression. As a main result, we find a significant negative correlation of the number of single-family home transactions and the level of the land transfer tax in all specifications. A one percentage point higher land transfer tax comes with about 6% fewer transactions in the long run. On top of the long-run effects, we observe massive anticipation effects for the months just before and just after a tax is about to be raised.

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<sup>12</sup> Since the effects for the ‘*Eigenheimzulage*’ are quite large (see Figure 9), we use three months prior and after its abolishment.

The first regression (1) suggests that the anticipation effect depends on the level of the tax increase. Aggregating the coefficients of the interaction terms with the plain anticipation coefficients, we get about 40% more transactions just before the tax notch for a one percentage point tax raise. Consistently, the results aggregate to a drop of 45% fewer transactions right after an increase. We observe the same result in the second specification (2) where we omit the interaction terms. The coefficient levels are consistent considering that the average tax increase is 0.875 and thus close to one. The pure anticipation dummies should be slightly higher compared to the sum of anticipation effects of the first regression.

In specification (3) we use monthly and yearly dummies instead of date dummies. Compared to the first results, the coefficients seem quite robust, although the significance levels change. Column (4) omits all anticipation effects and thus overestimates the effect of the transfer tax level. This result stems from the fact that for each state, the time frame with the lowest transfer tax includes bunching of transactions due to a raise but no hole of transactions. Additionally, the time frame with the highest transfer tax for each state includes a hole of transactions after a tax raise without including possible bunching for future tax increases. We measure 12.5% fewer transactions for a one percentage point higher transfer tax. Controlling for the bunching effects, however, 6% fewer transactions remain as a long-run effect.

TABLE 2. BASELINE RESULTS

Specification	Dependent Variable: Log Number of Single-Family Home Transactions			
	(1)	(2)	(3)	(4)
<i>Land Transfer Tax</i>	-0.0552*	-0.0647*	-0.0637**	-0.1248***
	(0.0228)	(0.0258)	(0.0193)	(0.0286)
<i>Months Before the Tax Change</i>				
2	-0.0391	-0.0161	-0.0089	
	(0.2111)	(0.0712)	(0.1480)	
1	0.1020	0.4115***	0.1164	
	(0.1696)	(0.0830)	(0.1239)	
<i>Months After the Tax Change</i>				
1	-0.1855	-0.4597***	-0.1444	
	(0.1163)	(0.0740)	(0.1934)	
2	0.2054	-0.0420	0.2383	
	(0.2619)	(0.0547)	(0.2436)	
<i>Level of Tax Increase * Months Before Tax Change</i>				
2	0.0295		0.0385	
	(0.1741)		(0.0914)	
1	0.3267*		0.3325**	
	(0.1355)		(0.0988)	
<i>Level of Tax Increase * Months After Tax Change</i>				
1	-0.2839*		-0.2827	
	(0.0945)		(0.1538)	
2	-0.2466		-0.2612	
	(0.2206)		(0.1879)	
<i>Constant</i>	5.1789***	5.2120***	5.2376***	5.4212***
	(0.1655)	(0.1699)	(0.0556)	(0.1369)
<i>Controls</i>	YES	YES	YES	YES
<i>Date</i>	YES	YES	NO	YES
<i>Years</i>	NO	NO	YES	NO
<i>Months</i>	NO	NO	YES	NO
<i>Obs.</i>	665	665	665	665
<i>Adj. R-squared</i>	0.7606	0.6179	0.7004	0.7673

*Notes:* Dependent variable: Log number of single-family home transactions. Significance levels (robust standard errors in brackets): \*\*\* 0.01, \*\* 0.05, \* 0.10. Column (1) shows the results for the specification of the equation in section 2.1. The regression of column (2) leaves out the interaction terms. In column (3) we replace the date dummies with seasonal and year dummies. Column (4) shows the result of the regression without controlling for the anticipation effects around the increase notches.

## 7. Robustness Checks

For robustness exercises, we apply a number of different specifications to our model.

### 7.1 Different Lengths of Anticipation

In the baseline setting, we generated dummy variables for the two months before and after tax increases. However, transactions might be put forward over even longer time periods. Table 3 shows the regression results for different amounts of anticipation dummies.

In the first column of each specification we use only one month before and after a tax raise. Transactions that get shifted in time outside of those two months are now calculated into the time frame before the tax raise. Thus, lower taxes are associated with more transactions. A hole of transactions after a tax increase stretching out farther than one month is calculated into the time period of a higher tax. Both effects lead to an overestimation of the long-term effect of transfer taxes on transactions. Using more dummy variables reduces the coefficient. However, the difference in coefficients for using one and two dummies is larger than for the setting with two and three month dummies. As expected, less transactions are brought forward when the transaction date absent the tax raise would have been further away from the time notch.

The specification with two month dummies before and two month dummies after the time notch is the one we have most trust in. Using even more dummies shows us that there still is slight overestimation of the long-term effect. However, when we stretch the anticipation period, we trim the time frame with which we estimate the long-term effect and thus increase uncertainty.

TABLE 3: RESULTS FOR DIFFERENT LENGTHS OF ANTICIPATION

		<i>Dependent Variable: Log Number of Single-Family Home Transactions</i>								
		(1)			(2)			(3)		
<i>#month dummies</i>		1	2	3	1	2	3	1	2	3
<i>Land Transfer Tax</i>		-0.0606** (0.0229)	-0.0552* (0.0228)	-0.0521* (0.0252)	-0.0663** (0.0253)	-0.0647* (0.0258)	-0.0654* (0.0279)	-0.0711** (0.0216)	-0.0637** (0.0193)	-0.0618** (0.0205)
<i>Months Before the Tax Change</i>										
	3			-0.1811 (0.1106)			0.0007 (0.0731)			-0.1174 (0.0732)
	2		-0.0391 (0.2111)	-0.0418 (0.2197)		-0.0161 (0.0712)	-0.0163 (0.0717)		-0.0089 (0.1480)	-0.0092 (0.1493)
	1	0.1014 (0.1548)	0.1020 (0.1696)	0.1015 (0.1740)	0.4134*** (0.0788)	0.4115*** (0.0830)	0.4115*** (0.0808)	0.1135 (0.1169)	0.1164 (0.1239)	0.1184 (0.1238)
<i>Months After the Tax Change</i>										
	1	-0.1634 (0.1155)	-0.1855 (0.1163)	-0.1877 (0.1184)	-0.4567*** (0.0715)	-0.4597*** (0.0740)	-0.4589*** (0.0742)	-0.1500 (0.1894)	-0.1444 (0.1934)	-0.1452 (0.1957)
	2		0.2054 (0.2619)	0.2056 (0.2723)		-0.0420 (0.0547)	-0.0411 (0.0550)		0.2383 (0.2436)	0.2397 (0.2480)
	3			0.0793 (0.1406)			0.0105 (0.0282)			0.0612 (0.1051)
<i>Level of Tax Increase * Months Before Tax Change</i>										
	3			0.1984 (0.1094)						0.1504* (0.0647)
	2		0.0295 (0.1741)	0.0301 (0.1762)					0.0385 (0.0914)	0.0400 (0.0926)
	1	0.3272* (0.1321)	0.3267* (0.1355)	0.3290* (0.1376)				0.3323** (0.0959)	0.3325** (0.0988)	0.3340** (0.1005)
<i>Level of Tax Increase * Months After Tax Change</i>										
	1	-0.2985** (0.1040)	-0.2839** (0.0945)	-0.2854** (0.0920)				-0.2753 (0.1504)	-0.2827 (0.1538)	-0.2824 (0.1539)
	2		-0.2466 (0.2206)	-0.2484 (0.2293)					-0.2612 (0.1879)	-0.2626 (0.1898)
	3			-0.0806 (0.1344)						-0.0432 (0.0748)
<i>Constant</i>		5.1977*** (0.1455)	5.1789*** (0.1655)	5.1680*** (0.1712)	5.2176*** (0.1507)	5.2120*** (0.1699)	5.2144*** (0.1741)	5.2649*** (0.0641)	5.2376*** (0.0556)	5.2326*** (0.0633)
<i>Controls</i>		YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>Date</i>		YES	YES	YES	YES	YES	YES	NO	NO	NO
<i>Years</i>		NO	NO	NO	NO	NO	NO	YES	YES	YES
<i>Months</i>		NO	NO	NO	NO	NO	NO	YES	YES	YES
<i>Obs.</i>		665	665	665	665	665	665	665	665	665
<i>Adj. R-squared</i>		0.7690	0.7701	0.7710	0.7657	0.7660	0.7660	0.7085	0.7099	0.7106

Notes: Dependent variable: Log number of single-family home transactions. Significance levels (robust standard errors in brackets): \*\*\* 0.01, \*\* 0.05, \* 0.10. Column (1) shows the results for the specification of the equation in section 2.1. The regression of column (2) leaves out the interaction terms. In column (3) we replace the date dummies with seasonal and year dummies. Column (4) shows the result of the regression without controlling for the anticipation effects around the increase notches.

## 7.2 Temporary Suspension of the Land Transfer Tax for Housing Companies and Cooperatives

In 2004, the German government approved a law which allowed for a temporary suspension of the land transfer tax for mergers of housing companies and housing cooperatives in eastern German states (*Gesetz zur Grunderwerbsteuerbefreiung bei Fusionen von Wohnungsunternehmen und Wohnungsgenossenschaften in den neuen Ländern, Drucksache 51/04*). This legal regulation lasted from December 2003 until December 2006 and aimed at assisting housing companies and cooperatives in undertaking new investments and therefore gaining a substantial business size (see Bundesrat 2004).

As we included three eastern German states in our sample (Berlin, Brandenburg and Saxony-Anhalt) and our chosen time frame overlaps with the temporary suspension of the land transfer tax, we need to consider whether the suspension had an effect on the number of transaction. For the case of Saxony-Anhalt, mergers have been excluded in the original data set. In Berlin, no merger of housing companies and housing cooperatives took place between 2004 and 2006. Thus, we only need to remove mergers which took place in Brandenburg from our dataset. According to the Federation of German Housing and Real Estate Companies (*Bundesverband deutscher Wohnungs- und Immobilienunternehmen e. V., GdW*),<sup>13</sup> 15 mergers took place between 2004 and 2006. Unfortunately, no detailed information on these mergers is available; therefore, we omit Brandenburg as a whole from our sample in order to make sure that distortive effects of the regulation are excluded.

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<sup>13</sup> In Brandenburg, almost all housing and real estate companies are members of the Federation of German Housing and Real Estate Companies (see BBU 2015 and Statistische Ämter des Bundes und der Länder 2014).

TABLE 4: RESULTS WITH AND WITHOUT BRANDENBURG

Specification	Dependent Variable: Log Number of Single-Family Home Transactions							
	(1)		(2)		(3)		(4)	
Brandenburg included?	YES	NO	YES	NO	YES	NO	YES	NO
<i>Land Transfer Tax</i>	-0.0552*	-0.0419	-0.0647*	-0.0507	-0.0637**	-0.0555*	-0.1248***	-0.1125**
	(0.0228)	(0.0282)	(0.0258)	(0.0327)	(0.0193)	(0.0228)	(0.0286)	(0.0326)
Months Before the Tax Change								
2	-0.0391	-0.1086	-0.0161	-0.0204	-0.0089	-0.0595		
	(0.2111)	(0.1922)	(0.0712)	(0.0775)	(0.1480)	(0.1117)		
1	0.1020	0.0419	0.4115***	0.3955**	0.1164	0.0643		
	(0.1696)	(0.1624)	(0.0830)	(0.0970)	(0.1239)	(0.0939)		
Months After the Tax Change								
1	-0.1855	-0.1780	-0.4597***	-0.4474***	-0.1444	-0.2331		
	(0.1163)	(0.1371)	(0.0740)	(0.0754)	(0.1934)	(0.1976)		
2	0.2054	0.1000	-0.0420	-0.0424	0.2383	0.1600		
	(0.2619)	(0.2521)	(0.0547)	(0.0503)	(0.2436)	(0.2162)		
<i>Level of Tax Increase * Months Before Tax Change</i>								
2	0.0295	0.1023			0.0385	0.0932		
	(0.1741)	(0.1471)			(0.0914)	(0.0628)		
1	0.3267*	0.3861**			0.3325**	0.3891**		
	(0.1355)	(0.1267)			(0.0988)	(0.0977)		
<i>Level of Tax Increase * Months After Tax Change</i>								
1	-0.2839**	-0.2929			-0.2827	-0.1845		
	(0.0945)	(0.1525)			(0.1538)	(0.2137)		
2	-0.2466	-0.1465			-0.2612	-0.1859		
	(0.2206)	(0.2352)			(0.1879)	(0.1743)		
<i>Constant</i>	5.1789***	5.0297***	5.2120***	5.0607***	5.2376***	5.0763***	5.4212***	5.2754***
	(0.1655)	(0.2362)	(0.1699)	(0.2425)	(0.0556)	(0.0641)	(0.1369)	(0.1806)
<i>Controls</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>Date</i>	YES	YES	YES	YES	NO	NO	YES	YES
<i>Years</i>	NO	NO	NO	NO	YES	YES	NO	NO
<i>Months</i>	NO	NO	NO	NO	YES	YES	NO	NO
<i>Obs.</i>	665	545	665	545	665	545	665	545
<i>Adj. R-squared</i>	0.7701	0.7553	0.7660	0.7516	0.7099	0.6893	0.7153	0.7033

Notes: Dependent variable: Log number of single-family home transactions. Significance levels (robust standard errors in brackets): \*\*\* 0.01, \*\* 0.05, \* 0.10. Column (1) shows the results for the specification of the equation in section 2.1. The regression of column (2) leaves out the interaction terms. In column (3) we replace the date dummies with seasonal and year dummies. Column (4) shows the result of the regression without controlling for the anticipation effects around the increase notches.

### 7.3 Regional Border Effects

When people just marginally prefer one state over another in a migrating scenario, an increase in land transfer taxes might have a crucial influence on the decision where to move. Thus, we might see market activity which has nothing to do with the transfer taxes in that particular state but raised taxes in a neighboring one.



As stated in section 2.1, people should seldom be on the verge to indifference when it comes to migrating to one state or another. Not only does Germany scarcely have any pairs of areas, which qualify as regional substitutes while being located in different states. On top of that, area-specific differences other than geographical ones should have an impact on the housing decision. After all, two areas of different federal states are also located in different districts and different municipalities. The area-specific characteristics therefore also comprise all specific characteristics on the different federal levels.

Still, we cannot fully rule out that the land transfer tax in one area affects market activity in another geographically close area of a different state. To a large part, this concern can be eliminated by taking a closer look at our dataset. Affected areas might be so called twin-metropolitan areas, where urban areas of two different states are located on opposite sides of the border. This applies for some areas in Rhineland-Palatinate. Fortunately, our dataset does not include those particular areas. Also, the housing market in city states like Bremen and Berlin, which are embedded in Lower Saxony and Brandenburg respectively, might be interdependent with the surrounding state. To our benefit, Lower Saxony conducted the exact same tax raises as Bremen, so there is no distortion in the interdependence of these two states and thus no bias in our data for Bremen. However, since Berlin and Brandenburg differ in their transfer tax measures, our baseline results might be biased by border effects between these two states.

Table 5 compares the results of our baseline regressions with the omission of Berlin and Brandenburg from our dataset. Worth noticing is that in the remaining states, the bunching before a tax increase to a large extent stems from the second month after a tax raise. For the long-term effect, the coefficients are only slightly lower and thus confirm our previous findings.

TABLE 5: RESULTS WITH AND WITHOUT BERLIN &amp; BRANDENBURG

Specification	Dependent Variable: Log Number of Single-Family Home Transactions							
	(1)		(2)		(3)		(4)	
Brandenburg or Berlin included?	YES	NO	YES	NO	YES	NO	YES	NO
<i>Land Transfer Tax</i>	-0.0552*	-0.0504	-0.0647*	-0.0596	-0.0637**	-0.0630**	-0.1248***	-0.1221***
	(0.0228)	(0.0274)	(0.0258)	(0.0350)	(0.0193)	(0.0119)	(0.0286)	(0.0178)
Months Before the Tax Change								
2	-0.0391	-0.0306	-0.0161	-0.0305	-0.0089	-0.0671		
	(0.2111)	(0.3581)	(0.0712)	(0.1223)	(0.1480)	(0.2039)		
1	0.1020	0.0256	0.4115***	0.3252**	0.1164	0.0031		
	(0.1696)	(0.2945)	(0.0830)	(0.0945)	(0.1239)	(0.1478)		
Months After the Tax Change								
1	-0.1855	-0.0372	-0.4597***	-0.4212**	-0.1444	-0.0071		
	(0.1163)	(0.2562)	(0.0740)	(0.1230)	(0.1934)	(0.4371)		
2	0.2054	0.3773*	-0.0420	-0.0039	0.2383	0.4461**		
	(0.2619)	(0.1424)	(0.0547)	(0.0806)	(0.2436)	(0.1053)		
<i>Level of Tax Increase * Months Before Tax Change</i>								
2	0.0295	0.0046			0.0385	0.0834		
	(0.1741)	(0.2589)			(0.0914)	(0.0652)		
1	0.3267*	0.3301			0.3325**	0.3953*		
	(0.1355)	(0.2414)			(0.0988)	(0.1455)		
<i>Level of Tax Increase * Months After Tax Change</i>								
1	-0.2839**	-0.3874			-0.2827	-0.3422		
	(0.0945)	(0.2645)			(0.1538)	(0.3984)		
2	-0.2466	-0.3816*			-0.2612	-0.4075**		
	(0.2206)	(0.1294)			(0.1879)	(0.0898)		
<i>Constant</i>	5.1789***	5.0521***	5.2120***	5.0848***	5.2376***	5.0505***	5.4212***	5.3020***
	(0.1655)	(0.3506)	(0.1699)	(0.3642)	(0.0556)	(0.0655)	(0.1369)	(0.2236)
<i>Controls</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>Date</i>	YES	YES	YES	YES	NO	NO	YES	YES
<i>Years</i>	NO	NO	NO	NO	YES	YES	NO	NO
<i>Months</i>	NO	NO	NO	NO	YES	YES	NO	NO
<i>Obs.</i>	665	417	665	417	665	417	665	417
<i>Adj. R-squared</i>	0.7701	0.7799	0.7660	0.7755	0.7099	0.7092	0.7153	0.7450

Notes: Dependent variable: Log number of single-family home transactions. Significance levels (robust standard errors in brackets): \*\*\* 0.01, \*\* 0.05, \* 0.10. Column (1) shows the results for the specification of the equation in section 2.1. The regression of column (2) leaves out the interaction terms. In column (3) we replace the date dummies with seasonal and year dummies. Column (4) shows the result of the regression without controlling for the anticipation effects around the increase notches.

#### 7.4 Further Subsamples

In addition to excluding Berlin and Brandenburg from our regression, we now regress specification (1) of the baseline results in Table 2 while omitting each state at a time. This way we can analyze whether our coefficients are determined by observations in individual states.

The results are shown in Table 6. The coefficient for the land transfer tax level ranges from 4 to 7.5%, and is insignificant for most specifications. However, the observation of a large drop in transaction numbers in the long run remains the same. Even more so, our results show lower standard errors for

larger (negative) coefficients. Also, although the anticipation dummies and the interaction dummies strongly vary for different settings, aggregating these coefficients reduces most of that variance. The results suggest that the level of tax increase is of different importance throughout German states.

TABLE 6: RESULTS FOR SUBSAMPLES

<i>State(s) omitted</i>	<i>Dependent Variable: Log Number of Single-Family Home Transactions</i>					
	Brandenburg	Bremen	Saarland	Saxony-Anhalt	Berlin	Rhineland-Palatinate
<i>Land Transfer Tax</i>	-0.0419 (0.0282)	-0.0593 (0.0284)	-0.0688** (0.0187)	-0.0449 (0.0326)	-0.0748** (0.0215)	-0.0429 (0.0310)
<i>Months Before the Tax Change</i>						
2	-0.1086 (0.1922)	-0.2551** (0.0747)	-0.0096 (0.1987)	0.1338 (0.3170)	0.0369 (0.3266)	0.0289 (0.2010)
1	0.0419 (0.1624)	-0.0289 (0.1418)	0.1039 (0.1793)	0.2907 (0.1590)	0.0932 (0.2841)	0.1225 (0.1857)
<i>Months After the Tax Change</i>						
1	-0.1780 (0.1371)	-0.1145 (0.2524)	-0.2620** (0.0890)	-0.2042 (0.0984)	-0.0181 (0.2226)	-0.2789** (0.0864)
2	0.1000 (0.2521)	-0.0712 (0.1933)	0.1957 (0.2774)	0.2185 (0.2761)	0.5050** (0.1528)	0.2944 (0.2659)
<i>Level of Tax Increase * Months Before Tax Change</i>						
2	0.1023 (0.1471)	0.2073* (0.0832)	-0.0052 (0.1809)	-0.0623 (0.2738)	-0.0548 (0.2428)	-0.0694 (0.1998)
1	0.3861** (0.1267)	0.4333*** (0.0805)	0.3481* (0.1408)	0.2050 (0.1667)	0.2780 (0.2419)	0.2909 (0.1823)
<i>Level of Tax Increase * Months After Tax Change</i>						
1	-0.2929 (0.1525)	-0.3354 (0.1707)	-0.2861** (0.0752)	-0.2924** (0.0761)	-0.3853* (0.1793)	-0.1426 (0.1242)
2	-0.1465 (0.2352)	-0.0057 (0.1671)	-0.2630 (0.2130)	-0.2692 (0.2429)	-0.4705** (0.1260)	-0.3356 (0.2201)
<i>Constant</i>	5.0297*** (0.2362)	5.4476*** (0.1653)	5.2536*** (0.1787)	5.0326*** (0.0903)	5.2653*** (0.1987)	5.0448*** (0.2139)
<i>Controls</i>	YES	YES	YES	YES	YES	YES
<i>Date</i>	YES	YES	YES	YES	YES	YES
<i>Years</i>	NO	NO	NO	NO	NO	NO
<i>Months</i>	NO	NO	NO	NO	NO	NO
<i>Obs.</i>	665	665	665	665	665	665
<i>Adj. R-squared</i>	0.7690	0.7701	0.7710	0.7657	0.7660	0.7660

Notes: Dependent variable: Log number of single-family home transactions. Significance levels (robust standard errors in brackets): \*\*\* 0.01, \*\* 0.05, \* 0.10.

## 8. Conclusion

The land transfer tax in Germany is a major part of all transaction costs. An increase in the tax rate makes real estate acquisitions significantly more expensive. We conclude that the announcement of an increase in the land transfer tax leads to significant bunching around the date of the increase: Many market participants bring their planned transactions forward in order to profit from the lower tax rate. As a result, a drastic drop in transactions can be observed after the tax increase.

However, the tax change also leads to long-run effects: Due to the higher tax rate, transactions become less attractive for buyers and sellers and therefore the market activity decreases. The increase in the tax rate might be especially relevant for so-called ‘threshold households’ which were *just* able to buy a house and for which even slight changes in the tax rate can cause a higher financial burden which they may not be willing to carry.

Increasing the tax does not only lead to massive distortions around the time notch, the long-run drop in transactions also curbs the tax revenue increase. Our results show that a one percentage point higher tax rate goes along with 6% fewer transactions.

This finding questions land transfer tax increases when at the same time other political measures which try to support home-ownership creation are in place. Furthermore, a low liquidity on the real estate market may lead to lower labor mobility; home owners tend to stay in their home even though it might be more efficient to move to a different place.

Further research efforts should be undertaken for a better understanding of the effects of the tax change on real estate transactions. So far, we were only able to study tax increases as no German state decrease the land transfer tax until today. It would be interesting to see if the market would react similarly to a tax change in the opposite direction. Real estate transactions in other countries where there has been both a tax increase and a tax decrease (or holiday) might give a valuable framework to investigate this interrelation in more detail.

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## **Data**

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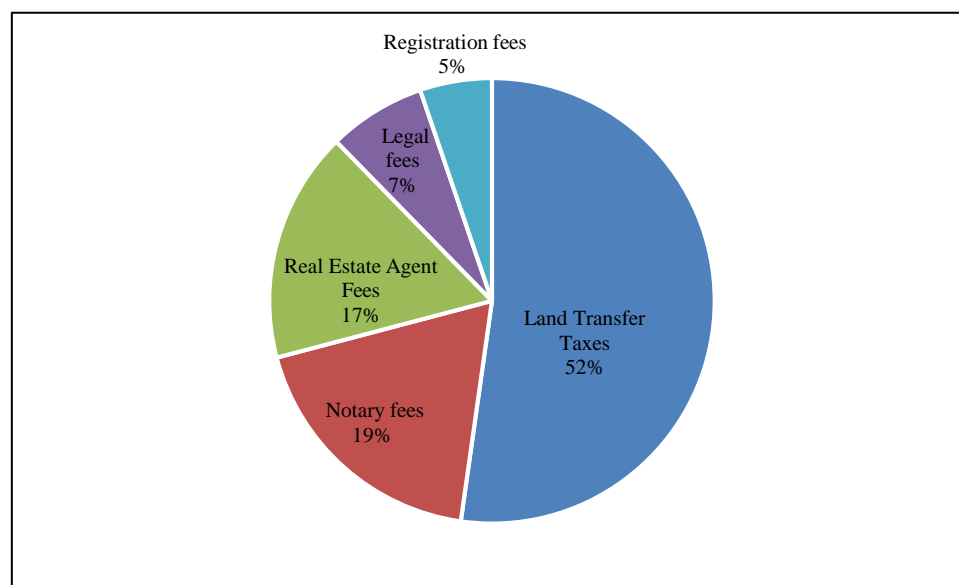
## Appendix

TABLE 7. SHARE OF DIFFERENT TYPES OF HOME USAGE (OWNER OCCUPIED VS. RENTED OUT) IN GERMANY, 2011

	<i>Total Number of Dwellings</i>	<i>Share of Owner Occupied</i>	<i>Share of Rented Out</i>
Single-Family Homes <sup>a</sup>	18,681,375	74%	22%
Multi-Family Homes	21,863,942	16%	78%
<i>Total</i>	40,545,317	100%	100%

*Notes:* The table gives the share of owner occupied homes and the share of rented out homes for single-family homes and multi-family homes. If a dwelling is neither owner occupied nor rented out it is vacant or used as a holiday home. a) Single-Family Homes are defined as dwellings with one or two apartments. *Data:* Statistische Ämter des Bundes und der Länder (2014).

FIGURE 10. AVERAGE SHARE OF DIFFERENT TYPES OF COSTS ON TRANSACTIONS COSTS OF PROPERTY TRANSACTIONS IN GERMANY, 2011



*Notes:* The figure shows the average share of different types of costs on total transaction costs of property transactions in Germany in 2011. Transaction costs include notary and legal fees, real estate agent fees and land transfer taxes. *Data:* Andrews et al. (2011).

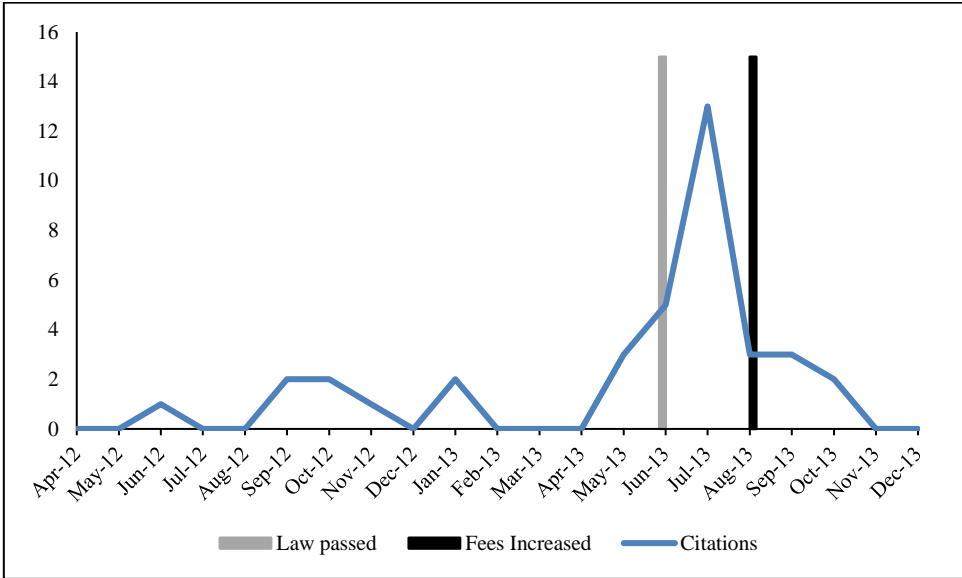
Next to the land transfer taxes, real estate agent and notary fees also play a significant part for the total transaction costs. As all other fees are relatively small, it can be assumed that they have little to no impact on the number of real estate transactions.

With regard to real estate agent fees, there is no legislative basis stipulating a certain fee level. Thus, real estate agents can theoretically ask for individual fees. However, agents usually orient themselves on the fees suggested by the umbrella organization in their respective German state. During the time frame of our analysis, there has been no change in this suggested fee level according to these umbrella organizations. As a result, we do not need to include changes in real estate agent fees in our analysis.

Notary fees are legally fixed; as of August 2013 a new law concerning the legal and notary fees has been introduced (*Gerichts- und Notarkostengesetz*, former *Kostenordnung für Verfahren der freiwilligen*

*Gerichtbarkeit*). As a result, legal and notary fees increased on average by 0.5 percentage points for all German states. Figure 11 charts the media coverage on the topic and the date of the increase of the fees. The data suggests that the timing of the change in the fees has not been much anticipated as most media coverage took only place in the month right before the increase of the fees. We control for the change in notary fees in our baseline setting.

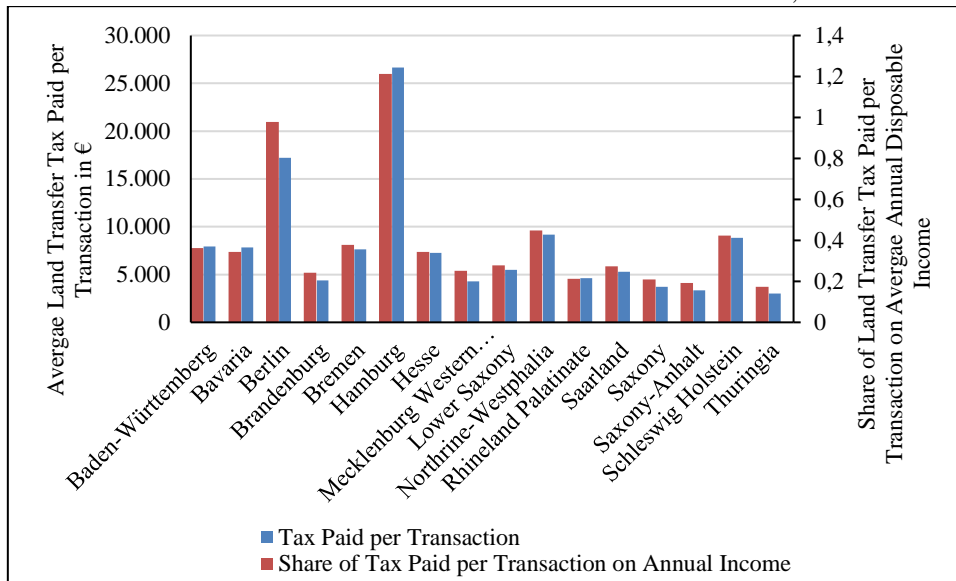
FIGURE 11. MEDIA CITATIONS OF THE INCREASE IN LEGAL AND NOTARY FEES IN GERMANY



Notes: The figure gives the media citations of ‘*Gerichts- und Notarkostengesetz*’ (‘Law on Court and Notary Fees’). Media coverage has been especially profound right before the increase of the fees. Further, all citations in the months before the law passed can be considered as from rather professional journals which leads us to the assumption that people have not been very aware of the increase in the legal and notary fees. Media citations from *Der Betrieb*, *Betriebsberater*, *Bundesrat Parlamentsdrucksachen*, *Bundestag Parlamentsdrucksachen*, *Gesetzgebungskalender*, *Haufe*, *Bundesanzeiger*, *Immobilienzeitung*, *Tierischer Volksfreund*, *NotBZ*, *Gießener Anzeiger*, *Coburger Tageblatt*, *Die Kitzinger*, *Saale Zeitung*, *Fränkischer Tag*, *Bayrische Rundschau*, *Bonner Generalanzeiger*, *Kölnische Rundschau*, *Welt am Sonntag*, *Handelsblatt*, *Sächsische Zeitung*, *Berliner Morgenpost*, *Freue Presse*, *Badische Zeitung*, *Euro*, *Nürnberger Nachrichten*, *news aktuell*, *Brauwelt*, *Miet-Rechts-Berater*. Data: <http://www.genios.de>.

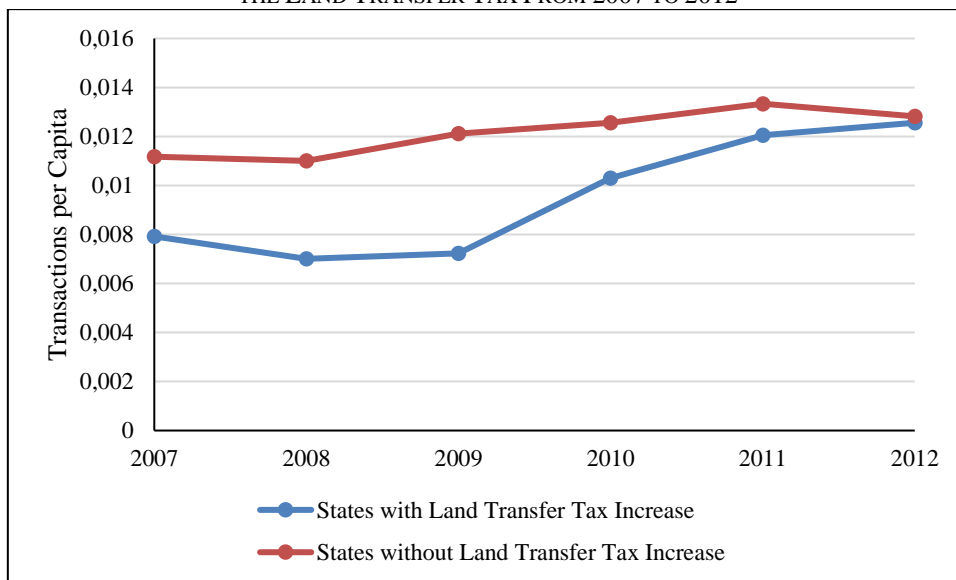


FIGURE 12. AVERAGE LAND TRANSFER TAX PAID PER TRANSACTION AND SHARE OF LAND TRANSFER TAX PAID PER TRANSACTION OF AVERAGE ANNUAL DISPOSABLE INCOME, 2012



Notes: The figure shows the average land transfer tax paid per transaction in 2012 (left hand side, blue columns) and the share of the land transfer tax paid per transaction of the average annual disposable income in Germany in 2012 (right hand side, red columns). Data: Bundesministerium der Finanzen (2015a), Bundesinstitut für Bau-, Stadt- und Raumforschung (2015) and Arbeitskreis der Gutachterausschüsse und Oberen Gutachterausschüsse der Bundesrepublik Deutschland (2014).

FIGURE 13: SINGLE-FAMILY HOME TRANSACTIONS PER CAPITA IN STATES WITH AND WITHOUT AN INCREASE IN THE LAND TRANSFER TAX FROM 2007 TO 2012



Notes: The figure gives the single-family home transactions per capita for German states which increased their land transfer tax and for states which did not. If there has been an increase in the tax level before July, the state has been counted in the group of states with tax increase in the respective year; if there has been an increase in or after July, the state has been counted in the group of states without tax increases. Data: Arbeitskreis der Gutachterausschüsse und Oberen Gutachterausschüsse der Bundesrepublik Deutschland (2014) and Statistische Ämter des Bundes und der Länder (2015).

TABLE 8. AMOUNT AND SHARE OF DIFFERENT TAXES ON THE TOTAL TAX REVENUE AT THE STATE LEVEL, 2014

<i>Tax Type</i>	<i>Tax Revenue in 2014 (m €)</i>	<i>Share of Total Tax Revenue of State Taxes</i>	<i>Share of Total Tax Revenue at the State Level</i>
Land Transfer Tax	9,339	53%	3.8%
Inheritance Tax <sup>a</sup>	5,452	31%	2.2%
Race Betting and Lottery Tax <sup>b</sup>	1,667	10%	0.7%
Beer Tax <sup>c</sup>	684	4%	0.3%
Fire Protection Tax <sup>d</sup>	409	2%	0.2%
<i>Total Tax Revenue of State Taxes<sup>e</sup></i>	17,556	100%	7%
<i>Total Tax Revenue at the State Level<sup>f</sup></i>	246,858		100%

*Notes:* The table gives the descriptives of the data set. a) Erbschaftssteuer. b) Rennwett- und Lotteriesteuer. c) Biersteuer. d) Feuerschutzsteuer. e) Landessteuern. f) Tax revenue after federal supplementary grants; *Steuereinnahmen der Länder nach Bundesergänzungszuweisungen*. *Data:* Bundesministerium der Finanzen (2015).

TABLE 9. OVERVIEW OF PUBLIC FUNDING INSTRUMENTS ENCOURAGING HOME OWNERSHIP IN GERMANY

<i>Name</i>	<i>Funding Type</i>	<i>Geographical Coverage</i>	<i>Funding Amount</i>	<i>Funding Period</i>
Eigenheimzulage	tax allowance	Germany	1% of purchase price	until 12/2005
Eigenheimrente	loan/tax allowance	Germany	154-454 € annually	since 01/2008
IBB Familienbaudarlehen	loan	Berlin	max. 60% of collateral value	since 03/2015
ILB Brandenburg Kredit	loan/grant	Brandenburg	max. 50,000 €	since 01/2013
ISB Darlehen Wohneigentum	loan	Rhineland-Palatinate	max. 150,000 €	since 04/2013
Saarländische Wohnraumförderung	loan	Saarland	max. 400 €/m <sup>2</sup>	since 04/2008

*Notes:* The table gives all public funding instruments encouraging home ownership in Germany which were introduced or abolished during the time period of our sample. Funding instruments on the municipal level have been excluded due to their very limited impact on transactions on the state level. *Data:* <http://www.genios.de> and <http://www.baufoerderer.de>.