TAX SELLS –

HOW DO JURISDICTIONS ATTRACT FIRMS AND HOW DO FIRMS REACT TO MISPRICINGS?

1. Introduction

"Tax sells". This admittedly provocative title describes the main research question of this investigation into whether and how firms react to mispriced tax jurisdictions. In general, every jurisdiction offers a set of public goods in the form of regional and demographic features, and some jurisdictions supply considerably superior public goods than others. Depending on its local and structural conditions, each jurisdiction must create strategies to promote itself. One way for a jurisdiction to attract new firms and, in turn, to increase its economic power and welfare, is to manipulate tax rates. More precisely, jurisdictions can attract firms by offering low tax rates. Thus, jurisdiction mispricing is defined as a situation in which the quality of public goods and services supplied by a jurisdiction has a price (i.e., a tax rate) that does not correctly match the intrinsic value of such public goods and services.

Assuming perfect competition, a tax rate higher (lower) than the equilibrium tax rate will be associated with an excess supply (excess demand) such that market forces will move it back to the market equilibrium (Fischer et al. 1982, Gravelle and Rees 1987, Moulin 1995). However, firm location decisions are not typically made under perfect competition. The commodities are not homogenous because each jurisdiction is unique and therefore offers a distinctive set of public goods. Location decisions might depend on specific location parameters, the size of the local market, accessibility to main markets, the urbanization of the local economy, land costs and/or employees' quality of life (Rymarzak and Siemińska 2012, Mota and Brandão 2013). Additionally, the information and transaction costs are high for location decisions such that they must be well considered and require a long time for planning. Finally, a perfect market assumes

information efficiency for all market participants, although this is typically not the case in reality. Therefore, it is a compelling research question to determine the degree to which market participants can look through the pricing strategies of jurisdictions. Consequently, there are several reasons why jurisdiction mispricings can occur and persist over a long time horizon.

In Germany, each municipality determines its trade tax rate independently. This decision largely depends on each municipality's specific supply of regional and demographic public goods (e.g., unemployment rate, tourism, GDP, infrastructure, etc.). The offer of public goods is thereby not exogenously given but can be modified by means of resources. Moreover, a municipality should consider spatial dependence in determining its trade tax rate because the incentives it offers to firms do not depend solely on its offer of public goods and services but also on the structure of the entire system, the municipality's position within that system and its interaction with other (nearby) municipalities (Ward and Gleditsch 2008 and Braid 2013).

Assuming perfect information (i.e., each municipality can perfectly assess both its own and all other regional and demographic characteristics), there would be only one theoretically "correct" trade tax rate (i.e., intrinsic value) for each specific set of a municipality's public goods. However, by participating in tax competition (for an overview, see Wilson 1999 and Devereux and Loretz 2013), a municipality can strategically set a lower or higher trade tax rate. Thus, a municipality might underprice its set of specific goods and services and set a lower trade tax rate in the hope that firms would notice the underpricing and be persuaded to relocate within its borders. Conversely, a municipality might overprice its offer of specific public goods and services and set a higher trade tax rate in the hopes that firms would not notice the overpricing and not relocate to other municipalities. However, not every discrepancy between a determined trade tax rate and intrinsic value is labeled as mispricing: For purposes of this study, a

municipality is identified as overpriced or underpriced only if it falls into the group of the largest discrepancies (10^{th} percentile) of all municipalities within Germany. To ensure that municipalities know their correct trade tax rate with regard to their corresponding supply of public goods, I only investigate municipalities that are adequately priced (i.e., not labeled as mispriced) during the starting period of my study, which is the year 2001. A municipality that then decides to change its tax rate considerably by 2004[1] (based on the supply of public goods in 2004) has made the over- or underpricing decision consciously.

Analyzing both the firm perspective and the municipality perspective leads to a two-sided research question. First, from the perspective of the municipalities, is mispricing their specific set of regional and demographic goods and services a successful strategy for municipalities? Second, from the firm perspective, do firms discover mispriced municipalities and react by relocating their businesses into underpriced or out of overpriced municipalities? Whether over- or underpricing can be a successful strategy for municipalities depends on whether firms have the ability to see through the pricing strategies of municipalities and to react to mispriced municipalities by relocating their businesses.[2]

The second research question is directly linked to the mispricing of jurisdictions discussed above and asks how firms address potential tax savings or additional tax payments that result from under- or overpricings. This question is the reason that the related literature focuses on tax incidence by specifically asking who bears the tax burden in formulary apportionment systems as opposed to who pays the tax bill (see Harberger 1962, Mclure 1980 and Gravelle 2013). Thus, I

---

[1] Data is only available for the following years: 2001, 2004 and 2007. A short-run analysis is defined as a change of a municipality's pricing strategy from 2001 to 2004 (3-year period). A long-run analysis is defined as a change of a municipality's pricing strategy from 2001 to 2007 (6-year period).

[2] This research question as to whether firms react to tax competition by income shifting is often investigated in studies in both accounting and capital markets theory, such as in the analysis of whether investors have the ability to see through mistakes in reported earnings (Dechow and Skinner 2000, Hanlon 2005, Cormier and Martinez 2006, Bardos et al. 2011).

ask who is actually paying the additional taxes in overpriced municipalities and whether firms pay these taxes readily or whether they make their employees indirectly responsible for paying them by reducing salaries or engaging in layoffs. Inversely, I ask who is actually "earning" the money when municipalities are underpriced. Do firms save the additional cash or pass on the tax savings to their employees in the form of increased salaries or new hirings?

By using spatial econometrics, I find that firms notice and react to mispriced municipalities. Firms are unwilling to pay excessive taxes in overpriced municipalities and are attracted by underpriced jurisdictions. I show that in the short term (i.e., when a municipality is adequately priced in 2001 and mispriced in 2004), firms react to underpricing by relocating their businesses into underpriced municipalities, whereas firms in overpriced municipalities hesitate and delay relocating out of such municipalities to determine whether the overpricing will remain constant over time. Thus, underpriced municipalities create a greater incentive for a firm to act, whereas overpriced municipalities make some firms more reserved. However, when mispricing stabilizes over the long run (i.e., when a municipality is correctly priced in 2001 and mispriced in 2004 and 2007), firms' relocation decisions into and out of mispriced jurisdictions increase in number—most likely because location decisions must be carefully considered due to the amount of time they require and the difficulty of reversing them. I therefore conclude that firms are able to analyze the pricing policies of municipalities and to react to mispricings by shifting real activities.

Over both the short- and long-run periods, I find that employees do not bear the burden of the tax incidence. Thus, firms pay the additional taxes themselves without passing the additional burden to their employees in the form of decreasing salaries and/or layoffs. By contrast, in the case of tax savings, firms do not pass significant amounts of saved cash on to their employees in

the short run, but do pass it on in the long run. Therefore, I conclude that employees are not "punished" for additional tax payments in overpriced jurisdictions but do participate in tax savings in underpriced jurisdictions in the long run.

I contribute to the literature in several ways. First, my dataset is unique. There has been a substantial amount of multistate-level research conducted in the U.S. (e.g., Klassen and Shackelford 1998, Gupta and Mills 2002)., and the literature has investigated cross-state income shifting under a formulary apportionment regime (see, for example, Mintz and Smart 2004). However, data availability is a key concern in this respect and limits the interpretability of the results because the tax data employed in such studies are largely derived from consolidated financial statements and can therefore only be approximated. However, the present study contributes to the literature by exploiting its unique dataset that consists of genuine tax data from the German trade tax system. Therefore, because it is not necessary to estimate the tax effects from accounting data, I provide a deeper understanding of the behavior of firms under formulary apportionment between regions within one country. Although allocation keys and further details may differ, the insights from this paper may still be transferable to an international context.

Second, following Shackelford and Shevlin (2001), my study avoids cross-country limitations (e.g., different tax regimes, legal systems and financial markets) by examining the effects of different tax rates across regions within one country, i.e., Germany. I contribute to the literature on income shifting by exploiting this unique setting at the firm level to show that taxes impact location decisions. My analysis does not suffer from self-selection bias because I use data on *all* commercial firms in Germany. Given these factors, I offer new insights on whether firms react to mispriced jurisdictions. In particular, I answer the question of whether firms know what a "fair" tax rate for a particular set of regional and demographic public goods is and how they react

to potential mispricings. By employing this unique dataset, I present a distinctive analysis of the effects of taxes on the behavior of firms. Additionally, I show that taxes impact location decisions and that firms (1) are able to see through the market and identify mispricings and (2) do not pass additional tax payments on to their employees (although they allow employees to participate in potential tax savings).

The remainder of this paper is organized as follows. Section 2 provides institutional details regarding the regulatory framework and business environment in Germany. Section 3 reviews the prior empirical literature and develops hypotheses. Section 4 describes the sample selection process and develops the methodological approach. Section 5 presents the results and robustness checks. Section 6 presents summary comments and draws conclusions.

2. Regulatory framework and business environment in Germany

The German trade tax system offers a unique opportunity to investigate the impact of tax rate changes on income shifting because of several of its idiosyncratic characteristics. One such peculiarity is that that Federal Republic of Germany is more equally and homogenously developed than most nations. For example, Shevlin et al. (2012) investigate domestic income shifting behavior of Chinese firms. However, the Human Development Report (2013) shows that the income gini coefficient, which measures the deviation of the distribution of income (or consumption) among individuals or households within a country (where 0 corresponds with perfect equality and 100 corresponds with perfect inequality), is much higher in China than in Germany. Thus, the Republic of China measures 42.5, the United States measures 40.8 and Germany measures 28.3 on the Human Development Report scale. Similar evidence can be found when comparing the quintile income ratio, which is the ratio of the average income of the richest

20% of the population to the average income of the poorest 20% of the population. The ratio is 9.6 for the Republic of China, 8.4 for the United States and only 4.3 for Germany.

Despite this homogeneity, specific jurisdictions within Germany have experienced different developmental trajectories, which means that spatial differences (e.g., regarding infrastructure, unemployment rate, tourism) still occur, although they occur with less frequency than in most other developed countries. As one example, the population density in 13 of the 16 German states varies only between 69 and 515 inhabitants per square kilometer; conversely, half of the population in China lives on 10 percent of the territory.[3]

Each state in Germany has multiple districts (there are a total of 470 districts), and each district can be subdivided into several municipalities (there were 12,268 municipalities overall in 2007). Consequently, each municipality offers a set of several public goods consisting of educational opportunities (e.g., number of schools and universities), sport and leisure activities, recreational functions, cost of living, infrastructure (e.g., accessibility to highways and airports), geographic features (e.g., open landscapes, industrial real estate and recreational areas), among other features.

Germany has one consistent tax system for the entire federal territory, which means, that federal tax rates for firms and individuals do not vary depending on the place of business or the place of residence, respectively. The national trade tax code is also identical for all German firms, with one exception: The trade tax rate can be determined entirely independent by each municipality. The trade taxes collected are the primary source of each municipality's public financing. Depending on the supply of public goods discussed above, each municipality can set

[3] The population density is substantially higher in the German city-states of Berlin (3,814), Bremen (1,563) and Hamburg (2,297). However, these three regions are excluded from the sample due to other reasons (for further details see chapter 4).

its trade tax rate such that, that supply (i.e., the offering of the public goods of a municipality) and demand (i.e., the number of firms with a permanent establishments in that very municipality) are in equilibrium; these equilibria are most likely why municipalities with a many-sided supply of public goods (such as Munich, Frankfurt or Cologne, where the trade tax rates are approximately 19.5%) have considerably higher trade tax rates than municipalities in rural areas with a poor supply of public goods (some with 0% tax rates).

However, the possibility that municipalities themselves decide the level of their trade tax rates might lead to tax competition among municipalities to either attract firms to their municipalities (i.e., setting a considerably lower trade tax rate compared to its offer of public goods) or to collect more taxes (i.e., setting a higher trade tax rate compared to its offer of public goods). I assume that municipalities can appraise their individual offer of public goods and can therefore assess which tax rate would be appropriate (as measured by their supply of goods). This process can be compared to that of a firm producing goods, in which the firm is able to estimate which price would be worth the product. Therefore, a municipality's mispricing is defined as the mechanism through which a municipality consciously determines a higher or lower tax rate, as measured by their supply of goods. Consequently, I do not mandatorily label municipalities with the highest (lowest tax rate) as overpriced (underpriced), but I do categorize municipalities as mispriced if the discrepancy between their actual trade tax rates and the "correct" trade tax rate is in the top (bottom) 10^{th} percentile of the whole sample. Therefore, because mispricing is dependent on the supply of public goods of each municipality, trade tax havens (i.e., municipalities with trade tax rates close to 0%) and high tax municipalities are not necessarily mispriced.

Firms with permanent establishments in more than one municipality must allocate the firm-level trade tax base in a formulary apportionment regime (allocation key: wages paid) with respect to the different municipalities. Thus, when considering individual firms with permanent establishments in more than one municipality, income shifting for trade tax purposes is only possible by means of location decisions (i.e., transferring employees) and not through the use of transfer prices or the location of debt and intangibles (i.e., so called accounting decisions).

As a consequence, the German trade tax system offers a unique opportunity for a natural experiment to analyze the effect of tax rate changes on location decisions. More precisely, the German trade tax system offers the opportunity to analyze a two-sided perspective. On the one hand, I can examine firm reactions to the setting of trade tax rates in the form of location decisions that are based on tax rate changes. On the other hand, I can investigate the decisions of municipalities to set their trade tax rates independently. Municipalities might have an incentive to consciously deviate from their "correct" tax rate (i.e., to increase or decrease their tax rates) when attempting to maximize income. This paper investigates the interaction of these two controversial perspectives (i.e., the perspective of the firm versus that of the municipality) and asks whether firms can look through the (mis-)pricing considerations of municipalities.

3. Prior Literature and Hypotheses Development

There is a debate in the literature regarding tax competition between countries (the modern literature on tax competition and the efficiency for local governments began with Oates 1972; for an overview of tax competition, see Wilson 1999 and Devereux and Loretz 2013). Some authors argue that tax rates decline as the result of tax competition between countries and

in particular due to competition for profits (Overesch and Rincke 2011; Leibrecht and Hochgatterer 2012; Haufler and Stähler 2013).

The prior literature also finds that strategic interaction in a tax setting is reasonable because of yardstick competition, when voters in a tax jurisdiction compare the taxes set by their representative with those in neighboring jurisdictions to evaluate the performance of their political representative (see Besley and Case 1995, Besley and Smart 2007 and for an spatial analysis with Italian data Bordignon et al. 2003). Moreover, by measuring the effective average tax rate, Devereux and Griffith 1998 provide evidence of the impact of the effective average tax rate on firms' discrete location decisions. Multinational firms make discrete choices about where to locate their foreign affiliates, and these choices depend on how taxes affect the post-tax level of profit available in each potential location. Additionally, Devereux et al. (2008) investigate whether countries compete over corporate tax rates and find that there are two forms of tax competition that countries engage in when responding to changes in other countries' tax regimes: over statutory tax rates for mobile profit and over effective marginal tax rates for capital. By proposing a new theoretical model of tax competition, Janeba and Osterloh (2013) find that large jurisdictions compete both locally with smaller neighboring communities and interregionally with more distant cities, whereas small jurisdictions compete only with nearby jurisdictions.

Similar to my study, there are previous studies that investigate tax competition among local governments (e.g., Asia-Pacific: Chuk 2012, Finland: Lyytikäinen 2012, France: Carbonnier 2013 or Reulier and Rocaboy 2009, Switzerland: Feld and Reulier 2009).

In Germany, each municipality determines its trade tax rate independently. This decision should depend largely on the specific regional and demographic goods and services offered by each municipality. Moreover, spatial dependence should be considered in the decision because a

municipality's incentives for determining its trade tax rate depend not only on its attributes and characteristics but also on the structure of the entire federal system, its position within that system, and its interactions with other (nearby) municipalities (Ward and Gleditsch 2008). I assume that each municipality knows its correct trade tax rate (i.e., the intrinsic value of its supply of public goods). This assumption implies that each municipality can accurately assess not only its own regional and demographic goods but also those of other municipalities. Assuming that all municipalities have access to this perfect information, there would be only one theoretically correct trade tax rate for each specific set of public goods that each particular municipality offers. However, regarding the tax (rate) competition discussed above, a municipality can strategically set a lower or even higher trade tax rate to attract firms (i.e., to underprice or overprice its offer of specific public goods); thus, if and only if the respective strategy succeeds can the municipality increase its economic prosperity and public budget over time.

A municipality that strategically sets a trade tax rate higher than its correct trade tax rate (i.e., a municipality that overprices its offer of regional and demographic public goods) does so in the hopes that firms permanently established within its borders will either not discover (i.e., no information efficiency) or not react to the overpricing (i.e., where transaction and transformation costs are too high). If firms do not react to the tax rate increase, the municipality's overpricing strategy will have been successful because it will have earned additional income from the higher tax rate with a stable tax base. However, if firms react to the overpricing by shifting employees out of the municipality, the municipality's public budget may shrink to a size smaller than it was before the tax rate increase. If the reduced income (caused by employees leaving the municipality) cannot be compensated for by additional income from higher tax rates, the municipality's strategy would therefore have failed.

A municipality that strategically sets a trade tax rate lower than its correct trade tax rate (i.e., a municipality that underprices its offer of regional and demographic public goods) hopes that firms that have a permanent establishment in that municipality react to the underpricing or that new permanent establishments create new employment. If firms do not react to the underpricing and therefore do not shift employees into the municipality, the municipality will have a smaller public budget than it had prior to reducing the tax rate and the municipality's strategy would have failed. However, if firms react to the underpricing by shifting employees in the underpriced municipality, this municipality would have a larger public budget than it had prior to the tax rate decrease. The municipality's strategy would be successful if the additional income from new employees in the municipality compensated for the reduced income earned from the lower tax rate.

Thus, overpriced municipalities assume or (at least) hope that firms will not notice or react to the overpricing, whereas underpriced municipalities hope that firms will not realize or react to the underpricing. Therefore, the overall research question involves whether firms judge the (mis)pricing of municipalities.

In general, I expect that firms react to mispriced jurisdictions by shifting real activities. However, real location decisions are time-consuming and must therefore be carefully considered. Firms only decide to shift employees in and out of mispriced municipalities if they assume that there will be mispricing for the long run.[4] Therefore, the observed effect in 2007 (i.e., six years after the pricing change) should be stronger than it was in 2004 (i.e., three years after the pricing change). Thus, by 2007, it could be assumed that the overpricing (underpricing) of a municipality has been confirmed in the long run. I hypothesize the following (in the alternative form):

[4] A long-run mispricing is defined as a situation in which a municipality is correctly priced in 2001 and mispriced in both of the following periods, i.e., in 2004 and 2007. A short-run mispricing is defined as a situation in which a municipality is adequately priced in 2001 but mispriced in 2004.

H1a: In the short run, employees are shifted only slightly into underpriced and out of overpriced municipalities compared to correctly priced municipalities.

H1b: In the long run, employees are shifted substantially into underpriced and out of overpriced municipalities compared to correctly priced municipalities.

Based on H1a and H1b, the mispricing of municipalities raises the question of who is actually paying or saving the taxes (Asimakopulos 1979, Auerbach 2006). Therefore, related research focuses on tax incidence and specifically asks who bears the tax burden in formulary apportionment systems as opposed to who pays the tax bill (following seminal work by Harberger 1962; for a recent overview of tax incidence effects in small open economies see Gravelle 2013).When wages are part of the allocation key, employees bear a large portion of an increased business tax by accepting reduced gross wages (e.g., Mclure 1980). By contrast, firms have additional resources available to hire additional employees or increase current salaries when business tax rates decrease. The effect holds when business tax rates increase. Consequently, jurisdictions have incentives to decrease the allocation weights on wages to positively impact employment (Goolsbee and Maydew 2000). Ljungqvist and Smolyansky 2014 find that corporate tax rate increases reduce employment and personal incomes (which is similar to the result in Liu and Altshuler 2013), whereas tax rate decreases increase personal incomes but not employment. Closely related to my analysis, Fuest et al. (2013) investigate firm behavior at the municipality level. Although their analysis is based on German data, it relies on labor market data rather than on confidential tax return data. Fuest et al. estimate that an increase in tax burden by EUR 1 negatively affects firms' wage bills by up to EUR 0.77. Using similar data, Siegloch (2013) presents empirical evidence that labor market participants are mobile among Germany's municipalities. He concludes that tax rate changes will generally not affect factor prices, i.e.,

individual wages, but will affect factor inputs, i.e., hours of employment. Whereas these two papers exclusively consider corporations, my paper focuses on firms of any legal form that are subject to formulary apportionment.

It is obvious that firms with permanent establishments in overpriced municipalities have greater tax payments. Therefore, it is reasonable to ask whether firms pay the additional tax burden themselves or whether they pass the higher tax payment on to their employees. If firms pass the higher tax payment on to their employees, layoffs should increase and/or salaries of employees should decrease when the tax payment of a firm increases. Conversely, firms in underpriced municipalities have lower tax payments and therefore lower expenses. In this case, it is reasonable to inquire whether firms save the additional cash or pass the tax savings on to their employees. If firms pass the tax savings on to their employees, new hirings and/or employee salaries should increase when the firm's tax payments decrease.

In the short run, I do not expect that firms will attempt to adjust higher tax payments at the expense of their employees. Similarly, I do not expect that employees will save in taxes. Thus, in the short run, I assume that the sum of salaries in mispriced municipalities will not differ significantly from the sum of salaries in correctly priced municipalities. Due to collective wage and salary agreements, wages and salaries cannot be arranged in such a manner that additional tax payments or potential tax savings can be passed on to employees in the short run. Likewise, layoffs or fresh engagements cannot proceed rapidly in the short run. However, over the longer term, I assume that firms will look for ways to save (tax) costs. Similarly, in the long term, I expect that firms will seek to satisfy their employees. If employees work in a permanent establishment that is domiciled in an unattractive area (e.g., a landscaped region with poor leisure facilities), the corresponding tax rate will most likely be low. These tax savings of a firm can be

passed on to the employees to compensate for a reduced quality of life. I therefore hypothesize the following (in the alternative form):

H2a: In the short run, additional tax payments and potential tax savings due to mispriced municipalities are paid by firms themselves and not passed on to their employees.

H2b: In the long run, additional tax payments and potential tax savings due to mispriced municipalities are passed on to the firms' employees and are not paid by firms themselves.

4. Sample Selection and Research Design

4.1 Sample Selection

I use a unique dataset from the German fiscal authorities. The dataset contains confidential tax return data for the full population of all German commercial firms that were subject to trade tax in 2001[5], 2004, and 2007.[6] This dataset includes data from corporations, partnerships and sole proprietorships. Data are available at the single taxpayer level (single firms) but excludes any identifying information. I merge this confidential dataset with a regional dataset to insert economic variables at the district level into my analyses. The full population of German firms liable for trade tax and their complete annual trade tax return information for the three years consists of 8,112,385 firms. I exclude firms that do not contain cases of trade tax allocation by means of formulary apportionment (i.e., firms without a permanent establishment in more than one municipality, i.e., 7,707,476 firms), which reduces my original sample to 404,909 firms (1,609,520 permanent establishment-years). Furthermore, I exclude firms with missing values for trade tax levy rates or missing identifying municipality codes, loss firms and firms with loss carry forwards and firms for which trade tax base allocation is not conducted with regard to wages paid[7].

In 2007, there were approximately 12,268 municipalities in Germany.[8] The initial sample of municipalities contains 37,704 municipality-years (13,100 municipalities in 2001, 12,336 municipalities in 2004, and 12,268 municipalities in 2007). I exclude one municipality and, therefore, 3 municipality years due to a missing official municipality key. Additionally, I exclude

---

[5] I convert 2001 values, which are in Deutsche Marks, to the Euro by dividing the Deutsche Mark values by the relevant factor 1.95583.

[6] This confidential dataset is prepared by German fiscal authorities only every third year and is the reason why the intervening years (i.e., 2002, 2003, 2005, and 2006) are not available and not included in my analyses.

[7] By eliminating these firms, I ensure that only tangible income shifting firms are investigated.

[8] The number of German municipalities varies and decreases over time, mostly because of mergers of municipalities.

municipalities that do not contain all the information necessary for my later regression (e.g., trade tax levy rate or number of inhabitants). Thus, 5,113 municipality-years are excluded. Moreover, I eliminate all municipalities with no neighbor (i.e., the so-called city-states of Berlin, Bremen and Hamburg, in addition to independent cities) for reasons of spatial dependence (for detailed information, see Section 4.2). Thus, 235 municipalities-years are dropped. To guarantee that each municipality can be followed in both the short and the long run, I exclude all municipalities that do not appear in each of the three years (5,236 municipality-years are excluded). My resulting main sample thus consists of 9,039 municipalities for each year (27,117 municipality-years).

(Insert Table 1 about here)

4.2 Research Design

First, to estimate the theoretically correct trade tax rate, I try explaining municipality trade tax rates by using a straightforward linear (OLS) model that includes a variety of municipality characteristics and characteristics of the municipalities' districts. These variables are proxies for each municipality's supply of public goods. However, the renewed emphasis of a certain modern economic theory implies that the incentives of a municipality to determine its level of trade tax rate does not solely depend on the attributes and characteristics of the particular municipality but also depends on the structure of the entire system, its position within that system, and its interaction with other (nearby) municipalities (Anselin and Rey 1997, Ward and Gleditsch 2008).

To account for potential spatial dependence in the form of geographical spillovers, I test whether the use of a spatial error model would be appropriate (i.e., I test for the presence of spatial effects in my OLS regression analyses). Therefore, I first run the corresponding OLS regression in the sample of all German municipalities for each year in which sample data are available in this study (i.e., 2001, 2004, and 2007):

$$LevyRate_{j,t} = \alpha_0 + \sum \beta_m MunicipalityControl_{j,t} + \sum \beta_n DistrictControl_{k,t} + \varepsilon_j \quad (1)$$

where $LevyRate_{j,t}$ is the trade tax levy rate of each municipality j in year t. The matrix $MunicipalityControl_j$ includes the following three municipality-specific variables: $Inhabitants_j$, $RealPropertyTaxA_j$, and $RealPropertyTaxB_j$. Tax rates on real property are different for agricultural land (Type A) and other land that is improved or may be build up (Type B). Both types of taxes, similarly to the trade tax rate, are set independently by each municipality, and the revenues raised are available for the municipalities' budgets.

The matrix $DistrictControl_k$ includes the following 15 district-specific macroeconomic variables to proxy for regional factors and therefore for the set of public goods offered by each municipality, where k is the anonymized district identifier. I believe that it is important to control for other non-tax factors that represent the attractiveness of a region and could, therefore, also impact the trade tax rate of a particular municipality. In general, I believe that two main aspects can impact the level of trade tax rates. First, the regional composition may have an impact. Thus, the following questions should be asked: What is the size of a district ($SizeOfDistrict_k$)? What is the financial situation of a district ($CashResult_k$ as the proxy for whether it is a poor area k or a wealthy area k)? What is the average purchase price of land in this area that has been newly designated for development ($AvgPurchasePriceBuildingLand_k$ as the proxy for land costs in area k)? How many business registrations and cancellations are there ($BusinessRegistration_k$ and $BusinessCancellation_k$ as proxies for the number of competitors in area k)? What are the features of the landscape ($Area_k$, such as open areas for new business)? Is the area dependent on tourism ($Tourism_k$ as a proxy for the cultural environment and leisure time facilities)? Second, the situation of potential employees might also have explanatory power. Thus, the following questions should be asked: How many newborns live in the district ($BirthTotal_k$)? What is the

gross domestic product per inhabitant ($GDP\_perInhabitants_k$)? How high is the unemployment rate ($UnemploymentRate_k$ as a proxy for the educational development in area k)? What is the available income per household ($AvailableIncome\_perHousehold_k$ as a proxy for the purchasing power in area k)? How many people are moving in and out of this area ($MovingIn_k$, $MovingOut_k$)? The municipality and district variables utilized are defined in detail in Table 2.

(Insert Table 2 about here)

To determine spatial neighbors[9] in the spatial weight matrix W, I stipulate that all municipalities within the same district are neighbors (i.e., observations that are spatially close).[10] If a district has only one municipality (such as, for example, the so-called city states of Berlin, Bremen and Hamburg, in addition to independent cities[11]), they are excluded from the sample because each municipality requires at least one neighbor.[12] Consequently, the total number of municipalities in this regression is approximately 9,039. The results of the three OLS regressions (2001, 2004, and 2007) and of the diagnostic test for spatial dependence in these OLS regressions are shown in Table 3.

(Insert Table 3 about here)

The computed Moran's I statistic (as the spatial dependence test) for these OLS residuals is 124.8 in 2001 (2004: 130.4; 2007: 150.5), and the associated p-values are always 0.000. This finding demonstrates that the OLS results, which assume independent observations, are strongly affected by the spatial clustering in the dependent and independent variables. As a result, these

---

[9] The term "neighbor" is used in the prior literature to indicate strict physical contiguity (see, for example, Ord 1975).

[10] The spatial weight matrix W, which is based on contiguity, is row-standardized so that each row sums up to 1 (i.e., dividing each row vector c_i by the total number of links $\sum c_i$). Therefore, this spatial weight matrix W provides information about which observations are considered neighbors.

[11] Independent cities are German towns, which are directly subordinated to a region as opposed to a district.

[12] Because real borders are not considered, these city-states have no neighbors.

OLS results are likely to be misleading for both the statistical and substantive inferences that I may wish to draw concerning the relationship between the level of trade tax rates and its determinants. Thus, I must account for the spatial dependence by implementing a spatial error model that corrects for the potential bias resulting from the possibility that the level of tax rate in one municipality may be dependent on the level of tax rates of nearby municipalities.[13] The spatial error model is recommended when spatial dependence is expected in the disturbance term because the OLS estimator is no longer efficient and provides biased standard errors (Anselin 1988),[14] which indicates that spatial dependence enters through the errors rather than through the systematic component of the model (i.e., spatial lag model). Thus, spatial dependence is added to my regression through spatial error by correcting for the spatial autocorrelation due to the use of spatial data.

$$LevyRate_{j,t} = \alpha_0 + \sum \beta_m MunicipalityControl_{j,t} + \sum \beta_n DistrictControl_{k,t} + \lambda W\xi + \varepsilon_j \qquad (2)$$

The coefficients in the spatial error model only explain the relationship between independent and dependent variables that is not explained by the spatial effects. Additionally, I have divided the overall error into two components, i.e., a spatially uncorrelated error term that satisfies the normal regression assumption (ε_j), and ξ, which is a term that indicates the spatial component of the error term (Ward and Gleditsch 2008). The parameter λ indicates the extent to which the spatial component of the errors ξ are correlated with one another for nearby observations, as given by the vector of connectivities W. In Table 4, the spatial coefficient lambda (λ) is significant in the spatial error models (λ = 0.7644 in 2001; λ = 0.776 in 2004; λ = 0.7944 in

[13] It would also be reasonable to use a spatial lag model if I were interested in determining the existence and nature of spatial interdependence. However, I do not use a spatial lag model because I am mainly interested in correcting for potential bias.

[14] The error term in the spatial error model is specified as follows: $\varepsilon_j = \lambda W\xi + u$, where λ represents the coefficient for the spatially correlated error and W is an NxN (i.e., 9039 x 9039) symmetric spatial weight matrix that represents proximity between municipality j and municipality m (with $j \neq m$). U is an error term that satisfies the classical assumptions of independent identical distribution and constant variance σ^2.

2007) with a contiguity-based matrix for all three years, which justifies the use of this spatial econometrics model.

To subsequently identify differences between the empirically observed trade tax rate and the theoretically correct trade tax rate, I predict values based on the estimated spatial error model above.

(Insert Table 4 about here)

Figure 1 shows how the estimated model values and empirically observed values plot against one another for 2001.[15]

[15] I use trade tax levy rates instead of converted trade tax rates for graphical convenience, and the results indicate a clustering of trade tax levy rates at values that are multiplied by 10.

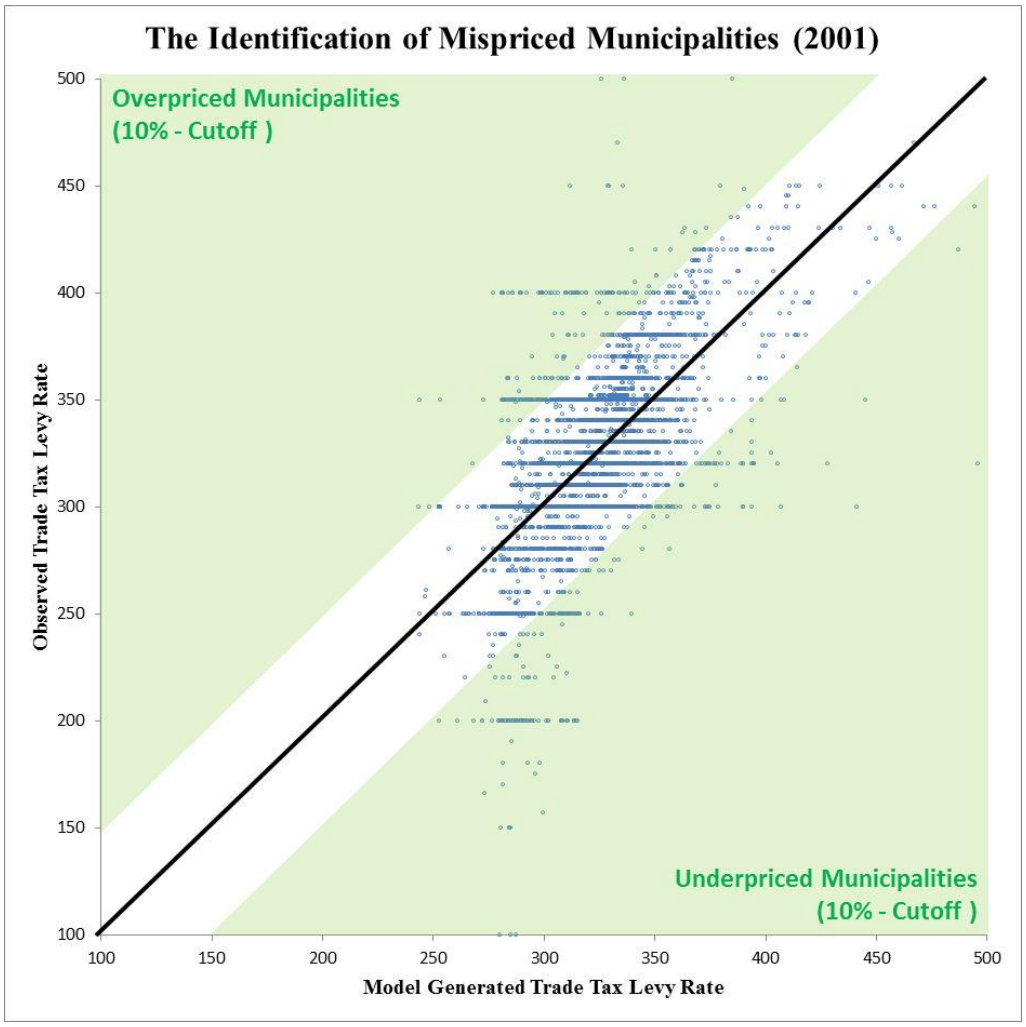

Figure 1: Identification of Mispriced Municipalities for 2001.
The identification strategy for 2004 and 2007 is analogous.

If every municipality sets its trade tax rate according to the intrinsic value of its public goods, all the 8,116 observation points should theoretically plot along the black diagonal. I classify a municipality as overpriced (underpriced) if it falls into the group of largest positive (negative) residuals of the spatial error regression (7). I use the 10^{th} percentile of all residuals as the cutoff and thus 904 out of 9,039 observed municipalities in 2001 are identified as overpriced (underpriced) (I perform an analogous procedure for 2004 and 2007). In Figure 1, the shaded areas represent this selection. To investigate the mispricing of municipalities over time, I analyze the following observations (see Figure 2):

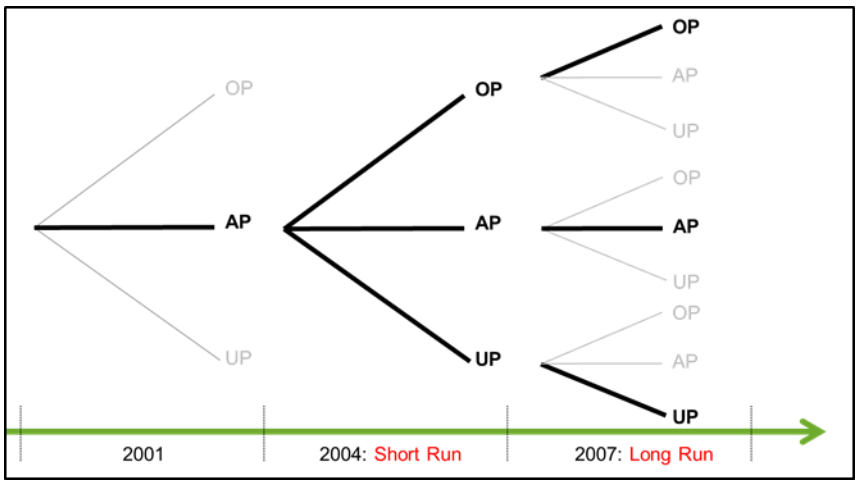

Figure 2: Overview of the municipalities used for the short and long-run analyses

I analyze the effect of how firms react to pricing changes of municipalities over time. To isolate this effect, I only analyze observations that were classified as correctly priced in 2001 (i.e., no mispricing in 2001 and thus not in the shaded area in Figure 1). This procedure has the advantage that the mispriced municipalities that I examine from 2004 were correctly priced in 2001. Moreover, correctly priced municipalities in 2004 were also correctly priced in 2001. Based on this short-run analysis, the long-run analysis investigates how firms react on long-run mispricing, which indicates that pricings in 2004 must be confirmed in 2007. Thus, for our purposes in this analysis, an overpriced municipality in 2007 must already have been overpriced in 2004 (but not in 2001).[16] In general, the mispricing of municipalities in 2007 must repeat the mispricing of 2004; otherwise, these municipalities are not considered in the long-run analysis.

To test H1a, I run the following regression (3) at the municipality level:

$$TaxBase_{j,04} = \alpha_0 + \beta_1 OP_{j,04} + \beta_2 UP_{j,04} + \beta_3 TaxBase_{j,01} + \beta_4 TaxBase_{j,01} * OP_{j,04} + \beta_5 TaxBase_{j,01} * UP_{j,04} + \sum \beta_m MunicipalityControl_{j,04} + \sum \beta_n DistrictControl_{k,04} + \varepsilon_i \quad (3)$$

[16] Municipalities, which were overpriced in 2004 but correctly or underpriced in 2007, are disregarded.

where $TaxBase_{j,01}$ and $TaxBase_{j,04}$ are the trade tax base of each municipality for 2001 and 2004, respectively.[17] For hypothesis 1, I test whether firms react more to overpriced and underpriced municipalities than to correctly priced municipalities. To test this assumption, I insert an indicator variable for both largely overpriced ($OP_{j,04}$) and largely underpriced ($UP_{j,04}$) municipalities, which implies that the regression coefficients on tax base vary depending on the level of mispricing. $OP_{j,04}$ = 1, if the residuals of the spatial error regression (2) are in the highest 10th percentile for 2004. Therefore, if residuals of the spatial error regression (2) are not in the subsample, $OP_{j,04}$ = 0, then the municipality is likely part of either the subsample of correctly priced municipalities or in the lowest 10th percentile of municipalities. Similarly, $UP_{j,04}$ = 1 if the residuals of the spatial error regression (2) are in the lowest 10th percentile in 2004 and 0 otherwise. Consequently, the interaction term $TaxBase_{j,01} * OP_{j,04}$ ($TaxBase_{j,01} * UP_{j,04}$) shows the incremental effect of being an overpriced (underpriced) municipality in 2004 compared with being a correctly priced municipality in 2004. All other variables are defined as discussed above.

In the short term, I expect an insignificant or only slightly negative coefficient for β_4, which would imply that firms react on that overpricing with a shift of personnel out of that overpriced municipality. In this case, the municipality's strategy would be unsuccessful. This finding would be consistent with firms interpreting overpriced municipalities as a ‘‘red flag’’ and reducing the amount of wages they pay (i.e., a reduction of employees) in these municipalities. Additionally, for β_5, I expect an insignificant or slightly positive coefficient in the short run. Firms realize and react to underpriced municipalities by shifting personnel into these municipalities. Thus, based on H1a, if employees are shifted more into underpriced

[17] For cross-sectional comparability, I convert 2001 values, which are in the currency Deutsche Mark, to the Euro by dividing the Deutsche Mark values by the relevant factor 1.95583.

municipalities and shifted less into overpriced municipalities compared to correctly priced municipalities, then $\beta_4 \leq 0$ and $\beta_5 \geq 0$.

Similarly, I expect the effect to be larger and statistically more significant in the long run (testing H1b). If firms have more time to adapt to a mispricing and recognize that there is mispricing in the short run (i.e., the mispricing would be reversed after one period), the observed effect in 2004 (i.e., three years after the pricing change) should be even more substantial in 2007 (i.e., six years after the pricing change). This effect indicates that employees are shifted significantly into underpriced and out of overpriced municipalities over the long run compared with correctly priced municipalities. Thus, consistent with H1b, I predict that $\beta_4 < 0$ and $\beta_5 > 0$ in the following regression (4) at the municipality level:

$$\begin{aligned} TaxBase_{j,07} = {} & \alpha_0 + \beta_1 OP_{j,07} + \beta_2 UP_{j,07} + \beta_3 TaxBase_{j,01} + \beta_4 TaxBase_{j,01} * OP_{j,07} \\ & + \beta_5 TaxBase_{j,01} * UP_{j,07} + \sum \beta_m MunicipalityControl_{j,07} \\ & + \sum \beta_n DistrictControl_{k,07} + \varepsilon_i \end{aligned} \quad (4)$$

To test hypothesis 2, I move from the municipality level (H1a and H1b) to the firm level by investigating firm decisions. Apart from the investigation level, the research design is similar to hypotheses H1a and H1b. Beginning with H2a, the short-run analysis, I investigate who is paying or earning the extra tax payments or tax savings by running the following regression (5) at the firm level:

$$\begin{aligned} LaborCosts_{i,04} = {} & \alpha_0 + \beta_1 OP_{i,04} + \beta_2 UP_{j,04} + \beta_3 LaborCosts_{i,01} + \beta_4 LaborCosts_{i,01} * OP_{i,04} \\ & + \beta_5 LaborCosts_{i,01} * UP_{i,04} + \varepsilon_i \end{aligned} \quad (5)$$

where $LaborCosts_{i,01}$ and $LaborCosts_{i,04}$ is the sum of wages paid within one firm i in 2001 and 2004, respectively. For hypothesis 2a, I test whether firms with at least one permanent

establishment in an overpriced (underpriced) municipality pass the additional tax payments (tax savings) on to their employees compared to firms with permanent establishments only in correctly priced municipalities. To test this assumption, I insert indicator variables for firms with permanent establishments in overpriced municipalities ($OP_{i,04}$) and for firms with permanent establishments in underpriced ($UP_{i,04}$) municipalities, which implies that the regression coefficients on labor costs vary depending on the level of mispricing. $OP_{i,04}$ = 1 if a firm has at least one permanent establishment in a municipality for which the residuals of the spatial error regression (2) are in the highest 10th percentile in 2004, and 0 otherwise. Similarly, $UP_{i,04}$ = 1 if a firm has at least one permanent establishment in a municipality for which the residuals of the spatial error regression (2) are in the lowest 10th percentile in 2004, and 0 otherwise.[18] Consequently, the interaction term $LaborCosts_{i,01} * OP_{i,04}$ ($LaborCosts_{i,01} * UP_{i,04}$) shows the incremental effect of being a firm that has permanent establishments in an overpriced (underpriced) municipality in 2004 compared to being a firm that has permanent establishments exclusively in correctly priced municipalities in 2004.[19] In the short run, I expect that firms will not have the ability to pass tax payments or savings on to their employees. Thus, consistent with H2a, I predict that $\beta_4 = 0$ and $\beta_5 = 0$.

However, in the long run (H2b), I expect the effect to be larger and statistically more significant. Firms have more time (i.e., at least more than three years) to pass on to their employees additional tax payments and tax savings caused by over- or underpricings of municipalities to their employees. Thus, I expect that in the long run, employees will bear the additional tax payments of an overpricing but also participate in the tax savings of an

[18] If firms have permanent establishments in both overpriced and underpriced municipalities, these firms are disregarded in the regressions due to opposed effects, which would even out (i.e., I would expect fewer labor costs in overpriced municipalities and greater labor costs in underpriced municipalities).

[19] Municipality and district control vectors cannot be implemented in these regressions because they are run at the firm level and not on the level of permanent establishments. Therefore, each firm is domiciled in more than one municipality and district.

underpricing. Thus, consistent with H2b, I predict that $\beta_4 < 0$ and $\beta_5 > 0$ in the following regression (6) at the firm level:

$$LaborCosts_{i,07} = \alpha_0 + \beta_1 OP_{i,07} + \beta_2 UP_{j,07} + \beta_3 LaborCosts_{i,01} + \beta_4 LaborCosts_{i,01} * OP_{i,07} + \beta_5 LaborCosts_{i,01} * UP_{i,07} + \varepsilon_i \quad (6)$$

5. Results and Robustness Tests

5.1 Results

Table 5 presents descriptive statistics for the variables in my (spatial) regression models, which are at the municipality or district level. In my sample, the trade tax levy rates vary between 0 and 900 %, with an average of approximately 325.14 percent. Municipalities and districts are naturally heterogeneous. In particular, the number of inhabitants per municipality shows notable variation, with a minimum of three inhabitants (for the municipality of Wiedenborstel) and a maximum of 516,166 inhabitants (for the municipality of Hannover).[20] With respect to economic indicators, the average GDP in EUR per inhabitant ranges between 11,539 (in the Sudwestpfalz district in 2001) and 86,728 (in the Munich district), with a mean of approximately 21,021. The unemployment rate varies between 2.2 % (in the Eichstätt district in 2007) and 29.3 % (in the Uecker-Randow district in 2004), with a mean of approximately 9.19 %.

(Insert Table 5 about here)

Table 6, Panel A, presents the results to the question of whether firms react to the mispricing of municipalities in the short run (i.e., when a municipality is correctly priced in 2001 but overpriced or underpriced in 2004).

(Insert Table 6 about here)

Consistent with my expectation, the coefficient for the interaction term (β_4) is not significantly different from 0. This finding likely results because firms cannot shift employees out of overpriced municipalities in the short run. Consequently, overpriced municipalities seem to improve their financial and economic situations in the short run. Analyzing the interaction term

[20] In my sample, Berlin is not the municipality with the most inhabitants because it is excluded for being a city-state and, therefore, having no neighbor.

(β_4) leads to the interpretation that overpriced municipalities do not have significantly lower tax base persistence compared to correctly priced municipalities. Therefore, because the not significantly lower tax base is taxed at a higher tax rate (as a result of the overpricing), overpriced municipalities increase their economic prosperity and public budget in the short run.

However, firms seem to react to the underpricing of a municipality in the short run. Large underpriced municipalities have significantly higher tax base persistence compared to correctly priced municipalities ($Model\ 1: \beta_5 = +0.74;\ Model\ 2: \beta_5 = +0.75; Model\ 3: \beta_5 = +0.75$). Firms are attracted by the lower tax rate and trust the underpriced municipalities in the short run. Because firms react to underpricing by shifting employees into the underpriced municipalities, these underpriced municipalities have significantly more tax base. The question of whether underpricing was successful (i.e., achieving a budget that is larger than it was before the tax rate increase) or unsuccessful as a strategy depends on whether the additional income can overcompensate the reduced tax rate.

In sum, both the underpricing and overpricing strategies are successful for municipalities in the short run. Employees are not significantly shifted out of overpriced municipalities (consistent with H1a), whereas employees are rapidly shifted into underpriced municipalities (inconsistent with H1a).

Based on my findings, the question is whether the municipality's strategy to over- or underprice is also successful in the long run. The results for the long-run analyses are presented in Table 6, Panel B.

Over the long run, I find that overpriced municipalities have significantly less persistent tax base ($Model\ 1: \beta_4 = -0.59;\ Model\ 2: \beta_4 = -0.58; Model\ 3: \beta_4 = -0.58$) relative to correctly priced municipalities. This finding indicates that firms shift employees out of overpriced

municipalities in the long run, although such firms may be hesitant and reserved in the short run. Consequently, when the overpricing is stable and constant over time, firms interpret largely overpriced municipalities as a ‘‘red flag’’ and reduce the amount of wages they pay (i.e., they reduce the number of employees) in these municipalities. This finding is constant over all three models and consistent with H1b. The tax base reduction stemming from employees being shifted out of overpriced municipalities is of sufficient magnitude that it likely cannot be compensated for with the income generated from the higher tax rate.

Additionally, I find that underpriced municipalities have significantly higher tax base persistence compared to correctly priced municipalities ($Model\ 1: \beta_5 = 1.20;\ Model\ 2: \beta_5 = 1.21; Model\ 3: \beta_5 = 1.21$). This finding, which is constant over all three models, is consistent with H1b and suggests that firms react to underpricing by shifting employees into underpriced municipalities. Thus, the underpriced municipalities have larger public budgets after the tax rate decrease. Compared to the short run, the coefficient is larger and the corresponding t-value is higher. Thus, in the long run, the underpricing strategy is successful because the additional income generated by the addition of new employees in these municipalities (and therefore, an increased tax base) compensates for the lower tax rate.

In general, overpriced municipalities have a different assumption regarding attendant firms than underpriced municipalities. Overpriced municipalities hope that firms will not realize and/or react to the overpricing, whereas underpriced municipalities hope that firms will realize and react to the underpricing. Based on my results, I conclude that firms realize and react to the mispricing of municipalities. Firms are unwilling to pay excessive taxes in overpriced municipalities. Instead, firms are attracted to underpriced jurisdictions. Underpriced municipalities offer sufficient incentives to firms such that firms shift employees into those

municipalities over both time horizons. With respect to overpriced municipalities, firms hesitate to move their employees out of those municipalities in the short run and wait to determine whether the mispricing can be proven and whether it will persist over time. Firms likely act this way because location decisions must be carefully considered because of the attendant time-consuming planning process and the difficulty of reversing such decisions.

Based on these findings, Table 7 reports the results for Hypothesis 2. Panel A, with data from the short-run analysis, presents the coefficients for the interaction terms (β_4 and β_5), which are insignificant and suggest that the labor costs of firms with permanent establishments in overpriced or underpriced municipalities do not differ from those of firms that have permanent establishments in correctly priced municipalities only. Thus, I can show that firms neither attempt to adjust the higher tax payments at the expense of their employees nor allow their employees to partake in the tax savings. Consequently, in the short run, firms bear the additional tax payments themselves but also earn money through additional tax savings, which is consistent with H2a.

(Insert Table 7 about here)

However, in the long-run analysis, the coefficient β_4 remains insignificant, which indicates that firms also bear additional tax payments in the long run due to overpriced municipalities. This relatively surprising finding is inconsistent with H2b. However, regarding tax savings, firms seek ways to satisfy their employees because the coefficient β_5 of the interaction term is significantly positive in two of the three models ($Model\ 1: \beta_5 = 1.52$; $Model\ 3: \beta_5 = 0.78$). Consistent with H2b, this finding suggests that firms pass on tax savings to their employees in the long run, perhaps to compensate for a reduced quality of life in mostly unattractive rural areas.

5.2 Robustness Tests

I conduct robustness tests to evaluate the reported results. I first determine the reliability of my identification strategy for mispriced jurisdictions. In my main analyses, overpricing and underpricing are defined as the top and bottom 10^{th} percentile, respectively. I rerun the aforementioned regression using the 20^{th} percentile. I expect that the main findings should remain observable but have weaker significance because increasing the amount of mispriced municipalities causes "lesser" mispriced municipalities to be labeled as overpriced or underpriced. The weaker the mispricing, the higher the possibility that firms (1) will not realize the mispricing or (2) will realize the mispricing but will not react to it by shifting employees because the net benefit (i.e., shifting costs versus tax savings) is too low.

(Insert Table 8 about here)

Both the short-run (Panel A) and long-run analyses (Panel B) presented in Table 8 show that my reported results in Table 6 remain significantly and economically unchanged when using a 20 % cutoff. All the main findings can be confirmed; as expected, the coefficients and the level of significance are slightly lower.

Pushing this idea further, it is informative that using a 30 % cutoff weakens the results. As mentioned above, by categorizing more municipalities as over- and underpriced, the observed shifting effects should disappear step by step. In this scenario, 60 % of the sample is mispriced, whereas only 40 % is correctly priced. The results show that in this case, firms do not significantly shift employees to underpriced municipalities either in the short run or in the long run. Additionally, firms do not shift significant numbers of employees out of overpriced municipalities in the short run. However, they do so in the long run—although with a lower level of significance. These robustness tests explicitly show that firms realize and react to mispricings

only when the mispricing is large enough. This finding underlines the theory that location decisions are costly and difficult to implement.

6. Conclusion

This paper investigates two research questions: (1) How do firms judge the mispricing of jurisdictions? and (2) Who bears the tax burden in the case of a mispricing? The first question contributes to the question of whether market participants can see through the (pricing) strategies of municipalities. If firms can identify mispricings of jurisdictions, I also ask if and how they react to this assessment.

I find that firms can indeed see through the market. Firms react to mispricings by shifting real activities (not just through accounting decisions). More precisely, I find that firms realize and react to the mispricing of municipalities, particularly over the long term. Firms are not willing to pay excessive taxes in overpriced municipalities but are rather attracted by underpriced jurisdictions. In the short run, the results are mixed. Regarding overpriced municipalities, firms hesitate and carefully determine whether the mispricing can be proven and is constant over time. Therefore, firms respond to the overpricing of municipalities with greater reserve. However, firms are already shifting significant amounts of employees into underpriced municipalities in the short run. Therefore, underpricing is a greater incentive for action for a firm than overpricing. Because firms are attracted by underpriced municipalities in both time horizons and react to these underpricings (i.e., an obvious decrease in the tax rate) by shifting employees into these regions, I conclude that taxes matter in firms' location decisions.

Because of data limitations, the prior literature focuses on income shifting via accounting decisions. This paper therefore contributes to the question of whether firms can realize tax overpricing and tax underpricing of jurisdictions. My results suggest that firms not only use accounting decisions to react to such mispricings but also react by making and implementing real location decisions.

Moreover, I find that the firms themselves bear the additional tax payments and do not pass on the tax burden to their employees by decreasing salaries or laying off employees in either the short or long run. Regarding tax savings due to underpriced municipalities, firms do not pass the saved money on to their employees in the short run but do so in the long run, which suggests that employees partake in the tax savings either by increasing salaries or accepting new jobs.

Of course, my study is also subject to limitations. According to the Human Development Index (HDI), Germany is a country with a very high level of human development (fifth out of 186 countries, Report 2013). Therefore, my conclusion will likely hold for similarly developed countries (e.g., the United States, which are ranked third in the HDI). However, it is unclear whether firms in less developed countries (e.g., the Republic of China, which ranks 100th in the HDI) would react to mispricing in the same way.

To conclude, research investigates whether taxes influence firms' operations over the course of several decades. Without disregarding the influence of other factors on firm behavior, this paper shows that "tax sells". Thus, firms react to changes in tax rates not only by means of accounting decisions but also through real location decisions, the extent to which may have thus far been underestimated.

References

Anselin, Luc (1988). Spatial Econometrics: Methods and Models, in: Dordrecht, Boston, London,

Anselin, Luc and Sergio J. Rey (1997). Introduction to the Special Issue on Spatial Econometrics. International Regional Science Review 20(1 & 2): 1-7.

Asimakopulos, A. (1979). The Incidence of Taxation. Challenge (05775132) 22(1): 47.

Auerbach, Alan J. (2006). Who Bears the Corporate Tax? A Review of What We Know. NBER/Tax Policy & the Economy (MIT Press) 20(1): 1-40.

Bardos, Katsiaryna Salavei, Joseph Golec and John P. Harding (2011). Do Investors See through Mistakes in Reported Earnings? Journal of Financial & Quantitative Analysis 46(6): 1917-1946.

Besley, Timothy and Anne Case (1995). Incumbent behavior: Vote-seeking, tax-setting, and yardstick competition. American Economic Review 85(1): 25.

Besley, Timothy and Michael Smart (2007). Fiscal restraints and voter welfare. Journal of Public Economics 91(3/4): 755-773.

Bordignon, Massimo, Floriana Cerniglia and Federico Revelli (2003). In search of yardstick competition: a spatial analysis of Italian municipality property tax setting. Journal of Urban Economics 54(2): 199.

Braid, Ralph M. (2013). State and local tax competition in a spatial model with sales taxes and residential property taxes. Journal of Urban Economics 75: 57-67.

Carbonnier, Clément (2013). Decentralization and Tax Competition between Asymmetrical Local Governments: Theoretical and Empirical Evidence. Public Finance Review 41(4): 391-420.

Chuk, Josephine (2012). Why tax competition in Asia-Pacific will only get stronger. International Tax Review 23(3): 19-19.

Cormier, Denis and Isabelle Martinez (2006). The association between management earnings forecasts, earnings management, and stock market valuation: Evidence from French IPOs. International Journal of Accounting 41(3): 209-236.

Dechow, Patricia M. and Douglas J. Skinner (2000). Earnings Management: Reconciling the Views of Accounting Academics, Practitioners, and Regulators. Accounting Horizons 14(2): 235-250.

Devereux, Michael P. and Rachel Griffith (1998). Taxes and the location of production: Evidence from a panel of US multinationals. Journal of Public Economics 68(3): 335.

Devereux, Michael P., Ben Lockwood and Michela Redoano (2008). Do countries compete over corporate tax rates? Journal of Public Economics 92(5–6): 1210-1235.

Devereux, Michael P. and Simon Loretz (2013). What Do We Know About Corporate Tax Competition? National Tax Journal 66(3): 745-773.

Feld, Lars P. and Emmanuelle Reulier (2009). Strategic Tax Competition in Switzerland: Evidence from a Panel of the Swiss Cantons. German Economic Review 10(1): 91-114.

Fischer, Stanley, Rudiger Dornbusch and Richard Schmalensee, Eds. (1982). Introduction to Microeconomics. New York, McGraw-Hill, Inc.

Fuest, Clemens, Andreas Peichl and Sebastian Siegloch (2013). Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany, available at: http://ftp.zew.de/pub/zew-docs/dp/dp13039.pdf, 1-47.

Goolsbee, Austan and Edward L. Maydew (2000). Coveting thy neighbor's manufacturing: The dilemma of state income apportionment. Journal of Public Economics 75(1): 125.

Gravelle, Hugh and Ray Rees (1987). Microeconomics, in: Longman Inc., New York,

Gravelle, Jennifer (2013). Corporate Tax Incidence: Review of General Equilibrium Estimates and Analysis. National Tax Journal 66(1): 185-214.

Gupta, Sanjay and Lillian F. Mills (2002). Corporate multistate tax planning: benefits of multiple jurisdictions. Journal of Accounting and Economics 33(1): 117-139.

Hanlon, Michelle (2005). The Persistence and Pricing of Earnings, Accruals, and Cash Flows When Firms Have Large Book-Tax Differences. Accounting Review 80(1): 137-166.

Harberger, Arnold C. (1962). The Incidence of the Corporation Income Tax. Journal of Political Economy 70(3): 215-240.

Haufler, Andreas and Frank Stähler (2013). Tax Competittion in a Simpel Model With Heterogenous Firms: How Larger Markets Reduce Profit Taxes. International Economic Review 54(2): 665-692.

Janeba, Eckhard and Steffen Osterloh (2013). Tax and the city — A theory of local tax competition. Journal of Public Economics 106: 89-100.

Klassen, Kenneth J. and Douglas A. Shackelford (1998). State and provincial corporate tax planning: income shifting and sales apportionment factor management. Journal of Accounting and Economics 25(3): 385-406.

Leibrecht, Markus and Claudia Hochgatterer (2012). Tax Competition as a Cause of Falling Corporate Income Tax Rates: A Survey of Empirical Literature. Journal of Economic Surveys 26(4): 616-648.

Liu, Li and Rosanne Altshuler (2013). Measuring the Burden of the Corporate Income Tax Under Imperfect Competition. National Tax Journal 66(1): 215-238.

Ljungqvist, Alexander and Michael Smolyansky (2014). On the Effectiveness of Fiscal Policy: Micro Evidence from Contiguous Border Counties, available at: http://areas.kenan-flagler.unc.edu/Accounting/TaxCenter/taxsym2014/Documents/2014%20Smolyansky.pdf, 1-51.

Lyytikäinen, Teemu (2012). Tax competition among local governments: Evidence from a property tax reform in Finland. Journal of Public Economics 96(7/8): 584-595.

McLure, Charles E. (1980). The state corporate income tax: lambs in wolves' clothing, in: H. Aaron, Boskin, M. The Economics of Taxation, Brookings, Washington, DC,

Mintz, Michael and Jack Smart (2004). Income shifting, investment, and tax competition: theory and evidence from provincial taxation in Canada. Journal of Public Economics 88(6): 1149.

Mota, Isabel and António Brandão (2013). The determinants of location choice: Single plants versus multi-plants* The determinants of location choice: Single plants versus multi-plants. Papers in Regional Science 92(1): 31-49.

Moulin, Hervé (1995). Cooperative Microeconomics, in: Prentice Hall/Harvester Wheatsheaf, Hertfordshire, 1-453.

Oates, Wallace E. (1972). Fiscal Federalism, in: Harcourt Brace Jovanovic, New York,

Ord, Keith (1975). Estimation Methods for Models of Spatial Interaction. Journal of the American Statistical Association 70(349): 120.

Overesch, Michael and Johannes Rincke (2011). What Drives Corporate Tax Rates Down? A Reassessment of Globalization, Tax Competition, and Dynamic Adjustment to Shocks. Scandinavian Journal of Economics 113(3): 579-602.

Report, Human Development (2013). The Rise of the South: Human Progress in a Diverse World, available at: http://hdr.undp.org/sites/default/files/reports/14/hdr2013_en_complete.pdf, 1-216.

Reulier, Emmanuelle and Yvon Rocaboy (2009). Regional Tax Competition: Evidence from French Regions. Regional Studies 43(7): 915-922.

Rymarzak, Małgorzata and Ewa Siemińska (2012). Factors affecting the location of real estate. Journal of Corporate Real Estate 14(4): 214-225.

Shackelford, Douglas and Terry Shevlin (2001). Empircal Tax Research in Accounting. Journal of Accounting & Economics 31(1-3): 321-387.

Shevlin, Terry, Tanya Y. H. Tang and Ryan J. Wilson (2012). Domestic Income Shifting by Chinese Listed Firms. Journal of the American Taxation Association 34(1): 1-29.

Siegloch, Sebastian (2013). Employment Effects of Local Corporate Taxes, available at: http://www.sbs.ox.ac.uk/sites/default/files/Business_Taxation/Events/conferences/symposia/2013/siegloch.pdf, 1-40.

Ward, Michael D. and Kristian S. Gleditsch (2008). Spatial Regression Models. Los Angeles, Sage Publ.

Wilson, John Douglas (1999). Theories of Tax Competition. National Tax Journal 52(2): 269-304.

Table 1
Sample Selection

Criteria	Municipalities in 2001	Municipalities in 2004	Municipalities in 2007	**Municipality-years**
full sample of German municipalities	13,100	12,336	12,268	**37,704**
with no missing official municipality key	*(-1)* = 13,099	*(-1)* = 12,335	*(-1)* = 12,267	***(-3)* = 37,701**
with no missing values for main (spatial) regressions	*(-1,979)* = 11,120	*(-2,115)* = 10,220	*(-1,019)* = 11,248	***(-5,113)* = 32,588**
with at least one spatial neighbor	*(-76)* = 11,044	*(-72)* = 10,148	*(-87)* = 11,161	***(-235)* = 32,353**
with each municipality can be followed in both the short and the long run	*(-2,005)* = 9,039	*(-1,109)* = 9,039	*(-2,122)* = 9,039	***(-5,236)* = 27,117**

Notes: This table explains the sample selection criteria used in this study. Variables referred to above are defined in Section Sample Selection.

Table 2
Variable Explanations

	Levy Rate	trade tax levy rate of the municipality j
	Tax Base	trade tax base (i.e., before calculating the tax rate) of each municipality j in the year 2001, 2004, or 2007
	OP	On a municipality level: Overpricing of a municipality j (i.e., residuals of the spatial error regression (2) are in the highest 10% percentile in the year 2004 (short run) or in the years 2004 and 2007 (long run)). On a firm level: A firms has at least one permanent establishment in a municipality for which the residuals of the spatial error regression (2) are in the highest 10% percentile.
	UP	On a municipality level: Underpricing of a municipality j (i.e., residuals of the spatial error regression (2) are in the lowest 10% percentile in the year 2004 (short run) or in the years 2004 and 2007 (long run)). On a firm level: A firms has at least one permanent establishment in a municipality for which the residuals of the spatial error regression (2) are in the lowest 10% percentile.
	Labor Costs	sum of wages paid within one firm i in a particular year (i.e., 2001, 2004, or 2007)
Municipality Controls		
	Inhabitants	Number of inhabitants in municipality j
	Real Property Tax A	Real Property Tax for agriculture, measured in %
	Real Property Tax B	Real Property Tax for architectural purposes, measured in %
District Controls		
	Size of district	Size of a district k, measured in squared kilometres (km²)
	Birth - Total	Births of all genders in a district k
	Cash Result	Cash Result is the result of operting income in a district k less operating expenses in the same district k
	Average Purchase Price Land	Average purchase price per squared meter (m²) in one year in district k in ths. Euros - total
	GDP per Inhabitants	Gross domestic product per inhabitants in district k
	Unemployment Rate	Unemployment calculated as the ratio of unemployed persons and the whole employable population in district k
	Available Income per Household	Average income per household in district k
	Moving In	Immigration over a district border k
	age under 18	Segmentation in different age groups
	age 18-25	
	age 25-30	
	age 30-50	
	age 50-65	
	age > 65	
	Total	Sum of all moving ins into district k
	Moving Out	Emigration over a district border k
	age under 18	Segmentation in different age groups
	age 18-25	
	age 25-30	
	age 30-50	
	age 50-65	
	age > 65	
	Total	Sum of all moving outs out of district k
	Business Registration	Umbrella term for all business registrations in one year in district k for different reasons
	Reconstruction	Business Registrations due to reconstruction in one year in district k
	Moving In	Business Registrations due to moving in in one year in district k
	Moving Out	Business Registrations due to moving out in one year in district k
	Total	Sum of all business registrations in one year in district k
	Business Cancellation	Umbrella term for all business cancellations in one year in district k for different reasons
	Abandonment	Business Cancellations due to abandonment in one year in district k
	Moving Out	Business Cancellations due to moving out in one year in district k
	Transfer	Business Cancellations due to transfer in one year in district k
	Total	Sum of all business cancellations in one year in district k
	Areas	Umbrella term for all areas
	Land Area	Land area is the sum of Settlement and Traffic Area, Farmland, Wood Area, Water Area and Mining Land
	Building Open Area Housing	Building Open Area Housing in district k
	Building Open Area Business	Building Open Area Business in district k
	Plant Area	Plant Area in district k without Mining Land
	Traffic Area	Traffic Area in district k
	Farmland	Area of agriculture (marsh and moorland among others)
	Tourism	Umbrella term for tourism key figures in district k
	Beds	Offered guest beds in district k
	Guests Overnight Stay	Guests Overnight Stay in district k

Table 3
OLS Estimation of theoretically appropriate trade tax rates

$$LevyRate_{j,t} = \alpha_0 + \sum \beta_m MunicipalityControl_{j,t} + \sum \beta_n DistrictControl_{k,t} + \varepsilon_j \quad (1)$$

Independent Variable	Pred. Sign	Model 2001	Model 2004	Model 2007
Intercept		251.6705***	259.7063***	241.6634***
Municipality Controls				
Inhabitants	+	0.0004***	0.0004***	0.0004***
Real Property Tax A	-	-0.036***	-0.0437***	-0.0305***
Real Property Tax B	+	0.3375***	0.3444***	0.3787***
District Controls				
Size of district	+/-	1.2344	0.5199	0.1600
Birth - Total	+	-0.0033*	-0.0035*	-0.0074***
Cash Result	+	-1.35e-07***	-4.59e-08***	-1.34e-08***
Average Purchase Price Land	+/-	-0.0670***	-0.0786***	-0.0976***
GDP per Inhabitants	+	3.42e-03	-8.16e-03	-9.49e-03
Unemployment Rate	-	-1.7652***	-2.0341***	-1.8854***
Available Income per Household	+	1.09e-03***	9.27e-06***	7.23e-06***
Moving In (total)	+	-0.0047***	-0.0031***	-0.0043***
Moving Out (total)	-	0.0047***	0.0031***	0.0049***
Business Registration (total)	+/-	0.0143***	0.0038*	0.0131***
Business Cancellation (total)	+/-	-0.0257***	-0.0026	-0.0178***
Areas	+			
Land Area		-0.0125	-0.0053	-0.0018
Building Open Area Business		-0.0032***	-0.0027***	-0.0051***
Plant Area		0.0195***	0.0160***	0.0247***
Tourism	+			
Beds		0.0001	0.0002	0.0016***
Guests Overnight Stay		1.45e-06	2.31e-07	-1.08e-03***
Adj. R^2		43.71%	46.31%	47.83%
N		9,039	9,039	9,039
Diagnostic tests for spatial dependence in OLS regressions				
Spatial error:				
Moran's I		124.791***	130.425***	150.346***
Lagrange multiplier		1.4e+04***	1.6e+04***	2.1e+04***
Robust Lagrange multiplier		7451.324***	8338.6464***	1.2e+04***

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Table 4
Spatial error model of theoretically appropriate trade tax rates

$$LevyRate_{j,t} = \alpha_0 + \sum \beta_m MunicipalityControl_{j,t} + \sum \beta_n DistrictControl_{k,t} + \lambda W\xi + \varepsilon_j \quad (2)$$

Independent Variable	Pred. Sign	Model 2001	Model 2004	Model 2007
Intercept		239.3928***	256.3617***	239.4266***
Municipality Controls				
Inhabitants	+	0.0003***	0.0003***	0.0002***
Real Property Tax A	-	0.0112*	0.0208***	-0.0163***
Real Property Tax B	+	0.3290***	0.2900***	0.3384***
District Controls				
Size of district	+/-	-0.0012	0.8310	0.8055
Birth - Total	+	-0.0046	-0.0051	-0.0067
Cash Result	+	-1.23e-07*	-4.48e-08	-1.34e-08
Average Purchase Price Land	+/-	-0.0699**	-0.0830***	-0.0992***
GDP per Inhabitants	+	-2.02e-03	-0.0002	-0.0001
Unemployment Rate	-	-1.4798***	-1.709***	-1.6105***
Available Income per Household	+	1.2e-03*	1.16e-03**	8.76e-06*
Moving In (total)	+	-0.0051***	-0.0035	-0.0044*
Moving Out (total)	-	0.0051***	0.0035	0.0044
Business Registration (total)	+/-	0.0182*	-0.0025	0.0109
Business Cancellation (total)	+/-	-0.0288***	-0.0054	-0.0146
Areas	+			
Land Area		-0.0002	-0.0085	0.0079
Building Open Area Business		-0.0033*	-0.0029	-0.0055*
Plant Area		0.0229**	0.0214**	0.0293***
Tourism	+			
Beds		3.46E-03	-0.0002	0.0014**
Guests Overnight Stay		2.05e-06	4.11e-06	-9.34e-06
Squared corr.		43.10%	45.20%	47.00%
N		9,039	9,039	9,039
lambda (λ)		0.7644***	0.7764***	0.7944***

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Weights matrix W, row-standardized

Table 5
Descriptive Statistics of Selected Variables

Municipality Controls					
Variable	**Obs**	**Mean**	**Std.**	**Min**	**Max**
Trade Tax Levy Rate	27,117	325.14	35.13	0	900
Inhabitants	27,117	4,640.25	10,845.16	3	516,166
Real Property Tax A	27,117	283.78	66.82	0	1,800
Real Property Tax B	27,117	309.71	42.52	0	900
District Controls					
Size of district	27,117	1,268.95	549.72	249	3,058
Birth - Total	27,117	1,417.36	936.13	347	10,075
Cash Result	27,117	-10,400,000.00	56,500,000.00	-925,000,000	125,000,000
Average Purchase Price Land	27,117	58.94	57.47	0	509
GDP per Inhabitants	27,117	21,020.83	5,764.08	11,539	86,728
Unemployment Rate	27,117	9.19	5.18	2	29
Available Income per Household	27,117	2,858,015.00	1,969,968.00	746,206	20,800,000
Moving In (total)	27,117	10,120.23	7,796.01	1,880	116,086
Moving Out (total)	27,117	9,877.56	7,298.70	2,273	116,171
Business Registration (total)	27,117	1,638.32	1,086.23	374	12,427
Business Cancellation (total)	27,117	1,308.73	874.78	329	9,288
Areas					
Land Area	27,117	126,896.00	54,973.19	24,917	305,822
Building Open Area Business	27,117	734.00	600.41	0	3,671
Plant Area	27,117	205.11	138.04	14	1,479
Tourism					
Beds	27,117	7,523.71	8,580.21	620	55,907
Guests Overnight Stay	27,117	901,692.00	1,071,432.00	55,505	6,877,273

Each of the variables is defined in Table 2.

Table 6
The reaction of firms to mispriced municipalitites in the short run (H1a)

PANEL A: Short run analysis (10% Cutoff)

$$TaxBase_{j,04} = \alpha_0 + \beta_1 OP_{j,04} + \beta_2 UP_{j,04} + \beta_3 TaxBase_{j,01} + \beta_4 TaxBase_{j,01} * OP_{j,04} + \beta_5 TaxBase_{j,01} * UP_{j,04} + \sum \beta_m MunicipalityControl_{j,04} + \sum \beta_n DistrictControl_{k,04} + \varepsilon_i \quad (3)$$

Independent Variable	Pred. Sign	Model 1	Model 2	Model 3
Intercept		31,267.66*	52,186.99**	-172,699.50
OP		-19,326.46	-22,293.87	-25,281.99
UP		-37,603.67***	-32,230.35***	-31,937.09***
Income01	+	**0.52*** (4.09)**	**0.50*** (4.07)**	**0.50*** (4.07)**
Income01 * OP	+/-	**0.06 (0.56)**	**0.07 (0.65)**	**0.07 (0.61)**
Income01 * UP	+/-	**0.74*** (6.09)**	**0.75*** (6.37)**	**0.75*** (6.39)**
Municipality Controls				
Inhabitants	+	6.89***	7.22***	7.29***
Real Property Tax A	-	-4.78	-119.82**	-140.92**
Real Property Tax B	+	-100.12	-56.20	-13.18
District Controls				
Size of district	+/-		3,047.29	4.53
Birth - Total	+		-1.35	21.09
Cash Result	+		0.00**	0.00*
Average Purchase Price Land	+/-		-221.88***	-406.60***
GDP per Inhabitants	+		2.31***	2.50***
Unemployment Rate	-		-1,669.9**	-882.06
Available Income per Household	+		0.01	12.4
Moving In	+			
age under 18				64.38
age 18-25				7.35
age 25-30				81.18**
age 30-50				-43.41*
age 50-65				25.35
age > 65				32.99
Total			10.41	
Moving Out	-			
age under 18				-56.34
age 18-25				-10.68
age 25-30				-91.33
age 30-50				58.13**
age 50-65				-40.05
age > 65				-66.29
Total			-9.72	
Business Registration	+/-			
Reconstruction				-18.63
Moving In				-201.54
Moving Out				50.10
Total			-33.64**	
Business Cancellation	+/-			
Abandonment				-17.50
Moving Out				177.10
Transfer				-79.22
Total			0.53	
Areas	+			
Land Area			-30.46	
Building Open Area Housing				-5.19
Building Open Area Business			7.06	5.86
Plant Area			-59.94***	-47.71**
Traffic Area				-2.41
Farmland				0.20
Tourism	+			
Beds			-0.05	0.99
Guests Overnight Stay			0.0000	-0.01
Adj. R^2		54.33%	55.16%	55.45%
N		5,004	5,004	5,004

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Table 6
The reaction of firms to mispriced municipalitites in the long run (H1b)

PANEL B: Long run analysis (10 % Cutoff)

$$TaxBase_{j,07} = \alpha_0 + \beta_1 OP_{j,07} + \beta_2 UP_{j,07} + \beta_3 TaxBase_{j,01} + \beta_4 TaxBase_{j,01} * OP_{j,07} + \beta_5 TaxBase_{j,01} * UP_{j,07} + \sum \beta_m MunicipalityControl_{j,07} + \sum \beta_n DistrictControl_{k,07} + \varepsilon_i \quad (4)$$

Independent Variable	Pred. Sign	Model 1	Model 2	Model 3
Intercept		56,274.41	54,596.69	-135,944.20
OP		35,388.02	33,328.91	30,524.70
UP		-92,642.47***	-83,990.53***	-85,840.28***
Income01	+	**0.66*** (4.47)**	**0.64*** (4.44)**	**0.64*** (4.48)**
Income01 * OP	-	**-0.59*** (-2.80)**	**-0.58*** (-2.94)**	**-0.58*** (-.294)**
Income01 * UP	+	**1.20*** (7.78)**	**1.21*** (8.08)**	**1.21*** (8.18)**
Municipality Controls				
Inhabitants	+	10.24***	10.45***	10.55***
Real Property Tax A	-	61.76	-113.36	-118.88
Real Property Tax B	+	-265.53*	-250.60	-191.58
District Controls				
Size of district	+/-		42,237.16**	4.47
Birth - Total	+		9.24	-8.73
Cash Result	+		0.00	0.00
Average Purchase Price Land	+/-		-147.90*	-398.38***
GDP per Inhabitants	+		4.11***	3.71***
Unemployment Rate	-		-2,426.46**	-882.06
Available Income per Household	+		0.02	12.4
Moving In	+			
age under 18				136.70**
age 18-25				-58.66**
age 25-30				16.07
age 30-50				-66.59
age 50-65				28.77
age > 65				-7.91
Total			2.07	
Moving Out	-			
age under 18				-111.69
age 18-25				11.03
age 25-30				45.82
age 30-50				110.27**
age 50-65				-118.45
age > 65				-61.86
Total			1.72	
Business Registration	+/-			
Reconstruction				-79.16
Moving In				-200.92
Moving Out				-203.53
Total			-95.37**	
Business Cancellation	+/-			
Abandonment				21.41
Moving Out				211.14
Transfer				529.76*
Total			15.46	
Areas	+			
Land Area			-422.39**	
Building Open Area Housing				0.87
Building Open Area Business			14.81	7.27
Plant Area			-79.99***	-48.92**
Traffic Area				-7.96*
Farmland				0.35
Tourism	+			
Beds			-1.36	3.19
Guests Overnight Stay			0.01	-0.02
Adj. R^2		50.30%	51.38%	51.85%
N		4,532	4,532	4,532

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Table 7

Tax Incidence: The reaction of firms to mispriced municipalitites in the long run (H2a)

PANEL A: Short run analysis

$$LaborCosts_{i,04} = \alpha_0 + \beta_1 OP_{i,04} + \beta_2 UP_{j,04} + \beta_3 LaborCosts_{i,01} + \beta_4 LaborCosts_{i,01} * OP_{i,04} + \beta_5 LaborCosts_{i,01} * UP_{i,04} + \varepsilon_i \quad (5)$$

Independent Variable	**Pred. Sign**	**Model 1** 30%-Cutoff	**Model 2** 20%-Cutoff	**Model 3** 10%-Cutoff
Intercept		1,189,666.00***	1,360,689.00***	5,730,975.00*
OP		3,137,044.00*	324,146.70	-2,113,601.00
UP		-869,979.00*	339,465.30	-4,527,709.00
LaborCosts01	+	**0.01** **(0.76)**	**0.04** **(1.03)**	**0.03** **(0.79)**
LaborCosts01 * OP	+/-	**0.01** **(0.15)**	**-0.01** **(-0.23)**	**-0.01** **(-0.38)**
LaborCosts01 * UP	+/-	**0.01** **(0.39)**	**-0.03** **(-0.52)**	**-0.02** **(-0.59)**
Adj. R^2		0.92%	0.49%	0.02%
N		1,472	3,039	5,471

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Table 7

Tax incidence: The reaction of firms to mispriced municipalitites in the long run (H2b)

PANEL B: Long run analysis

$$LaborCosts_{i,07} = \alpha_0 + \beta_1 OP_{i,07} + \beta_2 UP_{j,07} + \beta_3 LaborCosts_{i,01} + \beta_4 LaborCosts_{i,01} * OP_{i,07} + \beta_5 LaborCosts_{i,01} * UP_{i,07} + \varepsilon_i \quad (6)$$

Independent Variable	**Pred. Sign**	**Model 1** 30%-Cutoff	**Model 2** 20%-Cutoff	**Model 3** 10%-Cutoff
Intercept		525,897.30**	512,430.90***	1,886,384.00***
OP		2,426,854.00	3,290,023.00*	-425,074.50
UP		1,326,708.00	-3,712,060.00*	-1,013,275.00
LaborCosts01	+	**-0.01** **(-0.55)**	**0.01** **(0.73)**	**0.02** **(0.78)**
LaborCosts01 * OP	-	**0.01** **(0.66)**	**0.01** **(0.39)**	**-0.01** **(-0.50)**
LaborCosts01 * UP	+	**1.52***** **(4.42)**	**337.81** **(1.48)**	**0.78***** **(2.85)**
Adj. R^2		0.97%	27.90%	0.55%
N		640	663	3,310

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Table 8

Robustness Test: The reaction of firms to mispriced municipalitites in the short run (H1a)

PANEL A: Short run analysis (20% Cutoff)

$$TaxBase_{j,04} = \alpha_0 + \beta_1 OP_{j,04} + \beta_2 UP_{j,04} + \beta_3 TaxBase_{j,01} + \beta_4 TaxBase_{j,01} * OP_{j,04} + \beta_5 TaxBase_{j,01} * UP_{j,04} + \sum \beta_m MunicipalityControl_{j,04} + \sum \beta_n DistrictControl_{k,04} + \varepsilon_i \quad (3)$$

Independent Variable	Pred. Sign	Model 1	Model 2	Model 3
Intercept		28,259.37	42,812.53	-231,873.50
OP		-18,924.22*	-15,440.30	-18,701.09*
UP		-36,887.64***	-33,214.76***	-35,851.46***
Income01	+	**0.49*** (3.49)**	**0.48*** (3.49)**	**0.48*** (3.49)**
Income01 * OP	+/-	**0.01 (0.05)**	**0.01 (0.06)**	**0.02 (0.12)**
Income01 * UP	+/-	**0.56*** (2.66)**	**0.57*** (2.69)**	**0.57*** (2.69)**
Municipality Controls		yes	yes	yes
District Controls (aggregated)		no	yes	no
District Controls (disaggregated)		no	no	yes
Adj. R^2		56.54%	57.28%	57.66%
N		3,706	3,706	3,706

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).

Table 8

Robustness Test: The reaction of firms to mispriced municipalitites in the short run (H1b)

PANEL B: Long run analysis (20% Cutoff)

$$TaxBase_{j,07} = \alpha_0 + \beta_1 OP_{j,07} + \beta_2 UP_{j,07} + \beta_3 TaxBase_{j,01} + \beta_4 TaxBase_{j,01} * OP_{j,07} + \beta_5 TaxBase_{j,01} * UP_{j,07} + \sum \beta_m MunicipalityControl_{j,07} + \sum \beta_n DistrictControl_{k,07} + \varepsilon_i \quad (4)$$

Independent Variable	Pred. Sign	Model 1	Model 2	Model 3
Intercept		44,944.00	47,035.45	-323,219.60
OP		9,404.95	15,242.31	7,654.77
UP		-52,248.13***	-54,897.81***	-56,442.42***
Income01	+	**0.65*** (3.80)**	**0.63*** (3.80)**	**0.63*** (3.83)**
Income01 * OP	-	**-0.64*** (-3.22)**	**-0.63*** (-3.43)**	**-0.63*** (-3.43)**
Income01 * UP	+	**1.15*** (5.96)**	**1.17*** (6.22)**	**1.18*** (6.34)**
Municipality Controls		yes	yes	yes
District Controls (aggregated)		no	yes	no
District Controls (disaggregated)		no	no	yes
Adj. R^2		55.17%	56.27%	87.45%
N		3,006	3,006	3,006

Each of the variables is defined in Table 2.

*, **, *** significant at the 10%, 5% and 1% level (all p-values are based on two-tailed t-tests).