Testing the Self-Interested Voter Hypothesis
Evidence from a promised tax cut

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Abstract

Narrow material campaign promises can win elections. This paper demonstrates that a promise to abolish a broad-based housing tax accounted for a substantial share of Emmanuel Macron’s electoral success in the 2017 French presidential election, delivering more than 1.4 million votes. Using quasi-random spatial variation in the pre-reform tax burden across more than 35,000 municipalities, and instrumenting expected tax savings at the town level by formulaic real estate assessments established in the 1970s, I show that a one standard deviation (c. 1 percent of median household income) higher exposure to the tax cut was associated with a c. 1 to 1.5 percentage point increase in the Macron vote share at the municipality-level in the first round of the election. The results are robust to adjusting for a rich variety of observable characteristics of the municipality’s voting body, including the predicted local vote share for Macron from nationwide polling shifts prior to the campaign promise; to comparing only neighbouring cities; and to placebo tests using elections in which the same tax was not up for repeal. The implied boost was enough for the promised repeal to allow Macron to reach the run-off stage. Using high-frequency online search, polling, and prediction market data, I validate that the timing of the promise coincided with a significant and quantitatively consistent increase in voter information search, in Macron’s polling intentions, and in his market-based predicted chances of victory.

JEL codes: D72, H71, R38.

Keywords: distributive politics, housing tax, France.

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1 Introduction

American journalist and satirist H.L. Mencken once quipped that "every election is a sort of advance auction sale of stolen goods". The cynicism of that proposition notwithstanding, theories of political economy often start from the widely accepted tenet that rational voters elect candidates based on their narrow self-interest, and that expected material gains from one policy platform over another could push marginal voters to choose a side in electoral contests. During local or national campaigns, candidates regularly promise redistributive transfers, reductions in taxes, or "pork-barrel" government spending targeted towards certain locations, production factors, or specific segments of the electorate. Whether these electoral promises mostly constitute "cheap talk" of little credibility, or whether campaign announcements shape actual voting behavior, is a crucial question for the empirical content of economic models of the vote. Can politicians win support by merely promising higher transfers or lower taxes on certain constituencies once elected?

In this paper, I leverage quasi-random variation in exposure to a local tax cut across more than 35,000 French townships (communes) to assess the causal impact of a campaign promise on voter support. In the months leading to the highly disputed first round of the 2017 French presidential election, newcomer candidate Emmanuel Macron promised to repeal a widely unpopular housing levy, the "taxe d’habitation" (TH), worth close to 2 percent of disposable household income on average, while pledging the central government would compensate municipalities for any lost revenue. The promised repeal of the TH, combined with the implicit assurance that no additional local taxes would need to be raised to replace foregone receipts, created considerable spatial heterogeneity in expected net savings from this nationwide policy platform, depending on the initial TH tax bill. Using administrative data on variation in the local TH burden, and polling-place-level electoral returns, I show that expected benefits from the tax rebate causally explain a substantial share of Macron’s electoral support, over and beyond his predicted success based on the characteristics of the local voting body.

The pre-reform housing tax bill in a French town may plausibly have been correlated with observed and unobserved determinants of the propensity of the municipality’s electorate to lean towards Emmanuel Macron. For example, due to spatial sorting by political preferences across towns with varying housing values, potential Macron voters might merely be more likely to locate in high-price locations. Alternatively, city councils in towns with more Macron supporters may have been more prone to set high initial housing tax rates, again correlating the initial tax burden with local Macron support, independently of the promise itself. As described in detail in section 2, however, the tax base for the TH was devised in reference not to current housing market values, but to outdated appraisals assessed in the early 1970s for a few "reference units" in each town, never updated since besides a nationwide inflation adjustment, and outside the control of today’s local authorities. These institutional features implied large variation in initial tax burdens between municipalities otherwise comparable in current days, depending on idiosyncratic 1970 assessments. "Assessed rental values" from the 1970s, averaged at the municipal level, thus constitute an instrument for the expected local

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1 Sham Battle, The Baltimore Evening Sun, October 26, 1936.
2 See e.g. the seminal contributions of Downs (1957), Lindbeck and Weibull (1993), and Lizzeri and Persico (2001); or Persson and Tabellini (2016) for a general treatment of economic voting models.
3 See e.g. Rodden (2010) for a recent overview of this phenomenon and its electoral consequences in the United States.
tax savings, both strongly relevant – as they directly enter the tax computation, and plausibly orthogonal to other local determinants of the propensity to vote for Macron, conditional on current housing values interacted with current local tax rates.

Adjusting for housing market values – computed from exhaustive transaction data on millions of pre-election home sales – and administrative measures of local tax rates, I show that voters were more likely to choose Emmanuel Macron when they expected his election to offset a higher initial local tax bill. Higher expected savings from the TH repeal, driven by variation in 1970 assessments of the tax base, causally increase the local Macron vote share. The magnitude of the effect is large: municipalities with a one standard deviation higher tax bill (c. 1 percent of median household income) exhibit a statistically significant improvement of Emmanuel Macron’s score of 1 to 1.5 percentage point, conditional on his predicted share of the vote based on electoral results from past presidential elections and controlling for socio-demographic characteristics.

Heterogeneity analysis using Census data lends credibility to this causal mechanism. Localities with a larger share of homeowners (who stood to gain more, through capital gains, from reduced user costs of housing), and those with a smaller share of households exempt from the tax, were more responsive to the policy promise. The results survive a battery of robustness checks, ranging from additional observable controls, to comparing only municipalities that share a geographic border in order to adjust for spatially correlated political shifts, to using other electoral contests as placebo tests. Moreover, I show that voter search for information about Macron’s proposal on the housing tax, as inferred from Google searches, spiked around the announcement and close to election day. Event studies, using both aggregate high-frequency polling and prediction markets data, also display a nationwide impact of the tax cut announcement on Macron’s winning chances, consistent with the aggregation of estimated local effects.

Therefore, using the conditionally random component of pre-treatment exposure to the planned cut in the housing tax at the municipality level, across more than 35,000 towns, I validate the hypothesis that material self-interest constitutes a key motivation for voting behavior, even in ideologically polarized contests such as the 2017 French presidential election, hailed worldwide as a defining showdown between a populist far-right animated by identity concerns and a progressive center. The results suggest that tax cuts aimed at peculiarly salient, lump-sum, and politically controversial levies, might be especially efficient in triggering increased electoral support.

Politicians regularly make campaign promises involving substantial amounts of fiscal and non-fiscal redistribution across income levels, age groups, or other constituencies. A considerable body of theoretical work has studied the pre-election role of such “distributive politics” (Weingast, Shepsle, and Johnsen, 1981), and the resulting incentives for politicians to engage in material campaign promises (Feldman, 1982; Aragonès, Postlewaite, and Palfrey, 2007). While it is commonly accepted that voters may make electoral decisions based on their own self-interest, credible empirical evidence is surprisingly scant, and this paper contributes to our understanding of this phenomenon.

On the one hand, a large empirical corpus, summarized early on by Lewis-Beck and Stegmaier (2000), has ex-

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4See e.g. *Financial Times*, April 26, 2017, “Emmanuel Macron offers the patriotic antidote to nationalism”.


plored “retrospective” economic determinants of the vote. Existing work has documented the role of cyclical economic outcomes, or windfall gains, for the electoral success of incumbents, at the national or local level, using time series evidence (Brender and Drazen, 2008), or, more recently, quasi-random spatial shocks to income (Brunner, Ross, and Washington, 2011) or wealth (Bagues and Esteve-Volart, 2016) to test for the role of “attributional” motives in the incumbent vote share. Other studies have examined the specific role of past fiscal transfers for electoral outcomes, using quasi-experimental variation in expenditure outlays (Levitt and Snyder Jr, 1997; Huet-Vaughn, 2019), or truly randomized cash payouts (Manacorda, Miguel, and Vigorito, 2011; De La O, 2013; Zucco Jr, 2013), but tax cuts have received comparatively less attention. A handful of contributions have exploited local variation in exposure to a nationwide policy, with the goal of estimating their ex post electoral impact for local incumbents, a distinct question from my focus on campaign promises and their ex ante impact. Most recently, Casaburi and Troiano (2016) show that an increase in tax enforcement intensity in Italy, hitting various regions with differential intensity, increased local reelection probabilities; and Fetzer (2019) finds that higher exposure to fiscal austerity in the United Kingdom increased local support for the UKIP party and Britain’s exit from the European Union. This strand of literature has heretofore focused on “retrospective” motives, whereby voters reward or punish incumbents based on past transfers or taxes. While I also rely on plausibly exogenous spatial variation in policy exposure, my focus is on the ex ante response of the vote to a campaign promise in a national - rather than local - electoral contest, before the program is implemented.

Only a few studies have explored the effect of campaign promises of future tax and transfers on electoral support. Recent work on campaign efficacy has taken advantage of differential quasi-random or truly randomized exposure to information about politicians’ platforms (Kendall, Nannicini, and Trebbi, 2015; Cruz et al., 2018; Spenkuch and Toniatti, 2018), focusing on the role of voter knowledge but leaving aside differential exposure to actual policies implemented. Alpino (2018) studies a 2006 Italian electoral promise of tax cuts for homeowners, and finds a positive impact on voting intentions for Silvio Berlusconi in surveyed homeowners and in localities with higher home-ownership. Work by Elinder, Jordahl, and Poutvaara (2015) finds in declarative survey data that parents of younger children were more likely than their less affected counterparts to vote for the Social-Democrat Party when it promised them increased transfers. My strategy exploits an instrumental variable approach, combined with quasi-random geographic variation in pre-policy exposure to a promised tax cut; it relies on exhaustive town-level electoral returns and administrative tax data, and is concerned with a large tax cut proposal representing close to 2 percent of household annual income. This paper thus expands our understanding of the electoral efficacy of campaign promises at the national level, adjusting for predictable ideological shifts and socio-demographic composition, and leveraging plausibly exogenous local variation.5

5By focusing on the differential electoral impact of a local residence tax repeal, this paper also speaks to the literature on the political economy of local taxation. Existing work suggests that municipalities reduce local tax rates in election years. While several authors have investigated these local political budget cycles (e.g. Aidt and Mooney (2014) in London, Foremny and Riedel (2014) in Germany, or Alesina and Paradisi (2017) in Italy), the role of local taxes for national electoral outcomes remains mostly terra incognita.
2 Institutional background and data

2.1 The 2017 French presidential election

I study the electoral benefits of material campaign promises in the context of the 2017 presidential election in France. France has a democratic presidential regime; the president is elected every five years by popular vote in a two-rounds majoritarian electoral system. In April 2017, the first round pitted eleven candidates against each other. The 2017 election exhibited a series of unusual features, making it especially well-suited for the study of the electoral efficacy of campaign promises.

First, incumbent Socialist president François Hollande, facing historically low popularity ratings, decided not to run for re-election on December 1st, 2016. A rare occurrence in French politics, the decision is helpful to my empirical design, as the absence of an incumbent candidate voids the usual difficulty associated with disentangling retrospective voting from the impact of campaign promises. Second, two major traditional parties, the center-right Les Republicains (LR) and left-leaning Parti Socialiste (PS), held open primaries for the first time since the beginning of the Fifth Republic in 1958. Both chose “surprise” candidates, former Prime Minister François Fillon for LR and former Education Minister Benoit Hamon for PS, instead of the early poll leaders, former Prime Ministers Alain Juppe (LR) and Manuel Valls (PS). Third, François Fillon, the candidate for the main opposition party (LR), was engulfed in a political-financial scandal. News coverage of the misconduct made Fillon, the early favourite in January, drop to third place in a few weeks, and generated substantial volatility in polling intentions and prediction markets.

In this context of heightened political uncertainty among traditional parties, Emmanuel Macron, a former Economy Minister in Hollande’s cabinet, but a newcomer in electoral politics, mounted a bid for the presidency. He founded a new political party, En Marche, in April 2016, kick-starting his campaign by a show of force in his hometown, Amiens. He formally announced his candidacy on November 16th, 2016. Fillon and Hamon had run primary campaigns to the right- and left-wing of their respective parties, opening space for a centrist candidacy, according to observers. On February 24th, 2017, Emmanuel Macron was a guest of France’s most watched morning show, Bourdin Direct. He announced that, if elected president, he would exempt the bottom 80% of households by income (c. 24 million households) from the taxe d’habitation, a local residence tax.

On April 23rd, Macron received the most votes in the first round of the presidential election, with 24.01% of the overall vote, advancing to the runoff stage where he faced populist right-wing candidate Marine Le Pen. On May 7th 2017, Macron won the second round of the presidential election with c. 66.1% of the vote, becoming the eighth elected president of the Fifth Republic.

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6 Le Canard Enchaine, a satirical weekly newspaper, revealed in January 2017 that Mr Fillon had employed his wife and two of his children as aides while a member of parliament, and that they were paid in exchange for little actual work.

7 Daniel Boy, a researcher at the CEVIPOF, France’s largest political science research center, remarked in January 2017: “Between these two candidates, substantial political space is emerging in the center and the context is ideal for Emmanuel Macron.” Historian Jean Garrigues concurred: “Part of voters who supported [centrist candidates] Alain Juppe in the LR primary and Manuel Valls in the PS primary feel incompatible with the primary winners. There is a programmatic and political space in between.” Présidentielle: Entre Fillon et Hamon, Macron a-t-il un boulevard au centre?, 20 Minutes, January 31st, 2017. Competition in the general election was thus open, with five candidates (Fillon, Hamon, Macron, Marine Le Pen, leader of the far-right Front National-FN, and Jean-Luc Melenchon, chief of far-left party La France Insoumise-LFI) enjoying plausible chances of advancing to the runoff stage.
2.2 The French housing tax

The taxe d'habitation (TH) Mr Macron promised to repeal is a housing tax assessed by the State on behalf of local governments. It applies to all furnished housing units and is remitted by resident households, irrespective of their ownership status (tenants or owner-occupiers). It is one of four main sources of recurring tax revenue for local authorities in France. While the TH follows a complex array of rules, it is broadly understood as the product of historical rental values determined in 1970 by the sum of two tax rates set at the municipal level. I describe its main features of interest for the empirical strategy succinctly below, and provide additional details on its computation in appendix C.

**Tax base** The tax base is an assessed rental value of the unit, the valeur locative cadastrale in year \( n \) (VLC\(_n\)). The VLC is not predicated on the market value of the unit. Rather, it is the product of an estimated *weighted square footage* (surface ponderee), and a *reference rent* per square meter (tarif de reference):

- The *weighted square footage* re-weights the actual floor area of a unit in 1970 (or at the time of its construction) according to a complex parametric formula depending on a quadratic polynomial of area, eight "quality ladders", original 1970 condition and neighbourhood status, and the presence of what were deemed in 1970 to be "comfort" elements, such as running water or an elevator.
- The *reference rent* is based on the actual rent (per square meter of weighted square footage) of a few "representative units" (5.2 percent of all units nationally), recorded as of January 1\(^{st}\), 1970, for each quality ladder in most towns. All other dwellings were allocated the corresponding municipality-quality-cell specific reference rent.

Multiplying the "reference rent" by the "weighted square footage" of the unit yielded a nominal assessment (VLC) as of January 1970, known as the VLC\(_{70}\), for each unit. In theory, the law calls for a revision of the VLC\(_{70}\) every three years. In practice, revisions never occurred, due to the administrative complexity of the task. VLCs were "actualized" once in 1980 at the province-level, yielding VLC\(_{80}\). Since 1981, VLCs are increased by an annual indexation coefficient applicable *nationwide*, yielding a year \( t \) VLC\(_{t}\) for each unit. Special deductions off that tax base are available for older citizens, lower-income households, people with disabilities, and households with children. Formally, the tax base of a housing unit in quality ladder \( k \) and municipality \( j \), occupied by household \( h \) in year \( t \) is:

\[
\text{Base}_{hjk}\text{t} = \frac{\text{VLC}_{70}h}{\text{VLC}_{jt}} \times \text{Rate}_{j,k,1970} \times A_{\text{Dep}(j),70\rightarrow80} \times I_{1980\rightarrow t} \times \sum_r \text{DedRate}_{rjt}(X_{ht}) \times \text{VLC}_{jt} \text{Deductions}_{hjt}
\]

These also include a property tax (the taxe fonciere sur les propriete baties), a tax on undeveloped land (taxe fonciere sur les propriete non-baties), and a local business tax (the Local Economic Contribution or Contribution Economique Territoriale).

In rare cases, changes to the imputed square footage of a unit were made in the case of remodellings or additions.

There are 96 provinces or départements, each of which contains c. 350 municipalities on average, making the 1980 adjustment imperfect and noisy, and not unit-specific. More details are provided in appendix C.

They take the form of a fixed rate (e.g. 10% per additional child) multiplied by the average VLC in the municipality, VLC\(_{jt}\).
Tax rates  Municipalities receive information from the national revenue service only on the aggregate VLC in the town, not the VLC of individual units. Given their absence of control over the tax base, the rate of the TH was one of the instruments available to city councils to balance their budget until 2017. As of 2016, there were two main rates in force, at the municipality level, and at the level of the inter-municipal cooperation (a syndicate of towns jointly providing local public services, known as Etablissements publics de coopération intercommunale) – with the larger share attributable to the municipality. Tax rates vary widely across towns, reflecting political priorities and funding needs, conditional on aggregate assessed values. The distribution of tax rates as of 2016 is described in figure 1, and exhibits substantial dispersion across municipalities.

Summary of the tax computation  The total tax due by a household is increased by a flat fee $F_t$ of 1 to 3 percent of the tax due, to fund the administrative collection workload for the central government. Additional levies accruing to the central government are applied to ”luxury” units with a VLC above some threshold $\overline{B}$. Some tax filers (people above 60, disabled individuals, and widowers) with an income below a threshold close to the national poverty line adjusted for household size, are exempt from the tax. Finally, the tax is subject to a ceiling of 3.44% of annual taxable income. A household $h$ with income $Y_{ht}$ and characteristics $X_{ht}$, residing in municipality $j$ in year $t$, in a unit classified in category $k$, thus owes:

$$\text{Tax}_{hjkt} = \begin{cases} 
0 & \text{if } Y_{ht} \in \Omega_t(X_{ht}), \text{ the exoneration set for households with characteristics } X_{ht} \\
\min\left\{ \left[1 + F_t\right] \times \left(\tau_{\text{Com}} + \tau_{\text{EPCI}(j)} + \tau_{\text{High}}\mathbb{I}[\text{Base}_{hjkt} \geq \overline{B}]\right) \times \text{Base}_{hjkt} ; 0.0344 \times Y_{ht}\right\} & \text{otherwise}
\end{cases}$$

(2)

where the base is $\text{Base}_{hjkt}$, computed in equation 1.

Heterogeneity of the tax burden  The absence of revisions of appraised values over more than 45 years led to a substantial disconnect between market valuations and VLC assessments. Housing units in some regions, such as the Mediterranean and Atlantic coasts, and homes in suburban areas, were newly built in 1970. They benefited from then ”modern” amenities, leading to high reference rents in what had become mostly decayed social housing units or periphery areas forty-seven years later, in 2017. On the contrary, city centers in most of France’s large cities were only rehabilitated in the 1980s and 1990s. Along with newly gentrified rural towns, these areas had low VLC70s, both due to their poor condition in 1970, and to their relatively unattractive geographic situation back then. The TH was thus widely decried as France’s most unfair tax, mostly due to horizontal equity concerns. The tax burden was also substantially lesser in recently renovated apartment buildings in city-centers, mostly populated by higher-income households, than in single-family homes in rural periphery towns and in large social housing projects in urban suburbs. This burden-shifting regularly led to Parliamentary reports, the creation of advisory committees, and popular press outcry. The tax was especially burdensome for younger and lower to middle-income households, given its applicability to tenants, and its one-time annual lump-sum payment.

\[\text{12See e.g., among countless examples, Challenges, a popular weekly, on November, 13th, 2014, titling: "Why the housing tax is the most unfair of all taxes".}\]
2.3 Data description

I describe succinctly below the use of electoral results, local government finance reports, administrative house sales data, Census counts, and spatial geo-coded information for the construction of my main sample. Additional details on the construction of the data are provided in appendix D.

To construct my outcome variables, I use exhaustive data on electoral outcomes for all municipalities in France in the first rounds of the 2017, 2012, and 2007 presidential elections from the French Interior Ministry. I use nationwide polling data from Elabe to predict, using a shift-share strategy, local Macron support from aggregate polling shifts from 2012 candidates to 2017, as explained in section 3.

To construct my measure of exposure to the tax rebate, I use the French Treasury’s report on local taxes as of 2016, the last year of taxes known to households at the time of the election. I obtain TH rates, revenues, aggregate and average rental values (VLC) for each town, as well as the municipality-specific amount and number of beneficiaries of all deductions and exemptions. Figure 3a displays spatial variation in my baseline exposure measure (average TH receipts per household subject to the tax), across 35,197 municipalities merged to electoral data which constitute the baseline sample. Across these main-sample townships or communes, with a median number of registered voters of 345 (mean: 1,260), the average housing tax burden (weighted by registered voters) was c. 733 euro, with a standard deviation of 245 euro. On average, it represented 2.3 percent of household income.

When using historical assessments as an instrument for the local tax burden, I must control for current house prices, in order to adjust for household spatial sorting. I construct city-level mean values from exhaustive transaction data on c. 5 million home sales in a five-year period centered in 2017. Current house prices are correlated with the mean VLC in a town, as shown in figure 4: long-run persistence in amenities and productivity implies auto-correlation in home values, even over close to five decades (Rosenthal and Ross, 2015). Nonetheless, there remains substantial heterogeneity in VLCs, conditional on current home values. I control for local socio-demographic characteristics from a variety of sources: deciles of household income, capital, pensions, and labor shares of income, aggregate tax payments, the share of homeowners and the share of secondary residences in a municipality. To compare only contiguous municipalities, I use adjacency lists from OpenStreetMap. Finally, to study the dynamics of electoral odds around the TH repeal announcement in February 2017, I employ information from a French polls aggregator website, PollsPosition, Google Trends Internet search data, and prediction market prices from PredictIt.

Table 1 describes summary statistics of my sample across municipalities for two subsets of controls: those used in the full sample (panel (a)), and those restricted to the subset of larger municipalities (or county seats, chefs-lieux de canton) with available details on the full distribution of household income by decile (panel (b)).

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13These 35,197 municipalities on French mainland territory represent 99.97 percent of towns and close to 94 percent of the electorate in the 2017 election. When including additional controls, the sample size is reduced due to statistical secrecy procedures.

14Because of different local laws dating back to the German occupation of France in the 19th century, the DVF database does not cover c. 3000 municipalities in three provinces in the easternmost part of France, which are therefore excluded from the sample when using the instrumental variable approach.

15A regression at the municipality level of log VLC on log median home value yields an R-squared of only 0.32 (0.27 when using the mean home value), suggesting substantial unexplained variance in mean appraised values across towns conditional on current real estate market conditions.
3 Conceptual framework and estimation strategy

3.1 Causal inference on voter choice

Measuring the efficacy of campaign promises in delivering electoral support is a crucial step in giving empirical
credence to the theory of the self-interested voter, but identification issues can plague its direct estimation. Let
$PP_G^C$ be the monetary benefit that group $G$ draws from a policy promise by candidate $C$, and $V^C_i$ the event where
voter $i$ votes for candidate $C$. A simple model of voter choice whereby voters vote sincerely to maximize utility,
subject to some idiosyncratic noise, suggests estimating an individual-level regression:

$$\mathbb{P}(V^C_i = 1) = \alpha + \beta PP_G^C \times 1(i \in G) + \epsilon^C_i$$

Conceptually, the parameter of interest is $\beta$: the effect of an additional euro promised by candidate $C$ to group
$G$ on the probability that a voter $i \in G$ votes for $C$. However, the benefit of voting for $C$, from the point of view
of voter $i$, is not randomly assigned. Merely quantifying whether potential beneficiaries of a campaign promise
are more likely to support the corresponding candidate is subject to a fundamental endogeneity concern: $\epsilon^C_i$
can be correlated with $PP_G^C \times 1(i \in G)$. This issue can be traced to five main sources.

**Measurement error** First, neither platforms, nor policy preferences, are uni-dimensional. The determinants
of each constituency’s voting decision, whether economic or not, are many-fold, and identifying the pre-
cise impact of one electoral promise ($PP_G^C \times 1(i \in G)$), out of the many that constitute a politician’s platform
($\sum_{G'} PP_G^C \times 1(i \in G')$), is a difficult task, when there is correlation both across policy promises ($\text{Cov}(PP_G^C, PP_{G'}^C, \neq 0)$)
and in membership of various constituencies ($\text{Cov}(\mathbb{1}(i \in G'), \mathbb{1}(i \in G)) \neq 0$). Conversely, because policies
have complex consequences for individual situations, it is often hard to pinpoint ex ante precisely who stands
to gain from a given material campaign promise, and thus to link targeted groups to their electoral response.
This latter difficulty is especially pronounced when using survey data, where not only voter choice is declar-
ative and noisy, but only limited demographic information (whether $\mathbb{1}(i \in G) = 1$) is available to quantify
respondents’ potential gains from a platform. Both group membership, and benefits from a candidate’s plat-
form, are thus measured with substantial error, attenuating any directional relationship between political support
and potential financial rewards.

**Reverse causality** Second, policy promises are not randomly assigned, but rather the outcome of a strategic
decision by candidates, which can reflect expected electoral strength. A candidate could try to mobilize poten-
tial supporters, or, conversely, to counter weakness in a given category of voters, by offering a policy $PP_G^C$
designed to benefit them. Thus, reverse causality may amplify or attenuate the correlation between individual
benefits from a policy platform, on the one hand, and the likelihood of voting for a candidate, on the other.

**Confounding** Third, voter behavior could be partly determined by an omitted variable, a component of $\epsilon^C_i$,
correlated with policy platforms, confounding the direct causal relationship. Non-economic rationales for a
specific policy may preclude a direct estimation of the impact of monetary gains from a platform on electoral support. For instance, a candidate may promise to impose international tariffs for “identity”-related reasons (“Identity politics and trade policy”); if poorer individuals consume more imported goods (Fajgelbaum and Khandelwal, 2016), but are also more likely to vote based on identity motivations (Rodrik, 2020), they could be found to support the tariff candidate, in spite of their purchasing power being harmed more by her policies. Empirically, this means that unobserved determinants of voting behavior, such as personal ideology, tend to be correlated with membership in groups targeted by specific policy platforms, leading to omitted variable bias.

**External validity** Fourth, and partly due to the aforementioned issues, researchers wishing to identify the causal impact of electoral promises sometimes resort to location-specific campaign issues (e.g. targeted spending on local infrastructure, such as a new airport in Ahlfeldt and Maennig (2015)), where measurement error or reverse causality are a lesser concern. However, an trade-off arises between external validity and bias: using well-identified local variation in electoral promises may preclude drawing broader implications for nationwide tax and spending policy platforms. Indeed, because locally targeted spending, by its very nature, rarely represents a substantial share of a country’s aggregate income, generalizing its consequences to electoral responsiveness to national policies is challenging.

**Retrospective and prospective motives** Finally, the presence of retrospective voting motives (“punishment” and “rewards” for past behavior in office) makes the role of incumbent candidates challenging. Officeholders may pledge distinct policies, and also stand different chances in electoral contests, due to incumbency advantage or fatigue. Incumbency can then hamper the estimation of the role of policy promises in triggering electoral support: voter motivations may include both retrospective and prospective dimensions; and the credibility of pledges may vary between incumbents and other candidates.

### 3.2 Baseline specification

Overcoming these limitations thus requires precisely measured, economically substantial, and one-dimensional variation in the benefits expected by different groups from a nationwide policy promise. We need credibly exogenous variation in gains across constituencies to be neither confounded by correlates of ideology, nor driven by political targeting, and operate in the absence of any incumbency effect. Spatial variation in pre-reform exposure to the housing tax repeal in the 2017 French presidential election leverages exactly such heterogeneity. Defining \(j(i)\) as the municipality where voter \(i\) lives, a promise by candidate \(C\) to repeal the local housing tax effectively amounts to a locally-varying policy: \(PP^C_j \times 1(i \in j) = TH_{j(i)}\), so that equation 3 writes (adding individual observed determinants of the vote \(X_i\)):

\[
P(V_i^C = 1) = \alpha + \beta TH_{j(i)} + \gamma X_i + \epsilon_i^C
\]  
(4)
Aggregating votes at the municipal level yields a relationship between the share of votes \( \omega_{j,2017} \) for candidate C (Macron) and the local TH level \( TH_j \). Under the self-interested voter hypothesis, voters located in towns facing an initially higher housing tax burden, should vote in higher numbers for Emmanuel Macron, motivated by their narrow material interests, all else equal:

\[
\omega_{j,2017} = \alpha + \beta TH_j + \gamma X_j + \epsilon^C_j
\]  

(5)

By using administrative data at the town level, and exploiting pre-determined exposure to the nationwide promised tax repeal in the absence of incumbency, the specification in equation 5 addresses the measurement error, external validity, and retrospective voting issues exposed above. However, the confounding concern remains: unobserved determinants of local political ideology might be correlated with the pre-reform housing tax exposure in a municipality. If locations with higher tax burdens also have electorates with different propensities to vote for Macron, independently of the TH repeal promise, omitted variables at the town level may bias estimates of the causal impact of the pledge. To disentangle the specific role of the tax cut proposal, I proceed in two steps. I first adjust for persistent observed and unobserved determinants of voter behavior; I then use a plausibly exogenous driver of the TH burden to instrument spatial variation in pre-reform exposure.

3.3 Adjusting for local ideology

The first approach adjusts the electoral outcome measure (the Macron vote share in the first round of the 2017 election) for two alternative proxies of the predicted local Macron vote share, the “polling shift” and the “prediction error” methods. Both methodologies use as their dependent variable, instead of the raw Macron vote share, the deviation of local Macron support from its expected value based on different prediction methods:¹⁶

- **The polling shift approach.** This methodology predicts the 2017 local Macron vote based on a shift-share design, using aggregate shifts in support from 2012 to 2017 before the policy announcement, combined with local 2012 results. A study released on February 21st study¹⁷ included a decomposition of voting intentions by 2012 first-round vote of the respondent (for the top five 2012 contestants). I construct the polling shift residualized variable as the difference between the actual Macron vote share in municipality \( j \), \( \omega_{j,Mac,2017} \), and the predicted share based on nationwide shifts from 2012 candidates to Macron in 2017:

\[
PS_j = \omega_{j,Mac,2017} - \sum_{k=1}^{5} \lambda_k \omega_{jk,2012}
\]

where \( \omega_{jk,2012} \) is the share of 2012 registered voters who supported candidate \( k \) in municipality \( j \), and \( \lambda_k \) is the share of candidate \( k \) voters supporting Macron in 2017. \( PS_j \) is the “excess” Macron support, in

¹⁶While Macron was not a candidate in previous elections, making a difference-in-differences strategy infeasible, adjusting his vote share for his predicted support based on past elections has a logic similar to a DiD strategy. Section 4.3 explores this further using past elections as placebo tests.

¹⁷I rely on pre-announcement polling data from Elabe, a leading French pollster. Fieldwork was conducted five to three days prior to the tax cut announcement.
city \( j \), relative to his predicted strength based on support for any of the top five 2012 candidates before he announced the TH exemption.\footnote{The polling shifts \( \lambda_k \) are: 3 percent of 2012 Melenchon voters, 34 percent of Hollande voters, 42 percent of Bayrou voters, 15 percent of Sarkozy voters, and 1 percent of Le Pen voters, intending to vote for Macron in the first round. Since the top five candidates in 2012 represent 95 percent of the vote nationwide, I re-scale the predicted value so that the aggregate nationwide number of predicted Macron votes in 2017 matches the actual number of Macron voters. The linear combination of the top five candidates in 2012 has high predictive power for the actual 2017 Macron vote, with an \( R^2 \) of 36 percent.}

- **The prediction error approach.** In this alternative methodology, I regress the 2017 vote share of Emmanuel Macron on the vote share (as a share of registered voters) of each of the 10 candidates (plus abstention) in the first round of the 2012 election.

\[
\omega_{j,Mac,2017} = \sum_{k=1}^{11} \beta_k \omega_{jk,2012} + \epsilon_{j,2017}
\]

I then use only as my dependent variable \( PE_j \), the residual of this prediction, understood as the Macron vote share “purged” from its predictable component based on the ideological composition of the local electorate in \( j \):

\[
PE_j = \epsilon_{j,2017} = \omega_{j,Mac,2017} - \sum_{k=1}^{11} \hat{\beta}_k \omega_{jk,2012}
\]

The vote share of all candidates in the municipality in 2012 has significant predictive power, with the regression having an \( R^2 \) of 39 percent for the actual Macron vote share, but still preserves substantial variation in realized Macron support. The residualization implicitly neutralizes the impact of the Macron platform on the average municipality, thus only leaving room for heterogeneous effects depending on the initial tax burden.

### 3.4 Instrumental variables strategy

Even conditional on 2012 election results, and a wide array of observable characteristics \( X_j \), omitted variables in \( \bar{e}_j^C \), the city-level component of unobserved determinants of the Macron vote, may still drive any correlation between the pre-election housing tax exposure \( TH_j \), on the one hand, and the residual Macron excess vote share adjusted for national 2012-2017 shifts, \( PS_j \) or \( PE_j \). If populations with different political ideologies sorted themselves into towns with different housing values over the 2012-2017 period, a higher value of real estate in a municipality may still be associated with both the residual component of support for Emmanuel Macron, and the initial TH exposure.\footnote{It should be noted, however, that other components of the Macron platform, like restricting the French wealth tax (\( ISF \)) to the taxation of real estate, might have been expected to reduce the Macron vote share in high real estate price municipalities; and that adjusting for 2012 electoral behavior should offset most of this potential bias.} Alternatively, local voters with idiosyncratic preference shocks for Emmanuel Macron over the 2012-2017 period may also have been more prone to vote for mayors and local officials who tend to set high local tax rates for the TH.

However, owing to the specific structure of the housing tax detailed in section 2.2, the tax base is constructed from 1970 appraisals that are, conditional on current home values, orthogonal to household sorting in 2017. Historical assessed values, \( VLC_j \) form an instrument for expected local benefits from the tax repeal, since they
form a relevant but independent predictor of $TH_j$, that is uncorrelated with the non-tax local determinants of Macron vote shares, conditional on controls and 2012 electoral results. The two-stage least squares approach first predicts the average $TH_j$ burden at the city level based on mean assessed values $VLC_j$, current house values and current $TH$ tax rates; it then regresses the Macron vote share on the predicted value of the tax $TH_j^{IV}$, and the same set of controls. The first stage is:

$$TH_j^{IV} = \alpha^{IV} + \delta VLC_j + \lambda X_j + \nu_j$$

while the second-stage specification is the following:

$$\omega_{j,2017} = \tilde{\alpha} + \tilde{\beta} TH_j^{IV} + \gamma X_j + \tilde{\eta}_j$$

As explained in section 2.2, the formulaic rental values established in the 1970s are correlated with current home values, since prices exhibit persistence over time. Thus, in the main IV specification, I control for current tax rates, current housing values, and their interaction, as well as a vector of controls including average receipts from other local taxes also based on the $VLC70$. This strategy also bypasses the other potential confounder, the correlation between local ideology and tax rates set by mayoral councils. Moreover, I use as my main outcome variable the "excess Macron vote share" (either $PE_j$ or $PS_j$), constructed in the previous subsection, thus adjusting raw results for nationwide 2012-2017 shifts interacted with the composition of the local electorate. Even if 1970 VLC were associated with historical household sorting not taken into account by current home values, they are unlikely to be correlated with drivers of residual 2012-2017 changes in local voting decisions, other than the housing tax burden.

4 Empirical results

4.1 Spatial variation in expected benefits and the Macron vote share

4.1.1 Baseline specification

To evidence the relevance and quantitative magnitude of the results in raw electoral data, I start from the simplest possible specification. I regress the vote share of Emmanuel Macron $\omega_{j,2017}$, in the first round of the French presidential election, on the average initial housing tax (TH) burden, $TH_j$, in municipality $j$. As described in section 2.3, I use data from all municipalities with available vote results in mainland France and Corsica.\textsuperscript{20} In the baseline approach, I regress the Macron vote share in the first round of the 2017 election on average housing tax receipts per household in 2016 (corresponding to the last available year of housing tax assessment known to households before the April 23\textsuperscript{rd}, 2017 election), as well as a number of controls at the municipality level. The main equation of interest is a cross-sectional regression across all 35,197 available mu-

\textsuperscript{20}French citizens living abroad are exempt from the TH; France’s overseas provinces follow different rules in the setting of the housing tax and were already mostly exempt from it as of 2017; together, these groups excluded from my sample represent c. 6.6 percent of the overall electorate.
nicipalities in the sample, equation 5, where the preferred computation for the average burden in municipality \( j \), \( TH_j \) (total tax receipts divided by the number of household with a tax return) is the dependent variable, and \( X_j \) is a (potentially empty) vector of controls at the municipality level. Throughout the paper, following Casaburi and Troiano (2016), I cluster standard errors at the province (departement) level, given the potential for spatial correlation in the error term. In subsection 4.3, I discuss the potential for spatial correlation and check the robustness of the results to using province fixed-effects and a spatial first differences design.

The results are presented graphically in figure 5a, while the estimated coefficients are reported in table 2. The baseline bivariate estimates in column 1 (displayed in figure 5a) show a strong, positive, economically large, and statistically significant correlation between the average housing tax burden in a municipality and the share of votes obtained by Emmanuel Macron in the first round of the 2017 presidential election. The magnitude is substantial: a one standard deviation increase in the initial \( TH \) burden (c. EUR 250 or USD 280) is associated with a 1.7 percentage point higher Macron vote share. Going from the twenty-fifth percentile of initial housing tax burden to the seventy-fifth\(^{21}\) is associated with a 2.46 percentage points higher Macron vote share in the first round of the presidential election.

As mentioned in section 3, the vote share for Emmanuel Macron is likely to be correlated with other features of the municipality’s electorate, which, given the spatial sorting of households across space, could also be related to the initial housing tax burden. While the average \( TH \) was correlated with a number of characteristics of the municipality, there remained substantial heterogeneity in the housing tax burden even within narrowly defined strata. To adjust for the characteristics of the municipality, I include a series of municipality-level controls which might be correlated with the vote share for candidate Macron. Columns 2 and 3 include these additional controls. Column 2 includes only total population and mean income per capita (from the census and local public finance data sources). Column 3 includes, for a subset of larger municipalities and county seats, additional detailed controls from the FiLoSoFi database, on the structure of the local income distribution, notably the threshold of all income deciles, as well as the share of average local disposable income coming from capital income, pension income, and welfare benefits. Because these additional controls are only available for larger municipalities, they reduce the sample and shift its composition towards larger, richer towns, which tend to exhibit a lower response to the promised tax cut.\(^{22}\) Nonetheless, all specifications tell a consistent story, and quantitative estimates of the tax burden effect remain large. The magnitude of the coefficient estimated by OLS is lower when including additional controls, with a EUR 1,000 increase in the average housing tax burden yielding a c. 4.45 percentage points increase in the Macron vote share, but the estimated effect remains highly significant and positive. Given the substantial variation in commune size, columns 4 to 6 repeat the specifications in columns 1 to 3, but re-weight observations by the number of registered voters in each municipality. Estimated coefficients are smaller than those for the corresponding un-weighted specifications, a reflection of the smaller estimated impact of the housing tax repeal in larger municipalities, where the \( TH \) represents a smaller share of disposable income and measurement error is likely to be larger due to variation

\(^{21}\)Throughout the article, quantiles are re-weighted by the number of registered voters in each municipality.

\(^{22}\)Section 4.2 explores evidence on this heterogeneous response in depth and provides some potential explanations.
4.1.2 Adjusting for local ideology

To disentangle the specific role of the tax cut proposal from unobserved, persistent determinants of local Macron support, I then adjust my electoral outcome measure (the Macron vote share in the first round) for two alternative proxies of the predicted Macron vote share, using the polling shift approach and the prediction error approach explained in section 3. This “ideology-adjusted” specification uses either $PE_j$ or $PS_j$ as the outcome variable, and regresses it, using ordinary least squares, on the preferred measure of the average housing tax burden.

\[
PS/PE_j,2017 = \alpha + \beta TH_j^1 + \gamma X_j + \eta_j
\]  

The results are displayed in figure 5b. The figure shows a tight, positive, and highly consistent relationship between the initial average housing tax per household and the deviation of the Macron vote share from its expected level based on the 2012 results of the five major presidential candidates. Table 3 summarizes the quantitative results of these ideology-adjusted specifications. Column 1 displays the results for the $PE_j$ outcome, which amounts to controlling for the combined vote shares of each of the 12 candidates in the 2012 election. Columns 2 and 3 include additional controls, similar to the preceding subsection: column 2 includes widely available municipality level controls (population and mean income), while Column 3 includes additional detailed controls on the structure of the local income distribution, available only for the sub-sample of larger municipalities. Columns 4 to 6 repeat the same specifications, but for $PS_j$, the ”polling shift” approach, as the dependent variable. The results demonstrate that, even conditional on the expected ideological composition of the local electorate, the Macron “excess vote share” in the first round of the 2017 election – whether one uses $PE_j$ or $PS_j$ as the outcome – is strongly and positively correlated with the average initial housing tax burden in a municipality. Coefficients in column 1 to 5 are all statistically significant at the 1 percent level, and their magnitude is economically large. The results show that the “Macron excess vote share” increases by c. 0.5 percentage points in towns where the initial TH burden is one standard deviation higher, for my preferred estimate using the full sample, with controls, and $PS_j$ as the dependent variable (column 5).

4.1.3 Instrumental variables specification

In this subsection, I turn to the two-stages least squares specification building upon the exclusion restriction assumption underlying the strategy outlined in section 3.4. Conditional on other local tax receipts for taxes based on the VLC, and on current home values, current TH tax rates, and their interaction, the average rental values (VLC) in a municipality matter for the definition of the TH tax base, but should not affect the local Macron vote share through any other channel than the expected benefits from the housing tax repeal. Thus, in the context of the election, any observed correlation between the VLCs and the Macron excess vote share can only be driven

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23 The p-value for the coefficient in column 6 is 0.020, significant at the 5 percent level, with standard errors conservatively clustered at the province level.
by the electoral impact of the campaign promise, validating the self-interested voter hypothesis.

Reduced-form results from this instrumental variable strategy are displayed in figure 6. It evidences the relationship (conditional on partialling out controls including current home values, TH tax rates, and their interaction) between the excess Macron vote share – using the polling shift adjustment method – and the average VLC in the municipality. The reduced-form results display a quantitatively substantial and tight relationship between the average rental value (derived from the 1970 assessments) in a town, and local support for Emmanuel Macron in excess of its predictable level based on the 2012 presidential election results.

Detailed quantitative results from this instrumental variable strategy are reported in table 4. Columns 1 to 3 use the raw Macron vote share \( \text{Macron}_j \), as the outcome variable, instrumented by the mean VLC in the town. Column 1 only includes as controls other local tax receipts for taxes based on the VLC (the property tax, or \( \text{taxe fonciere sur les propriete baties} \), and the land-value tax, or \( \text{taxe fonciere sur les propriete non baties} \), as well as current median home values in the municipality, current TH tax rates, and their interaction. Column 2 includes the additional controls (mean and median income and population) available for – almost – the entire sample, while Column 3 includes the set of additional controls available for larger municipalities and county seats already described in the previous section. Columns 4 to 6 repeat the same specifications, but using \( \text{PS}_j \), the excess vote share adjusted for baseline pre-announcement nationwide polling shifts, as the outcome variable.24

Across all specifications, I find strongly positive and statistically significant effects of the instrumented housing tax burden on the Macron vote share. According to the preferred estimates in column 5 (using the polling shift approach in the full sample with controls), a one standard deviation increase in the initial TH burden (instrumented by the 1970-determined assessed rental values, and conditional on current home values and tax rates) leads to a c. one percentage point higher excess Macron vote share. The magnitudes of the point estimates are larger using the instrumental variable strategy than the corresponding effects estimated via ordinary least squares, suggesting that omitted variable bias might attenuate the electoral effect in the baseline OLS regressions. One possible explanation is that locations with a higher concentration of profitable companies derive more revenue from the municipal corporate tax, and can therefore afford to vote for lower individual housing tax rates (and therefore average tax bills) for a given average housing tax base. If these economically dynamic cities also tend to host a higher share of centrist Macron voters, the OLS-estimated correlation between the initial housing tax burden and the Macron vote would be biased downwards relative to the actual causal impact of the tax repeal.

**Vote-stealing effects** To further investigate Macron’s advantage in cities with a higher TH burden, I then turn to the differential impact of the initial TH on various other candidates in the 2017 election. The additional Macron support comes at the expense either of votes for other candidates, or through variation in turnout. Table 5 repeats the instrumental variables specification of table 4, using as the dependent variable the prediction error outcome for each of the other three major candidates (M. Le Pen, F. Fillon, J-L. Melenchon), as well as the abstention share (one minus turnout). The specification uses the prediction error approach to adjust for

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24The number of observations is reduced relative to the OLS strategy in tables 2 and 3, since home values are derived from the DVF database, which does not include three Eastern France provinces representing close to 1,800 towns – see appendix D.
ideological composition, instruments for the TH burden using the mean VLC in the municipality, and includes all available controls in the full sample. This exercise suggests that most of the impact of the TH on vote shares comes at the expense of support for far-right candidate Marine Le Pen, and, to a lesser extent, that a higher initial TH burden led to a small increase in abstention, with no statistically significant impact on support for other candidates.

4.2 Evidence on heterogeneous effects

The role of home-ownership The main effect of repealing of the housing tax, a reform fully financed initially by higher inter-governmental transfers from the State to local towns, was the implicit lump-sum expected re-distribution from low- to high-TH burden municipalities. However, if local taxes are partly or fully capitalized into housing prices, an additional induced effect of the housing tax cut would be a windfall capital gain for homeowners. Such capitalization effects would imply a stronger electoral response of the Macron vote share to the initial housing tax burden in locations with a higher share of homeowners.

Hence, I investigate next the heterogeneous role of the initial housing tax burden on the vote between municipalities with varying shares of home-owners versus tenants. Unlike the property tax (taxe foncière), the burden of the taxe d’habitation in France falls upon both home-owners and renters. Given the long-run nature of rental contracts and the well-established stickiness in nominal rents, economic incidence may closely follow statutory incidence. Thus both types of households, if they expect to stay in their current town for some period of time, should be expected to react to the tax when making electoral decisions. Nonetheless, any capitalization effects of lower housing taxes into property prices would exclusively benefit homeowners, whose assets would increase in value, generating a windfall capital gain when selling their house. Therefore, the overall net benefit of the Macron proposed reform is expected to be higher for households who own their home than for those who rent it, consistent with the so-called “homevoter hypothesis” (Fischel, 2009).

In the spirit of Ahlfeldt and Maennig (2015), I re-run the ideology-adjusted specifications (equation 8), adding an interaction term between the share of homeowners in the municipality and the initial TH burden. I use data provided by INSEE and drawing from the full population census (Recensement de la population), providing me with the share of homeowners among primary residences in each municipality as of 2016. The baseline specification is:

\[
\text{MacronShare}_{j,2017} = \alpha + \beta_T T H^1_j + \beta_O \text{Home-ownership}_{j,2016} + \delta \text{Home-ownership}_{j,2016} \times T H^1_j + \gamma X_j + \eta_j \quad (9)
\]

where the coefficient of interest on the interaction term is \( \delta \).

Table 6 summarizes the results. I find that the interaction has a strong, positive, and statistically significant effect on the vote share of candidate Emmanuel Macron. Column 1 uses the baseline OLS specification with only the Macron vote share as a dependent variable and no additional controls beyond home-ownership.

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25Standard rent contracts in France last three years. Moreover, rents cannot be adjusted upwards by more than a nationwide fixed indexation coefficient every year in the case of continuing rental relationships.
Columns 2 to 6 replicate the robustness tests already implemented for the baseline regression: instrumenting both the TH burden and the interaction term by the average VLC in the municipality (and its interaction with homeownership) while controlling for pre-period home values interacted with local tax rates (column 2), introducing municipality-level controls $X_j$, in the full sample (column 3), and repeating the previous three specifications using the Macron excess vote share as a dependent variable (using the polling shift approach $PS_j$) in columns 4 to 6. In all specifications, the additional marginal effect of home-ownership interacted with the TH burden remains economically large, and in all cases but column 6, significant at the five percent level.

To gauge the magnitude of the estimates of such heterogeneous effects, preferred results in columns 5 suggest that for cities at the first decile of home-ownership rates, a one standard-deviation increase in the housing tax burden in 2016 had an 1.27 percentage point effect on the excess vote share of candidate Macron; but that for those at the ninetieth percentile of home-ownership rates, the marginal effect of a one standard deviation increase on the excess vote share was 1.68 percentage points.

The role of exemptions  
As described in section 2, some households were exempt from the housing tax even before the Macron reform (depending on characteristics including household income, age, and the number of dependents). Therefore, we expect the impact of the proposed repeal on the Macron vote share to be smaller in towns where the share of exempt households is larger and where the housing tax is therefore a less salient issue and its cancellation a less valuable benefit.

To test for this heterogeneous effect, I re-run the ideology-adjusted specifications (equation 8), adding an interaction term between the share of exempt households in the municipality and the initial TH burden. The baseline specification is:

$$\text{MacronShare}_{j,2017} = \alpha + \beta TH_{j}^1 + \beta O \text{Exempt share}_{j,2016} + \delta \text{Exempt share}_{j,2016} \times TH_{j}^1 + \gamma X_j + \eta_j \quad (10)$$

Table 7 summarizes the results. I find that the interaction between the initial TH burden and the share of households exempt from the tax has a strong, negative, and statistically significant effect on the vote share of candidate Emmanuel Macron, controlling for the direct effect of both variables. Column 1 uses the baseline OLS specification with the raw Macron vote share as a dependent variable and no additional controls beyond the share of exempt households in the municipality. Columns 2 to 4 replicate the robustness tests already implemented for the home-ownership interaction: introducing municipality-level mean income and population as controls $X_j$ (in column 2), and instrumenting both the TH burden and the interaction term by the mean assessed value in the municipality (and its interaction with the exempted share), while using the Macron excess vote share as a dependent variable (using the polling shift approach $PS_j$), in columns 3 and 4. In all specifications, the additional marginal effect of the share of exempted households interacted with the TH burden remains negative and economically large.

The role of town size  
As mentioned above in section 4.1, the effect size in ordinary least squares regressions appears smaller when restricting the sample to larger municipalities. Column 1 of Table 8 shows this
heterogeneous effect size more directly, using the raw Macron vote share as an outcome, and suggests that the interaction of population size and initial average TH burden has a negative coefficient estimate. More populated towns appear less responsive to the TH repeal promise. Column 2 shows that this heterogeneous effect also appears when using the PS\textsubscript{j} polling shift dependent variable as an outcome.

There are, however, three plausible explanations for the lower estimated effect using OLS in larger cities. First, a potential reason for the lower estimated effects in larger municipalities may simply be measurement error. Indeed, averaging at the municipality level is likely to lead to more attenuation bias in a highly populated and diverse city of 500,000 inhabitants than in a town with a population of 500. Because larger towns have a wider diversity of neighbourhoods and quality categories, averaging the TH burden at the municipality level creates measurement error in the independent source of variation, biasing the effect towards zero in this subset of towns.

Second, because larger towns are characterized by higher incomes on average, the share of the housing tax in the median household budget is smaller in these areas, making a given average euro amount less salient for residents of these cities. Column 3 of table 8 suggests that, when using as an independent variable the ratio of the income tax to median income in the municipality, one cannot reject the absence of heterogeneous effect size for larger municipalities; the same occurs when including directly mean and median income as controls in column 4.

Third, because larger towns often benefit from the presence of larger corporations and associated revenue from local business and corporate property tax, they are able to set lower rates on the politically more salient local residential housing tax, making the housing tax a less politically salient issue in these cities and a less relevant burden on a typical household budget. Column 5 of table 8 indeed shows that, when instrumenting the housing tax by local mean VLC, and the interaction term by the interaction of the mean VLC and population, the effect size for larger municipalities is again not statistically different than for smaller towns.

4.3 Robustness

Adjusting for spatial correlation The spatial correlation in both Macron excess vote shares and initial average housing tax, visible in figures 3a and 3b, suggests a need to account for regional or local shifts in electoral outcomes, potentially driven by unobserved correlates of the housing tax burden. Although all regressions already cluster standard errors at the province level to account for such spatial correlation, I follow two distinct empirical approaches to control more flexibly for regional shifts and clarify the distinct role of the initial TH burden.

The first strategy includes province fixed-effects in the baseline regressions, to account for any additional regional shifts in the support for Emmanuel Macron not accounted for by national polling shifts. This also removes systematic local variation in the TH burden, such as the updating of rental values in 1980 at the province level, or province-level funding needs shocks for local authorities which may have had spillovers on the tax rates set locally by municipalities. Table 9 repeats the specifications of table 4, but including such province fixed effects. The magnitude of the coefficients (using either the IV specification or the OLS, and either the
raw vote share or the excess vote share adjusted for polling shifts) is slightly increased relative to the baseline measures, and all estimates remain significant at the 0.1 percent level.

My second strategy to control for local shocks uses a strategy akin to the spatial first-difference design (SFD) developed by Druckenmiller and Hsiang (2018). I use geographic adjacency files provided by OpenStreetMap to compare each municipality \( j \) to a weighted average of the set of immediately neighbouring municipalities \( N(j) \), and compute for each variable \( W_j \) (the outcome variable, the initial tax exposure, the instrument, and the controls), a " spatial first difference" equivalent, \( \Delta W_j = Y_j - \bar{W}_{N(j)} = Y_j - \sum_{k \in N(j)} \frac{Pop_k}{\sum_{k' \in N(j)} Pop_{k'}} Y_k \). I then regress the difference in electoral outcomes \( \Delta Macron_j = Macron_j - Macron_{N(j)} \) (or \( \Delta PS_j = PS_j - PS_{N(j)} \)) between a city and its set of neighbors on the difference in initial TH burdens \( \Delta TH^1_j = TH^1_j - TH^1_{N(j)} \), using either ordinary least squares or instrumental variables.

This spatial differencing strategy is conceptually close to a first-differences panel data regression over time, when dependent and independent variables are first subtracted their lagged values. As discussed in Druckenmiller and Hsiang (2018), the goal is to remove any remaining unobserved spatially correlated omitted variable bias. The baseline (ideology-adjusted) ordinary least squares specification, in equation 11, thus relates the difference in the Macron (excess) vote between two towns that share a geographic border, and their initial relative TH burden.

\[
\Delta Macron_{2017} = \alpha + \beta \Delta TH^1_j + \gamma \Delta X_j + \eta_j
\]

I also run the corresponding instrumental variables regression, using as an instrument for \( \Delta TH^1_j \) the spatial first difference (SFD) in mean VLCs, \( \Delta VLC_j \), and controlling for the SFD of median home values and its interaction with the SFD of local tax rates, as well as the SFD of other local taxes based on the VLC. Table 10 describes the results. The magnitude of the coefficients is stable and significant at the 0.1 percent level across specifications, suggesting the removal of spatially correlated endogeneity indeed makes estimates more precise. IV coefficients are, as earlier, larger than OLS, but overall similar in magnitude to the baseline IV specifications.

**Varying the definition of the average tax burden** I compute alternative definitions for the municipality-level value of the housing tax burden in 2016, and show the robustness of the results to the use of these alternative measures in table 11. Using data from the REI file, I experiment with a series of alternative measures, including the ratio of total TH receipts to inhabitants (column 1), to registered voters (column 2); the ratio of the average tax payment to the mean income per consumption unit (column 3) and to median household income (column 4) in the municipality; and the euro-denominated value provided by the French Finance ministry publicly available document mentioned in section 2.3, published in 2018 after the Macron election, quantifying the benefit of the housing tax cut at the municipality level for the “average” household (column 5).

For ease of interpretation, independent variables are normalized to have a mean of zero and a standard deviation of one, so that the figure in each column denotes the impact of a one standard deviation increase in the TH burden measure on the Macron excess vote share, using the polling shift approach (\( PS_j \)), and instrumenting

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26I use a spatial first-difference design with respect to a population-weighted average of all neighbouring municipalities. Results are virtually unchanged when using only the largest neighbouring municipality.
the variation by the mean 1970-determined VLC in the municipality. While coefficients vary in magnitude, given the varying definition of the housing tax burden, all imply a quantitatively large effect, consistent with the baseline results.

**Placebo test: the 2012 election**  In spite of the instrumental variable strategy, and several robustness checks, it is not entirely inconceivable that omitted variable bias (or alternative channels correlated with assessed rental values, even conditional on current house prices and tax rates) could still lead to a spurious correlation between local TH payments (or local VLC) and political alignment. To gauge the risk and potential magnitude of such a bias, I use the 2012 presidential election as a placebo test.

The *Taxe d’Habitation* was not a salient wedge issue during the 2012 election. None of the major candidates campaigned on its repeal, it was not mentioned in any of the televised debates, and only a few proposals to adapt the tax were made, mostly through income-based modulations (in the case of then Socialist candidate and future president Francois Hollande) or proposals to integrate it in the national progressive income tax (in the case of far-right candidate Marine Le Pen). All such proposed measures ranked relatively low on candidates’ platforms, and did not generate any national news coverage, beyond specialized trade publications destined for local officeholders.

As in section 4.1, I purge the vote share of each of the main 2012 contenders from its predictable component by removing the systematic association with previous election results. This time, I use 2007 election results at the municipality-level to construct the $PE_{j,2012,k}$ “prediction error approach” variable, for $k$ corresponding to each of the top five candidates in 2012, based on the same methodology as above. I regress the 2012 vote share of candidate $k$ on the full set of vote shares (as a share of registered voters) of each of the 12 candidates (plus abstention) in the first round of the 2007 election.

$$\omega_{j,k,2013} = \sum_{l=1}^{13} \beta_l \omega_{j,l,2007} + \epsilon_{j,2012}$$

I then use only the residual of this prediction, as my dependent variable $PE_{j,2012,k}$ for candidate $k$’s vote share “purged” from predictable realized shifts due to the ideological composition of the local electorate in $j$:

$$PE_{j,2012,k} = \omega_{j,k,2012} - \sum_{l=1}^{13} \hat{\beta}_l \omega_{j,l,2007}$$

This residualization amounts to adjusting flexibly in the main specification for the share of each candidate in the municipality in 2007.

I then regress the value of $PE_{j,2012,k}$, for each of the top five candidates, on the 2012 housing tax burden gathered from the *REI* 2012 database, as well as municipality-level controls provided by the FiLoSoFi 2012 data provided by INSEE. Table 12 repeats the ideology-adjusted specification (with controls for population and median income) for the top five candidates. As in all previous specifications, standard errors are clustered
at the province level. Only one out of the top five contenders (Francois Bayrou) in 2012 exhibits a correlation of his excess vote share with the initial TH burden significant at the five percent level. The magnitude of that correlation in 2012 is at least one order of magnitude smaller than the effect size measured on the Macron excess vote share in 2017, and the R-squared of 0.003, despite the addition of controls, is negligible, and two orders of magnitude lower than the R-squared of the corresponding ideology-adjusted specification for the Macron excess vote share regressions in column 2 of table 3. Moreover, given that Bayrou endorsed Macron in the 2017 election, even assuming the potential existence of a quantitatively small omitted variable bias pushing voters away from centrist candidates in high TH-burden municipalities would lead to our main 2017 estimates being biased towards zero. At any rate, even if one cannot fully rule out the existence of omitted channels and variables biasing the central estimates, the absence of a statistically significant or quantitatively relevant impact of the TH burden in the previous election provides strong evidence that the TH itself is not conditionally correlated to persistent, unobservable drivers of ideological alignment at the local level, and that its 2017 effect is indeed a reflection of the self-interested voter hypothesis.

5 Aggregate impact

In this final section, I provide evidence, using aggregate Internet searches, polling, and prediction market data, that Macron’s promise to repeal the housing tax indeed coincided with a rise in his appeal in the broader electorate. Moreover, I show that back-of-the-envelope calculations suggest the quantitative magnitudes of these aggregate effects are consistent with the range of implied effects from my spatial heterogeneity estimates.

5.1 Internet searches

Taxpayers use Internet search engines to look for information about their expected tax liability, and tend to do so around particular events, which can be interpreted as a form of rational attention, or a form of salience-based updating. Using Google Trends, Hoopes, Reck, and Slemrod (2015) have documented that taxpayers in the United States search for tax information online especially more around trigger events, and that presidential elections, in particular, are accompanied by increased search effort, notably when candidates make taxes a salient dimension of their policy platform.

Macron announced the policy on February 24th, 2017. Using monthly data from Google Trends’s search engine,27 I first show, in figure 7, that searches for the housing tax in 2017 and 2018 broke with their regular seasonal pattern (which usually exhibits a substantial spike in October-November, the deadline for payment), reflecting the increased salience of the housing tax during the 2017 presidential campaign. The abnormal attention drawn to the housing tax started with the Macron announcement in February 2017 and spiked in May 2017, the date of the runoff stage of the election. Searches related to the housing tax itself were particularly

27 Hoopes, Reck, and Slemrod (2015) provide detailed information on the computation of Google’s index for the “propensity to search”, a 0 to 100 index where 100 corresponds to the highest relative value of searches for a term over the specified sample period in a given area. I restrict the sample to France over a ten year period, from January 1, 2010 to January 1, 2020. The results do not depend on the time window used.
prominent in the months leading to the first round of the presidential election. They then rose again in July 2017, after a keynote address by newly nominated Prime Minister Edouard Philippe suggested the promised reform might be delayed, and a rift ensued between Macron and part of his cabinet.

Then, again using monthly data, I include as keywords joint searches for the centrist candidate and the housing tax (“taxe habitatation Macron”). As shown in figure 8, such joint searches rose fast in the period immediately following the announcement, and remained elevated throughout the campaign, peaking in May, the month of the run-off stage, but reaching high levels even in the following months, notably around and after the July 2017 policy address and subsequent conflict. In figure 9, looking at more granular daily data, by restricting the sample to the year 2017, I show that searches mentioning both Macron and the TH rose fast on the day of the announcement, suggesting widespread interest in the reform. They also rose in the runup to the first round of the election, and in the days following the presidential debate between E. Macron and M. Le Pen in between the two rounds, when the housing tax was one of the salient issues discussed.²⁸

5.2 Prediction markets

Prediction markets aggregate individual assessments of a race in progress, and, due to the incentives of participants to make accurate forecasts, they can provide high frequency market-based estimates of a candidate’s probability of winning an election. While such data suffer from known limitations (Wolfers and Zitzewitz, 2004), especially for low-liquidity markets, they can help identify the ex ante likely impact of events on electoral outcomes at relatively high-frequency.²⁹ I use data retrieved directly from PredictIt,³⁰ the most widely used prediction market, in a 30-day window around the reform announcement, on the daily closing price in a contract paying a dollar in case of a Macron win in the election. Relative to political prediction markets for the United States, French markets have much lower volume, given their lesser penetration and social acceptability in the wider French society (Charpentier, 2017). Results displayed in figure 11, graphically show that, in a thirty day window around the announcements, Macron’s predicted winning probability, as estimating from the closing price of a contract paying a dollar in the case of a Macron victory substantially in the days immediately following the announcement. The fifteen-day means immediately before and after the announcement exhibit a more than ten percentage points difference in estimated winning probabilities. One should note, however, that, two days before the policy announcement, on February 22nd, 2017, centrist politician and 2012 presidential candidate Francois Bayrou announced his support for E. Macron. However, the sustained rise in Macron’s chances immediately after the TH repeal announcement, over and beyond the initial gain from the announcement of Bayrou’s support two days earlier, is likely to reflect market estimates of the effect of the promised housing tax cut, especially so since Bayrou’s support would already have been at least partially priced in Macron’s victory chances.

²⁸See e.g. Ouest-France, May 4th 2017, Débat présidentiel. Ce qu’il faut retenir de l’affrontement entre Macron et Le Pen
²⁹See Coulomb and Sangnier (2014) for an application of the use of such data in the French case in the 2007 presidential election, ten years earlier.
5.3 Daily polling results

To provide evidence that the promise to exempt a substantial share of the electorate from the housing tax had a significant and immediate effect on voting intentions for Emmanuel Macron, I use data from daily polls released before and after the announcement. Some pollsters have assembled anecdotal evidence around Election day that the housing tax cut was indeed an emblematic and salient proposal of the Macron campaign. In particular, I use data provided by PollsPosition, a French polls aggregator. These data aggregate all national polls realized in France using a representative sample and a method agreed upon by the National Polling Commission and defined in a July 1977 law. They include data from eight different pollsters. Polls are dated by the median fieldwork date. Using an event study design, I measure predicted voting intentions for Emmanuel Macron around the announcement of the policy. As shown in figure 10, Macron’s support (as measured by voting intentions in the adult population for the first round of the 2017 presidential election) rose durably in the days immediately following his morning show announcement of his intention to scrap the housing tax. Akin to the observed prediction market impact around the announcement date, the rise could partly stem from the endorsement received by Macron from centrist 2012 candidate Francois Bayrou on February 22nd. The limitation to daily data in the event study does not allow me to fully disentangle the direct impact of Francois Bayrou’s endorsement from the impact of the proposed housing tax repeal, especially given that all polls used in the specification take between two and three days of fieldwork to be conducted, thus confounding the estimates of the relative impact of the TH tax cut and the Bayrou endorsement. However, the fact that the placebo analysis in section 4.3 shows no local correlation between the 2012 vote for Bayrou and the initial TH burden, and the coincidence with online searches as a proxy for the salience of the TH issue, both point towards the TH repeal pledge being the key driver of the rise in polling intentions.

Taking the estimates of the effect of the pledge obtained from the instrumental variables specification in section 4.1.1, one can perform a simple aggregation exercise to check their consistency with high-frequency polling outcomes. Assuming a linear relationship between the Macron vote share (as a percentage of registered voters in a municipality) and the initial TH burden, the promise was enough to receive an additional number of votes equal to \( \hat{\beta} \) times the weighted average housing tax across municipalities (where the weights \( N_j \) are the number of registered voters in the municipality). Using the main IV estimate of column 5 in table 4, \( \hat{\beta} = 4.07 \), implies that the aggregate number \( V \) of additional votes received by Emmanuel Macron as a result of the campaign promise was roughly equal to \( V = \sum \hat{\beta} \times TH_j \times N_j \), which, given that the (weighted) mean TH burden was around EUR 760, corresponds to an additional 1.4 million votes (3.1 percent of registered voters, or 3.75 percent of votes cast). Such an electoral boost is consistent with the approximate 3.5 percentage points

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31 See notably the IFOP Report n. 172, in November 2017, “L’exonération de la taxe d’habitation : mesure totémique du candidat-président Macron”. According to a Harris Interactive April 20th 2017 poll, two days before the first round of the presidential election, among 1022 respondents, a plurality (55 percent) cited the TH repeal as the most memorable and convincing policy platform of the campaign, 72 percent of those intending to vote for Emmanuel Macron cited the policy as the most convincing of the campaign. Another July 2017 Harris Interactive poll, which sampled 978 individuals soon after the presidential election, the repeal of the TH was Macron’s most favored proposal among those tested: 80 percent of respondents favored the policy.

32 I am thankful to Berengere Patault and Alexandre Andorra for sharing the PollsPosition data. These data are now made publicly accessible at https://www.pollsposition.com/home.
increase in average polls results around the announcement date, evidenced in figure 10; it would have been enough to push Macron to reach the runoff stage.

6 Concluding remarks

Numerous studies have documented the retrospective role of economic conditions or transfers in triggering support for incumbents. Researchers often rationalize these findings by voters updating imperfect prior beliefs about candidate’s trustworthiness or competence. On the other hand, despite self-interested voting being a tenet of political economy theory, there is surprisingly little empirical evidence on the causal role of forward-looking promises for electoral outcomes. This paper contributes to an emerging literature causally studying the “prospective” voting motive, and in particular, the electoral impact of promised tax cuts.

I exploit the housing tax repeal proposed by Emmanuel Macron in his 2017 French presidential bid to provide local and aggregate evidence that the electorate responds to monetary campaign promises by candidates, enough to sway a major election in a large, advanced economy. Towns with higher expected tax savings, as predicted by historical assessed home values from the 1970s still in use as of 2017, and adjusting for both current housing values and tax rates, witnessed substantially larger support for Emmanuel Macron in the first round of the presidential election. Controlling for local demographic characteristics, income distribution patterns, or past electoral outcomes in the municipality, does not eliminate the estimated impact of the initial housing tax burden. Even when restricting my estimation strategy to variation between neighbouring municipalities, the results evidence an economically and statistically significant impact of the predicted local tax cut on support for the candidate pledging it. Consistent with the causal mechanism, heterogeneity analyses suggest an especially strong impact of the promised tax cut in municipalities with a larger share of homeowners, a smaller share of exempt households, and a lower share of secondary residences.

To pinpoint the causal impact of material promises on voting behavior, I avail myself of a nationwide policy platform differentially affecting the burden of local taxation. This feature generates substantial divergence across fine geographic areas in exposure to the tax cut – even among contiguous municipalities, and conditional on observables likely to affect the performance of each presidential candidate. Moreover, the nature of the French housing tax, owing to the pre-determined and formulaic nature of the tax base assessment, allows for a plausible instrumental variable strategy to deal with potential endogeneity concerns. As demonstrated by opinion polls and Internet searches, the policy was clearly identified by voters as a key plank of the centrist candidate’s platform, especially given the high salience of the housing tax in the electorate. Because of the absence of an incumbent, voters had relatively little information on any of the contenders’ potential skills as head of State. They were therefore unlikely to vote based on retrospective evaluation considerations, and more sensitive to prospective policy concerns embodied in candidates’ platforms.

The efficacy of material campaign promises in delivering votes remains a contentious topic, both among social scientists and practitioners of politics. The self-interested voter hypothesis has recently lost some of its centrality in academic studies of voting behavior. Indeed, it has been suggested, that, as living standards improved in
the long-run, narrow material interests lost their pre-eminence in driving political behavior. Thomas Frank’s widely acclaimed 2007 book, *What’s the matter with Kansas?* (Frank, 2007), forcefully argued that alternative determinants of the vote, from “cultural anxiety” to altruistic considerations, accounted for the apparent disconnect between voters’ economic self-interest and their political preferences. This paper suggests that, even at times of high polarization along cultural or identity concerns, costly but credible and salient tax cuts pledges may be enough to win the upper hand in major electoral contests, and that expected material gains and losses from a policy platform are still relevant determinants of individual voting behavior.

References


Appendices

A Figures

Figure 1: **Housing tax rate distribution** The figure is a histogram plotting the frequency of initial housing tax rates by municipality, combining the rate of the municipality and the inter-municipal cooperation agreement.
Figure 2: **Validation of the housing tax burden measure** The figure is a binned scatter plot plotting the baseline estimate of the initial housing tax burden per household in a municipality, in euros, against a government estimate of average savings per household published in 2018, after the reform had been implemented. The x-axis of each dot is the mean value of the government estimate in the percentile. The y-axis is the average value of the tax burden (baseline measure) in the percentile. The line plots the predicted values from a linear regression model.

![Binned scatter plot from 29,701 municipalities](image)

Figure 3: **The initial TH burden and the Macron excess vote share** The left panel maps the initial housing tax burden per household in a municipality, in euros, as of 2016, the last year when the value of the tax was known to households before the presidential election. Darker values denote higher values of the initial TH burden. The detailed computation of the average housing tax burden is explained in section 2.3. The right panel maps the excess vote share is computed using the “polling shift” approach which adjusts for nationwide swings from 2012 candidates to Emmanuel Macron in polls immediately preceding the week of the announcement of the housing tax repeal. Darker values denote higher values of the excess vote share, the detailed computation of which is explained in section 4.1.
Figure 4: **Validation of the market value measure** The figure is a binned scatter plot plotting the baseline estimate of the mean assessed rental value (VLC) in the municipality, against an estimated median home value in the municipality over the period 2014-2019 from the *Demande de Valeurs Foncieres* database. The x-axis of each dot is the mean value of the housing market value in the percentile. The y-axis is the average value of the municipality-level VLC in the percentile. The line plots the predicted values from a linear regression model.

![Assessed rental value and current median home values](image)

Figure 5: **Baseline and ideology-adjusted specification** The left panel is a binned scatter plot plotting Macron’s first round vote share in the 2017 French presidential election against the initial housing tax burden per household in a municipality, in euros. The right panel plots Macron’s first round excess vote share against the initial housing tax burden. The excess vote share is computed using the “polling shift” approach which adjusts for nationwide swings from 2012 candidates to Emmanuel Macron in polls immediately preceding the week of the announcement of the housing tax repeal. The x-axis is partitioned into percentiles. The x-axis of each dot is the mean value of the housing tax burden in the percentile. The y-axis is the average value of the Macron (resp. excess) vote share in the percentile. The line plots the predicted values from a linear regression model.

![Macron vote and initial TH burden](image)

(b) Macron first-round vote surprise and housing tax

![Macron surprise (polling shift) and initial TH burden](image)

(a) Macron first-round vote share and housing tax
Figure 6: Macron first-round vote surprise and initial VLC: reduced form

The figure is a binned scatter plot plotting Macron’s first round excess vote share against the initial average 1970-determined rental value in a municipality, in euros. The excess vote share is computed using the “polling shift” approach which adjusts for nationwide swings from 2012 candidates to Emmanuel Macron in polls immediately preceding the week of the announcement of the housing tax repeal. The x-axis is partitioned into percentiles. The x-axis of each dot is the mean value of the rental value in the percentile. The y-axis is the average value of the excess vote share in the percentile. The line plots the predicted values from a linear regression model.

Figure 7: Google searches for the housing tax - 2008-2020

The figure plots monthly values from Google Trends for searches containing the term “taxe habitation” in France over the period 2008-2020. The index denotes Google’s computation of a propensity to save, normalized to 100 at its maximum over the period. The shaded area denotes the period starting with the Macron repeal announcement, and ending with the finalization of the conflict between Macron and his cabinet over the implementation of the reform.
Figure 8: **Google joint searches for “housing tax” and “Macron”**. The figure plots monthly values from Google Trends for searches containing the terms “taxe habitation Macron” in France over the period 2008-2020. The index denotes Google’s computation of a propensity to save, normalized to 100 at its maximum over the period. The shaded area denotes the period starting with the Macron repeal announcement, and ending with the finalization of the conflict between Macron and his cabinet over the implementation of the reform.

Figure 9: **Google joint searches for “housing tax” and “Macron” - campaign period**. The figure plots daily values from Google Trends for searches containing the terms “taxe habitation Macron” in France over the period January to September 2017. The index denotes Google’s computation of a propensity to save, normalized to 100 at its maximum over the period. The lines denote successively the Macron repeal announcement, the first round of the presidential election, the presidential debate, the runoff stage, and the height of the conflict between Macron and his cabinet over the implementation of the reform.
Figure 10: **Polls: first round voting intentions for E. Macron** The figure plots voting intentions for E. Macron in the first round, using all polls aggregated by PollsPosition. The vertical line denotes the Macron repeal announcement.

Figure 11: **PredictIt estimated winning probability of Macron** The figure plots daily values from PredictIt for the closing price of a contract paying one dollar in the case of a Macron final victory in the French presidential election in a thirty day window around the announcement. The vertical line denotes the Macron repeal announcement; the horizontal line denote the pre- and post-mean for the contract value in the fifteen days periods immediately preceding and following the announcement.
### Table 1: Summary statistics

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Data come from a variety of sources, including the French Interior Ministry, French national statistical institute, French Finance Ministry, French Territorial Planning Authority. The number of available observations for some detailed income distribution variables is lower, reflecting statistical secrecy rules.

### Table 2: Impact of the TH on Macron vote share: baseline specification

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* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001.

Standard errors in parentheses, clustered at the province level. Columns 1 to 3 are unweighted ordinary least squares regressions; Columns 4 to 6 are weighted by the size of the local electorate. Columns 2 and 5 include as controls mean and median income, as well as population size. Columns 3 and 6, in addition to the same controls, include all deciles of income and the share of disposable income coming from pensions, capital income, and social transfers.
Table 3: Impact of the TH on Macron vote share: ideology-adjusted specification

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* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 to 3 are ordinary least squares regressions for the PE$_j$ or "prediction error" dependent variable; Columns 4 to 6 are ordinary least squares regressions for the PS$_j$ or "polling shift" variable. Columns 2 and 5 include as controls mean and median income, as well as population size. Columns 3 and 6, in addition to the same controls, include all deciles of income and the share of disposable income coming from pensions, capital income, and social transfers.

Table 4: Impact of the TH on Macron vote share: instrumental variables specification

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* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 to 3 are instrumental variable regressions for the raw Macron vote share; Columns 4 to 6 are instrumental variable regressions for the PS$_j$ or "polling shift" dependent variable. Both use 1970-determined mean VLC in the municipality to instrument for the initial TH burden. Columns 1 and 4 include house values interacted with current TH rates, as well as other taxes depending on the VLC as controls. Columns 2 and 5 also include mean and median income, as well as population, as controls. Columns 3 and 6, in addition, include all deciles of income and the share of disposable income coming from pensions, capital income, and social transfers.
Table 5: Vote-stealing effects of the TH repeal promise

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
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<tr>
<td></td>
<td>(Le Pen)</td>
<td>(Fillon)</td>
<td>(Melenchon)</td>
<td>(Abstention)</td>
</tr>
<tr>
<td>Initial TH burden(EUR '000s)</td>
<td>-4.16****</td>
<td>0.13</td>
<td>0.00</td>
<td>1.68**</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(0.69)</td>
<td>(0.36)</td>
<td>(0.84)</td>
</tr>
<tr>
<td>Home value controls</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Local tax controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Full sample controls</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R-Square</td>
<td>0.02</td>
<td>0.05</td>
<td>0.02</td>
<td>0.03</td>
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</table>

* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 to 4 are instrumental variable regressions for the PE, or "prediction error" dependent variable, where the dependent variable is the excess vote share of each of the three main contenders besides E. Macron, and excess abstention over the prediction. All use 1970-determined mean VLC in the municipality to instrument for the initial TH burden. All specifications include house values interacted with current TH rates, other taxes depending on the VLC, as well as mean income per capita, and local population, as controls.
Table 6: Impact of the TH on Macron vote share: the role of home-ownership

<table>
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<th>(IV)</th>
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<th>(IV)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Raw Macron vote share</td>
<td>“Polling shift” excess vote share</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial TH burden (EUR ’000s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial TH burden</td>
<td>0.21</td>
<td>8.11*</td>
<td>4.34</td>
<td>1.36</td>
<td>6.28**</td>
<td>3.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.48)</td>
<td>(4.88)</td>
<td>(4.89)</td>
<td>(1.57)</td>
<td>(2.92)</td>
<td>(2.64)</td>
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<tr>
<td>Home ownership x Initial TH burden</td>
<td>9.80***</td>
<td>0.64</td>
<td>3.15</td>
<td>5.58***</td>
<td>-0.05</td>
<td>1.17</td>
<td></td>
<td></td>
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<td>(3.24)</td>
<td>(6.13)</td>
<td>(6.27)</td>
<td>(1.92)</td>
<td>(3.52)</td>
<td>(3.22)</td>
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<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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</tr>
<tr>
<td>Local tax controls</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Full-sample controls</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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</table>

* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 to 3 use the raw Macron vote share; Columns 4 to 6 use $P_{ij}$ or “polling shift” dependent variable. Columns 1 and 4 are OLS regressions; columns 2 to 3 and 5 to 6 are instrumental variable regressions, using 1970-determined mean VLC in the municipality to instrument for the initial TH burden and the interaction of the mean VLC with the home ownership rate to instrument for the interaction term. All specifications include controls for home ownership rates, house values interacted with current TH rates, other taxes depending on the VLC, as well as mean and median income, and local population, as controls.
Table 7: Impact of the TH on Macron vote share: the role of exemptions

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<tr>
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<th>(OLS)</th>
<th>(IV)</th>
<th>(IV)</th>
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</thead>
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<tr>
<td>Initial TH burden</td>
<td>7.21</td>
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<td>5.12</td>
</tr>
<tr>
<td></td>
<td>∗∗∗∗</td>
<td>∗∗∗∗</td>
<td>∗∗∗∗</td>
<td>∗∗∗∗</td>
</tr>
<tr>
<td></td>
<td>(1.04)</td>
<td>(0.60)</td>
<td>(0.65)</td>
<td>(0.88)</td>
</tr>
<tr>
<td>Exempt share x TH burden</td>
<td>-0.22</td>
<td>-0.14</td>
<td>-0.21</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>∗∗</td>
<td>∗∗∗</td>
<td>∗∗∗∗</td>
<td>∗∗∗∗</td>
</tr>
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<td></td>
<td>(0.09)</td>
<td>(0.04)</td>
<td>(0.06)</td>
<td>(0.06)</td>
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<tr>
<td>Home value controls</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Local tax controls</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Income controls</td>
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<td>Yes</td>
<td>No</td>
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</tr>
<tr>
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<td>0.08</td>
<td>0.09</td>
<td>0.10</td>
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<td>35197</td>
<td>33338</td>
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<td>Clusters</td>
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<td>96</td>
<td>92</td>
<td>92</td>
</tr>
</tbody>
</table>

Standard errors in parentheses

∗ p < 0.10, ∗∗ p < 0.05, ∗∗∗ p < 0.01, ∗∗∗∗ p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 uses the raw Macron vote share; Columns 2 to 4 use the PS_j or “polling shift”-corrected dependent variable. Columns 1 and 2 are OLS regressions; columns 3 and 4 are instrumental variable regressions, using 1970-determined mean VLC in the municipality to instrument for the respective measure of the TH burden and the interaction of the mean VLC with the exempted share to instrument for the interaction term. All specifications except column 3 include controls for population and mean income. Columns 3 and 4 also include as controls house values interacted with current TH rates, other taxes depending on the VLC.
<table>
<thead>
<tr>
<th></th>
<th>(OLS)</th>
<th>(OLS)</th>
<th>(OLS)</th>
<th>(IV)</th>
<th>(IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial TH burden</strong></td>
<td>5.21****</td>
<td>3.79****</td>
<td>4.13****</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(0.49)</td>
<td>(0.73)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pop. (‘000) x TH burden</strong></td>
<td>-0.02**</td>
<td>-0.01</td>
<td>0.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.09)</td>
<td></td>
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</tr>
<tr>
<td><strong>TH/income ratio</strong></td>
<td>0.59****</td>
<td>0.95****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.19)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pop (‘000) x TH/Income</strong></td>
<td>-0.00</td>
<td>-0.04</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.04)</td>
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<tr>
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<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Local tax controls</strong></td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Income controls</strong></td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>R-Square</strong></td>
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<td>0.08</td>
<td>0.11</td>
<td>0.13</td>
<td>0.10</td>
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<td>35197</td>
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<td><strong>Clusters</strong></td>
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<td>96</td>
<td>96</td>
<td>92</td>
<td>92</td>
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</tbody>
</table>

* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 uses the raw Macron vote share; Columns 2 to 5 use the \( PS_j \) or “polling shift” dependent variable. Columns 1 to 3 are OLS regressions; columns 4 and 5 are instrumental variable regressions, using 1970-determined mean VLC in the municipality to instrument for the respective measure of the TH burden and the interaction of the mean VLC with population size to instrument for the interaction term. All specifications include controls for population and mean income. Columns 4 and 5 include as controls house values interacted with current TH rates, other taxes depending on the VLC.
### Table 9: Impact of the TH, with province Fixed effects

<table>
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<tr>
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<th>(IV)</th>
<th>(IV)</th>
<th>(OLS)</th>
<th>(IV)</th>
<th>(IV)</th>
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</thead>
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<tr>
<td></td>
<td>Raw Macron vote share</td>
<td>&quot;Polling shift&quot; excess vote share</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Initial TH burden</td>
<td>8.261****</td>
<td>9.335****</td>
<td>5.626****</td>
<td>5.548****</td>
<td>5.833****</td>
<td>3.630****</td>
</tr>
<tr>
<td></td>
<td>(0.581)</td>
<td>(0.728)</td>
<td>(0.770)</td>
<td>(0.389)</td>
<td>(0.538)</td>
<td>(0.534)</td>
</tr>
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<td>Province FE</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Home value controls</td>
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<td>Local tax controls</td>
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<td>No</td>
<td>Yes</td>
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<td>Full-sample controls</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>R-Square</td>
<td>0.259</td>
<td>0.102</td>
<td>0.138</td>
<td>0.132</td>
<td>0.0656</td>
<td>0.0828</td>
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<td>92</td>
<td>92</td>
<td>95</td>
<td>92</td>
<td>92</td>
</tr>
</tbody>
</table>

* Standard errors in parentheses, clustered at the province level. All columns include province fixed-effects to account for spatial correlation in 2012-2017 electoral shifts that may be correlated to province-level shocks to the initial housing tax burden or the instrument. Columns 1 to 3 use the raw Macron vote share; Columns 4 to 6 use $PS_j$, the "polling shift"-corrected dependent variable. Columns 1 and 4 are OLS regressions; columns 2, 3, 5 and 6 are instrumental variable regressions, using 1970-determined mean VLC in the municipality to instrument for the initial TH burden. All specifications include province fixed-effects. Columns 2 to 3 and 5 to 6 include controls for house values interacted with current TH rates, as well as other taxes depending on the VLC. Columns 3 and 6 include mean income and local population as controls.
<table>
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<tr>
<th></th>
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<th>(OLS)</th>
<th>(IV)</th>
<th>(OLS)</th>
<th>(OLS)</th>
<th>(IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Polling shift” excess vote share</td>
<td>(0.293)</td>
<td>(0.262)</td>
<td>(0.495)</td>
<td>(0.201)</td>
<td>(0.191)</td>
<td>(0.349)</td>
</tr>
<tr>
<td>SFD(Initial TH burden)</td>
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<td>Yes</td>
</tr>
<tr>
<td>Income controls</td>
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* p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001

Standard errors in parentheses, clustered at the province level. Columns 1 to 3 use the raw Macron vote share; Columns 4 to 6 use $PS_j$ or “polling shift” dependent variable. Columns 1, 2, 3 and 5 are OLS regressions; columns 4 and 6 are instrumental variable regressions, using 1970-determined (spatial first difference of) mean VLC in the municipalities to instrument for the initial (spatial first difference) TH burden. All variables, dependent and independent, correspond to $\Delta Y_j = Y_j - \bar{Y}_N(j)$, with $\bar{Y}_N(j)$ the mean value of $Y$ in the set of municipalities contiguous to $j$, weighted by population. All IV specifications include controls for (the spatial first-difference of) house values interacted with current TH rates, and other taxes depending on the VLC. Columns 3 and 6 include spatial first differences of mean and median income, and local population, as controls.
Table 11: Alternative measures of the TH burden

<table>
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<th>(2)</th>
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<th>(4)</th>
<th>(5)</th>
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</thead>
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<td>TH receipts/inhab.</td>
<td>2.643***</td>
<td>(0.341)</td>
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<td>TH receipts/regist.</td>
<td>2.512***</td>
<td>(0.295)</td>
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<td>TH/mean income</td>
<td>2.531***</td>
<td>(0.454)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>TH/median income</td>
<td>2.031***</td>
<td>(0.300)</td>
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<td></td>
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<td>(0.142)</td>
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<td></td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Local tax controls</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>92</td>
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<td>92</td>
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</tbody>
</table>

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Standard errors in parentheses, clustered at the province level. All columns are instrumental variable regressions, using 1970-determined mean VLC in the municipality to instrument for the initial TH burden. All specifications include controls for house values interacted with current TH rates, and other taxes depending on the VLC.

Table 12: Placebo analysis: impact in 2012 election

<table>
<thead>
<tr>
<th></th>
<th>(Melencion)</th>
<th>(Hollande)</th>
<th>(Bayrou)</th>
<th>(Sarkozy)</th>
<th>(Le Pen)</th>
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<tr>
<td>Initial TH burden</td>
<td>-0.19</td>
<td>0.48</td>
<td>-0.77***</td>
<td>-0.48</td>
<td>-0.91*</td>
</tr>
<tr>
<td></td>
<td>(0.31)</td>
<td>(0.51)</td>
<td>(0.28)</td>
<td>(0.47)</td>
<td>(0.46)</td>
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<tr>
<td>Full sample controls</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R-Square</td>
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<td>0.00</td>
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<td>0.01</td>
<td>0.01</td>
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<td>Clusters</td>
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Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$

Standard errors in parentheses, clustered at the province level. All columns are OLS regressions, and include controls for population size and median income in 2012. The dependent variable is $PE_{j,k,2012}$, the prediction error between a candidate’s actual 2012 vote share and its expected vote share based on a regression of 2012 results on 2007 presidential election vote shares for all candidates in the town. The independent variable of interest is the average housing tax burden per household as of 2011.
C Details of the housing tax computation

The housing tax is part of four main sources of local tax revenue for municipalities in France. Breuillé, Duran-Vigneron, and Samson (2018) provide a detailed overview of the various components of municipal taxation in France. Municipalities also rely on direct government grants to fund their operations and investment projects. As of 2017, local tax revenue for municipalities stood at EUR 52 billion out of total receipts of c.EUR 90 billion, with government grants representing most of the remainder. The TH is collected on residents of furnished units. Residents of occupied units are defined as the owner-occupier or the tenant occupying the housing unit as of January 1st of each year; for vacant units and second homes, the tax is paid by owners. In 2018, the French government made the source code for the computation available as part of its open data policy, at the following address.

C.1 Tax base

The tax base of the TH is an assessed annual renting value of the unit, the \textit{valeur locative cadastrale} (VLC). The VLC assessment, used for the determination of all local taxes in France, such as the individual property taxes on developed and undeveloped land is the product of an estimated weighted square footage, and an imputed rental rate per square meter.

\textbf{Weighted square footage} The weighted square footage (\textit{surface ponderee}) computation started by measuring the actual square footage of a housing unit in 1970 (or at the time of construction). Each housing unit was then ranked into one a “quality category”, corresponding to one of eight coarse levels on a ladder from “insalubrious” to “luxury”, as classified arbitrarily in 1970 by civil servants in each town. The assessors then re-weighted the measured footage, using a formula over-weighting the first 20 square meters and under-weighting additional square footage beyond a threshold that varies according to the unit’s quality, to account for category-specific estimated “decreasing returns” in rental services. The “weighted square footage” thus computed was adjusted upwards for the presence of what were deemed in 1970 to be “comfort” elements, like the presence of a bathtub (5 additional sq. m or 50 sq. ft), sinks (3 sq. m), running water (10 sq. m), or electricity (2 sq. m), each adding a fixed number of “weighted square footage”.

The resulting weighted area is adjusted downwards or upwards by 5 percent in the presence of an elevator in 1970, and by two multiplicative factors (up to minus or plus 20 percent each): the “maintenance coefficient”, which accounts for the age, maintenance requirements and overall condition of the unit – as of 1970; and the “peculiar situation coefficient”, which takes into account its relative location within a municipality. Both adjustments were made with respect to the condition of the unit and the desirability of its location according to municipal employees as of January 1st, 1970.

\textbf{Rental rates} The weighted square footage obtained after all previous steps was then multiplied by a municipality- and category-specific “rental rate”, defined in 1970, to obtain the imputed rental value. In each town, a few
"representative units" (5.2 percent of units nationally) were assessed for each category, with municipal assessors recording either their actual market rental rate, observed as of January 1st, 1970, or an imputed rate (a constant return on the unit’s last sale price as of 1970) for vacant units that were not currently rented and for owner-occupied units. Each non-reference housing unit was then allocated the municipality- and category-specific rental rate (per square meter of weighted square footage) of the reference unit. Multiplying the “rental rate” by the “imputed square footage” of the unit yielded a nominal VLC as of January 1970, or VLC70. Newly built housing after 1970 is classified into one of the eight quality categories, and then attributed a virtual VLC70 according to the exact same process.

Revisions of the VLC - or absence thereof  Officially, a July, 1, 1974 law calls for the revision of the VLC70 every three years, as well as changes to the imputed square footage of a unit in the case of remodellings or additions. However, the VLC70 were never revised. They were ”actualized” once in 1980, using a common province-level multiplicative adjustment factor, yielding somewhat updated VLCS, nicknamed VLC80.33 Together, the Senate, National Assembly, and two advisory and control bodies, the Cour des Comptes, and Conseil des Prelevements Obligatoires, authored more than twenty reports dedicated to the need for a general revision of the imputed rental values from 1990 to 2017. A July 1990 bill34 was the only attempt at wholly revising rental values. Updated market rate assessments were collected throughout the French territory, leading to the existence of a shadow rental value database, the VLC90, at the French revenue service (then called the Direction Generale des Impots). According to the planned revision, rental values would have been updated upwards by more than 50 percent for at least 7 percent of units, and higher-income households would have been hit substantially harder.35 However, after years of fierce debates, the government abandoned the project in the late 1990s, in view of the substantial implied redistributive effects. A small scale experiment to revise some VLC in five out of ninety-five provinces was also conducted in 2011, but did not lead to an updating of VLCS used in the housing tax.

The absence of local revisions of rental rates and imputed square footage over more than 45 years led to a substantial geographic disconnect between current market valuations and the formulaic assessments. Even the “weighted square footage” had rarely been updated as of 2017, even though virtually all city center housing units had undergone substantial remodellings and additions of “comfort” elements, such as elevators, electricity, bathrooms, or running water, over the previous five decades. The VLC are sometimes adjusted on a case-by-case basis in the presence of egregious mistakes, or changes in the rental value due to substantial architectural changes, although there is no penalty for failing to disclose a remodelling addition to the tax administration. Indeed, smaller municipalities often only receive information from the national revenue service

33There are 96 provinces or départements of varying size and population in metropolitan France, each of which contains more than 350 municipalities on average. The maximum decadal nominal actualization coefficient applied in 1980 was 85 percent, in Paris. The minimum was 41 percent, in the Gers. The standard deviation of nominal decadal actualization across provinces was only eight percent. As a point of comparison, cumulative CPI inflation was over 170 percent over the same 1970-1980 period, according to INSEE, the French national statistical institute.

34Loi n.90-669 du 30 juillet 1990 relative à la révision générale des évaluations des immeubles retenus pour la détermination des bases des impôts directs locaux

35See the June 2012 Senate Ways and Means committee report on revising the VLC, Rapport d’information fait au nom de la Commission des Finances sur la révision des valeurs locatives professionnelles et commerciales
(DGFIP) about the aggregate VLC in the town.

C.2 Tax rates

Tax rates The municipal tax rate applied to the base, on the other hand, is defined by a vote in city councils every year. As of 2016, there were two main levels of the tax in force, at the municipality or commune level, and at the level of the “inter-municipality” or EPCI (a syndicate of towns who jointly provide a variety of local public services). Additional tax rates are imposed in some municipalities to fund flooding prevention or other special services.

Applicable adjustments and deductions The tax base, obtained by multiplying the rental value by the imputed square footage, is adjusted for a number of deductions, most of which correspond to reductions for the number of dependents living in the household, or special exemptions for older citizens, lower-income households, or people with disabilities. Most deductions are aimed at reducing the burden of the tax for larger and/or underprivileged households. They are defined as a fixed deduction rate (e.g. 10% per additional child) multiplied by the average VLC in the municipality, $\overline{VLC}_m$. Specific categories of households (people above 60, disabled individuals, and widowers) with an income below a threshold close to the national poverty line, adjusted for household size, are exempt from the tax. Finally, the tax is subject to a ceiling of 3.44% of the household’s annual fiscal income. Most deductions and ceilings are “paid for” by the central government, through inter-governmental grants to municipal authorities compensating for the corresponding lost revenue. Since only 43 percent of households paid any progressive income tax (Impot sur le revenu) in 2016, the TH was also the only broadly applicable and salient tax remitted by households at almost all income levels above the poverty line.

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36 One national mandatory deduction is increasing in the number of dependents: the deduction rate can be adapted by municipalities from 10 to 20 percent for the first two children, and from 15 to 25 percent per child after the third. Two deductions, up to a ceiling of fifteen percent each, can be voted upon locally in city councils: one applies to all households, and the other to households below a means-tested threshold.

37 In 2017, out of EUR 23.9bn (slightly less than two percent of aggregate disposable income) of total TH receipts, EUR 1.7bn corresponded to the inter-governmental compensation for exempted households, and EUR 4bn to the inter-governmental compensation of deductions, leaving 18.2bn (76 percent) directly paid by households locally.

38 Most households not subject to the progressive income tax but receiving wage or pension income pay a c. 20 percent Value Added Tax on consumption, a c. 10 percent flat wage tax (CSG/CRDS), and social security contributions covering health and unemployment insurance ranging from 30 to 60 percent of total labor costs. Nonetheless, because they are either directly subtracted from gross income or included in sale prices, these levies are generally not as salient as direct tax payments from the point of view of households (see e.g. Bozio, Breda, and Grenet (2017)).
D Data appendix

I use data from a variety of administrative sources in France to construct my outcome variables and key sources of variation at the municipality-level in the initial housing tax burden.

Units of observation  The unit of observation is a “2017 municipality” (i.e. a municipality for which there exists available 2017 electoral data). In 2017, all 35,281 municipalities in France’s mainland territory reported exhaustive electoral data.39 Municipalities in France have been subject to numerous and continuous mergers and modifications. To aggregate municipalities at a consistent level, I use data from INSEE’s Code officiel géographique files that include all mergers between municipalities that occurred from 2015 to 2017 (recorded in response to a law facilitating inter-municipal mergers), and manually add mergers that occurred from 2012 to 2015. This allows me to aggregate past 2012 electoral results (from municipalities existing in May 2012), and housing tax burdens known at the time of the election (from municipalities existing as of January 1st, 2016), to the level of 2017 municipalities, matching 99.9 percent of the electorate of 2017 mainland municipalities (35197 municipalities) to available data on past electoral data, housing tax receipts per household, average assessed values, town population, and average income.

Due to statistical secrecy constraints, data are not disclosed by INSEE, the French national statistical institute, when areas or subgroups with less than fifty households or a hundred individuals can be re-identified. Thus, while the baseline regression sample includes 35197 municipalities with available data, the smallest 11 percent of municipalities (around 3700) drop from the sample when adding controls for median income; and only the largest c. 5000 municipalities remain when adding controls for income distribution by deciles and composition of income by sources.

Electoral outcomes  My main outcome variable is the share of registered voters who supported Emmanuel Macron in the first round of the French presidential election in April 2017. Exhaustive data on electoral outcomes for all municipalities in France in the first and second rounds of the 2017 and 2012 presidential elections are gathered by the French Interior Ministry, using figures from the national electoral commission (Commission nationale de recensement des votes). Similarly, I use data on 2012 first-round electoral results available from the Interior Ministry to construct two alternative predicted vote shares for Emmanuel Macron in 2017: one based on expected shifts from 2012 candidates to Emmanuel Macron inferred from opinion polls; and one based on linearly projecting Macron’s electoral support on the vote share of all candidates in the 2012 election. Out of all municipalities that report 2017 electoral data, more than 80 percent only include one polling place; 60 percent of registered voters live in municipalities with less than 10 individual polling places.40

39I exclude the cases of French citizens in foreign countries and French territories outside mainland France (except Corsica), since French citizens abroad are exempt from the housing tax, and specific exemptions and deductions are granted to French territories outside the mainland.

40Precincts or polling places, which count 670 registered voters on average and are recommended not to exceed a maximum of c. 1,000 voters, are the smallest unit level at which votes are recorded, but do not correspond to any administrative tax unit. Votes are also recorded at the municipality level, which is the relevant housing tax administrative layer. The average municipality counts 1,260 registered voters.
Local taxation  Local taxation data are available for the year 2016 from the Recensement des Elements d’Impostion a la Fiscalite Locale (REI) database, designed by the French Treasury. I obtain detailed information on Taxe d’habitation tax rates, tax revenues, average assessed rental values (VLC or Valeur Locative Cadastrale), as well as municipality-specific deduction rates, and the number of beneficiaries of all deductions and exemptions. I use data from 2016, since the housing tax is paid in November each year, and the 2016 tax bill was the last known to households at the time of the April 2017 presidential election. The data include such details for all local taxes, including the TH, but also the taxe fonciere (an individual property tax) and the contribution economique territoriale and its successor, the contribution sur la valeur ajoutée des entreprises, a local corporate business tax. Since these other levies depend on the Valeur Locative Cadastrale, I control for receipts from these taxes when using the VLC as an instrument, to satisfy the exclusion restriction that the VLC does not affect voter support through e.g. other taxes that might have been expected to be changed by the election (although no candidate planned to reform any of the other local taxes based on the VLC).

My preferred measure for the average value of the housing tax burden per household in 2016, \( TH_{1j} \) divides the sum of TH receipts (at the municipal and inter-municipal level) by the number of households subject to the tax in a municipality. I include the collection fee \( F_t \) imposed by the national government, as well as a few small specific "historical" taxes associated with the TH, levied on the same tax return using the same base, which were also subject to the Macron measure.\(^{41}\) As shown in figure 2, my main measure lines up almost exactly with an ex post estimate of the average savings per household, provided by a government document published in 2018, after the Macron election, quantifying the benefit of the housing tax cut at the municipality level.\(^{42}\)

Housing market values  There does not exist a publicly available set of current market-rate housing values at the municipality level in France. To construct conditionally exogenous variation and control for the role of current housing values in household sorting and local ideological alignment, as described in detail in subsection 4.1.3, I use the Demande de Valeurs Foncieres (DVF) database provided by the French Finance ministry.\(^{43}\) The DVF database is an exhaustive repository of c. five million housing transactions that intervened in France over a period of five years (2014 to 2019), recording their exact location, total value, square footage, and, for some observations, specific characteristics of the sale. I match geo-coded transactions to their municipality, and use the full database\(^{44}\) to compute median and mean home values, and price per square meter, for home sales in each municipality over the five-year window centered around the 2016-2017 period of interest. The (log) VLC based on 1970 values, and the current (log) median home value line up relatively closely, with a correlation of

\(^{41}\)These notably include the so-called "taxe GEMAPI" and residence taxes specific to the Greater Paris area, which together represent less than 0.08 percent of overall TH receipts in the sample.

\(^{42}\)This alternative measure, which has a 95 percent correlation with my baseline \( TH_{1j} \) figure in the available subset of c. 30,000 municipalities, is not used as the main dependent variable, for two reasons. First, it was not known to households at the time of the election; second, it includes the impact of potential variation in local tax rates between 2016 and 2018. In the robustness section, however, I experiment with a series of alternative measures of the TH burden, including this ex post government estimate.

\(^{43}\)See Casanova Enault, Boulay, and Coulon (2019) for a detailed description of the DVF database and potential caveats in the reporting of the data.

\(^{44}\)I only include sales of houses and apartments, and exclude sales of unbuilt land and smaller units like garages. I also exclude sales of units below 10 square meters and winsorize the sample by excluding extreme values for the price per sq. meter.
0.57 (0.52 when using (log) mean home values).

**Municipality-level characteristics**  To control for composition effects at the municipality level and test for heterogeneous responses, I also include municipality-level socio-demographic from a variety of sources. The primary source is the FiLoSoFi database (*Fichiers Localises Sociaux et Fiscaux* or *Localized Social and Fiscal Files*) in 2016. These data, combined by INSEE, the French statistical institute, are designed specifically to cover all taxpayers subject to the TH. They include inputs from several sources, notably tax files, pension schemes, and social security services, as well as the full population census. The FiLoSoFi files provide detailed information on population composition, age structure, income levels by decile, the share of disposable income received from capital, labor, or pensions, as well as the share of income paid in taxes or received in welfare benefits. When including additional controls, the sample size varies slightly according to data availability, because INSEE does not disclose municipality-level data when it can be used to re-identify information about less than fifty households or a hundred individuals.

The Filosofi database provide median household income in a municipality. I also obtain mean income per capita at the municipality level, as well as local population counts, from a government dataset specifying criteria for the attribution of inter-governmental grants, the *Dotation Globale des Collectivités Locales* dataset.

I construct a data file of aggregate income tax payments per municipality from the *IRCOM* (*Impot sur le Revenu des Communes*) database, provided for each province, by the French Direction Generale des Finances Publiques.

I use Housing Census data on municipalities from the 2017 Supplemental Housing Survey to obtain the share of homeowners, the share of renters, and the share of secondary residences in a municipality. Finally, I use geographic adjacency files from OpenStreetMap, a collaborative open-source geographic information systems project providing the identifiers of all neighbouring municipalities for each municipality in my sample, enabling me to identify and compare neighbouring municipalities in a spatial first differences design.

**Nationwide sources**  : To construct a pre-reform prediction for the Macron vote share at the local level, I rely on pre-announcement polling data from an Elabe poll published three days before the TH tax cut announcement, including a decomposition of voting intentions depending on the respondent’s 2012 vote. When demonstrating the importance of the TH effect for Macron’s support at the aggregate level, I avail myself of a variety of additional sources. In particular, I use Internet search data from Google Trends; polling data from IFOP’s rolling daily poll; and prediction market data from the website PredictIt, when running event studies on estimated voter interest, victory chances, and polling results around the day when Macron announced the reform in February 2017.

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