

The Effect of Fiscal Autonomy on Local Governments*

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Abstract

This study examines the impact of revenue decentralization on local government budgets, focusing on a 2012 Italian reform that transitioned revenue away from national transfers towards local property taxes. Through a difference-in-difference approach, we identify three key results. First, municipalities respond to decentralization by raising overall tax revenue. Second, they enhance progressivity by altering the tax composition and also directly increasing the personal income tax rates. Finally, despite no change in expenditure, public good provision also increases. The size of the personal income tax base determines how municipalities respond: municipalities with higher bases increased income tax revenues, whereas those with lower bases relied more on non-tax revenue.

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1 Introduction

In recent decades, numerous countries have decentralized revenue and expenditure responsibilities from higher levels of government to state and local authorities. Within OECD countries, the proportion of revenue collected through direct taxation by state or local authorities has steadily increased (OECD, 2019). For instance, in Italy, the share of total government revenue collected as taxes at the subnational level increased from 5.8% in 1995 to 11.6% in 2020. Proponents of decentralization argue that it can improve efficiency, whether through better information or via the political incentives of local authorities (e.g., Oates 1972, Besley and Coate 2003). The fundamental assumption underlying these arguments in favor of decentralization is that, given more responsibility over their own budget, local governments would exhibit behavior that is *distinct* from what they would do under a more centralized system. We empirically assess this hypothesis, focusing in particular on the revenue generation process and public good provision.

This paper studies how local governments' revenue and expenditure behavior responds to additional responsibility over their budget. We look specifically at a fiscal reform which reduced national transfers in exchange for an increase in property taxes. In 2012, the Italian national government increased municipal tax revenue through the expansion of the property tax revenue – the *Imposta Municipale Propria* (IMU) – and paired it with a simultaneous reduction in national transfers. The reform had three components. First, it essentially doubled the valuation of the property tax base. Second, it gave municipalities more discretion over property tax rates by expanding the range of tax rates a municipality could choose from. Third, the reform reduced the *actual* national transfers to municipalities, with the reduction amounting to the *expected* additional property tax revenue. This expected revenue was calculated by comparing the 2011 property tax revenue to the property tax value implied by the new property tax base definition, combined with a default tax rate applied to all municipalities, regardless of their eventual tax rate choice.

We leverage the fact that the IMU reform effectively reduced transfers more for some municipalities than others to estimate the causal effect of the decentralization of budgetary responsibility. We use a propensity-matched difference-in-difference empirical strategy comparing municipalities with relatively larger actual transfer cuts (i.e. equal to their larger expected property tax increases) to those which are similar at baseline but experience smaller reform-induced tax increases and transfer cuts.

Our analysis delivers three key results. First, increased responsibility leads municipalities to increase and diversify their revenue sources. Municipalities cover the losses in transfers by raising more tax revenue – on average, they raise less property tax revenue than expected

and supplement the remaining shortfall through other taxes. Second, these changes increase the progressivity of local taxation, both through a shift in the composition of taxes as well as by explicitly increasing the income taxes on individuals in the highest tax brackets. Finally, there is a modest increase in the level of public goods provided despite a lack of change in total revenue or expenditure.

More specifically, we first find that in response to a one Euro decrease in national transfers, which corresponds to a one Euro increase in *expected* property tax revenue, municipalities raise property tax revenue by approximately 0.80 Euro. But rather than letting overall revenue decrease, municipalities offset the lower-than-expected property tax revenue with an increase of about 0.20 Euro from other taxes, particularly on richer individuals. Furthermore, we find no changes in debt levels, or municipal expenditure.¹

We further characterize the other tax revenue responses outside of the property tax.² We find that municipalities respond to increased autonomy due to the reform by increasing the progressivity of local income taxes – the likelihood of having multiple income tax rates increases among municipalities more affected by the reform. Having multiple tax rates increases progressivity because the national government mandates that municipalities can only implement multiple income tax rates if they are higher for higher income brackets. Moreover, we find that municipalities increase more the marginal income tax rates in higher income brackets.

While these results apply specifically to the progressivity of the income tax, we contend that overall local taxation becomes more progressive overall. First, municipalities respond to the additional responsibility by shifting the overall composition of taxes away from the property tax and toward the personal income tax. Considering the relatively regressive nature of the property tax (Löffler and Siegloch 2021, Guzzardi et al. 2023), this change represents a shift toward a more progressive local tax system in response to the IMU reform. Furthermore, since individual relocation responses to tax rate changes are relatively small in this context (Rubolino and Giommoni 2023), the increased progressivity of statutory income tax rates likely results in a more progressive incidence of local personal income tax.³

¹In the Appendix, we show that there is no discernible change neither in the levels nor the composition of municipal expenditure.

²Italian municipalities could levy three main taxes at that time: the property tax, the personal income surtax, and the waste management tax. Section 2 provides a more detailed discussion of revenue sources for Italian municipalities. Unfortunately, precise values for personal income tax revenue at the municipal level are unavailable; our data reports separately the value of the property tax revenue and the aggregate of all other tax revenues. In Section 5, we explore how the increase in other tax revenue from the IMU reform originates from an upswing in personal income tax revenue as well.

³We remain neutral regarding whether the IMU reform made the overall tax system more progressive. To answer this question, municipal-level information on other tax changes levied at the national level would be necessary. Unfortunately, we do not have access to such information. Nonetheless, it is important to

Finally, we observe a modest increase in the provision of public goods such as education and local police in the short run. Specifically, a 10,000 Euro change in the IMU reform results in a one percent increase in the probability of having a nursery school in the municipality and a 0.2 percent increase in the probability of having a local police station within 3 years of the reform. That this increase in public goods happens without any change in total expenditure suggests that the efficiency of public spending may have improved.

To explore the mechanisms underlying this response, we look for three different heterogeneities. We first test whether municipalities with different municipal characteristics respond differently to greater fiscal autonomy. We show that municipalities uniformly respond to a one Euro change in the value of the IMU reform by increasing property tax revenue by only 0.80 Euro, with little heterogeneity by municipal characteristics. However, in line with the literature on tax structure (e.g., (Hettich and Winer, 1984, 1988, 1999), Volkerink and De Haan 1999, Kenny and Winer 2006), they differ in how they compensate for the budget shortfall arising from the reform. Specifically, municipalities with above-median income tax bases cover the difference by raising revenue from other tax sources. In contrast, municipalities with lower income tax bases rely more on revenue from non-tax sources.

Finally, we do not find support that the increase in fiscal autonomy increased the political accountability of the mayors (Besley and Coate 2003) or prompted different municipal response based on local citizens' preference (e.g., Alderman 2002, Strumpf and Oberholzer-Gee 2002, Faguet 2004).⁴

To test the political accountability hypothesis, we exploit the existence of a two-term limit for Italian mayors. In this context, an incumbent in the second mandate faces lower political competition, since she cannot be reelected. The absence of statistically significant differences among mayors facing different degrees of competition suggests that the municipalities do not switch from property taxation to income tax because the property tax is a more salient one, in contrast to what has been found in prior literature (Bordignon et al. 2017, Bracco et al. 2019 and Ferraresi et al. 2019).

We test the local preferences mechanism by focusing on differential responses by municipalities with above- or below-median poverty rates. Municipalities with a larger share of poor families exhibit a smaller (mechanical) increase in revenue from the other taxes, but we do not observe any discernible change in the income tax rates they levy on their citizens with different income levels.⁵ This suggests that the municipalities with different citizens

acknowledge that the tax system overseen by the treated local governments has become more progressive following the increase in decentralization resulting from the IMU reform.

⁴Unfortunately, we cannot test whether municipalities ruled by different parties (e.g. right versus left wing) respond differently, since the majority of Italian small municipalities (i.e. the object of our analysis) are ruled by civic lists, which are complicated to categorize based on their political ideology.

⁵If the size of the income tax base correlates with the share of poor families, it could partially invalidate

characteristics, which are proxies for different individual preferences for taxation, do not behave differently.

The causal interpretation of our results relies crucially on two details of the IMU reform: its unexpected implementation in 2012 and the unalterable nature of the value of the reform, from the municipality's perspective. Initially slated for 2014, the IMU reform was pushed forward to 2012 in the latter part of 2011, driven by a surge in Italian public interest rates and the imperative for the national government to urgently address public debt accumulation. The unforeseen nature of this shift mitigates the possibility of anticipatory responses by municipalities, which we also confirm in an event study analysis.

Moreover, the municipalities had no capacity to influence the value of the IMU reform, as all pertinent factors determining the extent of the reform were finalized by the end of 2011. Specifically, the *expected* additional property tax revenue, equivalent to the transfer cut, was calculated using a default property tax rate established by the national government and doubling the property tax base, which had been unchanged since 1990. This value was then compared to the property tax revenue in 2011. Thus, each element of the value of the IMU reform had been determined prior to announcement of the reform in November 2011.

Although municipalities could not predict the implementation of the IMU reform, our estimates might still be subject to bias if municipal responses to the reform are heterogeneous. For example, comparing the response of municipalities who were differentially affected by the IMU reform requires comparing the change in behavior between municipalities with different property tax bases, which could in turn have different responses to the same change in fiscal autonomy.

To mitigate this concern, we employ propensity score matching on a set of observable variables that could plausibly influence municipalities' budget behavior. These variables include the size of the tax base, municipal budget size, citizens' preferences, political competition, local state capacity, and past tax behavior.⁶ This approach allows us to better isolate the effect of a quasi-exogenous difference in the IMU reform by accounting for differential responses by baseline observable characteristics and only comparing municipalities that are observably similar to each other.

We further disentangle the influence of the IMU reform on municipal behavior from two other policies enacted in our study period. First, we rule out that the responses we find

the scope of the two separate analyses. In the Appendix, we show that this is not a major concern in this context, as there is a small negative correlation between these two variables. The size of the income tax base is mainly influenced by the income values of non-poor individuals, as poor families are usually exempt from personal income taxes.

⁶The matching procedure is similar to the one described in Galiani et al. (2005). In the Appendix, we describe the matching strategy in greater depth and we provide the complete list of the variables used in the matching process.

are driven by other transfer cuts enacted in 2012 by concentrating on municipalities with populations smaller than 5,000, which were unaffected by the transfer cuts in that year⁷. This approach could raise concerns about the external validity of our findings if municipalities with fewer than 5,000 inhabitants are not representative of all Italian municipalities. This does not appear to be a critical issue for this context, as these smaller municipalities still constitute approximately 70 percent of all Italian municipalities.⁸ Second, in Section 7 we re-compute our estimates but restrict our study period only up to 2012. This approach aims to exclude any potential influence from the 2013 reform of the *Domestic Stability Pact*, which extended its applicability to all Italian municipalities with more than 1,000 inhabitants.

This paper contributes to three literatures. First, we contribute to the large literature on fiscal federalism (e.g., Oates 1972, Seabright 1996, Oates 2005, Besley and Coate 2003 and Ahmad and Brosio 2015).⁹ We show two novel local tax revenue responses to decentralization. First, greater local budget responsibility induces municipalities to increase their tax revenue – for every Euro of transfer cuts from the IMU reform, municipalities replace them with an equivalent increase in property tax revenue for 0.80 Euro, with no change in expenditure. Additionally, municipalities allocate the remaining 0.20 Euro of transfer cuts towards augmenting personal income tax for wealthier individuals, particularly in municipalities with a larger income tax base. Second, we show that greater budgetary responsibility enhances the progressivity of local taxation *within* municipalities. This is the result of both a change in the composition of revenue sources and the tax schedule itself. In response to the IMU reform, municipalities shift tax revenue from the property tax to the much more progressive personal income tax. Furthermore, they enhance greater progressivity by increasing the probability of multiple (and increasing) income tax rates for different income brackets and charging a higher income tax rate for richer residents. By focusing on the effects of decentralization on how municipalities raise revenue, our findings complement related work looking at the effects of decentralization on corruption (e.g., Fisman and Gatti 2002 and Brollo et al. 2013), expenditure and debt (e.g., Boetti et al. 2012, Baskaran 2012 and Hatfield and Kosec 2013), tax enforcement (e.g., Jia et al. 2020), and political competition (Bordignon et al. 2020).

Consistent with the prior literature on the effects of decentralization on public goods, we also find that greater fiscal autonomy results in greater public good provision even in the short run. We find that decentralization increases the probability of having a nursery school or a local police office in the municipality (e.g., Barankay and Lockwood 2007, Clark 2009,

⁷Refer to Marattin et al. 2022 for details on this reform.

⁸In the Appendix, Figure A1 shows the distribution of the municipal size.

⁹See Martínez-Vázquez et al. (2017) and Agrawal et al. (2024) for comprehensive literature reviews on this topic.

Albornoz and Cabrales 2013, Escaleras and Register 2012, Faguet and Sánchez 2014, and Agasisti and Porcelli 2023).

This paper also contributes to the literature studying how different revenue sources – whether it is raised via taxes or transfers – can affect public bodies’ behavior. There are examples of this in the flypaper effect literature (e.g., Knight 2002, Dahlby and Wilson 2003, Caselli and Michaels 2013, Helm and Stuhler 2021 and Köthenbürger and Loumeau 2023), as well as empirical studies that focus on the differential impact on local behavior of greater taxes versus greater transfers (e.g., Gadenne 2017 and Martínez 2023). This paper adds to this literature in two ways. First, we differ in the type of change in the local budget that we observe. Whereas prior work has studied either a change in the level of transfers and/or taxes separately, we instead analyze the impact of a policy *replacing* general national transfers with local taxation. Additionally, while prior work has looked mostly at the effects of these changes on expenditure or public good provision, we focus on the spillovers onto other forms of revenue.

The closest paper to ours is Bianchi et al. (2023), which studies the effect of the introduction of property tax reform in Italy in the early 1990s and finds that decentralization increases female labor supply by increasing public goods and, specifically, expanding the availability of nursery schools. In contrast to the wider and longer-run perspective taken by Bianchi et al. (2023) to look at spillovers onto the labor market, our analysis looks at the short-run response of the Italian municipalities. This allows us to focus on the details of the *budgetary* response of the local governments, such as the composition and nature of different revenue sources. We show that local governments use their greater fiscal autonomy to increase overall tax revenue, both the property tax and the one from other sources (i.e., personal income tax), whereas there is no change in the level of expenditure. Then, we also highlight how the municipal response has an additional consequence in increasing the progressivity of local taxes *within* the municipalities.

Finally, our paper speaks to the literature on the determinants of the incidence of local taxes. Giommoni (2019) shows how political cycles can exacerbate local progressivity; Agrawal and Brueckner (2022) study how the incidence of state taxes changes if the employment and residence location differ (as in the cases of telework); Rubolino (2023) focuses on the role of tax enforcement. More generally, this paper also relates to a large literature studying the incidence of local taxation, in the presence of cross-government shifting of the tax base (e.g., Feldstein and Wrobel 1998, Schmidheiny 2006, Leigh 2008, Agrawal and Foremny 2019, Milligan and Smart 2019, Brülhart et al. 2021, Rubolino and Giommoni 2023 and Foremny et al. (2024)). We highlight how increasing fiscal responsibility from the national to the local level can increase the progressivity of local taxes.

The rest of the paper is organized as follows. Section 2 discusses the institutional setting, Section 4 illustrates the data and descriptive statistics, Section 4 outlines the empirical strategy, Section 5 discusses the results and Section 6 highlights the relevant mechanisms. Section 7 shows the robustness checks and, finally, Section 8 concludes.

2 Institutional Setting

Historically, the Italian national government held most of the authority on expenditure and revenue decisions. In the last few decades, however, it has been devolving expenditure and revenue responsibilities from higher levels of government to lower ones.

The increase in revenue autonomy of the municipalities started in 1992, when the national government introduced the municipal property tax (ICI), which was entirely a component of the municipal budget.¹⁰ ICI was set such that municipalities could set tax rates within a range stipulated by national law, allowing them to categorize rates based on the use and nature of buildings. Meanwhile, the tax base was determined by the national cadaster. The ICI quickly became the primary revenue source for municipalities, contributing, on average, more than 50 percent of their total tax revenues.¹¹

The introduction of ICI was accompanied by another significant reform in 1998. The national government granted municipalities the authority to impose a surcharge on personal income tax, as outlined in D.L. 360/1998. This reform empowered municipalities to apply an additional tax on personal income, supplementing the income tax rates established by the national government. The decentralization process persisted into the early 2000s through a constitutional reform that redefined the responsibilities of both national and local governments across various public sectors. Concurrently, the national government implemented broader reforms such as the *Domestic Stability Pact* (DSP), aiming to enforce stringent fiscal rules for larger municipalities and curbing the option for bailouts from the national government. Since its inception, the Pact has undergone nearly annual modifications, encompassing various aspects such as subjects, targets, sanctions, monitoring procedures, and incentives.

In the early 2000s, the municipal personal income tax also underwent expansions. Starting in 2007, municipalities were granted the authority to introduce an exemption threshold for lower incomes, and from 2010, they gained the option to establish either single or multiple tax rates (Law n. 42/2009). Since 2011, if a municipality adopts a graduated tax scheme, rates must align with the income brackets established for the national income tax (D.L.

¹⁰D.L. 299/1991 and D.Lgs. 504/1992.

¹¹See Bianchi et al. (2023) for more details.

138/2011),¹² and must have higher tax rates for higher income brackets.¹³

The initial plan intended for the decentralization process to conclude in 2014 through a revision of the property tax levied by municipalities (with the name changing from ICI to *Imposta Municipale Propria*, or IMU), accompanied by an equivalent reduction in national transfers. The reform aimed to enhance each municipality's revenue-raising capacity without altering their overall budget levels. However, in 2011, prompted by the deteriorating economic conditions in Italy following the recession (e.g., see the evolution of interest rates on sovereign debts in Figure A2 in the Appendix), the national government unexpectedly implemented a fiscal adjustment program targeting national expenditure and debt. As a consequence, the introduction of the IMU, which was initially slated for 2014, was modified from the original plan and abruptly moved forward to 2012 in November 2011.

The IMU reform brought about significant alterations to the municipal property tax. Key modifications from the reform included the doubling the valuation of the tax base, the incorporation of the main residence into the tax base, and the revision of the range of tax rates based on building type, which provided municipalities with a broader set of options. These adjustments resulted in a notable increase in the property tax revenue that municipalities collected.¹⁴

Each building type was assigned a default national tax rate, but municipalities could choose to set their tax rate within a given range. For example, the default rate for base buildings was 0.76%, but municipalities could choose to set the tax rate between 0.46% and 1.06%.¹⁵

The default national tax rate is important to the implementation of the reform in two ways. First, the national government used the recommended tax rate for each building type to compute the expected property tax revenue for each municipality following the IMU reform. It then reduced transfers to each municipality by the surplus in property tax revenue. This surplus was calculated by comparing the property tax revenue each municipality was expected to collect (i.e., using the new value of the tax base and the default tax rates) to the property tax revenue already accrued in 2011.

Second, the central government mandated that if municipalities collected more than the

¹²Therefore, municipalities could set up to five brackets (plus an exemption for lower incomes): the first bracket goes up to 15,000 Euro of yearly income, the second one up to 28,000 Euro, the third one up to 55,000 Euro, the fourth one up to 75,000 Euro and the last one is for the remaining income larger than 75,000.

¹³Refer to Giommoni (2019) for a more detailed discussion on the legislative changes regarding the municipal income tax during these years.

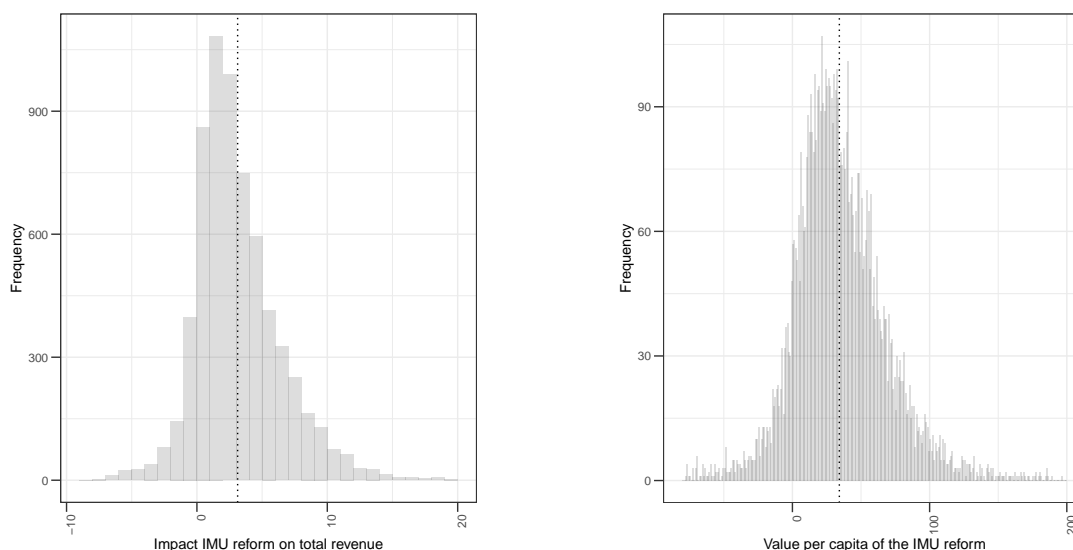
¹⁴The overall property tax revenue surged from 9.8 billion Euros to 23.8 billion Euros (Ambrosanio et al., 2014).

¹⁵For main residences, the tax rate was 0.4% (+/- 0.2), the tax rate for agricultural land was 0.2 (+/- 0.1), and the rate for buildings constructed for sale was 0.72 (+/- 0.34).

expected value of the property tax, they should transfer back approximately half of it to the national government.¹⁶ While municipalities had the flexibility to apply a higher-than-expected rate to the value of these buildings, they were effectively disincentivized to do so because they were obligated to 0.38 percent of the surplus to the national government.

In Figure 1, the left panel illustrates the anticipated *additional* property tax revenue resulting from the IMU reform as a proportion of municipalities' revenue, while the right panel depicts it in Euros per capita. The impact of the IMU reform varies significantly among municipalities. While about 10% of municipalities faced a decline in expected property tax revenue due to the IMU reform, the majority were expected to see an increase in property tax revenue. On average, the IMU reform was expected to increase property tax revenue by approximately 3 percent of overall municipal revenue, equivalent to roughly 35 Euros per capita.¹⁷

Figure 1: Distribution of size of the IMU reform by municipality



(a) IMU reform as share of 2011 total revenue (b) Value of the IMU reform per capita

The two figures depict the distribution of the IMU reform, calculated as the additional property tax revenue that the national government expected each Italian municipality to collect. The left panel illustrates the distribution of the IMU reform as a share of the total municipal budget in 2011. Instead, the right panel presents the size of the IMU reform per capita. Additional details on the distribution of the IMU reform are provided in the Appendix (e.g. Figure A3).

In subsequent years, there have been changes both in how the IMU is calculated and in

¹⁶This does not apply to the property tax revenue from the main residence, which directly financed the municipalities.

¹⁷Figure A4 in the Appendix depicts the geographical distribution of the same measures. While some heterogeneity exists in the impact of the reform among municipalities in different provinces, there is no discernible geographical pattern regarding the impact of the IMU reform.

the regulations governing other pertinent municipal taxes. For the former, two changes stand out: firstly, since 2013, the main residence has been excluded from the property tax base, although other types of buildings continued to be included.¹⁸ To compensate for the forfeited property tax revenue from main residences, the national government offset municipalities with transfers of an equivalent amount. While our focus remains exclusively on the 2012 reform, it's worth noting that this additional change could introduce a downward bias in our estimates, as it would diminish the impact of the 2012 IMU reform on the municipal budget.

Finally, two other reforms significantly impacted the municipal budget in 2012 and 2013. First, as an additional response to the national debt crisis, in 2012 the national government implemented substantial transfer cuts to all municipalities larger than 5,000 inhabitants.¹⁹ Furthermore, in 2013, another reform substantially impacted municipal budgets. The national government altered the rules defining the minimum size of municipalities subject to the DSP. From 2007 to 2012, only municipalities with a population exceeding 5,000 inhabitants were subject to the DSP. Starting in 2013, this criterion was extended to encompass all municipalities with a population surpassing 1,000 inhabitants. In Section 4 we discuss how we isolate the effect of the IMU reform from these other two policies implemented approximately at the same time.

3 Data and Descriptive Statistics

The data we use in our analyses are drawn from several Italian government sources. For data on municipal revenue, expenditure, and public goods provision we scrape municipal balance sheet data from the *Open Bilanci* website,²⁰ which has a variety of municipal-level information from 2008 to 2014. We scrape total revenue, municipal taxes (property tax and other taxes), revenues from fees, transfers from national/regional governments and other sources, non-tax revenues, loans, sales and capital transfers, and revenue from deposits paid by third parties. We use this to construct three revenue types for a municipality: tax revenue, transfers, and other sources.²¹ We also collected information on the total municipal

¹⁸Before 2011, the main residence was initially taxed only for luxury buildings. In 2012, it was extended to all main residences, then exempted again from luxury buildings. Finally, the definition of luxury buildings changed between pre-2011 and post-2013 taxation.

¹⁹See Marattin et al. (2022) for understanding how these transfer cuts affected municipal budgets.

²⁰<https://openbilanci.it/>.

²¹Our definitions of these revenue sources deviate from that of the national Department of Finance and Open Bilanci. We assign revenue from shared funds such as the experimental rebalancing fund and later the municipal solidarity fund (*Fondo di solidarieta' comunale*) as transfers, while the official definition assigns them as tax revenue. We do this to highlight what we believe to be the relevant difference between transfers and own revenue for a municipality. From a municipality's point of view, transfers from this fund are transfers from a higher level of government relative to the municipality. We have confirmed the validity of defining

expenditure and on municipal expenditure by sector. We have information on the level of expenditure on the following sectors: administration, social, territory and environmental services, instruction, roads and transport, culture, sport, police and justice. We can further categorize these expenditure into three groups: service expenditure (including all the expenditure but administration), the remuneration of the city council (which are part of the expenditure on administration), and other administration expenditure. Finally, we have detailed information on the provision of public goods for some of these sectors; in particular, the number of nursery schools and available slots, number of local police officers, amount of public lighting, and the amount of waste collected.

We collect data on the IMU reform and the other transfers cuts from the *Istituto per la Finanza e l'Economia Locale (IFEL)*, which collected information on the size of transfer cuts/expected change in property tax revenue from the IMU reform for each Italian municipality. Then, we collect information on the personal income tax base and income tax behavior at the municipal level from the Italian Home Department up to 2013. Finally, we use information on sociodemographic variables for each municipality from the Italian National Bureau of Statistics (*ISTAT*) and the Italian National Census (in 2011).

We exclude three groups of municipalities from the analysis. First, we exclude the Italian municipalities belonging to regions with a special degree of autonomy compared to the rest of the country since the IMU reform was implemented differently in these regions.²² Among the remaining municipalities, we focus solely on municipalities smaller than 5,000 inhabitants to better identify the impact of the IMU reform. Finally, we employ a propensity score matching algorithm to select Italian municipalities with more similar baseline characteristics.²³ Consequently, our ultimate sample comprises 3,749 municipalities.

Table 1 shows the descriptive statistics of the balance sheet variables before 2011 for the municipalities in the study. We report information on the average yearly value of expenditure and revenue, as well as the shares of expenditure and revenue by invoice account. The most relevant municipal expenditure categories are for public service provision (62%), administration (31%), and debt repayment (7%). Before the IMU reform, property tax revenue was on average the largest source of tax revenue for the municipalities (13%), while transfers from the national government accounted for approximately 22% of municipalities' budget. Revenue from other taxes and transfers from other public entities account for 20% of revenue, and approximately 45% comes from debt or other sources of revenue.

Table 1 also presents information on the public goods provided by the Italian municipal-

revenue in this way with subject matter experts at the Bank of Italy.

²²Some Italian regions have more autonomy compared to the others (i.e., Sicily, Valle D'Aosta, Trentino Alto Adige, Friuli Venezia Giulia, and Sardinia).

²³In Section 4 we discuss this choice in further detail.

ities in the sample. Due to data limitations, we collect information on only four types of public goods, but these represent municipal public good provision in different and relevant sectors of the municipal activity.²⁴ On average, 8 percent of the municipalities have a nursery school, 70 percent have a station of local police, and 4 out of five have a municipal waste management service and public lighting.²⁵

The IMU reform was expected to have a substantial impact on the average municipality's budget, equalling about 3% of total revenue before 2011. Only one-tenth of the municipalities implemented multiple income tax rates before 2011.

Table 2 presents the descriptive statistics of the municipal characteristics collected for the municipalities in the sample. On average, municipalities are relatively small, with an average population of 1,802 inhabitants. The majority of residents own their residences, and the buildings are generally in good condition, with an average size of approximately 100 square meters. Despite this, there are instances of families living in crowded or poverty conditions. The population includes a small share of children under six years old, and shows a notable gender disparity, with few individuals employed. The majority of those employed work in either the service or industry sector. Approximately 66 percent of municipalities were subject to the Domestic Stability Pact (DSP) at least once during the analysis period.

²⁴In the Appendix, Table A5 shows additional outcomes related to the same public goods.

²⁵If the municipality does not have municipal waste management, this can be managed by the private sector and/or other public institutions (e.g. *Unioni dei comuni*).

Table 1: Descriptive Statistics - Balance sheet information

| | Mean | Median | Std Dev. |
|---|-------|--------|----------|
| Total Expenditure (thousands of Euro) | 2,176 | 1,796 | (1,632) |
| <i>Share of expenditure by sectors:</i> | | | |
| Services | 0.62 | | (0.12) |
| Administration | 0.31 | | (0.11) |
| Debt repayment | 0.07 | | (0.09) |
| Total Revenue (thousands of Euro) | 2,161 | 1,771 | (1,650) |
| <i>Share of revenue by source:</i> | | | |
| Property tax | 0.13 | | (0.08) |
| Transfers from national gov. | 0.22 | | (0.10) |
| New loans | 0.08 | | (0.12) |
| Other taxes | 0.11 | | (0.06) |
| Other transfers | 0.09 | | (0.07) |
| Other revenues | 0.37 | | (0.15) |
| <i>Public goods</i> | | | |
| Nursery school | 0.08 | | (0.27) |
| Local police | 0.69 | | (0.46) |
| Waste management | 0.85 | | (0.36) |
| Public lights | 0.81 | | (0.39) |
| <i>Property tax characteristics</i> | | | |
| Amount of the IMU reform (thousands of Euro) | 57.9 | 39.4 | (83.6) |
| Amount of the IMU reform (as share of pre-2011 revenue) | 0.03 | 0.02 | (0.003) |
| <i>Income tax characteristics</i> | | | |
| Having multiple tax rates | 0.09 | | (0.28) |
| First income bracket tax rate τ_1 | 0.36 | | (0.24) |
| Second income bracket tax rate τ_2 | 0.36 | | (0.24) |
| Third income bracket tax rate τ_3 | 0.36 | | (0.24) |
| Fourth income bracket tax rate τ_4 | 0.36 | | (0.24) |
| Fifth income bracket tax rate τ_5 | 0.36 | | (0.24) |
| N. municipalities | 3,749 | | |

The table shows the descriptive statistics of the balance sheet variables used in this paper. We show respectively: the average yearly expenditure by sectors, the average yearly revenue by source, the public good provision, the average impact of the reform, and the average characteristics of the personal income surtax. All statistics are based on observations up to 2011, but the income tax information for which we focus on 2010 and 2011 to take into account the income tax reform as well.

Table 2: Descriptive Statistics - municipal characteristics

| <i>Municipality characteristics</i> | Mean | Std Dev. |
|---|--------|----------|
| Population | 1,802 | (1,265) |
| <i>Property Tax Base characteristics:</i> | | |
| Sh. property building | 0.77 | (0.06) |
| Sh. buildings in good state | 0.82 | (0.12) |
| Sh. buildings in bad state | 0.02 | (0.02) |
| Avg. building size (sqm) | 104 | (14) |
| <i>Demographics:</i> | | |
| Demographic density | 142 | (232) |
| Income per capita | 11,620 | (2,840) |
| Sh. poor families | 0.02 | (0.01) |
| Sh. families in crowded conditions | 0.01 | (0.01) |
| Sh. foreigners | 0.59 | (0.42) |
| Sh. younger than 6 y.o. | 0.05 | (0.01) |
| Male employment rate | 0.55 | (0.08) |
| Female employment rate | 0.35 | (0.08) |
| Sh. employed in agriculture | 0.10 | (0.09) |
| Sh. employed in industry | 0.33 | (0.11) |
| Sh. employed in services | 0.39 | (0.11) |
| Sh. employed in trade | 0.18 | (0.05) |
| <i>Electoral characteristics:</i> | | |
| Margin of victory | 0.29 | (0.28) |
| Sh. of the same party as national gov. | 0.14 | (0.34) |
| Sh. second mandate mayors | 0.24 | (0.43) |
| Sh are subject to DSP | 0.66 | (0.47) |
| Sh. mayor with university degree | 0.36 | (0.48) |
| Sh. pub. employees with univ. degree | 0.13 | (0.14) |
| Sh. pub. employees < 20 years exp. | 0.54 | (0.26) |
| N. municipalities | 3,749 | |

The table shows the descriptive statistics of the municipal characteristics used in this paper. All statistics are based on observations up to 2011. Some of these variables are collected in the National Census, which runs every 10 years. We use the information in the 2011 census for some of these descriptive statistics (e.g., the employment information) and in the propensity score matching outlined in the Appendix.

4 Empirical Strategy

Our estimation approach has two stages. First, we use propensity score matching on a set of observable control variables that could influence municipal property tax revenue, akin to Galiani et al. (2005). Specifically, we estimate propensity scores using a linear model, where the value of the IMU reform is regressed on pre-reform characteristics such as tax base size, municipal budget size, citizens’ preferences, political competition, local state capacity, and past tax behavior. The rationale for doing this is to address concerns regarding the potential heterogeneity of the IMU reform’s impact, which may vary based on municipal characteristics, potentially biasing our estimates. After matching on baseline observable characteristics, we compare municipalities experiencing varying degrees of the IMU reform while sharing similar observed attributes.²⁶

Then, we use a difference-in-difference specification on the matched municipalities to study how municipalities respond to the increased responsibility of raising a larger part of their budget as tax revenue. We use the value of the expected additional property tax revenue each municipality should collect from the IMU reform ($IMUReform_m$) as value of national transfers that each municipality was expected to replace with municipal revenue. In particular, we compute Equation 1:

$$Y_{mt} = \alpha_m + \alpha_t + \beta IMUReform_m \times Post_t + \gamma X_{mt} + \epsilon_{mt} \quad (1)$$

Y_{mt} represents the levels of each type of revenue source or expenditure, the personal income tax rates, or dummy variables indicating whether the specific public good (i.e., nursery school, local police, waste collection, public lighting) is provided by the municipality, α_m and α_t are respectively municipality m and t year fixed effects, $IMUReform_m$ is the expected additional property tax revenue resulting from the IMU reform (i.e., equal to the value of the transfer cut), $Post_t$ is a dummy taking value 1 after 2011, 0 otherwise. X_{mt} are time-varying control variables we use in this analysis: the population, the level of other transfer cuts, a dummy variable taking the value 1 if the municipality is subject to the DSP, another dummy variable taking the value 1 if the party ruling the municipality is aligned with the national government, a dummy variable indicating whether the mayor is in the second mandate, the margin of victory in the most recent local election, a dummy variable indicating whether the mayor has a university degree, and characteristics of public employees, such as the share of employees with less than 20 years of experience and the share of public employees with a university degree. Finally, standard errors are clustered at the municipality level.

²⁶Further details regarding the matching strategy are elaborated upon in the Appendix.

Our identification strategy relies on two important details of the IMU reform: first, that the timing of the reform was unexpected, and second, that the value of the $IMUReform_m$ could not be manipulated by the municipalities. On the exogeneity of the timing of the reform’s implementation, the IMU reform was initially slated for 2014. However, in November 2011, its implementation was unexpectedly anticipated in 2012. The unanticipated nature of this move is evident in the evolution of interest rates for Italian public debt (Figure A2 in the Appendix). Before this period, the Italian interest rate followed a similar trend as other countries, but it spiked in the latter part of 2011, necessitating a substantial intervention by the national government to curb public debt accumulation. Hence, we argue our results should not be influenced by an anticipatory behavior of the municipalities.

The unprecedented nature of the reform also means that municipalities could not influence the intensity of the IMU reform before its implementation. They could not suddenly modify the value of the property tax base,²⁷ and the default property tax rate was set at the national level. Moreover, the 2011 property tax revenue was already determined by the time of the IMU reform’s implementation in November 2011.

Finally, we adapt our analysis to distinguish the impact of the IMU reform from the other transfer cuts implemented in 2012 which could influence municipal behavior. First, we incorporate controls for the level of other transfers received by each municipality from the national government every year. Additionally, we narrow our focus to municipalities with populations smaller than 5,000, which remain unaffected by the transfer cuts in 2012 (see Marattin et al. (2022) for reference).²⁸

To assess the comparability of municipalities in the sample, we look for evidence in Section 5 that the parallel trends assumption holds. This assumption states that, in the absence of the IMU reform, the outcome variables for matched municipalities which were more or less affected by the reform would have trended similarly. We test the parallel trends assumption using the event study specification in Equation 2.

$$Y_{mt} = \alpha_m + \alpha_t + \sum_{t=2008}^{2014} \beta_t IMUReform_m \times D_t + \gamma X_{mt} + \epsilon_{mt} \quad (2)$$

Here, D_t is a dummy taking value 1 if year is equal to t , 0 otherwise. We omit the D_t for 2011, the year prior to the IMU reform. If the parallel trends assumption holds, then there should be no statistically significant β_t coefficients for all the years prior to the IMU reform.

The estimates outlined in Section 5 could be biased if the value of the IMU reform is

²⁷In the Appendix, Figure A5 shows that municipalities did not anticipate the IMU reform by modifying the size of the property tax base.

²⁸Figure A1 in the Appendix shows the distribution of the municipal size in 2011. The majority of the municipalities have a population lower than 5,000.

correlated with other policies implemented shortly after 2012, such as the reform of the DSP implemented in 2013 as described in Section 2. To verify the robustness of our findings to these other policies, in Section 7 we focus solely on the impact of the IMU reform up to 2012.

5 Main Results

In this section, we discuss how municipalities respond to the additional revenue-raising responsibility imposed by the IMU reform using the DiD framework outlined in Section 4.

Revenue Sources First, we focus on the effects of the IMU reform on the property tax revenue collected. Figure 2 and Table 3 illustrate that the IMU reform led to an increase in property tax revenue for Italian municipalities. Specifically, a one Euro increase in $IMUReform_m$ corresponds to a 0.80 Euro increase in property tax revenue. This result remains robust when including control variables and province linear trends. This result implies that, for every Euro of expected additional property tax revenue (equal to the transfers cut), the municipalities increase their property tax revenue only by 0.80 Euro.

Table 3 further shows how, on average, municipalities increased property tax revenue less than the national government’s predictions. Since the expected additional property tax revenue each municipality should have collected corresponds also to the amount of transfer cuts that each municipality faced as a result of the IMU reform, this implies that the budget of the municipality could shrink on average, unless the municipalities compensate for the lower property tax revenue with other revenue sources or by decreasing expenditure.

The event study graph in Figure 2 illustrates the absence of pre-trends in property tax revenue among municipalities differently impacted by the IMU reform in 2012, which supports the assumption that our propensity-matched municipalities would have otherwise trended similarly. Additionally, it shows a drop in property tax revenue in 2013, which is likely due to the exemption of the main residence from the calculation of property tax revenue for that year.

Figure 2: Event study figure of the effect of the IMU reform on property tax revenue



The figure shows the results of Equation 2 using the property tax revenue as outcome. The figure shows the results including all the controls discussed in Section 4 and province linear trends.

Table 3: Average impact of the IMU reform on property tax revenue

| | (1) | (2) | (3) |
|-------------------------------------|----------------------|---------------------|---------------------|
| | Property Tax Revenue | | |
| $IMUReform_m \times Post_t$ (€1) | 0.858*** (0.069) | 0.842*** (0.074) | 0.845*** (0.075) |
| Controls | | X | X |
| Province linear trends | | | X |
| N. of observations | 26,090 | 25,438 | 25,438 |
| N. of municipalities | 3,753 | 3,749 | 3,749 |

This table presents the results of Equation 1. The dependent variable is the property tax revenue earned by municipality m in year t . $IMUReform$ is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform). $Post_t$ is a dummy taking value 1 after 2011, 0 otherwise. Standard errors are clustered at the municipality level.

We next consider the effects on revenue sources other than the property tax. Table 4 shows the results of Equation 1, focusing on the effect on the different revenue sources. Table 4 and Figure 3 shows the equivalent results estimating Equation 2 for the same revenue variables.²⁹

Table 4 and Figure 3 show that the IMU reform led to an overall increase in tax revenue. For every Euro of expected additional property tax revenue, municipalities couple the increase in property tax revenue discussed above with an increase in revenue from other taxes by approximately 0.20 Euro on average. This additional tax revenue precisely offsets the lower increase in property tax revenue highlighted in Table 3. On net, the total revenue (i.e., taxes, transfers, and other revenue) remains unchanged after the implementation of the IMU reform. It is important to highlight how this increase in other sources of tax revenue is not a mechanical response to the IMU reform, since the reform did not require municipalities to cover revenue shortfalls with other sources of taxation. We find that municipalities choose to differentiate their revenue sources, consistent with an increase in the marginal (electoral) cost of levying a single source of taxation (e.g. Hettich and Winer 1984, Geys and Revelli 2011).

²⁹In the Appendix, we show the result focusing on the expenditure level (by sector). The IMU reform has no effect on the average level of spending of the municipalities.

Table 4: Effect of the IMU reform on municipal revenue

| | <i>Revenue</i> | | | | | | | |
|-----------------------------|-------------------|-------------------|---------------------|----------------------|-------------------|------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Total revenue | | Other tax rev. | | Debt | | Other revenue | |
| $IMUReform_m \times Post_t$ | -0.137 (0.168) | -0.050 (0.174) | 0.164*** (0.035) | 0.187**** (0.034) | -0.029 (0.211) | 0.275 (0.211) | -0.137 (0.128) | -0.155 (0.127) |
| Province linear trends | | X | | X | | X | | X |
| N. of observations | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 |
| Baseline | 2,152,289 | 2,152,289 | 271,142 | 271,142 | 2,503,531 | 2,503,531 | 83,690 | 839,690 |

This table presents the results of Equation 1. The dependent variable is the revenue earned by municipality m in year t by the different revenue sources. $IMUReform$ is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform). $Post_t$ is a dummy taking value 1 after 2011, 0 otherwise. All the regressions include all the controls listed in Section 4 and province linear trends (if indicated). Standard errors are clustered at the municipality level.

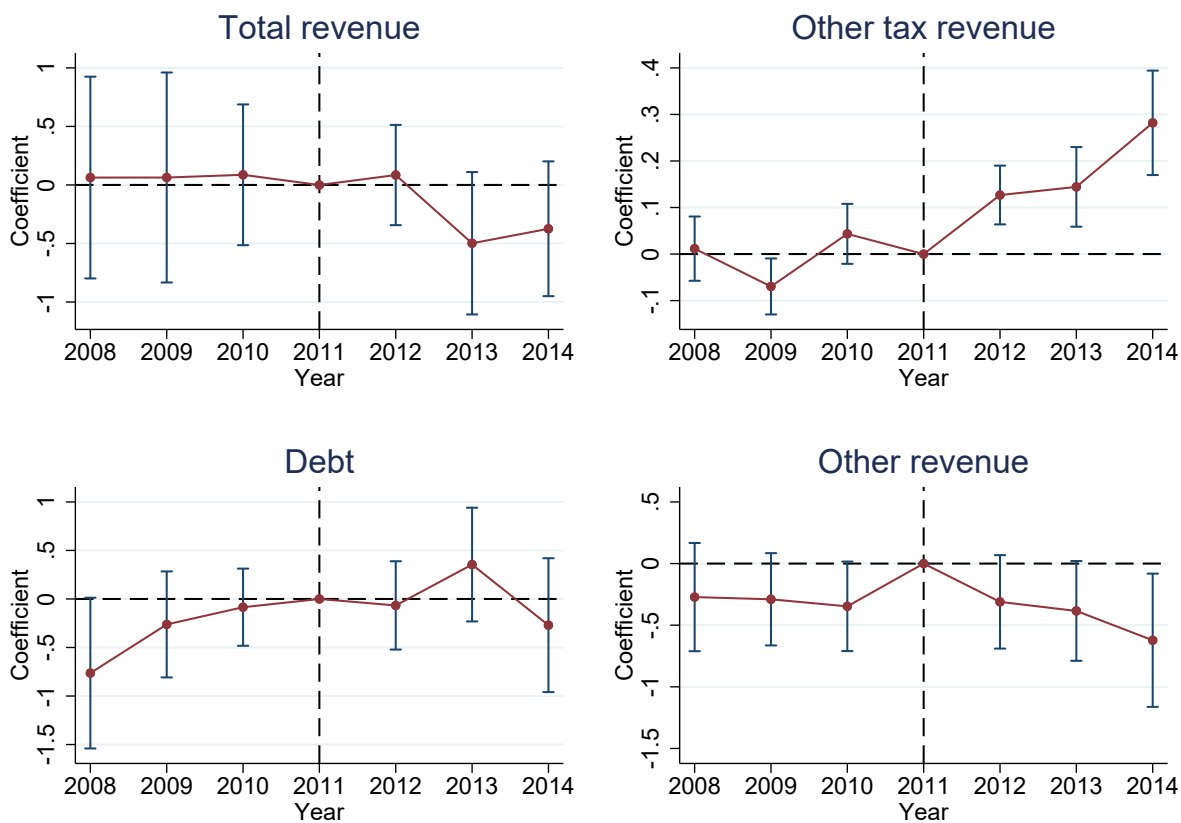
Figure 3 presents the results of Equation 2 on various revenue outcomes, as detailed in Table 4. We highlight three key observations. First, municipalities subject to different values of the IMU reform exhibit similar trends in their revenue outcomes before the implementation of the IMU reform. Second, revenue from other taxes steadily increases every year following the implementation of the IMU reform. Finally, on average, municipalities do not substitute tax revenue with other sources, such as debt or fines/fees.

Unfortunately, we cannot further distinguish which types of other tax revenue are increased as a result of the IMU reform. However, in the remaining part of this section, we explore how this response likely stems from an increase in the personal income surcharge that municipalities can collect.

Income Tax Characteristics We leverage detailed information on the personal income surtax set by municipalities to analyze which taxpayers experienced increased income tax rates after the introduction of the IMU reform. For clarity, in this part of the analysis, the value of the IMU reform (i.e., $IMUReform_m$) is presented in tens of thousands of Euros. Table 5 highlights two key findings.

Firstly, Italian municipalities with greater fiscal autonomy are more likely to impose multiple personal income tax rates for higher income brackets. A 10,000 Euro change in the expected additional property tax revenue (equivalent to the transfer cut of the IMU reform) results in an increase in the probability of having multiple personal income tax rates for larger income brackets. It is important to note that municipalities could set different tax rates for

Figure 3: Event study figure of the effect of the IMU reform on revenue outcomes



The figure shows the results of Equation 2 using the values of the different revenue sources as outcomes. The figure shows the results including all the controls discussed in Section 4 and province linear trends.

various income brackets but were constrained in two ways, described more extensively in Section 2. The number (and size) of the income bracket is established at the national level, and the tax rates for higher income brackets had to be greater than (or equal) to those for lower ones. Therefore, the increase in multiple tax rates in column 1 already suggests that municipalities respond to the IMU reform by enhancing the progressivity of personal income taxation.

Moreover, columns 2-6 in Table 5 directly show how municipalities increased income tax rates for richer individuals. Following the implementation of the IMU reform, Italian municipalities raised income tax rates by 0.06 percentage points (0.2 percent) for every ten thousand Euro reduction in transfers. This adjustment primarily affected individuals in the two highest tax brackets, who had yearly gross personal incomes exceeding 55,000 Euros.

Table 5: Effect of the IMU reform on personal income tax rates

| | <i>Personal income tax rate by tax bracket</i> | | | | | |
|--|--|--------------------|--------------------|--------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Multiple tax rates | τ_1 | τ_2 | τ_3 | τ_4 | τ_5 |
| $IMUReform_m \times Post_t$ (€10,000) | 0.0014*** (0.0003) | 0.0001 (0.0003) | 0.0003 (0.0003) | 0.0004 (0.0003) | 0.0005* (0.0003) | 0.0006* (0.0003) |
| N. of observations | 21,216 | 21,216 | 21,216 | 21,216 | 21,216 | 21,216 |
| N. of municipalities | 3,627 | 3,627 | 3,627 | 3,627 | 3,627 | 3,627 |
| Baseline | 0.01 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 |

This table presents the results of Equation 1. The dependent variable is about the characteristics of the personal income tax revenue collected by municipality m in year t . “Multiple tax rate” is a dummy taking value 1 if the municipality imposes multiple tax rates, 0 otherwise. τ_1 is the tax rate for individuals earning a yearly personal income lower than 15,000 Euros, τ_2 is the tax rate for individuals earning a yearly personal income between 15,001 Euros and 28,000 Euros, τ_3 is the tax rate for individuals earning a yearly personal income between 28,001 Euros and 55,000 Euros, τ_4 is the tax rate for individuals earning a yearly personal income between 55,001 Euros and 75,000 Euros. Finally, τ_5 is the tax rate for individuals earning a yearly personal income greater than 75,000 Euros. $IMUReform_m$ is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform). $Post_t$ is a dummy taking value 1 after 2011, 0 otherwise. All the regressions include all the controls listed in Section 4 and province linear trends. Standard errors are clustered at the municipality level.

The results in Figure 4 show a clear increase in the probability of having multiple income tax rates immediately after the implementation of the IMU reform, and a similar increase in the value of the tax rates for individuals belonging respectively to the second, third, fourth and fifth income bracket.

Thus taken together, the results in Table 3, 4 and 5 suggest an increase in the progressivity

Figure 4: Event study figure of the effect of the IMU reform on personal income tax outcomes



The figure shows the results of Equation 2 on the outcomes related to the personal income tax. Multiple tax rate is a dummy taking value 1 if the municipality imposes multiple tax rates, 0 otherwise. τ_1 is the tax rate for individuals earning a yearly personal income lower than 15,000 Euros, τ_2 is the tax rate for individuals earning a yearly personal income between 15,001 Euros and 28,000 Euros, τ_3 is the tax rate for individuals earning a yearly personal income between 28,001 Euros and 55,000 Euros, τ_4 is the tax rate for individuals earning a yearly personal income between 55,001 Euros and 75,000 Euros. Finally, τ_5 is the tax rate for individuals earning a yearly personal income greater than 75,000 Euros. The figure shows the results including all the controls discussed in Section 4 and province linear trends.

of local taxation as a result to greater fiscal autonomy to municipalities. In general, the Italian property tax is not very progressive (Löffler and Siegloch 2021, Guzzardi et al. 2023).³⁰ The property tax base has remained unchanged for approximately 30 years before the IMU reform, which dampens the correlation between the property tax base and the current market value of buildings. Additionally, the IMU reform encompassed property tax collection for all residential buildings, including the main residence. Therefore, in 2012, the property tax applied to all citizens, regardless of income, whereas Table 5 reveals a more substantial income tax increase for higher-income individuals.

Public Goods Finally, we investigate whether fiscal autonomy arising from the IMU reform led to changes in the provision of public goods. Table 6 shows that the IMU reform had increased public good provision in the short run. The first four columns of Table 6 indicate that, for every 10,000 Euros of the IMU reform, municipalities increased the probability of having a nursery school by 0.09 percentage points (1 percent) and the probability of having a local police station by 0.1 percentage points (0.2 percent).³¹

Table 6: Effect of IMU reform on public goods

| | <i>Extensive margin</i> | | | | | | | |
|---|-------------------------|----------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Nursery school | | Local police | | Waste coll. | | Public lights | |
| <i>IMUReform_m</i> × <i>Post_t</i> (€10,000) | 0.0008** (0.0004) | 0.0009** (0.0004) | 0.0014*** (0.0005) | 0.001** (0.0005) | -0.0004 (0.0006) | -0.0004 (0.0006) | -0.0002 (0.0006) | -0.0007 (0.0006) |
| Province linear trends | X | | X | | X | | X | |
| N. of observations | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 |
| Baseline | 0.079 | 0.079 | 0.69 | 0.69 | 0.84 | 0.84 | 0.81 | 0.81 |

This table presents the results of Equation 1 on public good provision. The dependent variable is respectively: a dummy taking value 1 if the municipality has a nursery school, 0 otherwise (column 1 and 2); a dummy taking value 1 if the municipality has a local police office, 0 otherwise (column 3 and 4); a dummy taking value 1 if the municipality has a public waste management collection, 0 otherwise (column 5 and 6); a dummy taking value 1 if the municipality has a public lightening, 0 otherwise (column 7 and 8). *IMUReform_m* is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform), in €10,000. *Post_t* is a dummy taking value 1 after 2011, 0 otherwise. All the regressions include all the controls listed in Section 4 and province linear trends (if indicated). Standard errors are clustered at the municipality level.

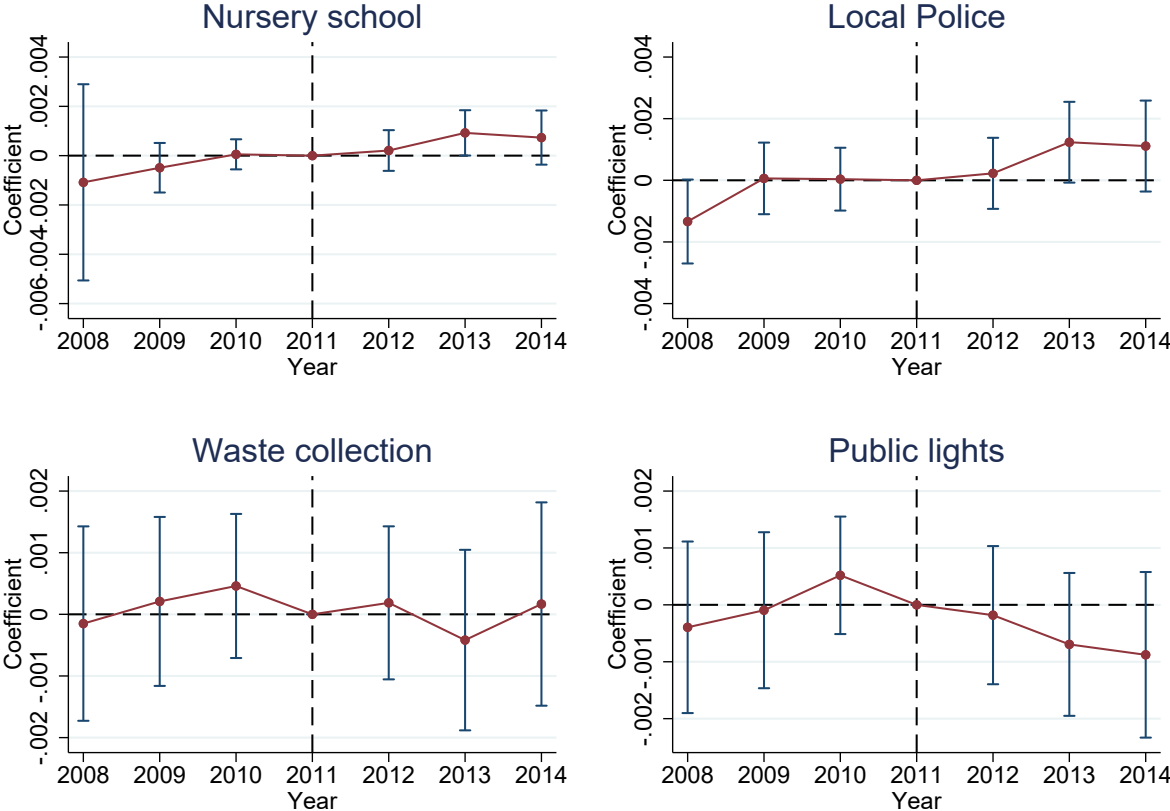
Figure 5 shows that both the probability of having a nursery school/local police station in the municipality steadily increased after the IMU reform’s implementation. In contrast,

³⁰In the Appendix, we show the relationship between the property tax revenue per capita collected by Italian municipalities and the average income per capita of the inhabitants.

³¹In the Appendix, we show additional results using a different definition of the public goods than we use in this part of the analysis.

there is no discernible change in the two other public good outcomes, specifically whether the municipality organizes waste collection and provides public lighting. Therefore, we conclude from Table 6 that the greater decentralization resulting from the IMU reform improved the provision of public goods by local governments.

Figure 5: Event study figure of the effect of the IMU reform on public good outcomes, extensive margin



The figure shows the results of Equation 2 on the outcomes related to public good provision. The figure shows the results including all the controls discussed in Section 4 and province linear trends. Each outcome is represented by a dummy variable taking value one if the municipality provides the corresponding public good in the municipality in that specific year.

At first glance, the effects of the IMU reform on the provision of local public goods may appear relatively modest. However, two important considerations should be emphasized. First, the IMU reform ultimately resulted in a budget-neutral reform (as outlined in Table 4). Thus, any change in public good provision, given the same budget size, implies greater efficiency in public spending. Errico et al. (2024) seems to confirm our hypothesis by looking at the details of the public contracts issued by the Italian municipalities in the aftermath

of the IMU reform. Second, our study primarily focuses on the short-run response of municipalities to increased fiscal autonomy within two years after the reform’s implementation. While budgetary outcomes can be expected to respond promptly to a policy which directly affects municipal budgets, any substantive effects in real outcomes that typically take longer to materialize is notable. Our results complement the findings in Bianchi et al. (2023), which identifies a longer-run increase in public good provision.

6 Mechanisms

In this section, we explore potential mechanisms underlying the response to the IMU reform. We focus on three potential explanations of these results. First, given the evidence that the increase in fiscal autonomy leads to greater income tax progressivity in the main results, we test whether the municipalities exploiting the income tax source more extensively have a larger income tax base (e.g. Kenny and Winer 2006).

Table 7 considers how the budgetary response to the IMU reform differs by a municipality’s personal income tax base before 2012. We define *HighIncomeTaxBase_m*, an indicator variable for whether a municipality had an above-median income tax base. Table 7 presents the results of Equation 1, once we also include all relevant interactions with *HighIncomeTaxBase_m*.

The table shows two key findings. Column 2 shows that property tax revenue does not change with the size of the personal income tax base. However, column 3 shows that the size of the personal income tax base is an important determinant of how local governments compensate for the budget shortfall arising from the IMU reform.

In line with the theoretical predictions ((Hettich and Winer, 1984, 1988, 1999)), we find that the increase in tax revenues other than the property tax is driven by municipalities with a higher personal income tax base. Conversely, municipalities with a lower income tax base increase revenue from non-tax sources (“Other revenue”). We detect no differences in the provision of public goods or in measures of income tax progressivity between municipalities with larger or smaller income tax bases, though the effects are imprecisely measured.

Table 8 then explores whether the responses differ by the level of political competition in the municipalities. We estimate Equation 1, interacting it with the variable *LowCompetition_m*, which takes value 1 if the incumbent mayor faces a term limit in 2011, 0 otherwise. We exploit an institutional feature of the Italian context, under which mayors cannot run for more than two elections (e.g., Bordignon et al. (2017)). Therefore, when the variable *LowCompetition_m* takes value one, the municipality is subject to a lower political competition.

In Table 8, none of the coefficients in the third column (i.e. the one showing how the IMU

Table 7: Response to the IMU reform by size of the income tax base

| | (1) | (2) | (3) | (4) |
|---|----------------------|-----------------------|---|--------|
| | $IMUReform_m$ | $HighIncomeTaxBase_m$ | $IMUReform_m$ $\times HighIncomeTaxBase_m$ | N |
| | $\times Post_t$ | $\times Post_t$ | $\times Post_t$ | |
| <i>Revenue</i> | | | | |
| Property Tax Rev. | 0.759*** (0.164) | -3,092 (15,390) | 0.113 (0.188) | 25,438 |
| Total Revenue | 0.579 (0.530) | 47,228 (33,435) | -0.600 (0.567) | 25,438 |
| Other Tax Rev. | -0.028 (0.039) | 38,872*** (4,327) | 0.152*** (0.053) | 25,438 |
| Debt | 0.237 (0.714) | 10,413 (55,573) | 0.110 (0.768) | 25,438 |
| Other revenue | 0.923** (0.442) | -47,085* (27,930) | -0.988** (0.465) | 25,438 |
| <i>Public Goods</i> | | | | |
| Nursery school | -0.0001 (0.0001) | 0.0066 (0.0072) | 0.0007 (0.0010) | 25,438 |
| Local police | 0.0005 (0.0018) | 0.0055 (0.0135) | 0.0004 (0.0019) | 25,438 |
| Waste collection | -0.0002 (0.0018) | 0.0162 (0.0137) | -0.0002 (0.0019) | 25,438 |
| Public lights | -0.0036* (0.0022) | 0.0038 (0.0126) | 0.0030 (0.0022) | 25,438 |
| <i>Personal Income Tax</i> | | | | |
| Multiple tax rates | 0.0005 (0.0005) | 0.028*** (0.006) | 0.0003 (0.0006) | 21,216 |
| First income bracket tax rate τ_1 | -0.0003 (0.0008) | -0.012* (0.007) | 0.0008 (0.0009) | 21,216 |
| Second income bracket tax rate τ_2 | -0.0002 (0.0009) | -0.009 (0.007) | 0.0008 (0.0009) | 21,216 |
| Third income bracket tax rate τ_3 | -0.0002 (0.0009) | -0.007 (0.007) | 0.0009 (0.0010) | 21,216 |
| Fourth income bracket tax rate τ_4 | -0.0002 (0.0009) | -0.004 (0.007) | 0.0009 (0.0010) | 21,216 |
| Fifth income bracket tax rate τ_5 | -0.0001 (0.0009) | -0.002 (0.007) | 0.0009 (0.0009) | 21,216 |

This table shows the results of Equation 1, including the relevant interactions for studying the mechanism. Column 1 represents the average impact of one Euro of the IMU reform on the revenue aspect and the average impact of 10,000 Euro of the IMU reform on the outcomes related to public goods and personal income tax. Column 2 denotes the average change in the outcome variables post-2012 for municipalities with an income tax base exceeding the median, while column 3 indicates the average impact of one Euro of the IMU reform on the revenue aspect and the average impact of 10,000 Euro of the IMU reform on the outcomes related to public goods and personal income tax for municipalities with an income tax base surpassing the median. We interact the variables $Post_t$ and $IMUReform_m$ with the variable $HighIncomeTaxBase_m$, which takes value 1 if the municipality belongs to the group of municipalities with an income tax base larger than the median, 0 otherwise. All controls described in Section 4 are included, province linear trends are included as well and standard errors are clustered at the municipality level.

reform interacts with the degree of political competition) are statistically different from zero. This also suggests that the switching of composition of local taxes away from the property tax towards the income tax is not due to the greater salience of the property tax. This is because, as highlighted in Bordignon et al. (2017), if the shifting of tax burden from property tax to income tax was due to the salience of the latter type of taxation, then we would expect to see a stronger response in places with greater political competition.

Finally, we analyze whether municipalities with different municipal characteristics respond differently to the IMU reform. Economists have long posited that one advantage of decentralizing policymaking is that local governments can better tailor policies to local preferences, characteristics, or constraints (e.g., Oates 1972, Alderman 2002, Faguet 2004). In contrast, central governments are presumed to provide a uniform level of public goods, or identical regulations for all states.

In Table 9, we interact the value of the IMU reform with a dummy (i.e., $Poor_m$) taking value 1 if the share of poor families in 2011 is larger than the median, 0 otherwise.³² If the different local preferences for taxation influence the differential response of municipalities, then we could expect different behavior between municipalities with a different shares of poor families. Instead, the only statistically significant coefficient in Column 3 is the lower revenue from the other tax revenue, even though the bottom part of the Table shows how municipalities with a larger share of poor families do not charge a different income tax rate for any income bracket. Therefore, we interpret the negative coefficient on other tax revenue as a mechanical effect of imposing a similar tax rate on a smaller (income) tax base.³³

³²We also investigate whether the similarity of the effects in Tables 7 and 9 is simply because the share of poor families is strongly correlated with the size of the income tax base. Figure A6 reassures us that there is only a slight negative relationship between these two variables. This is likely due to the fact that the size of the income tax base is not heavily influenced by the income of poorer individuals, who are often exempt from income tax.

³³The results on the income tax rate in Column 1 are less precisely estimated but in line with the coefficients in Table 5.

Table 8: Response to the IMU reform by the degree of political competition

| | (1) | (2) | (3) | (4) |
|---|-----------------------------|----------------------------------|---|--------|
| | $IMUReform_m \times Post_t$ | $LowCompetition_m \times Post_t$ | $IMUReform_m \times LowCompetition_m \times Post_t$ | N |
| <i>Revenue</i> | | | | |
| Property Tax Rev. | 0.877*** (0.098) | -537 (10,431) | -0.048 (0.134) | 25,438 |
| Total Revenue | 0.113 (0.221) | -25,388 (29,589) | -0.217 (0.375) | 25,438 |
| Other Tax Rev. | 0.179*** (0.041) | 1,484 (3,976) | 0.001 (0.061) | 25,438 |
| Debt | 0.365 (0.292) | 41,909 (44,455) | -0.022 (0.430) | 25,438 |
| Other revenue | 0.019 (0.169) | -26,800 (21,638) | -0.300 (0.256) | 25,438 |
| <i>Public Goods</i> | | | | |
| Nursery school | 0.0008 (0.0006) | -0.0027 (0.0061) | -0.0000 (0.0008) | 25,438 |
| Local police | 0.0014** (0.0006) | 0.0151 (0.0123) | -0.0013 (0.0011) | 25,438 |
| Waste collection | -0.0001 (0.0008) | 0.0072 (0.0130) | -0.0001 (0.0011) | 25,438 |
| Public lights | -0.0006 (0.0007) | 0.0177 (0.0119) | -0.0003 (0.0011) | 25,438 |
| <i>Personal Income Tax</i> | | | | |
| Multiple tax rates | 0.0012*** (0.0004) | -0.004 (0.005) | 0.0002 (0.0006) | 21,216 |
| First income bracket tax rate τ_1 | 0.0005 (0.0004) | 0.014** (0.006) | -0.0006 (0.0006) | 21,216 |
| Second income bracket tax rate τ_2 | 0.0006* (0.0004) | 0.013** (0.006) | -0.0005 (0.0006) | 21,216 |
| Third income bracket tax rate τ_3 | 0.0008** (0.0004) | 0.013** (0.006) | -0.0006 (0.0006) | 21,216 |
| Fourth income bracket tax rate τ_4 | 0.0008** (0.0004) | 0.013** (0.006) | -0.0006 (0.0006) | 21,216 |
| Fifth income bracket tax rate τ_5 | 0.0010*** (0.0004) | 0.013** (0.007) | -0.0006 (0.0006) | 21,216 |

This table shows the results of Equation 1, including the relevant interactions for studying the mechanism. We interact the variables $Post_t$ and $IMUReform_m$ with the variable $LowCompetition_m$, which takes value one if the municipality is subject to lower political competition (i.e., the incumbent cannot run for the mayor position again), 0 otherwise. Column 1 represents the average impact of one Euro of the IMU reform on the revenue aspect and the average impact of 10,000 Euro of the IMU reform on the outcomes related to public goods and personal income tax. Column 2 denotes the average change in the outcome variables post-2012 for municipalities with a mayor at the second mandate, while column 3 indicates the average impact of one Euro of the IMU reform on the revenue aspect and the average impact of 10,000 Euro of the IMU reform on the outcomes related to public goods and personal income tax for municipalities with a mayor at the second mandate. All controls described in Section 4 are included, province linear trends are included as well and standard errors are clustered at the municipality level.

Table 9: Response to the IMU reform by the share of poor families

| | (1) $IMUReform_m \times Post_t$ | (2) $Poor_m \times Post_t$ | (3) $IMUReform_m \times Poor_m \times Post_t$ | (4) N |
|---|------------------------------------|-------------------------------|--|----------|
| <i>Revenue</i> | | | | |
| Property Tax Rev. | 0.830*** (0.066) | 17,403 (11,458) | -0.030 (0.127) | 25,438 |
| Total Revenue | -0.091 (0.205) | 28,134 (26,595) | 0.089 (0.320) | 25,438 |
| Other Tax Rev. | 0.261*** (0.036) | 11,394*** (4,050) | -0.140** (0.061) | 25,438 |
| Debt | -0.007 (0.219) | -55,772 (38,830) | 0.532 (0.383) | 25,438 |
| Other revenue | -0.266 (0.166) | 6,574 (22,420) | 0.221 (0.237) | 25,438 |
| <i>Public Goods</i> | | | | |
| Nursery school | 0.0008 (0.0006) | 0.0036 (0.0068) | 0.0001 (0.0008) | 25,438 |
| Local police | 0.0009 (0.0007) | 0.0330*** (0.0123) | 0.0001 (0.0009) | 25,438 |
| Waste collection | 0.0001 (0.0008) | 0.0174 (0.0130) | -0.0009 (0.0012) | 25,438 |
| Public lights | -0.0008 (0.0009) | 0.020* (0.012) | 0.0003 (0.0010) | 25,438 |
| <i>Personal Income Tax</i> | | | | |
| Multiple tax rates | 0.0016*** (0.0005) | -0.0006 (0.0052) | -0.0003 (0.0006) | 21,216 |
| First income bracket tax rate τ_1 | 0.0000 (0.0004) | -0.0023 (0.0062) | 0.0002 (0.0006) | 21,216 |
| Second income bracket tax rate τ_2 | 0.0002 (0.0004) | -0.0020 (0.0063) | 0.0002 (0.0006) | 21,216 |
| Third income bracket tax rate τ_3 | 0.0003 (0.0004) | -0.0028 (0.0064) | 0.0002 (0.0006) | 21,216 |
| Fourth income bracket tax rate τ_4 | 0.0004 (0.0005) | -0.0022 (0.0065) | 0.0002 (0.0006) | 21,216 |
| Fifth income bracket tax rate τ_5 | 0.0005 (0.0004) | -0.0021 (0.0066) | 0.0002 (0.0006) | 21,216 |

This table shows the results of Equation 1, including the relevant interactions for studying the mechanism. We interact the variables $Post_t$ and $IMUReform_m$ with the variable $Poor_m$ which takes value one if the share of poor families within the municipality in 2011 is larger than the median, 0 otherwise. Column 1 represents the average impact of one Euro of the IMU reform on the revenue aspect and the average impact of 10,000 Euro of the IMU reform on the outcomes related to public goods and personal income tax. Column 2 denotes the average change in the outcome variables post-2012 for municipalities with a larger share of poor families, while column 3 indicates the average impact of one Euro of the IMU reform on the revenue aspect and the average impact of 10,000 Euro of the IMU reform on the outcomes related to public goods and personal income tax for municipalities with a larger share of poor families. All controls described in Section 4 are included, province linear trends are included as well and standard errors are clustered at the municipality level.

7 Robustness Checks

We then conduct robustness checks on the main results. In particular, we address concerns regarding the potential influence of the DSP, which was reformed in 2013. This reform expanded the DSP’s applicability from municipalities with more than 5,000 inhabitants (before 2013) to include all municipalities with more than 1,000 inhabitants (starting from 2013).

While Equation 1 and 2 include controls for whether a municipality is subject to the DSP, there could still be bias if the IMU reform’s value correlates with the DSP’s application. The scatter plot in Figure 6 shows that this is not the case. Indeed, there is little correlation between the per capita value of the IMU reform (y-axis) and municipal size (x-axis).

For additional validation of our results, we estimate Equation 1 up to 2012. This allows us to isolate the effect of solely the IMU reform, as no municipalities with fewer than 5,000 inhabitants were subject to the DSP up to 2012. However, this approach shortens the time span of the response from the municipalities under consideration. Table 10 shows how the increase in property tax revenue is larger if we focus on the response in 2012 only. This is not surprising, since the main residence was included in 2012 reform, while it was excluded from the property tax revenue only in 2013.

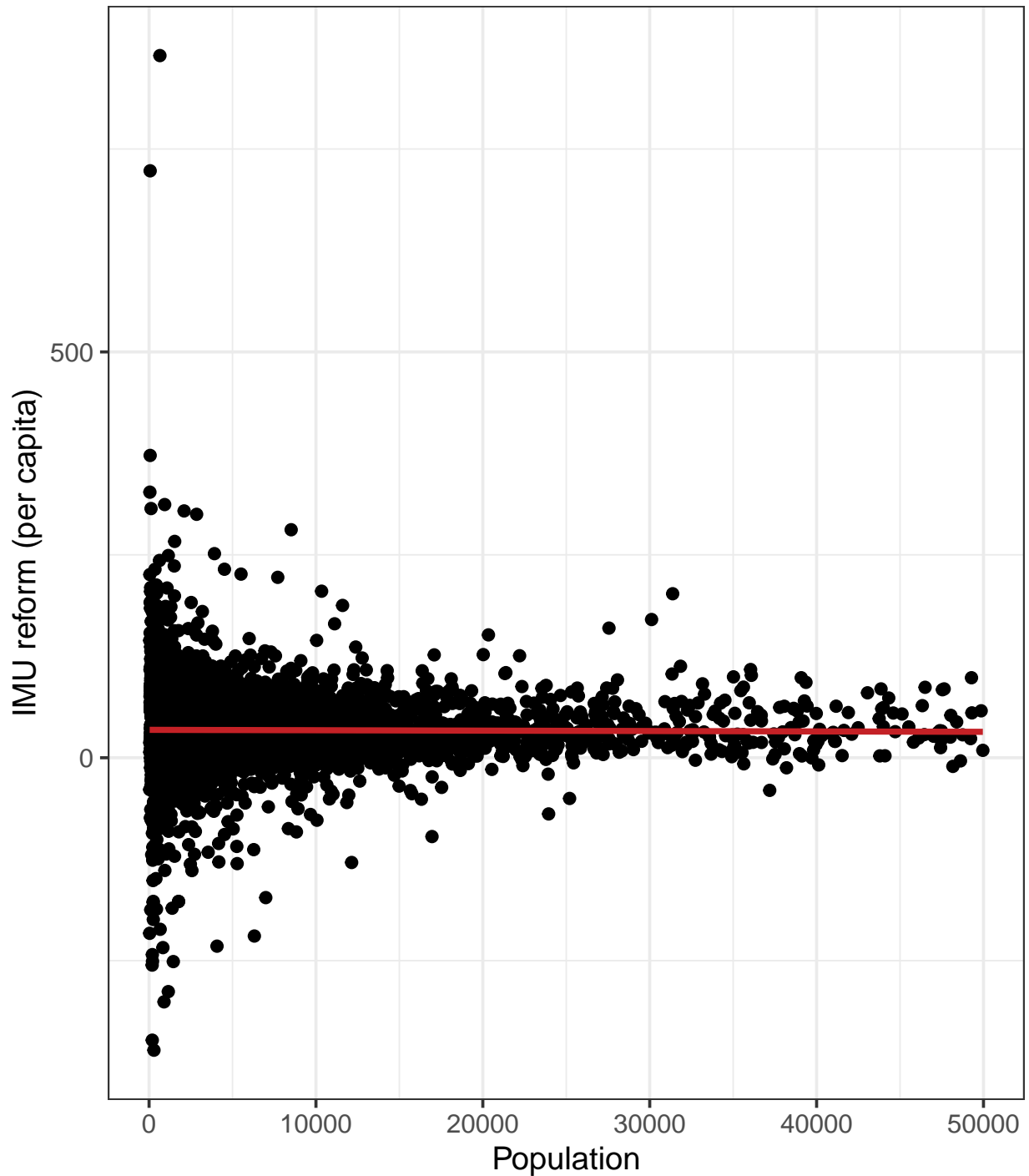
Table 10: Average impact of the IMU reform on property tax revenue, up to 2012

| | (1) | (2) | (3) |
|------------------------------------|----------------------|---------------------|---------------------|
| | Property Tax Revenue | | |
| $IMUReform_m \times Post_t$ (€) | 0.988*** (0.061) | 0.987*** (0.069) | 1.032*** (0.072) |
| Controls | | X | X |
| Province linear trends | | | X |
| N. of observations | 18,716 | 18,281 | 18,281 |
| N. of municipalities | 3,753 | 3,749 | 3,749 |

This table presents the results of Equation 1. The dependent variable is the property tax revenue earned by municipality m in year t . $IMUReform$ is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform). $Post_t$ is a dummy taking value 1 after 2011, 0 otherwise. All controls listed in Section 4 and province linear trends are included. Standard errors are clustered at the municipality level. We consider observations up to 2012.

Table 11 demonstrates that the results remain largely consistent when focusing on the year 2012 alone in the post-reform period. There is a slight difference which can be attributed to a modest increase in municipal budgets, specifically in total revenue. This difference is

Figure 6: Value of the IMU reform by municipal size



The figure shows the relationship between the value of the IMU reform (y-axis) and the municipal size (x-axis). Since the DSP applies on municipalities larger than a certain population threshold (either 5,000 or 1,000), this graph shows how the value of the IMU reform is not correlated with other policies applied from specific population thresholds.

due to municipalities not reducing their revenue from property tax in 2012, while already increasing revenue from personal income taxation (Other tax revenue). The results regarding public goods in Table 6 exhibit similar magnitudes but are no longer statistically significant. Therefore, while we cannot entirely dismiss the possibility that the public goods response may be influenced by the DSP’s application, it is also plausible that the less precise estimation is a result of the extremely short period considered in this part of the analysis (i.e., only the year of the reform’s implementation, 2012). This duration may be too short to detect a response in real outcomes such as public good provision.

Table 11: Effect of the IMU reform on revenue and public good provision, up to 2012

| | Revenue | | | |
|--|-----------------------|-----------------------|-------------------------|----------------------|
| | (1) Total revenue | (2) Other tax rev. | (3) Debt | (4) Other revenue |
| $IMUReform_m \times Post_t$ | -0.009 (0.298) | 0.124*** (0.032) | 0.114 (0.224) | -0.195 (0.177) |
| Province linear trends | X | X | X | X |
| N. of observations | 17,740 | 17,740 | 17,740 | 17,740 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 |
| | Public Goods | | | |
| | (1) Nursery school | (2) Local Police | (3) Waste collection | (4) Public lights |
| $IMUReform_m \times Post_t$ (€10,000) | 0.0002 (0.0004) | 0.0003 (0.0006) | 0.0001 (0.0006) | -0.0005 (0.0006) |
| Province linear trends | X | X | X | X |
| N. of observations | 17,740 | 17,740 | 17,740 | 17,740 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 |

This table presents the results of Equation 1. The dependent variable is the revenue earned by municipality m in year t by the different revenue sources or the outcomes related to the public good provision. $IMUReform$ is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform). $Post_t$ is a dummy taking value 1 after 2011, 0 otherwise. All the regressions include all the controls listed in Section 4 and province linear trends. Standard errors are clustered at the municipality level. We consider observations up to 2012.

Table 12 confirms the robustness of the results in Table 5 regarding the increased progressivity of the personal income tax, even when focusing on the year 2012 alone. In response to the greater fiscal autonomy arising from the IMU reform, municipalities were more likely to have multiple rates for various income brackets and also increased income tax rates for richer individuals starting in 2012.

Table 12: Effect of the IMU reform on personal income tax rates, up to 2012

| | <i>Personal income tax rate</i> | | | | | |
|---|---------------------------------|--------------------|--------------------|----------------------|-----------------------|-----------------------|
| | (1) Multiple tax rate | (2) τ_1 | (3) τ_2 | (4) τ_3 | (5) τ_4 | (6) τ_5 |
| <i>IMUReform_m</i> × <i>Post_t</i> (€10,000) | 0.0023*** (0.0006) | 0.0002 (0.0003) | 0.0004 (0.0003) | 0.0007** (0.0003) | 0.0008*** (0.0003) | 0.0010*** (0.0003) |
| N. of observations | 17,706 | 17,706 | 17,706 | 17,706 | 17,706 | 17,706 |
| N. of municipalities | 3,627 | 3,627 | 3,627 | 3,627 | 3,627 | 3,627 |

This table presents the results of Equation 1. The dependent variable is about the characteristics of the personal income tax revenue collected by municipality m in year t . Multiple tax rate is a dummy taking value 1 if the municipality imposes multiple tax rates, 0 otherwise. τ_1 is the tax rate for individuals earning a yearly personal income lower than 15,000 Euros, τ_2 is the tax rate for individuals earning a yearly personal income between 15,001 Euros and 28,000 Euros, τ_3 is the tax rate for individuals earning a yearly personal income between 28,001 Euros and 55,000 Euros, τ_4 is the tax rate for individuals earning a yearly personal income between 55,001 Euros and 75,000 Euros. Finally, τ_5 is the tax rate for individuals earning a yearly personal income greater than 75,000 Euros. *IMUReform* is defined as the additional property tax revenue that the municipality should collect (equal to the amount of transfer cut implemented by the national government as a result of the IMU reform), in €10,000. *Post_t* is a dummy taking value 1 after 2011, 0 otherwise. All the regressions include all the controls listed in Section 4 and province linear trends. Standard errors are clustered at the municipality level. We consider observations up to 2012.

8 Conclusion

Decentralization of fiscal responsibility to local governments has been happening rapidly in many countries. This poses the empirical question of whether local governments behave similarly under a decentralized system as they would in a more centralized one, in terms of how they raise revenue or spend it.

We study a decentralization reform implemented in Italy in 2012 that coupled a decrease in national transfers to municipalities with increases in property tax revenue collected by the municipalities. This reform increased local fiscal responsibility to fund local spending through taxation rather than transfers.

On average, municipalities increase property tax revenue less than the national government expected at the time of the reform's implementation, but they manage to compensate for the shortfall by increasing other sources to the revenue. Specifically, we demonstrate that on average, municipalities more exposed to the IMU reform increased the marginal tax rates for richer individuals and were more likely to have a progressive tax schedule. Given the policy context, these changes lead to increased progressivity of local taxes.

Furthermore, we show that municipalities with greater fiscal autonomy resulting from the IMU reform also respond by increasing the provision of public goods, specifically raising the probability of having a nursery school or a local police office in the municipality. This provides suggestive evidence that the efficiency of public spending improved as well as a result of the additional autonomy. These results are particularly informative considering our focus on the short-term response to the IMU reform (up to three years later), making the observed response on real outcomes noteworthy within such a limited time horizon.

Finally, we explore three different mechanisms that could influence the response to greater fiscal autonomy. First, we show that municipalities with a larger personal income tax base tend to increase income tax revenue, while those with a smaller income tax base augment their revenue from alternative sources such as fees and fines.

Furthermore, our heterogeneity analyses reveal that municipalities do not respond in this way due to electoral reasons or municipal characteristics. Indeed, neither the degree of political competition nor the share of poor families in the municipality affects the budgetary behavior and the public good provision of the municipalities affected by the IMU reform.

Taken together, the results indicate that decentralization does indeed make a difference for the behavior of local governments. Greater fiscal autonomy implies a more progressive local tax system and increased efficiency in the delivery of public goods. Furthermore, we show that the direction and magnitude of the response are influenced by heterogeneity across localities. As countries consider whether to continue decentralizing fiscal authority to local entities, policymakers should anticipate these changes in budgetary decisions and their interactions with local characteristics and conditions.

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A Appendix Figures and Tables

Figure A1 illustrates the distribution of municipal sizes across Italy. The vertical dotted line denotes the 5,000 inhabitants threshold, defining our sample municipalities. With only 30 percent exceeding this threshold, our analysis's external validity might be constrained if these larger municipalities behave distinctly under similar fiscal autonomy changes. Yet, no compelling rationale suggests such divergence a priori.

Figure A2 depicts the interest rate trends on public debt across various European nations. Notably, Italian public debt interest rates surged in the latter half of 2011.

Instead, Figure A3 illustrates the distribution of the IMU reform's value, representing the transfer cuts in absolute terms. Conversely, Figure A4 displays the geographical dispersion of the IMU reform, both as a share of 2011 total revenue and on a per capita basis. Despite the varied impact of the IMU reform across Italian municipalities, there appears to be no distinct geographical pattern in its effects.

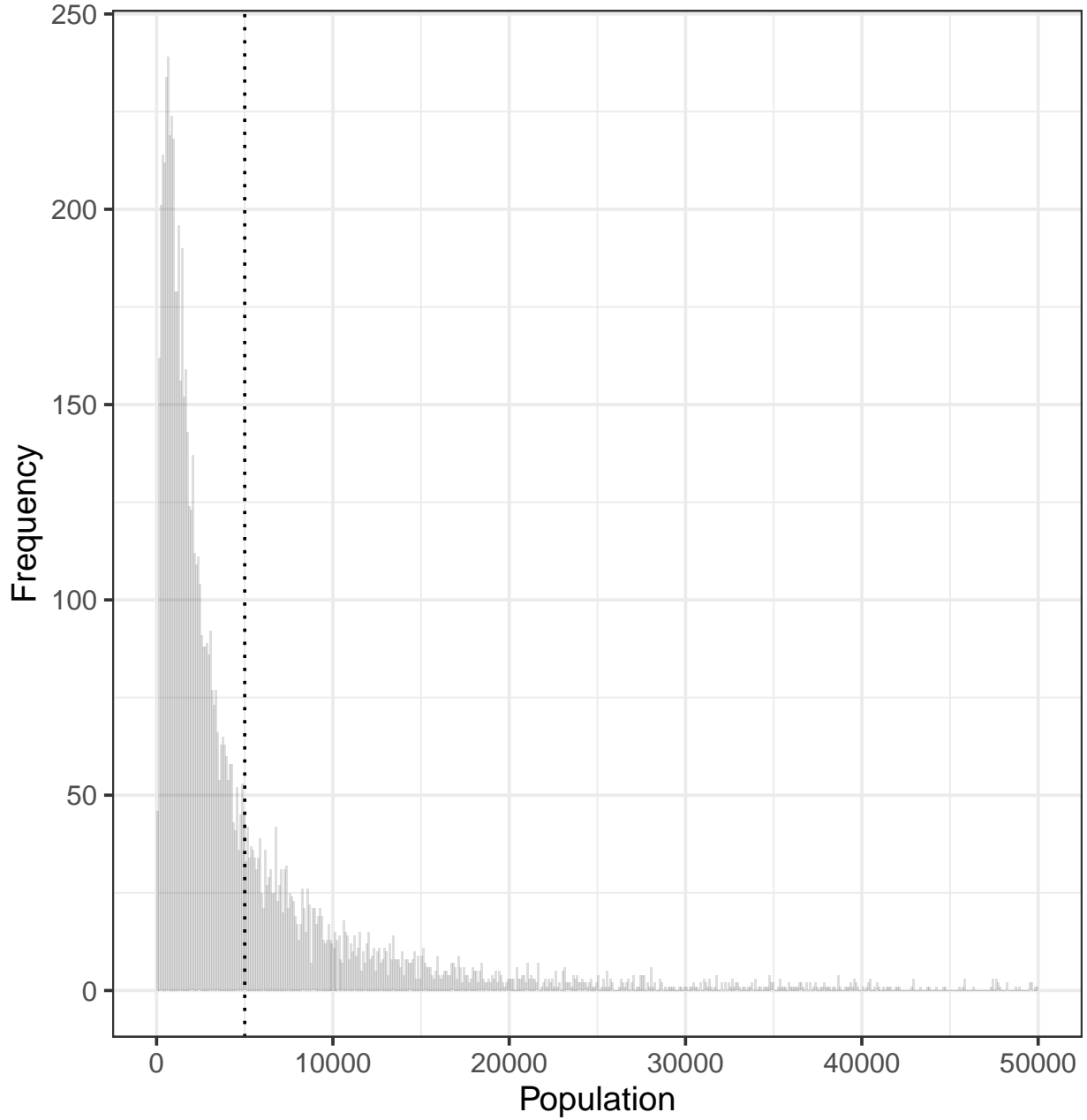
Next, we present the matching procedure employed to select municipalities in the sample, enhancing comparability among municipalities with different levels of the IMU reform.

A concern arises about the potential heterogeneity in the impact of the IMU reform across municipalities, varying with their characteristics. For instance, the reform's impact might be more pronounced in areas with higher personal income. In such cases, simple difference-in-differences estimates may be biased if some municipalities are more affected by the IMU reform without comparable unaffected municipalities and vice versa (Heckman et al. 1997). Matching methods address this potential bias by pairing municipalities with different levels of the IMU reform that share similar observed attributes. Focusing exclusively on municipalities within the region of common support in the distribution of observable characteristics alleviates this concern.

We selected relevant observables for matching municipalities based on the details of the IMU reform outlined in Section 2. The calculation of the IMU reform's value revolves around the disparity between two distinct values: the expected property tax revenue resulting from the IMU reform (computed using the recommended property tax rates) and the actual value of property tax revenue in 2011. The computation of the former involves a function that incorporates the default property tax rates, set by the national government and uniform across all municipalities but varied according to the type of building, and the (unobserved to us) tax base value. In contrast, the latter is influenced by the value of the property tax base (unobserved to us) and the property tax rates set by each municipality for each type of building (endogenously determined and unobserved to us for all building types).

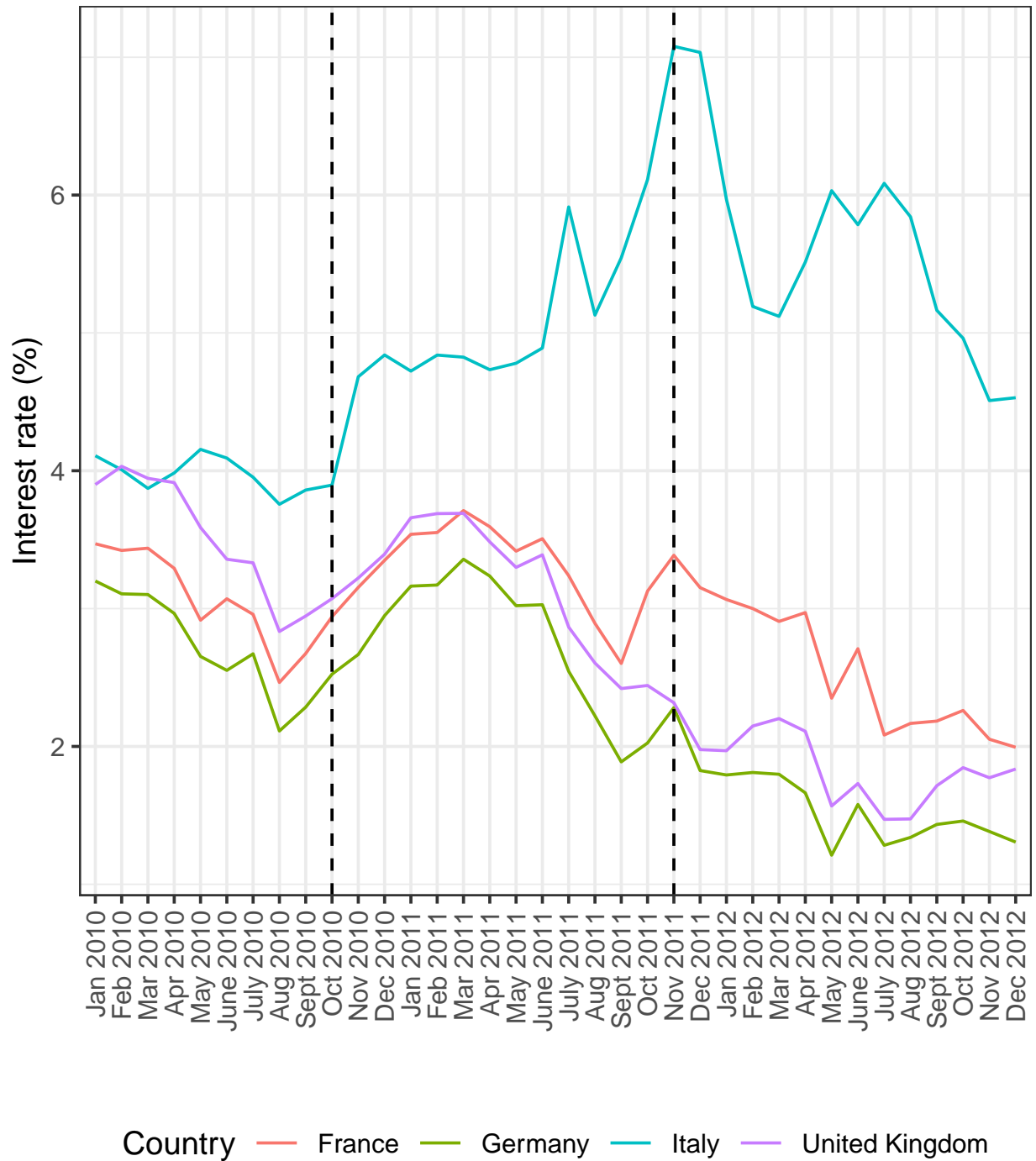
Therefore, we select observable exogenous characteristics that can be correlated with

Figure A1: Distribution of municipality size



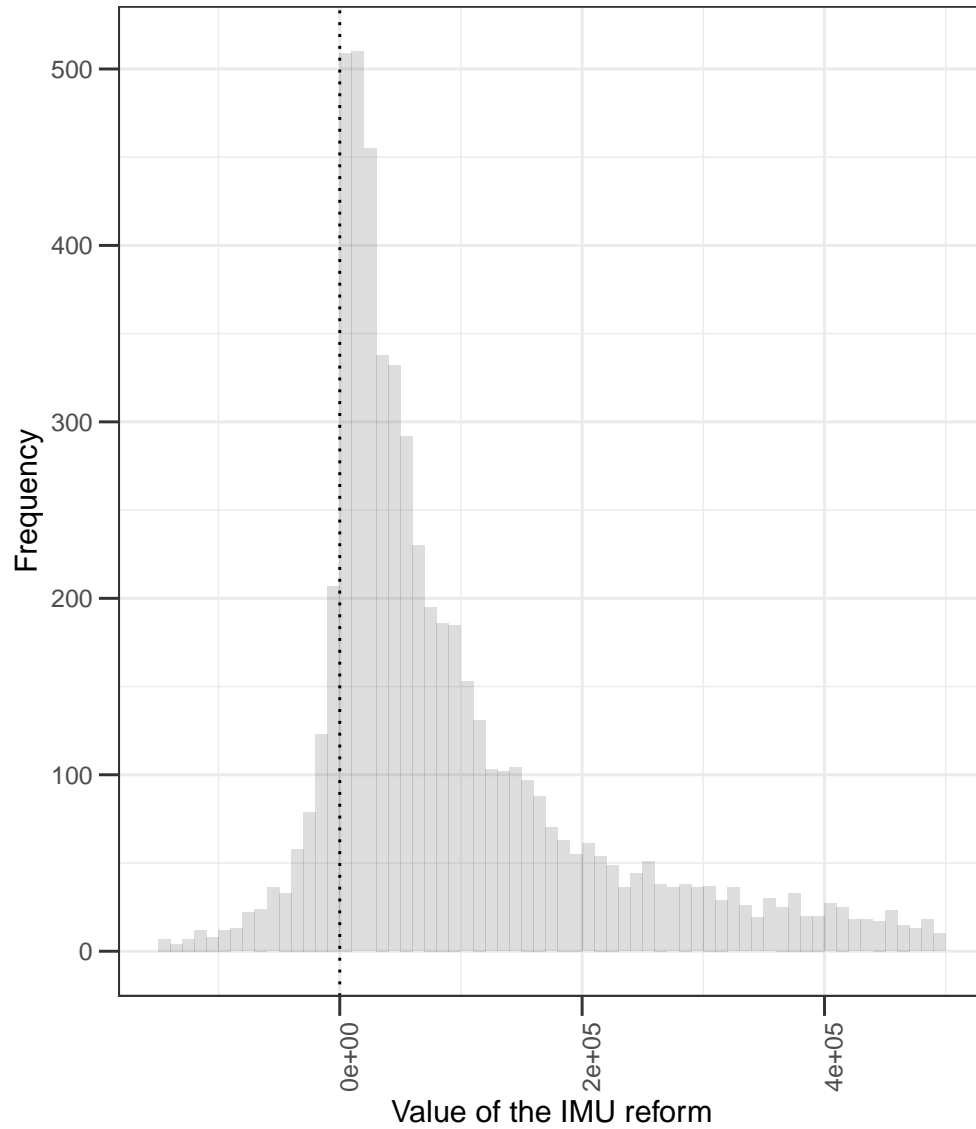
The figure shows the distribution of the municipality size. The dotted line represents the 5,000 inhabitants threshold, which is the upper bound we used for selecting the municipalities in this paper. Municipalities smaller than 5,000 inhabitants represent approximately 70 percent of all the Italian municipalities.

Figure A2: Trends in the interest rate on national debt by country



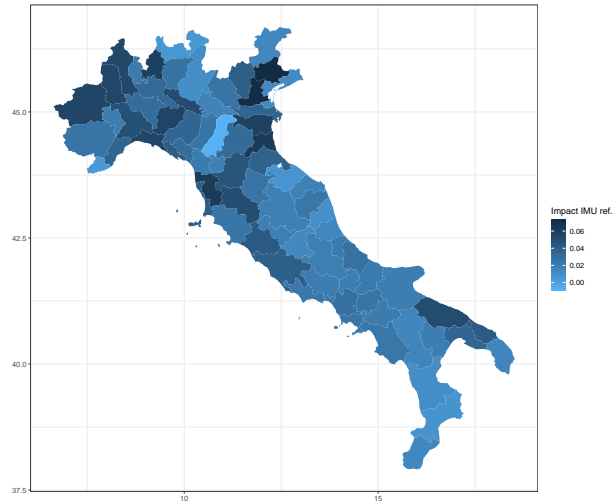
The figure shows the monthly evolution of the public debt interest rate by country. The first dotted line represents the month in which information about the Greek debt crisis was disseminated, while the second dotted line represents the month in which the Italian national government was replaced in order to implement economic reforms aimed at curbing debt accumulation.

Figure A3: Distribution of the impact of the IMU reform

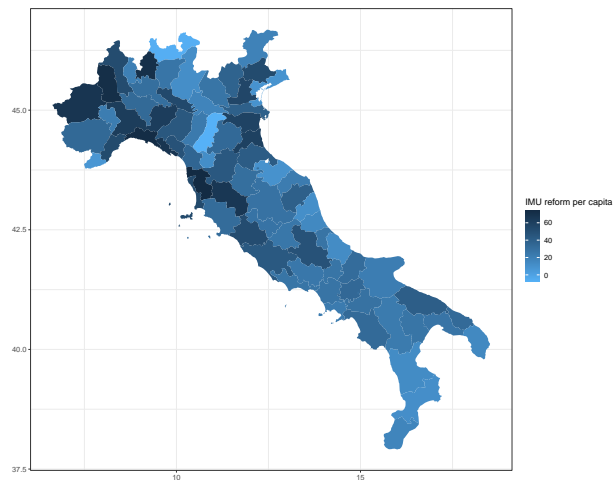


The figure shows the distribution of the IMU reform, calculated as the additional property tax revenue that the national government expected each Italian municipality to collect in absolute value.

Figure A4: Geographic distribution of size of the IMU reform



(a) IMU reform as share of 2011 total revenue



(b) Value of the IMU reform per capita

The two figures depict the geographical distribution of the IMU reform, calculated as the additional property tax revenue that the national government expected each Italian municipality to collect. The top figure illustrates the geographical distribution of the IMU reform as a share of the total municipal budget in 2011. Instead, the bottom figure shows the geographical distribution of the size of the IMU reform per capita.

the unobserved determinants of the IMU reform. In particular, we include the following observable characteristics before 2012: the population, the demographic density, the average building size, the share of buildings in good (bad) state, the share of property building and the total number of buildings as proxy for the value of the property tax base; whether the municipality is subject to the *DSP* and the amount of transfers received by other public institutions as exogenous information on the budgetary condition of the municipality, which likely influenced the value of the property tax revenue; the male (female) employment rate, the share of families in poverty conditions, the share of families living in crowded conditions, the share of individuals younger than 6 years old, the share of employed by sector (i.e., agriculture, industry, services and trade), the past property tax rate for main residence as proxies for the determinants of tax rates; a dummy variable for whether the mayor has a university degree, the share of public employees with less than 20 years of employment and the share of public employees with a university degree as proxies for municipal tax capacity; a dummy for whether the municipal government is politically aligned with the national one, a dummy for whether the mayor is at the second mandate and the average margin of victory as proxies for the political accountability within the municipality.³⁴

We average all the observations before 2012 at the municipal level and compute the regression outlined in Equation A.1.³⁵

$$\begin{aligned}
IMUReform_m &= \alpha_p + \beta'_0 \mathbf{Tax_Base}_m + \\
&+ \beta'_1 \mathbf{Budget}_m + \\
&+ \beta'_2 \mathbf{Citizens_characteristics}_m + \\
&+ \beta'_3 \mathbf{Tax_Capacity}_m + \\
&+ \beta'_4 \mathbf{Political_Variables}_m + \epsilon_m
\end{aligned} \tag{A.1}$$

$IMUReform_m$ represents the value of the transfer cut resulting from the IMU reform (as the one we use in Equation 1), α_p are province fixed effects, whereas $\mathbf{Tax_Base}_m$ includes the above-described proxies for the value of the property tax base, \mathbf{Budget}_m includes whether the municipality is subject to the *DSP* and the amount of transfers received by other public institutions, $\mathbf{Citizens_characteristics}_m$ comprises all the citizens' characteristics influencing the level (and type) of property taxation. $\mathbf{Tax_Capacity}_m$ includes a dummy variable

³⁴We have divided the variables in these categories arbitrarily, but we do not expect this variables to perfectly and unequivocally represent one category.

³⁵Unfortunately, we observe some of these variables for the entire period before 2012 (e.g., the total value of transfers), many come from the Italian census which has information on 2011 only (e.g., employment rate by gender, share of families in crowded/poor conditions).

for whether the mayor has a university degree, the share of public employees with less than 20 years of employment, and the share of public employees with a university degree. Finally, **Political_Variables**_{*m*} represents all those variables capturing the degree of political accountability within a municipality. Standard errors are clustered at the municipal level. Table A1 shows the results of Equation A.1.

Table A1: Correlations between IMU reform and municipality characteristics

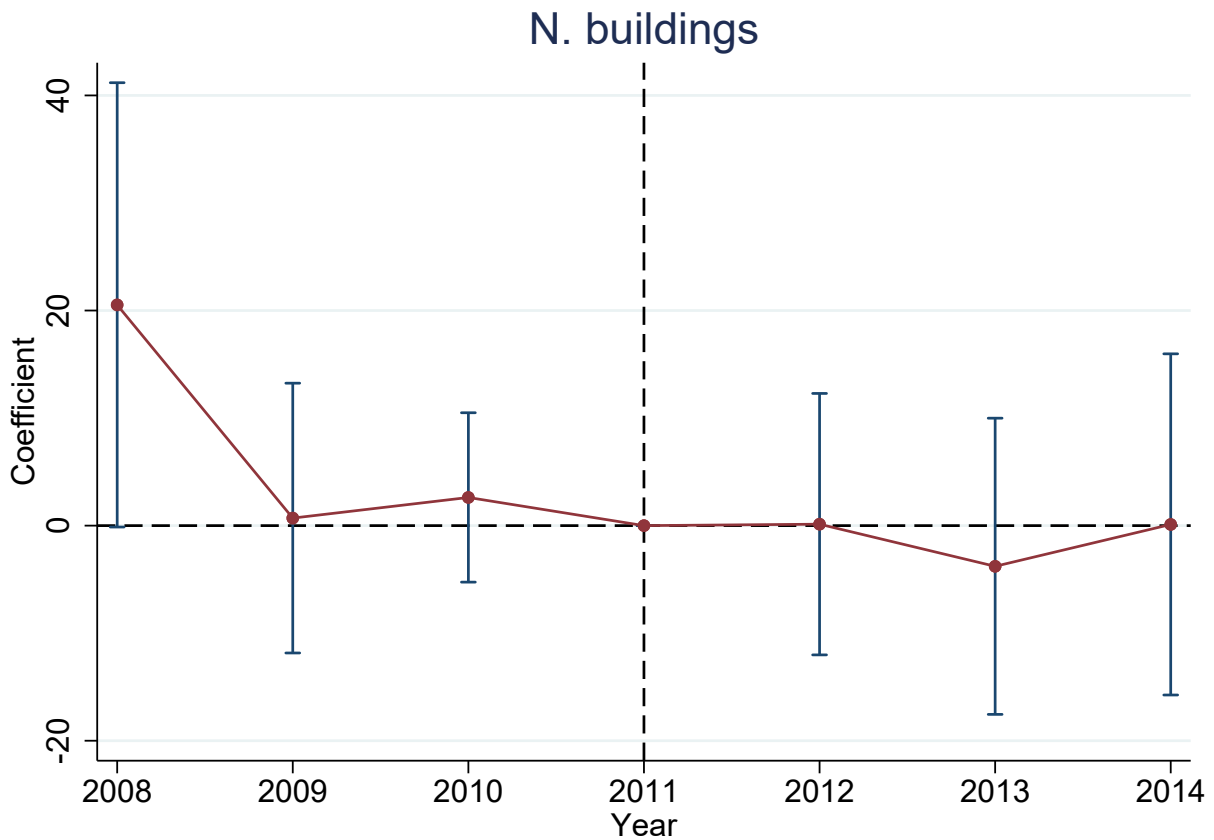
| | (1) | (2) | (3) | (4) | (5) |
|---------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| | <i>IMUReform_m</i> | <i>IMUReform_m</i> | <i>IMUReform_m</i> | <i>IMUReform_m</i> | <i>IMUReform_m</i> |
| <i>Tax Base</i> | | | | | |
| Population | 30.13*** (1.45) | 30.59*** (1.82) | 30.76*** (1.84) | 33.36*** (1.98) | 34.04*** (2.02) |
| $\tau_{MainResidence}$ | -26.926*** (1,760) | -27,020*** (1,773) | -26.825*** (1,781) | -27,828*** (1,790) | -27,790*** (1,792) |
| N. buildings | 0.205 (0.518) | 0.211 (0.509) | 0.373 (0.406) | 0.119 (0.459) | 0.106 (0.465) |
| Sh. Property building | -364.55 (240.18) | -372.81 (241.39) | -416.35* (244.33) | -641.14*** (248.42) | -1,048*** (249) |
| Sh. Good state building | 228.42** (96.79) | 228.76** (96.86) | 234.23** (98.42) | 177.42* (97.49) | 179.83* (97.72) |
| Sh. Bad state building | 174.45 (465.83) | 187.70 (470.11) | 144.52 (487.79) | -94.32 (473.96) | -43.47 (475.08) |
| Building size | 1,015*** (123) | 1,010*** (121) | 1,010*** (124) | 1,093*** (133) | 1,151*** (136) |
| Demographic density | 2.99 (8.28) | 2.63 (8.24) | 2.63 (8.33) | 6.16 (8.84) | 7.89 (9.17) |
| <i>Budget</i> | | | | | |
| Total other transfers | | -0.002 (0.005) | -0.002 (0.005) | -0.003 (0.005) | -0.004 (0.005) |
| <i>DSP</i> | | -20,541 (16,257) | -21,334 (16,320) | -31,177** (15,540) | -33,296 (15,482) |
| <i>Tax capacity</i> | | | | | |
| Sh. less 20 years exp. | | | -6,839* (4,041) | -5,055 (3,964) | -4,786 (3,964) |
| Sh. with university degree | | | -2,063 (6,676) | 695 (6,695) | 888 (6,689) |
| University degree mayor | | | 825.78 (2,855) | 233 (2,825) | 358 (2,811) |
| <i>Citizens characteristics</i> | | | | | |
| Male employment | | | | -83.69 (248.5) | -51.33 (249.55) |
| Female employment | | | | -418.68 (321.2) | -561.18* (324.55) |
| Sh. poor families | | | | -2,505** (1,157) | -2,757** (1,159) |
| Sh. crowded families | | | | -2,489*** (1,005) | 1,811* (982) |
| Sh. less 6 years old | | | | -3,106*** (1,039) | -2,026** (1,039) |
| Sh. employed agriculture | | | | -5,272 (21,031) | -4,209 (20,925) |
| Sh. employed industry | | | | -6,477 (21,050) | -5,486 (20,944) |
| Sh. employed services | | | | -5,278 (21,030) | -4,333 (20,923) |
| Sh. employed trade | | | | -5,669 (20,978) | -4,777 (20,870) |
| <i>Political accountability</i> | | | | | |
| Party aligned | | | | | -10,780** (5,185) |
| Second mandate | | | | | 214.97 (3,295) |
| Margin of victory | | | | | 10.22 (41.69) |
| Share of foreigners | | | | | -181.24*** (38.55) |
| N | 3,879 | 3,872 | 3,829 | 3,829 | 3,829 |

The table shows the results of Equation A.1. All regressions control for province fixed effects and standard errors are clustered at municipal level.

Once computed Equation A.1 as outlined in the last column of Table A1, we can predict the value of the $IMU_{Reform_{m,p}}$ given the estimated coefficients for the control variables. Finally, we focus only on those municipalities with a value of the *predicted* value of the IMU reform within the 1st and 99th percentile of all the municipalities in the data. We select the sample of our analysis as suggested in Galiani et al. (2005). A notable difference is that we do not have a clear treatment and control group, since our treatment is continuous. Therefore, we select the municipalities with a predicted value of the IMU reform between the 1st and 99th percentile.

Figure A5 shows the results of Equation 2 using as outcome the number of buildings (i.e. the size of the property tax base). Figure A5 shows clearly how municipalities did not react (or anticipated) to the IMU reform by changing the size of the property tax base.

Figure A5: Event study figure of the effect of the IMU reform on number of buildings

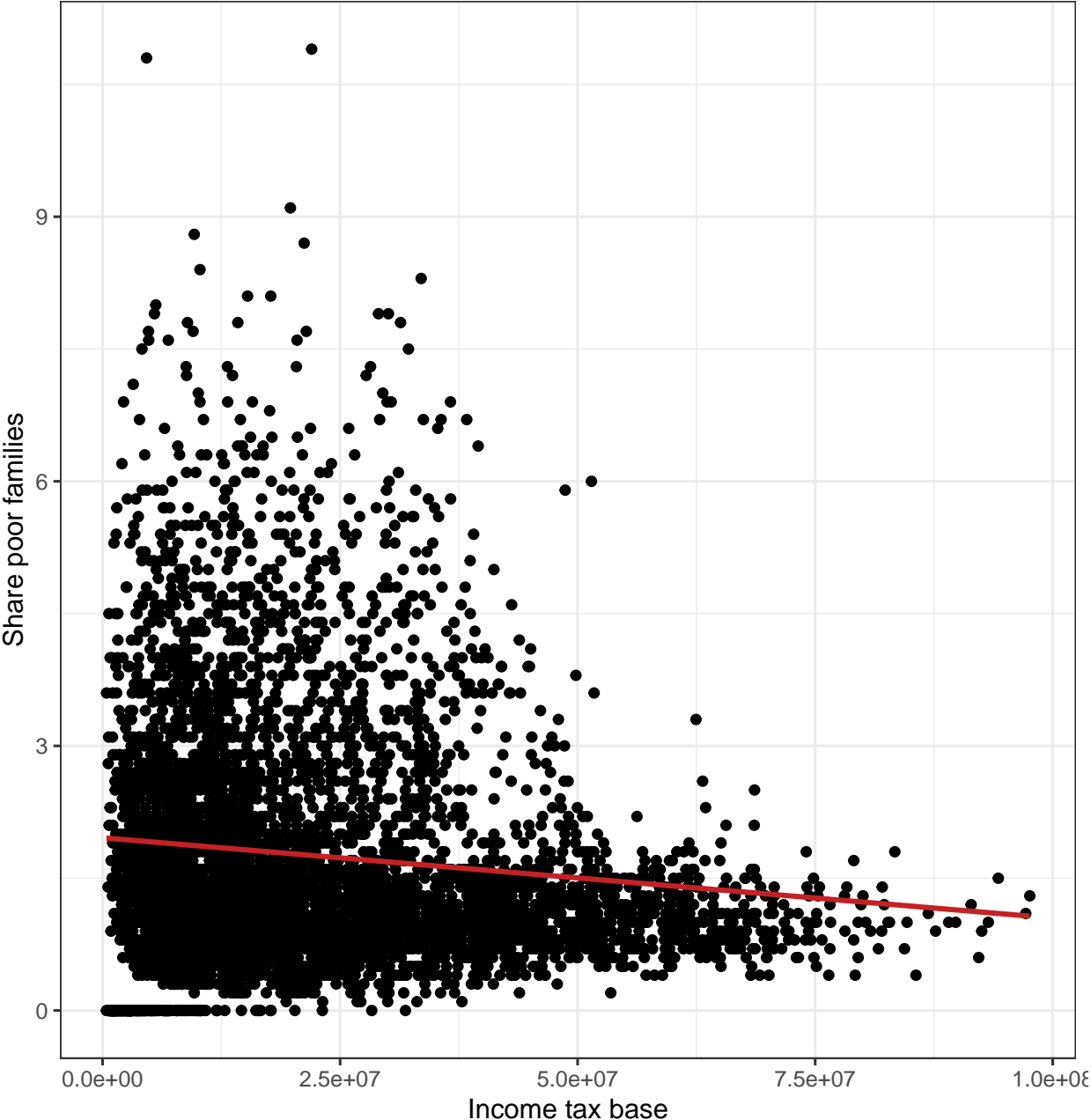


The figure shows the results of Equation 2 using as outcomes the number of buildings in the municipality. The figure shows the results including all the controls discussed in Section 4 and province linear trends. The IMU reform does not affect the size of the property tax base (i.e. the number of buildings).

Figure A6 shows the relation between the income tax base and the share of poor families

within a municipality. There is a slightly negative relationship between the two variables, indicating that municipalities with a larger share of poor families have a slightly larger likelihood of having a smaller income tax base.

Figure A6: Relation between income tax base and share of poor families



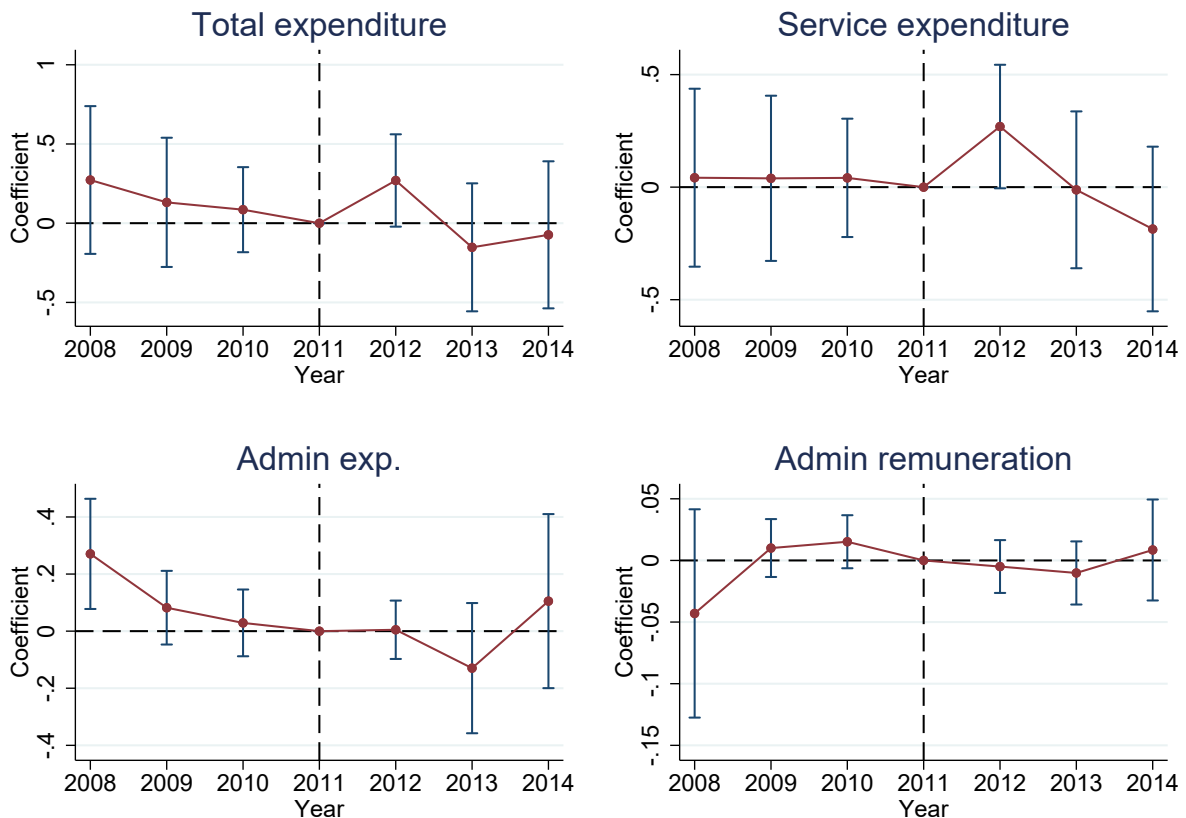
The figure shows the relation between the share of poor families in 2011 and the size of the income tax base in 2011. There is a slightly negative relationship between size of the income tax base (x-axis) and the share of poor families in a municipality.

Figure A7 and Table A2 show the results of Equation 1 and 2 using as outcome the yearly

municipal expenditure by sector. Table A2 shows how the municipalities did not change their expenditure within three years from the implementation of the IMU reform. Instead, Figure A7 shows a small increase in expenditure for services in 2012, which does not continue in the following years and, indeed, it does not correspond to a statistically significant change in the same outcome in Table A2.

Then, we investigate further the results of Table A2. Table A3 shows the results of Equation 1 by using as an outcome variable the municipal expenditure on services by sector. The first column indicates the results on the overall expenditure on services, whereas the other columns focus respectively on each sector separately. None of the sectors experienced a statistically significant change in the expenditure as the result of the IMU reform. Finally, Table A4 highlights how the no effect on the expenditure outcomes can hide a change in the composition of the expenditure between an increase in current spending and an equal decrease in the investments. The only exception is the decrease in the investment in administration.

Figure A7: Event study figure of the effect of the IMU reform on expenditure outcomes



The figure shows the results of Equation 2 using as outcomes the values of the different expenditure sources. The figure shows the results including all the controls discussed in Section 4 and province linear trends.

Table A2: Effect of IMU reform on expenditure

| | <i>Expenditure</i> | | | | | | | |
|------------------------------|--------------------|-------------------|------------------|------------------|-------------------|-------------------|------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Total exp. | | Service exp. | | Admin exp. | | Admin remun. | |
| $IMU Reform_m \times Post_t$ | -0.024 (0.136) | -0.004 (0.138) | 0.014 (0.106) | 0.053 (0.112) | -0.043 (0.072) | -0.049 (0.072) | 0.005 (0.016) | 0.002 (0.016) |
| Province linear trends | | X | | X | | X | | X |
| N. of observations | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 |

The table shows the results of Equation 1. The table shows the results on the following outcome variables: overall expenditure, service expenditure, the expenditure on the public body, and admin remuneration. We control for municipality and year fixed effects, the logarithm of population, the logarithm of the level of other transfer cuts, a dummy variable taking the value 1 if the municipality is subject to the DSP, another dummy variable taking the value 1 if the party ruling the municipality is aligned with the national government, a dummy variable indicating whether the mayor is in the second mandate, the margin of victory in the last election, a dummy variable indicating whether the mayor has a university degree, and characteristics of public employees, such as the share of employees with less than 20 years of experience and the share of public employees with a university degree. Standard errors are clustered at the municipality level. Standard errors are clustered at the municipality level.

Table A3: Effect of IMU reform on expenditure

| <i>Expenditure</i> | | | | | | |
|-----------------------------|-------------------|------------------|------------------|-------------------|-------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Service exp. | Social | Territory | Mobility | Education | Culture |
| $IMUReform_m \times Post_t$ | 0.053 (0.112) | 0.029 (0.032) | 0.021 (0.072) | -0.083 (0.053) | 0.015 (0.033) | 0.003 (0.015) |
| N. of observations | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 |
| | Sport | Tourism | Development | Police | Justice | Others |
| $IMUReform_m \times Post_t$ | -0.008 (0.026) | 0.018 (0.020) | 0.011 (0.011) | 0.001 (0.008) | -0.001 (0.001) | 0.047 (0.033) |
| N. of observations | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 |

The table shows the results of Equation 1. The table shows the results on the expenditure divided by sector. We control for municipality and year fixed effects, the logarithm of population, the logarithm of the level of other transfer cuts, a dummy variable taking the value 1 if the municipality is subject to the DSP, another dummy variable taking the value 1 if the party ruling the municipality is aligned with the national government, a dummy variable indicating whether the mayor is in the second mandate, the margin of victory in the last election, a dummy variable indicating whether the mayor has a university degree, and characteristics of public employees, such as the share of employees with less than 20 years of experience and the share of public employees with a university degree. Standard errors are clustered at the municipality level. Standard errors are clustered at the municipality level.

Table A4: Effect of IMU reform on expenditure

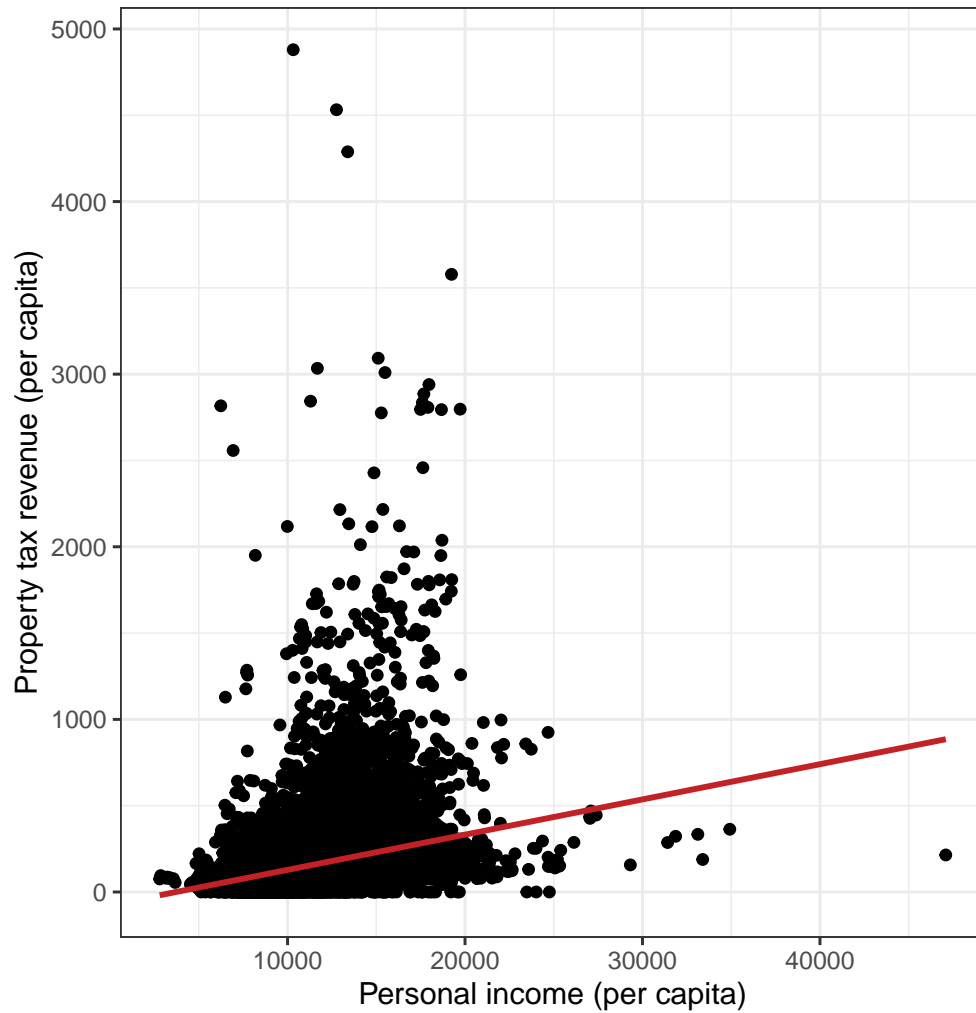
| | <i>Expenditure</i> | | | | | | | | |
|-----------------------------|--------------------|-----------------|-------------------|---------------------|------------------|-------------------|-------------------|------------------|---------------------|
| | <i>Total Exp.</i> | | | <i>Service Exp.</i> | | | <i>Admin Exp.</i> | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| | Overall | Current exp. | Investment | Overall | Current exp. | Investment | Overall | Current exp. | Investment |
| $IMUReform_m \times Post_t$ | 0.004 (0.138) | 0.154 (0.11) | -0.150 (0.119) | 0.053 (0.111) | 0.099 (0.077) | -0.046 (0.111) | -0.048 (0.070) | 0.056 (0.051) | -0.105** (0.047) |
| N. of observations | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 | 25,438 |
| N. of municipalities | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 | 3,749 |

The table shows the results of Equation 1. The table shows the results on the following outcome variables: overall expenditure, current expenditure and investment levels. We control for municipality and year fixed effects, the logarithm of population, the logarithm of the level of other transfer cuts, a dummy variable taking the value 1 if the municipality is subject to the DSP, another dummy variable taking the value 1 if the party ruling the municipality is aligned with the national government, a dummy variable indicating whether the mayor is in the second mandate, the margin of victory in the last election, a dummy variable indicating whether the mayor has a university degree, and characteristics of public employees, such as the share of employees with less than 20 years of experience and the share of public employees with a university degree. Standard errors are clustered at the municipality level. Standard errors are clustered at the municipality level.

Then, Figure A8 plots the average income in each Italian municipality (x-axis) and the average property tax per capita collected (y-axis). The figure clearly shows how there is little (positive) correlation between the two variables, further highlighting the small progressivity of the property taxation in Italy.

Finally, Table A5 and Figure A9 show the results for other outcomes related to the public good provision in the Italian municipalities. Specifically, we look at: the number of slots available in nursery schools, the number of local police officers, the amount of waste collected (in tonnes) and the number of public lights. The estimates for all the outcomes under analysis are not statistically significant, highlighting how the municipalities do not respond to the greater fiscal autonomy from the IMU reform on these margins.

Figure A8: Progressivity of property tax



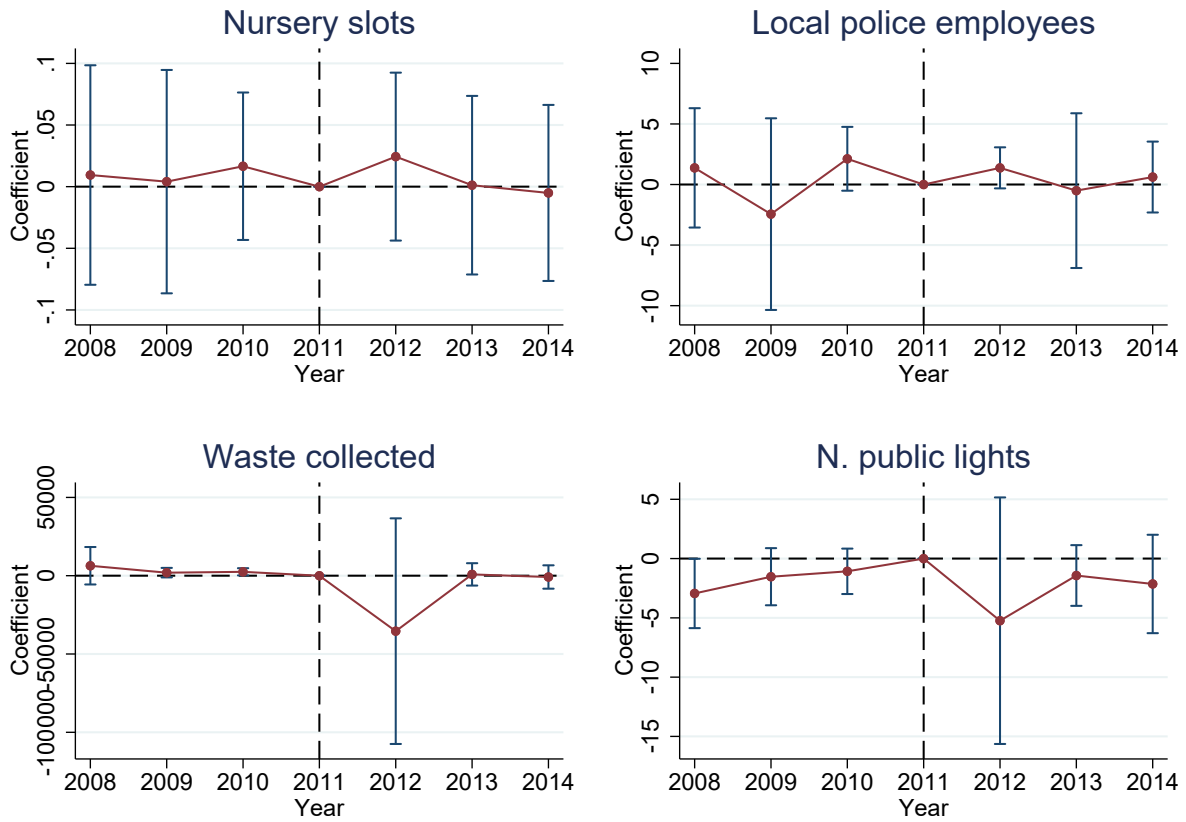
The figure shows suggestive evidence of the regressivity of the property tax in Italy. The y-axis shows the average value of the property tax per capita in each Italian municipality in the sample. Instead, the x-axis shows the average personal income per capita. The red line shows the linear relation between these two variables. It is clear from the figure that higher average income per capita is not associated with a clear increase in property tax per capita.

Table A5: Effect of IMU reform on public goods

| | <i>Intensive margin</i> | | | | | | | |
|--|-------------------------|-------------------|--------------------|------------------|---------------------|---------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Nursery slots | | Local police empl. | | Waste collected | | N. public lights | |
| $IMUReform_m \times Post_t$ (€10,000) | -0.000 (0.024) | -0.017 (0.025) | -0.375 (2.231) | 0.670 (2.147) | -11,679 (12,614) | -13,502 (13,297) | -2.172 (2.443) | -2.000 (2.891) |
| Province linear trends | | X | | X | | X | | X |
| N. of observations | 1,583 | 1,583 | 14,454 | 14,454 | 22,607 | 22,607 | 17,981 | 17,981 |
| N. of municipalities | 314 | 314 | 2,590 | 2,590 | 3,607 | 3,607 | 3,114 | 3,114 |

The table shows the results of Equation 1. The table shows the results on the following outcome variables: expenditure on nursery schools, number of available slots, dummy taking value 1 if there is a nursery school in the municipality, 0 otherwise, and number of teachers in nursery schools. To ease the interpretation of the coefficients, the variable $IMUReform_m$ represents the value of the size of the IMU reform in thousands of euros. We control for municipality and year fixed effects, the logarithm of population, the logarithm of the level of other transfer cuts, a dummy variable taking the value 1 if the municipality is subject to the DSP, another dummy variable taking the value 1 if the party ruling the municipality is aligned with the national government, a dummy variable indicating whether the mayor is in the second mandate, the margin of victory in the last election, a dummy variable indicating whether the mayor has a university degree, and characteristics of public employees, such as the share of employees with less than 20 years of experience and the share of public employees with a university degree. Standard errors are clustered at the municipality level. Standard errors are clustered at the municipality level.

Figure A9: Event study figure of the effect of the IMU reform on public good outcomes, intensive margin



The figure shows the results of Equation 2 using as outcomes additional information on public good provision. The top-left figure shows the effect of the IMU reform on the number of slots available in nursery schools, the top-right shows the results on the number of local police officers, the bottom-left on the amount of waste collected and, finally, the bottom-right figure shows the effect of the IMU reform on the number of public lights. The figure shows the results including all the controls discussed in Section 4 and province linear trends.