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Inter-municipal cooperation and the provision of local public goods

Sonia Paty, Morgan Ubeda

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Inter-municipal cooperation, local public spending, fiscal federalism, difference-in-differences

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1 Introduction

Over the past 20 years, several countries have introduced inter-municipal cooperation to try to reduce territorial fragmentation in terms of the number of municipal/local governments.[1] Such policies are aimed at benefiting from economies of scale in the production of local public services and reducing tax competition and inequalities between local governments. However, the empirical evidence on the success of these territorial reforms to achieve these objectives is mixed (for a recent review see e.g. Bel and Sebö, 2021).[2]

For instance, in the Italian case, Ferraresi et al. (2018) found that belonging to an inter-municipal community reduced current local per capita expenditure by around 5 percent and that this effect was persistent over time and increased up to six years after implementation. However, in the French case, Frère et al. (2014) no effect of cooperation on total spending during the period 1994-2003 and Charlot et al. (2015) and Breuillé et al. (2018) conclude that fiscal cooperation had induced an increase in total local tax rates. The authors cite institutional inefficiencies, tax harmonisation, and increased provision of public services as potential explanations for this increase but do not provide evidence on the respective importance of these mechanisms.

Whether inter-municipal union is increasing or not local efficiency in providing public services needs further investigation and more complete and detailed data on budget accounts and the ranges of services provided. Specifically, we need to know more about the impact of this reform on spending related to the services transferred from the cooperating municipalities to the community. Do cooperation and its expected economies of scale reduce or not overall spending on local public services that are transferred from the municipalities to the community? Are there economies of scale that derive from the supply of some local public services within a larger territory? Basic decomposition of spending by type (operating vs. investment) does not allow us to answer these questions since local public services include some activities that are transferred to the communities and some that are not. We need specific information on the range of services and the associated expenditure. We also need to disentangle the effect on total spending of transferring specific local public services from the tax

[1] Amalgamation or merger between local governments is an alternative policy to inter-municipal cooperation. In this case, former municipalities disappear after the creation of a bigger local government. See e.g. Reingewertz (2012), Uusitalo and Moisio (2013), Baskaran et al. (2016), Blom-Hansen et al. (2016), Cobban (2019).

[2] See also Bel et al. (2012), Allers and de Greef (2018), Luca and Modrego (2021), Tricaud (2021) etc.

harmonisation effect. After cooperation, a single tax rate can be implemented which removes tax competition between local governments; however, any related increase in tax rates and tax revenues might lead to increased public spending.

This paper tries to fill a gap in the literature by exploiting detailed data on the budget accounts of French municipalities and communities to explore the causal impact of inter-municipal cooperation on the delivery of some specific local public services, transferred from the municipalities to the community.

We exploit the characteristics of the French institutional setting to test the impact of inter-municipal cooperation on local budgets, and to isolate the effect of transferring specific local public services from the tax harmonisation effect. Since 1999, to solve the problem of municipal fragmentation the French government has been in favor of inter-municipal jurisdictions based on large state grants.[3] Inter-municipal communities are the result of the union of several municipalities which enables collective financing and management of some local public services. Currently, all French municipalities are grouped within larger jurisdictions (known as 'Etablissements Publics de Coopération Intercommunale' or EPCI in French).

We believe that our study makes two original contributions. First, by considering the decomposition of local public spending by function, we can determine the impact of inter-municipal cooperation on the composition of local public spending. Second, our data on the range of local public services at the inter-municipal level allows estimation of the specific impact of transferring one specific service from the municipal to the inter-municipal level conditional on the existence of cooperation and controlling for fiscal regime (harmonised or not).

In our setting, the main estimation challenge derives from the fact that the transfer of responsibilities to inter-municipal jurisdictions can take any order or not be transferred , and that the intensification of fiscal cooperation can happen at any moment. To overcome the problem of dynamic heterogeneous treatment effects, we use a straightforward extension of the LP-DiD (difference in difference) estimator of Dube et al. (2023).

This allows us to identify the possible existence of a (dis)economies of scale effect of transferring one local public service while controlling for a tax harmonisation effect over a large territory. We confirm that local (i.e. municipal and community) spending increases by 20 percent after integration. This significant effect is persistent over time.

[3]There are currently about 35,000 municipalities in France. 80 percent of them have less than 2,000 inhabitants.

We try to identify the mechanism behind this broad result. It is possible that this increase in total spending could be due to the heterogeneity of the local public goods involved. For instance, economies of scale may be more difficult to achieve in the case of supply of public library services for a small neighborhood compared to provision of cultural and sporting infrastructure to a large community composed of several municipalities.

Our data on spending by function allows us to measure the impact of cooperation on the composition of local public services. The estimation results show that following the creation of an inter-municipal community the proportion of expenditure on urban policies increased in local spending.

It might be the case that cooperating municipalities would "benefit" from a tax harmonisation effect, which could drive the observed increase in spending. Using our data on the transfer of services, we confirm that the deepening of fiscal integration through the imposition of a single business tax (SBT) rate allowed an increase in local spending. However, conditional on the existence of cooperation and controlling for fiscal regime, with the exception of water supply we find no negative effect of mutualising services on spending. In contrast, we find a significant increase in total spending on public transit from its transfer to the inter-municipal jurisdiction. It would seem that the increase in local spending can be explained in part by the transfer of this policy from the municipal to the inter-municipal level independent of a tax harmonisation effect.

Our results would indicate that the increase in spending following integration is driven by two factors: (i) larger provision of specific public services such as public transport which some small municipalities were unable to provide on their own i.e. the so called "zoo effect" (Oates, 1988); and (ii) a tax harmonisation effect which imposes a SBT rate within the fiscally integrated area.

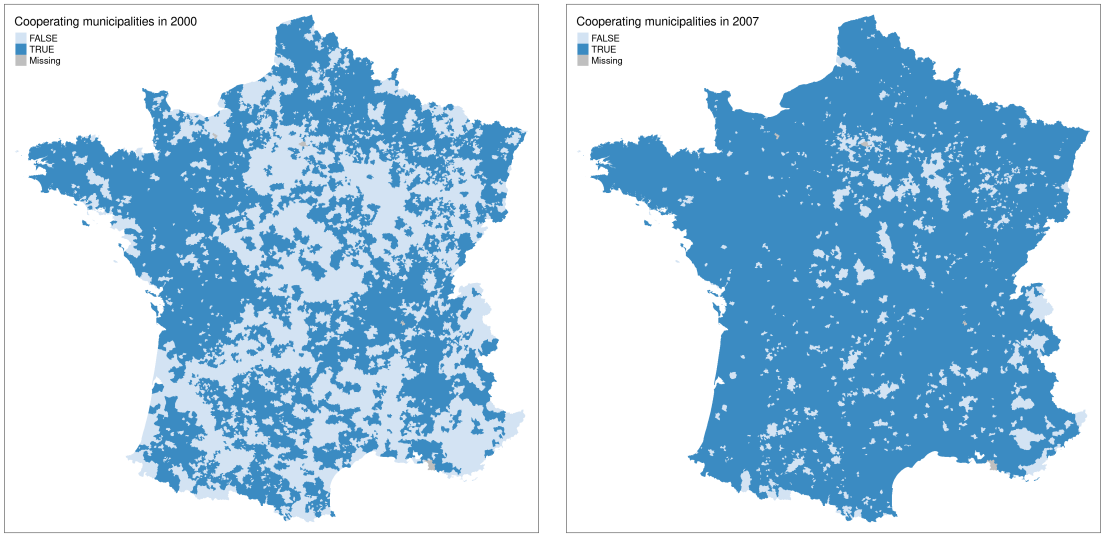
Overall, although we cannot exclude the possibility that scale economies in the provision of some local public goods by inter-municipal communities were achieved, they were clearly dominated by the provision of new public services for particularly small municipalities and by the tax harmonisation within the fiscally integrated territory. Thus, inter-municipal cooperation has allowed provision of a wider range of local public services within a larger territory but has not reduced local public spending.

The paper is organized as follows: Section 2 describes the institutional background; sections 3 and 4 present the data, the descriptive statistics, and the estimation strategy,

section 5 presents the results, and section 6 concludes.

2 Institutional context

In France, inter-municipal cooperation - also called functional cooperation - increased greatly following publication of the 1999 Chevènement law. In 1993, 5,069 municipalities were part of an inter-municipal cooperation structure. structure but the December 16, 2010 law made it mandatory for French municipalities to join a cooperation group by 2014. It should be noted that in 2000, 94% of French municipalities had already opted for this structure incentivized by state grants.[4] Map 1 shows the staggered and voluntary adoption of cooperation among French municipalities between 2000 and 2007.



Map 1: Inter-municipal cooperation among French municipalities between 2000 and 2007

French communities can take one of four jurisdictional forms which are based on demographic criteria: "métropole" (M) (the most integrated form of cooperation) requiring a minimum of 400,000 inhabitants, "communauté urbaine" (CU) requiring a minimum of 250,000 inhabitants, "communauté d'agglomération" (CA) requring a minimum of 50,000 inhabitants and one member municipality including over 15,000 inhabitants, and "communauté de communes" (CC) with no inhabitant number threshold.

[4]See Di Porto et al. (2016) to know more on the determinants of cooperation in France.

The share of the French population covered by these structures increased from 28% in 1993 to almost 100% in 2014. In 2018, there were 22 M, 11 CU, 221 CA, and 1,005 CC. Currently, more than half of the French population belongs to one of the most integrated community forms (M, CU, CA). The creation of a community allows the municipalities to decide (based on a specific majority) which among several categories of services will be delegated to the union (the categories are discussed later in the paper). In effect, every transferred service/competence is managed and funded collectively by the community. Each year, the municipal or community council can authorise changes to these responsibilities but all municipalities must maintain transfer the agreed missions over the year.

The jurisdiction of the community requires some compulsory responsibilities/services. For instance, CCs must provide at least one urban and one economic development service. The most integrated community forms such as M, CU and CA are required to provide more services than the CCs. The most frequent services supplied by communities are public transport, garbage collection and treatment, social housing, social aid, road construction and maintenance, sport and cultural infrastructures, and economic policies (e.g. enterprise zones, financial support for business).

Alongside the inter-municipal communities, there is a historical cooperation called "syndicats de communes". These more restricted municipal unions are responsible for the provision of one or several local public goods financed by municipal contributions and specific tax revenue. The "syndicats" tend to be responsible for the treatment of waste and water resources and sporting infrastructure such as swimming pools. Over time, due to the development of inter-municipal cooperation since 1999 this type of cooperation has decreased.

Inter-municipal cooperation also allows for community provision of public services financed by the community's own tax revenues. The setting of and interaction of inter-municipal tax rates with municipal tax rates varies according to the union's choice of tax regime. French law allows for two main tax regimes: a single regime or an additional tax regime. The single tax regime is mandatory for M and CA, and optional for CC and CU. In this setting, cooperating municipalities pass responsibility for levying the local business tax to the new cooperation entity. This allows the imposition of a unique business tax rate over the whole territory covered by the cooperating municipalities.

Under the additional tax regime, municipalities set their own business tax rates

and the community charges an additional business levy on the same tax base. This additional tax rate applies uniformly to all the municipalities in the group. Communities levy about 20 percent of the total tax revenues of the local block; 73% of communities chose to surrender their fiscal autonomy by choosing a SBT regime.

Depending on its cooperation status, a municipality can set its own tax rates (if it does not belong to a community), or can set an additional tax rate (if it belongs to a community with an additional tax regime), or lose the right to set the business tax rate (if it is a member of a community with a SBT). This last case refers to the most integrated fiscal regime.

3 Data and descriptive statistics

3.1 Data

We exploit original data on French municipalities and their communities over the period 2000 to 2019. Our dataset is based on four data sources:

- tax revenue data for each level of local government (municipal, community, syndicats) collected at the municipal level from 2001 to 2019 (source: *Direction Générale des Finances Publiques*);
- municipality accounting budget data for 2000 to 2019 and community accounting data for 2007 to 2019 which are used to obtain the state transfers (source: *Direction Générale des Finances Publiques*).
- functional accounting budget data (see appendix A for the 9 functions) for municipalities with more than 3,500 inhabitants available from 2002 to 2011 (source: *Direction Générale des Finances Publiques*).
- data on local public services transferred to the community over the years taken from the *BANATIC* database covering 2007 to 2019 (source: *Direction Générale des Collectivités Locales*).

After combining these data based on their different time coverage, we obtained three samples.

Sample A includes all municipalities that cooperated after 2007. This start date is based on data availability because we only have access to comutity accounting data

starting in 2007. Because comunity variables are zero before cooperation, we can still exploit the municipal data for years 2001-2006. These pre-treatment years are used to improve the robustness of the pre-trend tests. To measure spending, we proxy it using total spending which is the sum of total tax revenues and state transfers to the municipality and its cooperation group. Tax revenues are at the municipal level; to obtain the state transfers at a municipal level we assigned the group transfers to the municipalities as a proportion of their share in the group's total population.

Sample B includes municipalities with over 3,500 inhabitants over the years 2002 to 2011, which began cooperating after 2002. We focus on this sample for the analysis of spending by function because of data availability.

Sample C includes all those municipalities that joined an inter-municipal union before 2006 using data on local public services available from 2007 to 2017.

3.2 Descriptive statistics

Table 1 describes our main municipal level dependent variables and the cooperation status of the municipalities (outside or included in a community) over the three samples. All accounting variables are expressed in Euro per capita.

Table 1 describes, for our data, per-capita fiscal revenues and state transfers. We approximate consolidated spending as the sum of fiscal revenues and state transfers. We do so because these two variables are the main sources of revenues of municipalities, and they are not subject to the double-counting problems that other available spending variables are subject to. Further, focusing on these variables allows us to take into account the budgets of "Syndicats", that are mission-specific cooperation structures on which data is scarce.

Sample A includes 61,615 observations from 2002 to 2019, corresponding to the 3,445 municipalities which became part of a cooperation group after 2007 and covering 1,189 cooperation groups.

Sample B includes 8,009 observations, corresponding to the 676 municipalities with more than 3,500 inhabitants which joined a cooperation group after 2002. In these municipalities, per capita fiscal revenues (€747.6) and state transfers (€270.48) were higher before cooperation than in the case of Sample A.

Sample C includes 343,073 observations over the period 2007 to 2019, corresponding to the 26,762 municipalities that joined a community before 2003, from 2007 to 2019.

Table 1: Descriptive statistics over the three samples

	Sample A		Sample B		Sample C	
	Mean	s.d.	Mean	s.d.	Mean	s.d.
Municipality only, before cooperation						
Fiscal revenues	455.08	704.60	747.60	430.69		
Housing tax	108.63	146.10	199.79	165.02		
Property tax	170.03	268.69	297.07	178.92		
Business tax	138.54	585.97	244.10	239.55		
State transfers	232.74	210.20	270.48	154.11		
Consolidated spending	687.71	836.84	1018.09	549.11		
Total (municipality and community), after cooperation						
Fiscal revenues	616.34	747.19	752.33	405.67	478.98	488.12
Housing tax	228.15	229.92	247.31	174.90	177.98	116.15
Property tax	245.24	332.32	337.66	196.45	186.54	157.57
Business tax	91.70	344.89	159.59	169.70	66.34	390.50
State transfers	265.01	212.51	300.35	144.22	261.24	156.31
Consolidated spending	881.35	865.88	1052.68	509.02	740.26	532.85
Population	1537.90	5743.01	12923.89	14970.80	1754.56	10038.49
Cooperation	0.52	0.50	0.66	0.47	1.00	0.00
Number of observations	61615		8009		343073	
Number of communities	1189		422		2918	
Number of municipalities	3445		676		26762	

Notes: Sample A: all municipalities that entered a cooperation group after 2007, from 2001 to 2019. Sample B: municipalities with a population greater than 3,500 inhabitants that joined a community after 2002, from 2002 to 2014. Sample C: all municipalities that joined a union before 2003, from 2007 to 2019. All variables in € per capita. Cooperation is a dummy variable equal to one if the municipality joins a community in a given year.

We also supplement these data with current spending data decomposed by function. There are nine functions in the accounting data (see Appendix A for details): general spending, urban policies, culture, economic policies, education, family, housing security, social aid, sports.

Descriptive statistics are shown in Table 2.

First, we note that the main spending category is "general spending" (39.5%), followed by urban policies (19.6%), education (13.5%) and sports (9.23%). General

Table 2: Descriptive statistics on current expenditures by function

	Pooled data		Before coop.		After coop.	
	Mean	s.d.	Mean	s.d.	Mean	s.d.
General spending	39.50	13.41	39.51	14.92	39.50	12.55
Urban policies	19.56	7.46	18.75	7.61	19.98	7.34
Education	5.42	3.27	5.22	3.25	5.53	3.28
Sports	1.65	2.45	1.62	2.94	1.66	2.14
Culture	13.46	5.81	13.88	6.24	13.25	5.56
Family	4.01	3.97	3.87	4.03	4.09	3.93
Security	0.43	0.95	0.51	1.19	0.40	0.78
Social aid	3.83	2.39	4.16	2.55	3.66	2.29
Economic development	2.90	2.86	3.30	3.08	2.69	2.72
Housing	9.23	4.28	9.20	4.34	9.24	4.24

Notes: Functional current spending data in percentage of total current spending. Data represents current spending aggregating municipal and community data. Sample B: municipalities with a population greater than 3,500 inhabitants that entered a group after 2002, from 2002 to 2011.

spending can not be affected to only one of the other 8 functions. Urban policies gather all the "network" systems (like tap water, sewage systems and public transport), as well as garbage collection, and road maintenance. Education refers here to the maintenance of school buildings, extra-curricular activities and non-permanent employees' salaries. Since civil servants in education (teachers and school employees) are paid directly by the state, their salaries do not fall into this account. Finally, sport infrastructure includes expenditure related to stadiums, swimming pools, and other outdoor facilities, and grants for sports and youth clubs.

If we compare non-cooperating to cooperating municipalities, we observe a modest increase in total spending which seems to be driven mainly by urban policies and expenditure on sport, and a slight decrease in spending on security, education, and social policies. In the succeeding sections we provide some more rigorous evidence of these effects.

4 Estimation strategy

Our analysis consists of two steps. The first set of regressions analyse the effect on local budget accounts of joining a cooperation group. The second set of regressions is aimed at distinguishing between the specific effect of mutualising provision of public

goods from the effect of fiscal cooperation.

4.1 Entry into a cooperation group

First, we analyse the effect on local government budgets of entering a cooperation group employing a DiD strategy to compare the evolution of the cooperating municipality and non-cooperating municipality budgets. Since municipalities can enter cooperation groups at different times, we are faced with a staggered adoption setting which might bias traditional two-way fixed effects estimates depending on whether the effect of cooperation is dynamic or is heterogeneous across cohorts.

Several papers provide evidence of the shortcomings related to naive regression approaches in which the differences double if not all units are treated at the same date. Several authors propose alternative estimators which are robust to treatment effect heterogeneity and dynamic treatment effects (Goodman-Bacon, 2021, Sun and Abraham, 2020, de Chaisemartin and D'Haultfœuille, 2020, Borusyak et al., 2022, Dube et al., 2023). We chose to follow Dube et al. (2023) and use their proposed LP-DiD estimator which retrieves variance-weighted average treatment effects under the assumption of parallel trends. In practice, the effect of entry into a cooperation group D_{it} on the evolution of the outcome ℓ years after entry $\Delta_\ell y_{it} \equiv y_{it+\ell} - y_{it-1}$ is identified by estimating the following regression:

$$\Delta_\ell y_{it} = \beta_\ell D_{it} + \gamma_\ell X_{it} + \delta_t + \epsilon^\ell_{it}, \tag{1}$$

where the estimation sample is restricted to units treated at t and units not treated until $t + \ell$. Here, δ_t are year fixed-effects, and X_{it} is a set of control variables. If the controls are excluded, the regression would identify the causal effect of entry into a cooperation group conditional on no selection into treatment based on the dynamics of local budgets. Previous studies show that the structure of state transfers is an important incentive for French municipalities to cooperate (Breuillé et al., 2018, Di Porto et al., 2016), and that the expected costs and benefits of cooperating vary widely between urban and rural municipalities (Tricaud, 2021). Therefore, we control for the dynamics of state transfers in previous years and for rural status, time and year fixed effects.

4.2 Transfer of public services and tax harmonisation

In the second step of our analysis, we focus on already cooperating municipalities and examine the effect of transferring missions to the cooperation group and switching to a SBT regime. Any specific service/responsibility can be transferred from the municipality to the union in any order at any time, and a community can increase its level of integration at any time by changing from an additional tax regime to a SBT regime. These treatments can occur in any order and at any time which results in multiple staggered treatments.

We start by following Schmidheiny and Siegloch (2023) and report two way fixed effects regressions for the local budget variables on mission transfers and tax regimes. This estimator is valid under the assumption of homogeneous and additive treatment effects. As de Chaisemartin and D'Haultfœuille (2023) discuss, violation of either of those assumptions result in estimators that do not recover any meaningful average treatment effect. Therefore, we tested the robustness of our results to using a generalization of the LP-DiD estimator, which allows for unrestricted treatment heterogeneity between cohorts, periods, and previously transferred missions and tax regime switches.

4.2.1 LP-DiD with multiple treatments

We want to distinguish the effect of fiscal competition changes due to a common fiscal basis from the effect of transferring responsibilities to the cooperation group. The main problem related to this estimation arises from the fact that missions can be transferred randomly or not at all, and that intensification of tax integration can also happen at any moment.

There are K treatments, and we note m_i^k the year at which municipality i received treatment $k \in K$ (in our setting, transferred a particular mission or changed its tax regime), with $m_i^k = \infty$ when the mission is never transferred. We denote $M = (m^k)_{k \in K} \in \mathcal{M}$ the vector of treatment years, with $\mathcal{M} = (\{1, ..., T, \infty\})^K$ the set of possible treatment trajectories. Accordingly, let $Y_{it}(M)$ be the potential outcome of municipality i in year t if it were to have followed trajectory $M \in \mathcal{M}$.

In what follows, we will maintain two assumptions about individual potential outcomes: no anticipation and parallel trends. For all treatment k, we will denote $M^{-k} \in \mathcal{M}^{-k}$ the vector $(m^l)_{l \neq k}$ of treatment dates for all treatments except k, and with some abuse of notations we will write $Y_{it}(m^1, ..., m^K) = Y_{it}(m^k, M^{-k})$.

Assumption 1: No anticipation For all $k \in 1, ..., K$, $m^k \in \{1, ..., T, \infty\}$, $M^{-k} \in \mathcal{M}^{-k}$, and $t < m^k$,

$$Y_{it}(m^k, M^{-k}) = Y_{it}(\infty, M^{-k}).$$

Assumption 2: Conditional parallel trends for all k, t, and $M = m^k, M^{-k}$

$$\mathbb{E}[Y_{it}(\infty, M^{-k}) - Y_{i1}(\infty, M^{-k}) \mid M_i = M] = \mathbb{E}[Y_{it}(\infty, M^{-k}) - Y_{i1}(\infty, M^{-k}) \mid M_i^{-k} = M^{-k}].$$

Assumption 2 states if we pick any treatment k, then parallel trends holds when comparing units that followed the same trajectory for the other $K-1$ treatments.

We define the effect of treatment k on municipality i with other treatment dates M^{-k}

$$\tau_{it}^k(m^k, M^{-k}) = Y_{it}(m^k, M^{-k}) - Y_{it}(\infty, M^{-k}),$$

that we aggregate to form cohort-specific conditional average treatment effects on the treated

$$\tau_t^k(m, M^{-k}) = \mathbb{E}[Y_{it}(m, M^{-k}) - Y_{it}(\infty, M^{-k}) \mid m_i = m, M_i^{-k} = M^{-k}],$$

which measures the average effect of transferring treatment k in year m. Note that in general we allow for this treatment effect to depend on the whole vector of treatment dates for the other treatments M^{-k}, so that we are completely agnostic about the nature of interactions between treatments.

For the estimation, we propose a straightforward extension of the LP-DiD estimator of Dube et al. (2023), where the year fixed-effects are replaced with year times trajectory for the other treatments fixed-effects:

$$\Delta_\ell y_{it} = \beta_\ell^k D_{it}^k + \delta_{M^{-k}t} + \epsilon_{it}^{\ell k}. \tag{2}$$

With $\Delta_\ell y_{it} \equiv y_{i,t+\ell} - y_{i,t-1}$, β_ℓ our parameter of interest, D_{it}^k a dummy variable for switching into treatment k in year t. The estimating sample is restricted to the union of the clean control set for observations treated in t at horizon ℓ, denoted $CS_{kt\ell}^0 \equiv \{it \mid m_i^k > t + \ell\}$, and $CS_{kt\ell}^1 \equiv \{it \mid m_i^k = t\}$ the set of observations treated in t. Here, $\delta_{M^{-k}t}$ are fixed-effects for every year-times-entry into other treatments trajectory combination. In general, these $M^{-k} \times t$ fixed-effects partition the population into T^K groups (T possibilities for each of the $K-1$ treatments apart from k, times T possibilities for t). Straightforward application of the FWL theorem shows that the

OLS estimate of β_ℓ^k in equation (2) is

$$\hat{\beta}_\ell^k = \sum_t \sum_{M^{-k}} \frac{N_t(M^{-k}) s_t^1(M^{-k})[1 - s_t^1(M^{-k})]}{\sum_t \sum_{M^{-k}} N_t(M^{-k}) s_t^1(M^{-k})[1 - s_t^1(M^{-k})]} [\Delta_l \bar{y}_t^1(M^{-k}) - \Delta_l \bar{y}_t^0(M^{-k})],$$

where

$$\Delta_\ell \bar{y}_t^1(M^{-k}) \equiv \frac{1}{|CS_{ktl}^1 \cap \{M_i^{-k} = M^{-k}\}|} \sum_{it \in CS_{ktl}^1 \cap \{M_i^{-k} = M^{-k}\}} \Delta_\ell y_{it}$$

is the average outcome difference for units treated in t and receiving the other treatments in years M^{-k} and

$$\Delta_\ell \bar{y}_t^0(M^{-k}) \equiv \frac{1}{|CS_{ktl}^0 \cap \{M_i^{-k} = M^{-k}\}|} \sum_{it \in CS_{ktl}^0 \cap \{M_i^{-k} = M^{-k}\}} \Delta_\ell y_{it}$$

is the average outcome difference for units not treated until $t + \ell$ and receiving the other treatments in years M^{-k} too. Under Assumption 1 and Assumption 2, each double-difference estimates a cohort-specific conditional ATT, i.e. $\mathbb{E}[\Delta_\ell \bar{y}_t^1(M^{-k}) - \Delta_\ell \bar{y}_t^0(M^{-k})] = \tau_{t+\ell}^k(t, M^{-k})$. Thus, $\hat{\beta}_\ell^k$ consistently estimates a variance-weighted average treatment effect on the treated.[5]

Finally for all $M^{-k} = (m^l)_{l \neq k}$, let $M_{t+\ell}^{-k} = (m^l \text{ if } m^l < t + \ell, \infty \text{ otherwise})_{l \neq k}$ be the vector of dates of treatments where all the treatments that happen later than $t + \ell$ are replaced by ∞. Then from the no anticipation assumption $Y_{it+\ell}(t, M^{-k}) = Y_{it+\ell}(t, M_{t+\ell}^{-k})$, so that it is enough to control for $M_{t+\ell}^{-k}$ interacted with year dummies instead of the whole set of interactions between M^{-k} and year dummies, allowing to save a few degrees of freedom.

4.2.2 Identification under treatment additivity

While estimating (2) is attractive for its flexibility, when the number of treatments becomes large relative to the sample size it becomes more and more likely to run into groups for which we have only treated observations, so that we cannot include them in the ATT. It might be especially problematic if treatment effects are highly heterogeneous and the treated units for which we have no counterfactual have responses that are widely different from the rest of the population. If it is not the case, then an attractive assumption to counteract the curse of dimensionality is to assume away this heterogeneity and assume treatment additivity.

[5] If there is no M^{-k} cell with only treated observations, it is always possible as in Dube et al. (2023) to use WLS or regression adjustment to recover an unweighted ATT.

Assumption 3: Treatment additivity $\tau_t^k(m, M^{-k}) = \tau_t^k(m)$ for all m, all k and all M^{-k}.

Assumption 3 is a statement about treatment heterogeneity: while treatment effects might be heterogeneous across years and treatment cohorts, it assumes that the intensity of the effect of treatment k is not related to treatment status regarding the $K-1$ other treatments. We call it an additivity assumption because it implies that for all M, the combined effect of the treatments is the sum of treatment-specific effects:

$$\begin{aligned}
\mathbb{E}[Y_{it}(M) - Y_{it}(\infty) \mid M] &= \mathbb{E}[Y_{it}(m^1, m^2, ..., m^K) - (Y_{it}(\infty, m^2, ..., m^K) \mid M] \\
&+ \mathbb{E}[Y_{it}(\infty, m^2, ..., m^K) - Y_{it}(\infty, \infty, ..., m^K) \mid M] + ... \\
&+ \mathbb{E}[Y_{it}(\infty, \infty, ..., m^K) - Y_{it}(\infty) \mid M] \\
&= \mathbb{E}[\tau_{it}^1(m^1, M^k) + \tau_{it}^2(m^2, \infty, m^3, ..., m^K) + ... + \tau_{it}^K(m^K, \infty) \mid M] \\
&= \sum_{k=1}^{K} \tau_t^k(m^k),
\end{aligned}$$

where the two first equalities always hold, while the last one comes from Assumption 3.

Under this assumption, we can estimate each treatment effect by estimating the standard LP-DiD equation (1) adding to the vector of controls a set of year times treatment time $m^l \times t$ for all the other treatments $l \neq k$ as controls.

5 Results

In this section, we first present the results for the impact of inter-municipal cooperation on the provision of local (municipal and inter-municipal) public goods and then present the results based on functional accounting data. This allows us to investigate the impact of cooperation on the composition of local public spending in more depth. Finally, we discuss the estimations results focusing on the effect of transferring one service/responsibility from the municipal to the inter-municipal level controlling for tax harmonisation. The results of our estimations allow us to disentangle the possible explanations for the changes in local public spending.

5.1 The effect of inter-municipal cooperation on local public good provision

We are interested in the impact of cooperation on total provision of local public services by both the inter-municipal union and the municipalities. We estimate

equation (1) for sample A using Dube et al. (2023) LP-DiD estimator. All variables are log-transformed.

For space reasons, we do not present the results for the impact of cooperation on municipal budgets which confirm the findings in Breuillé et al. (2018) and Charlot et al. (2015).[6] We find a significant reduction in municipal spending and municipal tax revenues when municipalities join a cooperation group.

Figure 1 shows that local spending increases by more than 15 percent in the year of integration. This increase persists and even grows which provides evidence of a long-term effect 6 years after integration.

Result 1: Inter-municipal cooperation leads to a significant and permanent increase in local spending of around 20 percent after year of integration.

In the case of revenues and consistent with Breuillé et al. (2018) and Tricaud (2021), total municipality and cooperation group income increased substantially (see Figure 1) over the period analysed. State transfers rose by more than 15 percent after integration and increased constantly in the subsequent years. On average, per capita tax revenues also increased by 8 percent after entry and remained at this high level.

We show also that the revenue from each local tax (housing tax, property tax, business tax) increases significantly after cooperation with stable long-term effect, except for local business tax revenue which does not rise significantly after three years after integration.

[6] They are available on request.

5.2 The effect of inter-municipal cooperation on the composition of spending

To further investigate the effects of cooperation on local spending provision, we focus on the detailed composition of local spending. To do this, we estimate equation (1) applying the LP-DiD estimator of Dube et al. (2023) on Sample B. This sample includes municipalities with more than 3,500 inhabitants which joined a community after 2002. Recall that local government expenditures are categorized according to nine functions (see appendix A).

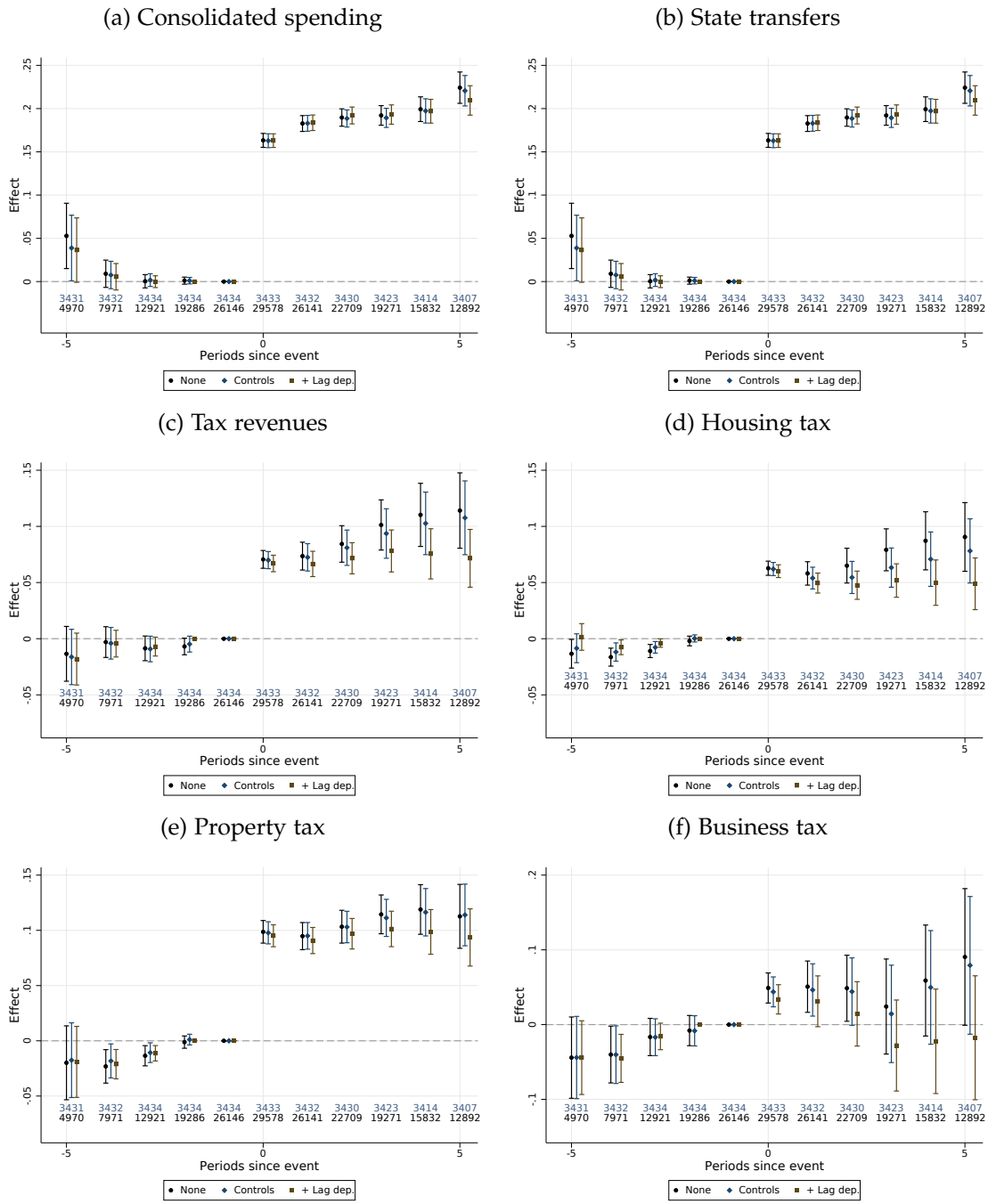
Figure 2 depicts the effect of joining a community on each local spending category measured as a percentage of municipal and inter-municipal spending. The only function where cooperation leads to a significant increase (as a percentage of total spending) is urban policies. This effect persists six years after cooperation and thus is a long term effect. At the same time, we find a significant and permanent decrease in spending on education, sport, and social policies (although in the case of sport and social policies it is weakly significant). For all other functions, the effect is not significant.

Result 2: Inter-municipal cooperation leads to a significant and permanent increase (decrease) in urban (education) policies in the composition of local public spending.

While this result suggests that the increased spending after joining a cooperation group is related to urban policies (e.g. public transport and road maintenance), it does not allow us to draw conclusions about the role played by provision of those particular public services in the overall higher level of spending. For instance, it might be caused by the higher revenues derived from tax harmonisation.

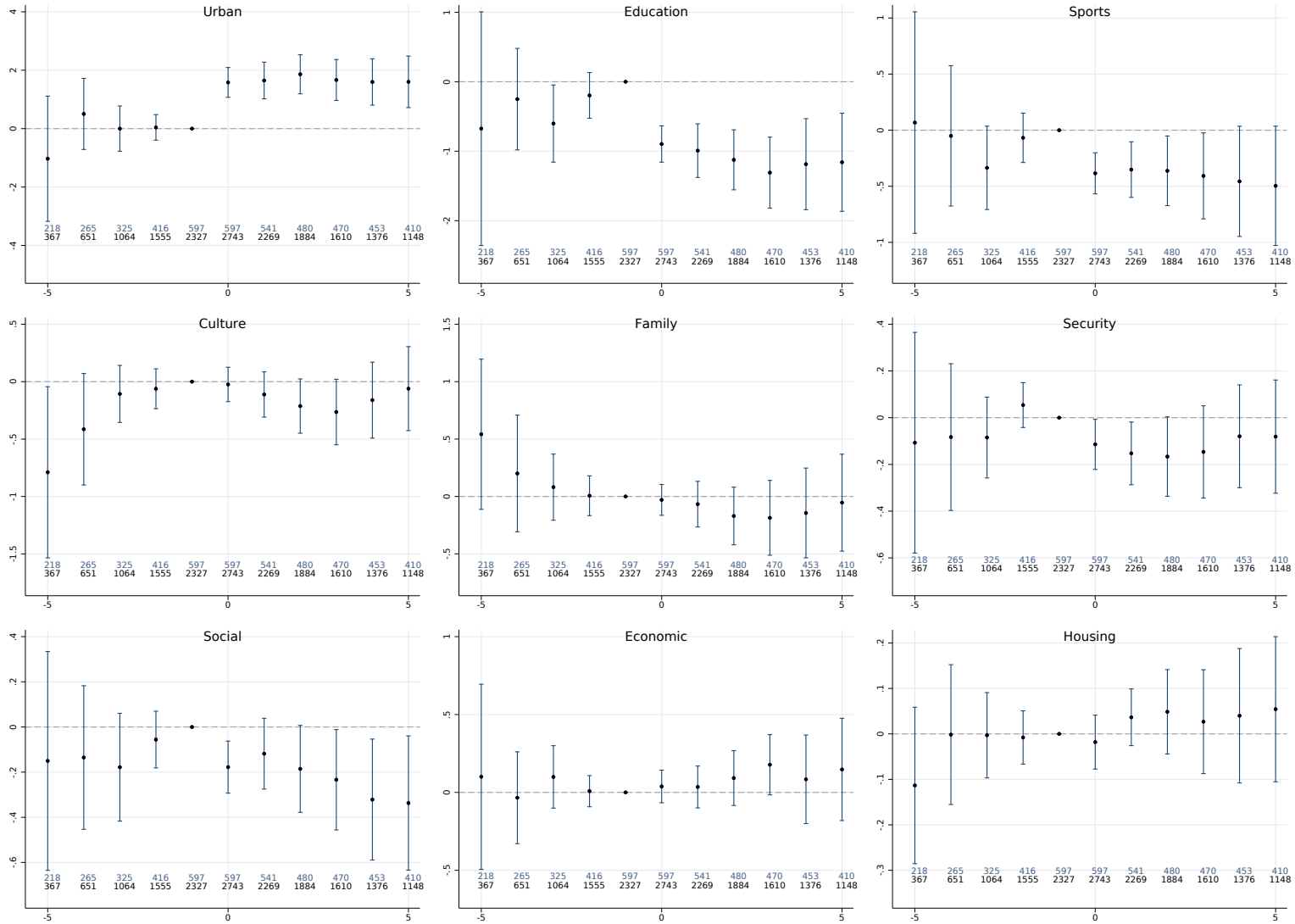
To investigate the effect of particular public services on total expenditures, in section 5.3 we investigate the impact from transferring specific services to the community, conditionally on already belonging to an inter-municipal union.

Figure 1: Effect of cooperation on consolidated local budget



Note: LP-DiD estimates: "None" includes no controls, "Controls" includes controls for the urban/rural status and population, the last one also controls for the lagged values of the dependent variable. Estimations on all municipalities that entered a cooperation group after 2007 (Sample B). Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.

Figure 2: Effect of cooperation on the composition of local spending by function



Note: Each panel reports the evolution of the share of the total (municipal + community) spending allocated to each function. LP-DiD estimations on municipalities with a population greater than 3,500 inhabitants that entered a cooperation group after 2002 (Sample B). Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation.

5.3 The effect of transferring service(s) from the municipal to the inter-municipal level

Here, we more closely investigate local government spending in the context of deeper cooperation based on the transfer of additional services/responsibilities from the municipality to the community. Specifically, we estimate equation (2) for sample C which includes municipalities already cooperating in 2003. We chose to focus on municipalities cooperating before 2003 because we wanted to avoid possible confounding factors that could happen in the early years after a municipality joins a cooperation group. As we saw in the previous section for all of our variables the effect of entry into a cooperation group stabilizes after at most three years.

As already mentioned, we selected the responsibilities/services covering the main French municipality and community missions. Therefore, we focus on public transport, garbage collection and treatment, water supply, social aid, sports and cultural infrastructures, and education. Note that we cannot fully investigate the areas covered by economic policies (e.g. enterprise zones, financial support for business) since most of these responsibilities are transferred automatically to the inter-municipal community if it exists.

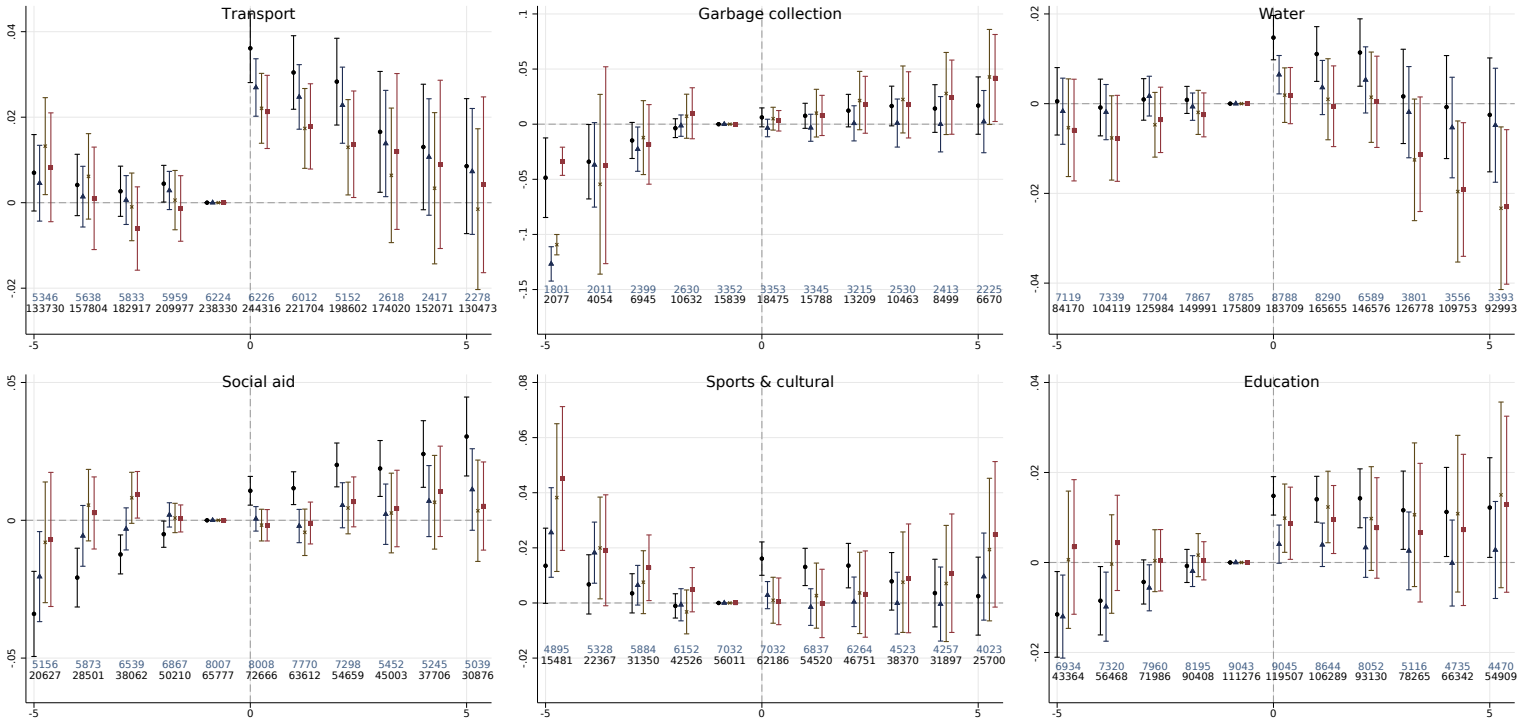
The main problem related to estimating the causal effects of each policy separately is that the transfer of individual responsibilities is not random and might be positively correlated e.g. when municipalities decide to intensify their cooperation, they may vote for the transfer of several local public services at the same time. Therefore, the preferred method is to estimate the effects of each policy jointly, or find a method to control for the other treatment variables when estimating the effect of one particular treatment/service. Another concern is that services transfers coincide with fiscal integration i.e. a change in the community tax regime (from additional to single tax) which also could drive changes in tax revenues and spending.

To try to estimate the effect of the transfer of each specific responsibility net of the other services/responsibility transfers and controlling for fiscal integration, we compute estimates which robust to heterogeneous treatment effects using an extension of Dube et al. (2023) presented in subsection 4.2.

Figure 3 depicts the results.[7]

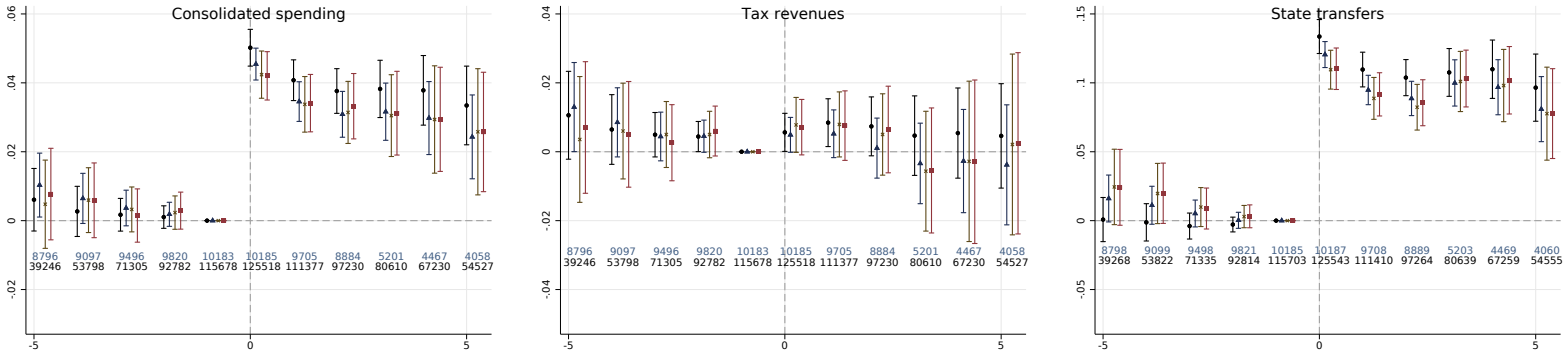
[7] We also run a traditional two-way fixed effects regression that includes all the treatments. Because we already have seven treatment variables we could not add dynamic effects to this specification. Estimation results where we control for the tax regime of the group are shown in Table 4 in Appendix. All missions

Figure 3: Effect of transferring mission on total consolidated spending, controlling for other services



Note: Dynamics of total consolidated spending around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation.

Figure 4: Effect of fiscal integration on total consolidated spending, tax revenues and state grants controlling for missions



Note: Dynamics of total consolidated spending, tax revenues and state grants around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.

When controlling for fiscal integration, the results of our estimation strategy are significant for the transfer of public transport. Therefore, the effects of transfer of public transport on total spending are significantly positive but only for three years. We observe also that transferring the water supply leads to a weakly significant decrease in spending but only five years after the start of cooperation.

Result 3: The increase in local public spending after cooperation can be explained in part by the transfer of public transport from the municipal to the inter-municipal level.

It would be inconsistent for a small municipality to develop its own public transport network since this would cover only that particular territory and longer trips would depend on the level of provision in nearby municipalities and their willingness to coordinate. By transferring this service to a higher level of government serving a larger territory — i.e. the inter-municipal community — municipalities can internalise this externality and benefit from an improved service.

This explanation is consistent with the results in Tricaud (2021) which show that the probability of connection to a transport network increases strongly after joining a community.

This would indicate that increased provision of specific public services in municipalities which were too small to offer otherwise is an important driver of the total increase in public spending and is consistent with a zoo effect (Oates, 1988).

Result 4: Scale economies where they exist are clearly dominated by this zoo effect i.e. the provision of new public services in small and formerly isolated municipalities. This result still holds if we control for intra-community fiscal integration.

Finally, the estimation results for the effect of fiscal integration i.e. the change from an additional to a SBT regime, show a significant and positive impact on total consolidated spending (see 4 in panel A). Controlling for the transfer of missions/services, the increase in spending is around 3 percent following the tax regime change. This rise is due mostly to increased state grants after cooperation (see panel c) and not to tax revenue (panel b) which does not change .

Result 5: Fiscal harmonisation/integration leads to a significant increase in total spending regardless of the transfer of services.

seem to lead to a significant increase in public spending when they are transferred to the community level.

5.4 Additional results for transferring service(s) from the municipal to the inter-municipal level

In this subsection, we examine local government tax revenues in more depth following more intense cooperation based on transfer of an additional mission/service from the municipality to the community. To do this, we estimate equation(2) for sample C which includes municipalities already cooperating in 2003.

We only find a small but significant reduction (2%) in total tax revenues following the transfer of water management (see appendix Figure 5). However, transfer of public transport seems to generate a significant increase in business tax revenue which persists for up to three years after the transfer. The other tax revenues do not seem to have been used to finance the transfer of public transport or any other responsibility from the municipalities to the community (See Figures 6, 7 and 8).

Figure **??** shows that the increase in public spending due to public transit was funded by an increase in state transfers.

Finally, we observe the effect of tax harmonisation on tax revenues, controlling for services. Figure 10 shows that fiscal integration has no impact on total tax revenues but significantly increases business tax revenues and decreases housing tax revenue. Property tax revenues seem not to be influenced by tax harmonisation.

6 Concluding remarks

This paper provides evidence that rather than decreasing total spending based on economies of scale, inter-municipal cooperation leads to a sizable increase in local public spending.

It shows also that this increase is accompanied by a shift of the composition of spending towards urban policies. By their nature, urban services (public transport, network maintenance) tend to generate positive externalities such that the marginal benefits derived from these services increases with the level of provision in neighboring municipalities. When we explored the specific effect of transferring responsibility for some services to the community, with the exception of water supply we found no significant reduction in spending for any of the services considered. Instead, we found significant and large positive effects for the transfer of public transport which can be expected to improve after cooperation due to the more extensive coverage of the transport network.

While we cannot exclude the possibility of scale economies in the provision of some local public goods by inter-municipal communities that would be compensated by an increase in the quantity or quality of the public goods, we find no evidence of any significant reduction in taxes and spending after transferring missions to the cooperation group. Our results support either an absence of scale economies, or the existence of a zoo effect based on provision of new public services for small municipalities.

It is possible also that some of the increased costs related to the provision of some services are due to an improvement in service quality. Although we do not have a reliable indicator of the quality of local public services in France, we would assume that their average quality probably increased after cooperation due to a possibly better alignment with those municipalities that supplied the highest quality public goods before cooperation.

7 Acknowledgements

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References

Allers, M. A. and de Greef, J. A. (2018). Intermunicipal cooperation, public spending and service levels. *Local Government Studies*, 44(1):127–150.

Baskaran, T., Feld, L. P., and Schnellenbach, J. (2016). Fiscal federalism, decentralization, and economic growth: A meta-analysis. *Economic Inquiry*, 54(3):1445–1463.

Bel, G., Fageda, X., and Mur, M. (2012). Does Cooperation Reduce Service Delivery Costs? Evidence from Residential Solid Waste Services. *Journal of Public Administration Research and Theory*, 24(1):85–107.

Bel, G. and Sebö, M. (2021). Does Inter-Municipal Cooperation Really Reduce Delivery Costs? An Empirical Evaluation of the Role of Scale Economies, Transaction Costs, and Governance Arrangements. *Urban Affairs Review*, 57(1):153–188.

Blom-Hansen, J., Houlberg, K., Serritzlew, S., and Treisman, D. (2016). Jurisdiction size and local government policy expenditure: Assessing the effect of municipal amalgamation. *American Political Science Review*, 110(4):812–831.

Borusyak, K., Jaravel, X., and Spiess, J. (2022). Revisiting event study designs: Robust and efficient estimation.

Breuillé, M. L., Duran-Vigneron, P., and Samson, A. L. (2018). Inter-municipal cooperation and local taxation. *Journal of Urban Economics*, 107:47–64.

Charlot, S., Paty, S., and Piguet, V. (2015). Does Fiscal Cooperation Increase Local Tax Rates in Urban Areas? *Regional Studies*, 49(10):1706–1721.

Cobban, T. W. (2019). Bigger Is Better: Reducing the Cost of Local Administration by Increasing Jurisdiction Size in Ontario, Canada, 1995–2010. *Urban Affairs Review*, 55(2):462–500.

de Chaisemartin, C. and D'Haultfœuille, X. (2020). Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects. *American Economic Review*, 110(9):2964–2996.

de Chaisemartin, C. and D'Haultfœuille, X. (2023). Two-way fixed effects regressions with several treatments.

Di Porto, E., Parenti, A., Paty, S., and Abidi, Z. (2016). Local government cooperation at work: a control function approach. *Journal of Economic Geography*, 17(2):435–463.

Dube, A., Girardi, D., Jordà, Ò., and Taylor, A. (2023). A local projections approach to difference-in-differences event studies. Technical report.

Ferraresi, M., Migali, G., and Rizzo, L. (2018). Does intermunicipal cooperation promote efficiency gains? Evidence from Italian municipal unions. *Journal of Regional Science*, 58(5):1017–1044.

Frère, Q., Leprince, M., and Paty, S. (2014). The Impact of Intermunicipal Cooperation on Local Public Spending. *Urban Studies*, 51(8):1741–1760.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2):254–277.

Luca, D. and Modrego, F. (2021). Stronger together? Assessing the causal effect of inter-municipal cooperation on the efficiency of small Italian municipalities. *Journal of Regional Science*, 61(1):261–293.

Oates, W. E. (1988). On the measurement of congestion in the provision of local public goods. *Journal of Urban Economics*, 24(1):85–94.

OFGL (2010). Les finances des collectivités locales en 2010. Technical report.

Reingewertz, Y. (2012). Do municipal amalgamations work? Evidence from municipalities in Israel. *Journal of Urban Economics*, 72(2-3):240–251.

Schmidheiny, K. and Siegloch, S. (2023). On event studies and distributed-lags in two-way fixed effects models: Identification, equivalence, and generalization. *Journal of Applied Econometrics*.

Sun, L. and Abraham, S. (2020). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2):175–199.

Tricaud, C. (2021). Better alone? Evidence on the costs of intermunicipal cooperation.

Uusitalo, R. and Moisio, A. (2013). The impact of municipal mergers on local public expenditures in finland. *Public Finance and Management*, 13(3).

A Categories of local public services based on functional accounting data, DGFIP

0. General spending: IT, administrative and support services, cemeteries, and in general all expenses that cannot be filed elsewhere;

1. Security: Police, firefighters and prevention programs;

2. Education: Schools and associated extracurricular activities and services (sports, health, school canteens, accommodations and boarding and school buses);[8]

3. Culture: public libraries, theaters and museums, as well as financial support to cinemas, galleries, festivals, professional artists and amateur clubs;

4. Sports: swimming pools, stadiums and other infrastructures for sports and outdoors activities, as well as youth clubs and day care centers (excluding preschools);

5. Social aid: mainly social policies such as foster cares, relief programs and professional insertion programs, as well as centers and infrastructures for the disabled. This category can also include a small share of health infrastructures such as dispensaries, maternity wards and abortion centers, but public hospitals and emergency rooms are financed by higher levels of government and the public health insurance system;[9]

6. Family: services for senior citizens (from nursing homes to senior citizen's clubs), family discounts of municipal services, and daycare centers and preschools.

7. Housing: aids to social housing organizations and construction companies;

8. Urban policies: tap water and sewage system, garbage collection, cleaning services, public transit, road maintenance, public parks, urban renewal and forestry and river management as well as environmental conservation policies;

[8] It should be noted that in France, teachers and school employees are paid directly by the ministry of education, and that municipalities only manage primary schools. They mainly finance building renovations, extra-curricular activities and non-permanent employees. Higher levels of education are managed either by the county, the region or the state, although municipalities might co-finance some extra-curricular activities and services.

[9] For instance in 2008 10% of this category came from health services at the municipal level and 3% at the group level, while the remaining were social services (OFGL, 2010).

9. Economic policies: open markets and business assistance.

B Additional results

Table 3: Correlation between transfer treatment variables

	PT	GC	W	SC	ED	SA	EP
Transport	1						
Garbage collection	0.0570***	1					
Water	0.200***	0.0538***	1				
Sports & cultural	0.115***	0.126***	0.121***	1			
Education	0.134***	0.0990***	0.120***	0.164***	1		
Social aid	0.0993***	0.0824***	0.0847***	0.149***	0.168***	1	
switch_tpu	0.176***	0.0480***	0.116***	0.129***	0.0945***	0.0874***	1

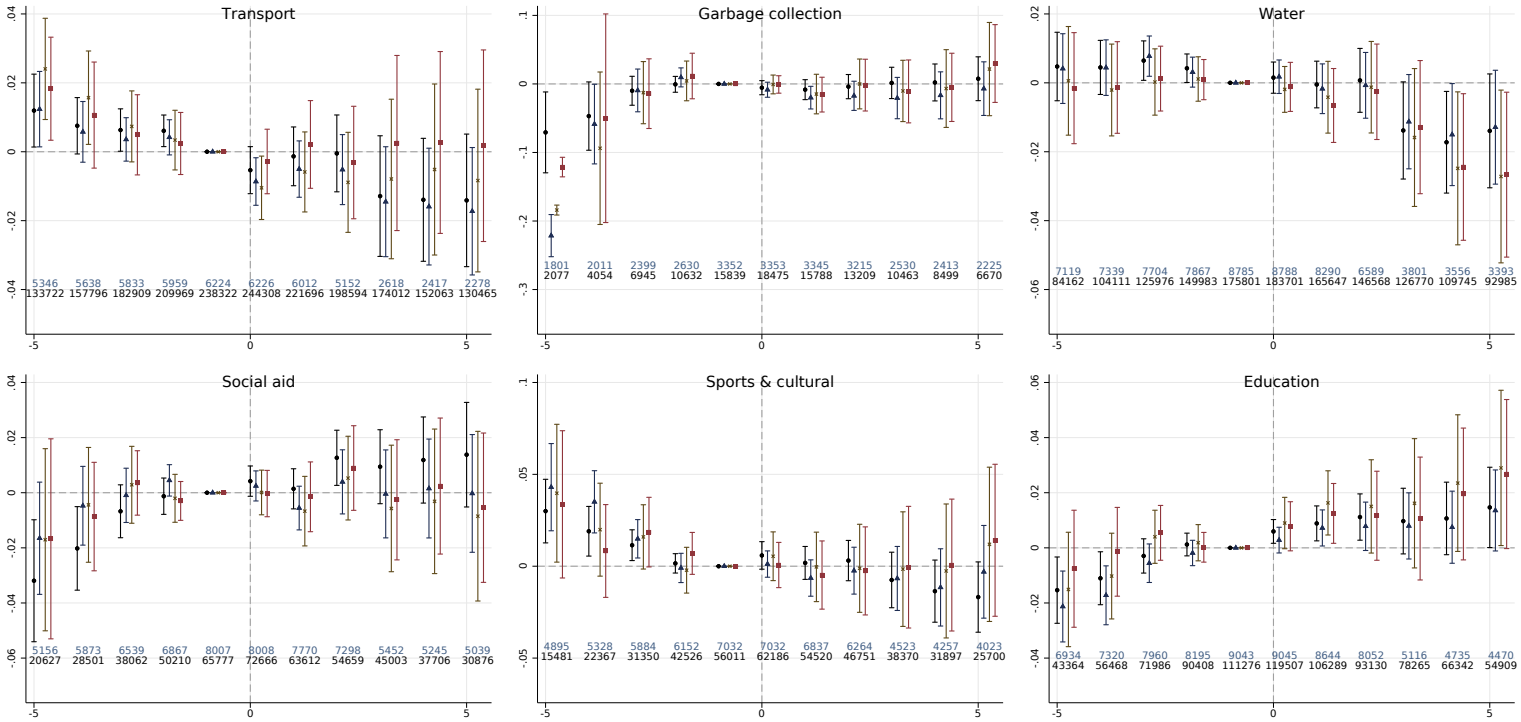
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: TWFE regressions of the impact of mission transfer on total spending and budget components

	Total	Taxes	Transfers	HT	PT	BT
Transport	0.0237***	-0.00241	0.0833***	-0.00979	0.0111	0.0389***
	(0.00410)	(0.00509)	(0.00804)	(0.00589)	(0.00954)	(0.00879)
Garbage	0.0147**	0.00445	0.0318***	0.0122	0.00980	-0.0127
	(0.00465)	(0.00600)	(0.00767)	(0.00921)	(0.00836)	(0.0118)
Water	0.00690*	0.0000978	0.0306***	0.000500	0.00945	0.0100
	(0.00293)	(0.00391)	(0.00561)	(0.00473)	(0.00677)	(0.00751)
Culture & sports	0.0114**	0.00766	0.0234***	0.00367	0.0138	0.0264**
	(0.00358)	(0.00482)	(0.00569)	(0.00517)	(0.00951)	(0.00930)
Education	0.0105***	0.0108**	0.00995	0.0138**	0.0114	-0.00312
	(0.00287)	(0.00374)	(0.00542)	(0.00481)	(0.00607)	(0.00728)
Social aid	0.0136***	0.0155***	0.0157**	0.00131	0.0209***	0.00170
	(0.00311)	(0.00419)	(0.00551)	(0.00528)	(0.00622)	(0.00849)
Fiscal	0.0497***	0.0104**	0.126***	-0.0118*	0.00156	0.0267***
	(0.00287)	(0.00381)	(0.00519)	(0.00468)	(0.00666)	(0.00708)
Observations	412234	412216	412351	411445	411399	355860

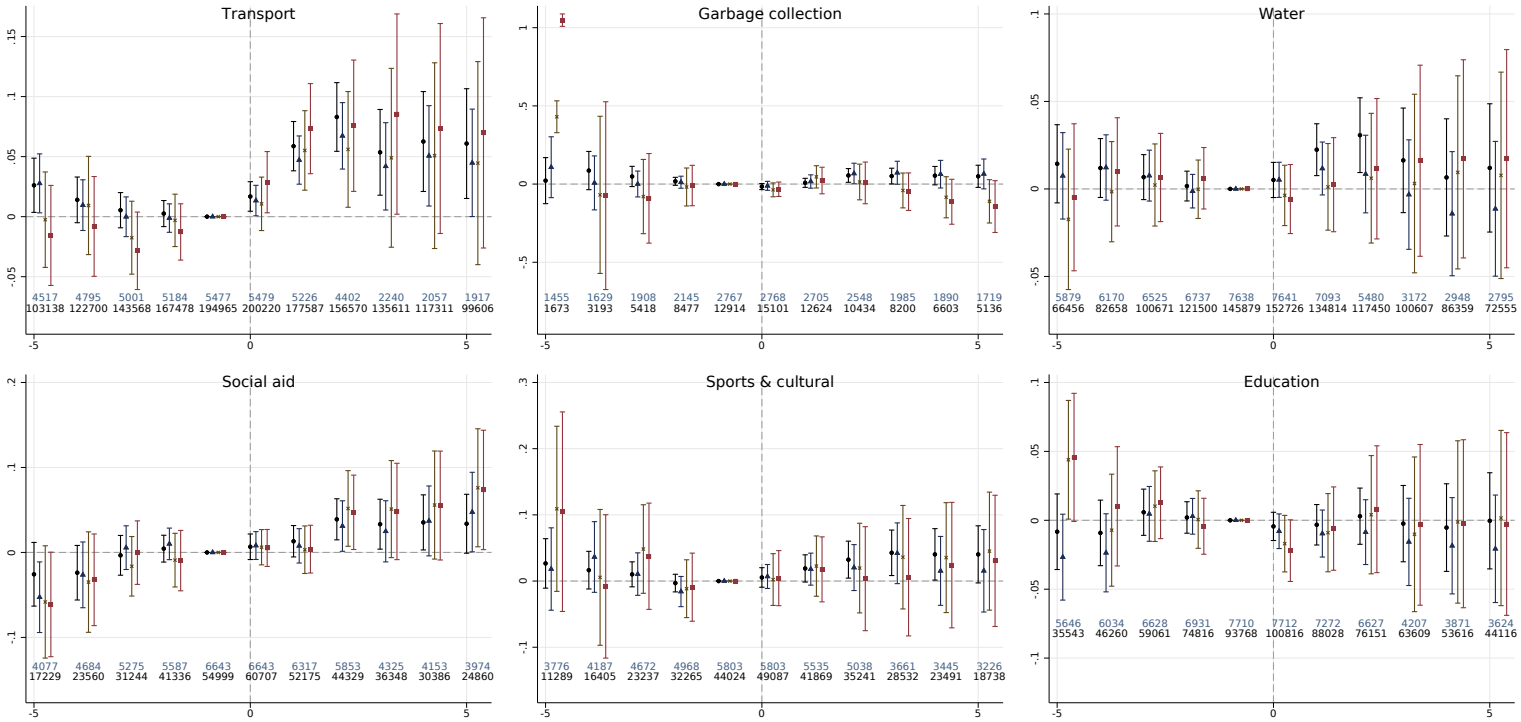
Note: Standard errors in parenthesis. Standard errors clustered at the cooperation group level. * $p < 0.05$, ** $p < 0.01$, ** $p < 0.001$. Estimations on Sample D. All regressions include year and municipal fixed-effects and control for urban/rural status. HT = housing tax, PT = property tax, BT = business tax.

Figure 5: Effect of transferring services on total tax revenues, controlling for other services



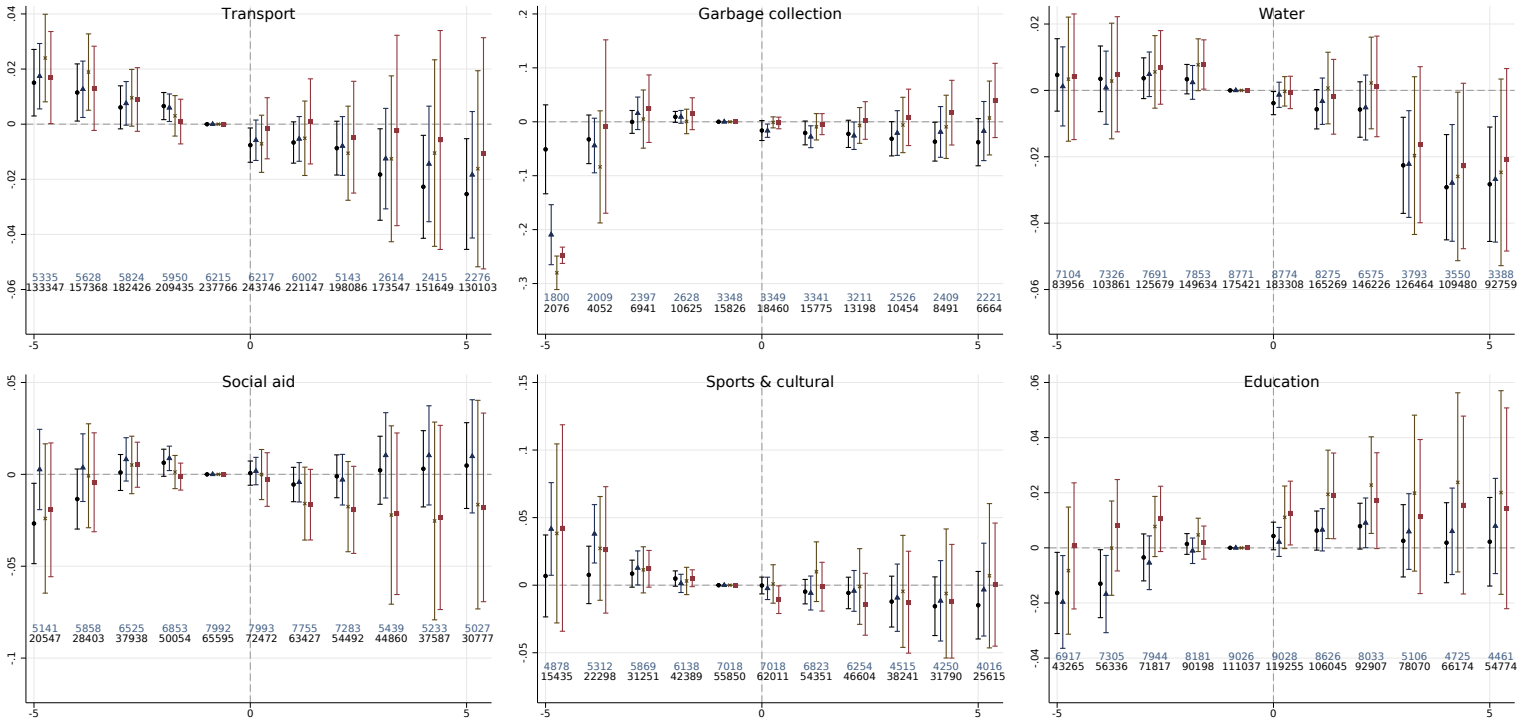
Note: Dynamics of total tax revenues around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.

Figure 6: Effect of transferring services on business tax revenues, controlling for other services



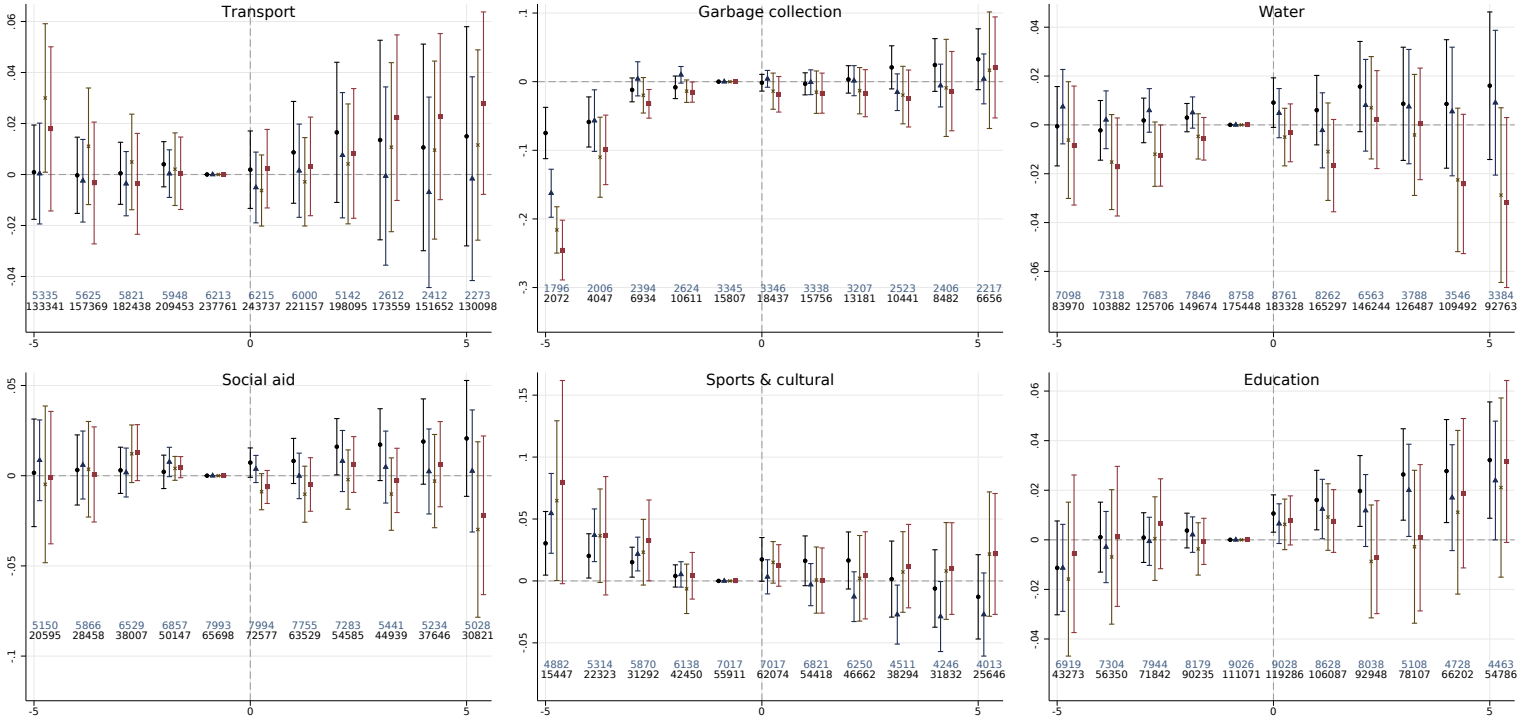
Note: Dynamics of total tax revenues around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level

Figure 7: Effect of transferring services on housing tax revenues, controlling for other services



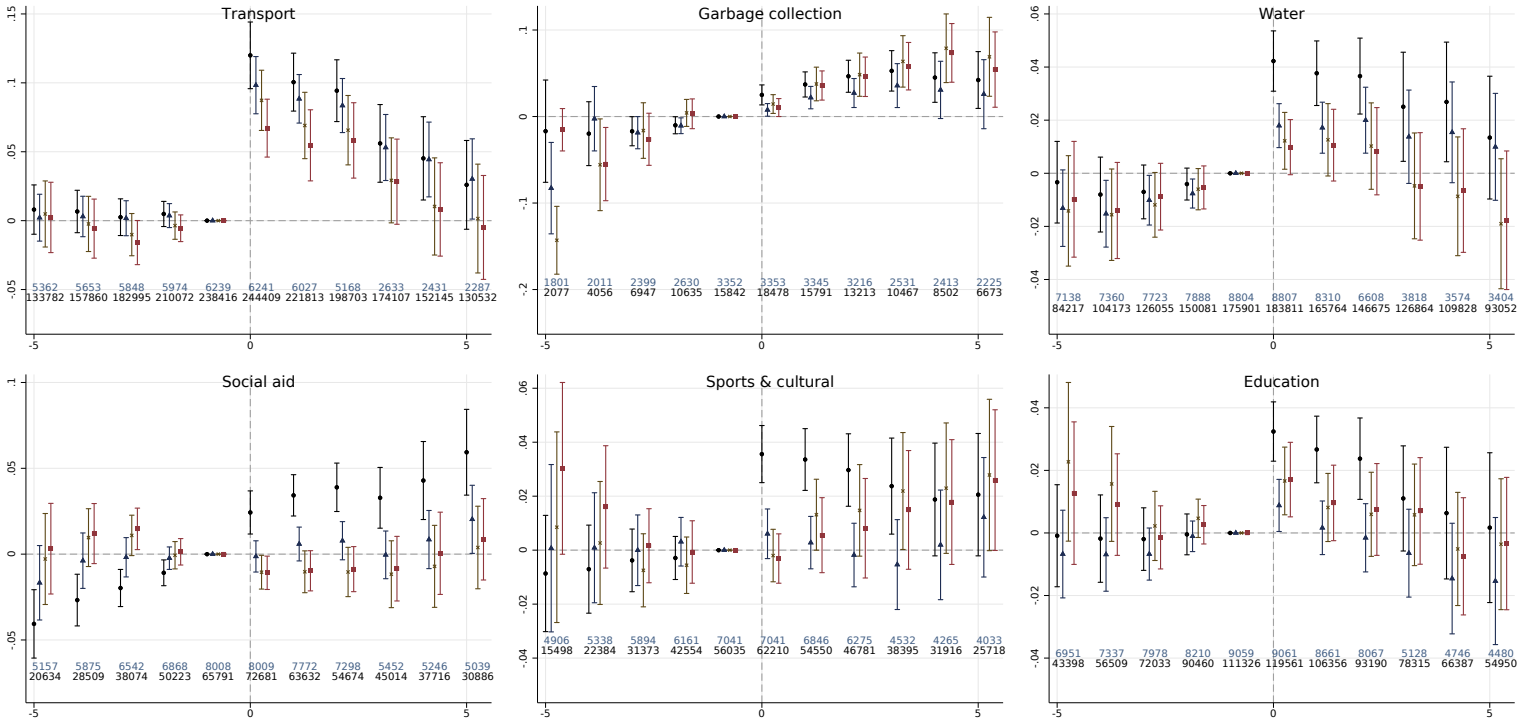
Note: Dynamics of total tax revenues around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.

Figure 8: Effect of transferring services on property tax revenues, controlling for other services



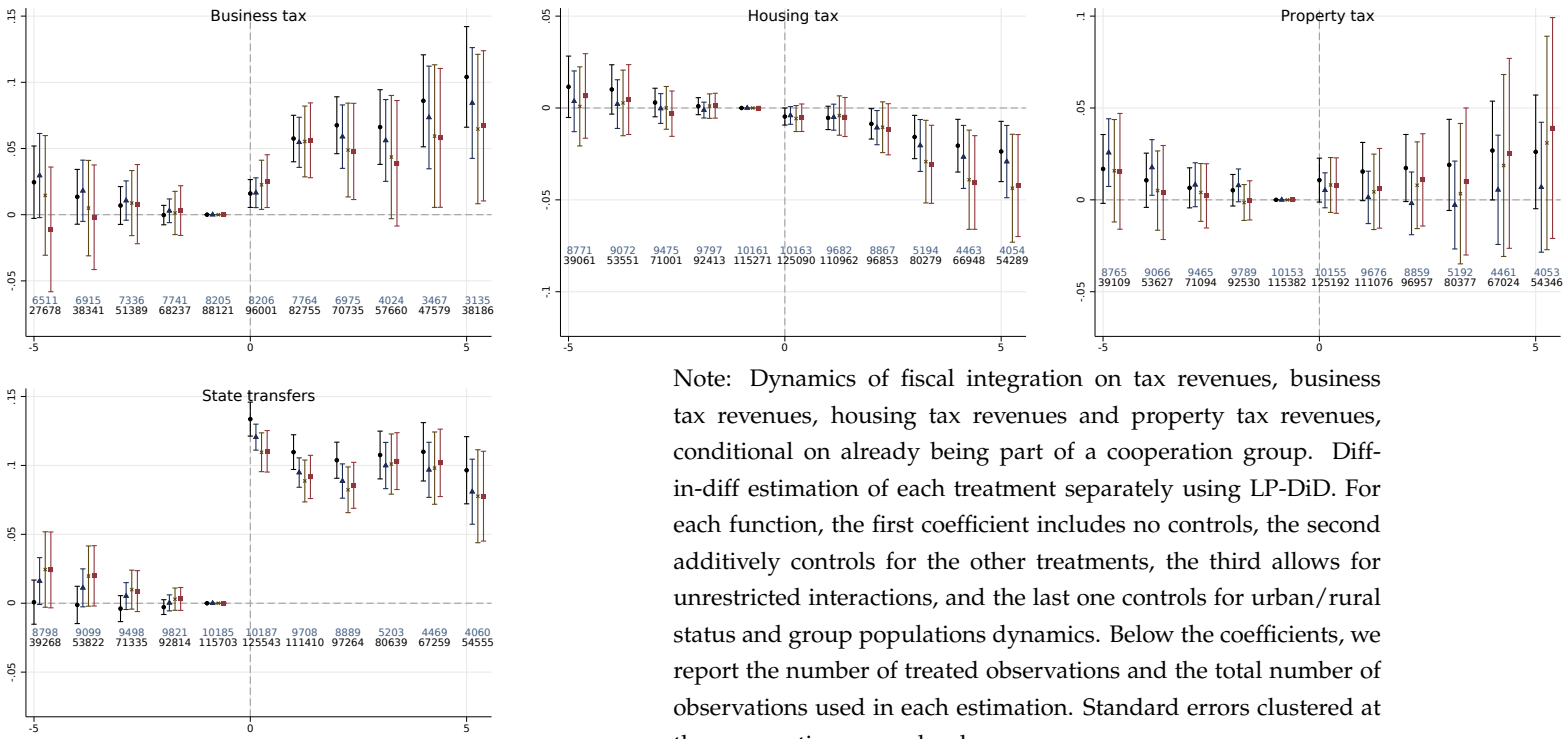
Note: Dynamics of total tax revenues around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the othr treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.

Figure 9: Effect of transferring services on state transfers, controlling for other services



Note: Dynamics of transfers from the central government around status change, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.

Figure 10: Effect of tax harmonisation on tax revenues, business tax revenues, housing tax revenues and property tax revenues, controlling for other services



Note: Dynamics of fiscal integration on tax revenues, business tax revenues, housing tax revenues and property tax revenues, conditional on already being part of a cooperation group. Diff-in-diff estimation of each treatment separately using LP-DiD. For each function, the first coefficient includes no controls, the second additively controls for the other treatments, the third allows for unrestricted interactions, and the last one controls for urban/rural status and group populations dynamics. Below the coefficients, we report the number of treated observations and the total number of observations used in each estimation. Standard errors clustered at the cooperation group level.