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in French Wastewater Services »**

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One Authority, Many Tariffs

Contractual Lock-in and the Speed of Harmonisation
in French Wastewater Services

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Abstract

Mandated consolidation of local utilities transfers tariff-setting authority to a larger jurisdiction, which is then expected to charge a single price. We show that it does not, and we identify what stands in the way. Using the universe of French wastewater services over 2008–2024, we follow 1,937 municipal services through the transfer of their competence to an intermunicipal body and measure how fast the receiving authority harmonises the tariffs it inherits. Convergence is real but slow: a service whose tariff exceeded the average of its new perimeter by one euro per cubic metre closes twenty-nine per cent of that gap on average and half of it after five years, with no plateau in sight. Consolidated authorities do not merge the services they take over: the number of separate tariff perimeters per authority is unchanged five years on. The binding constraint appears contractual rather than political: comparing each delegated service with itself, convergence runs at fifteen per cent while its concession is still in force and at thirty-eight per cent once it has expired. Harmonisation, when it comes, falls on the smallest members of the new perimeter, whose tariffs rise by up to a quarter. Creating a single tariff-setting authority does not create a single tariff, and the speed at which one emerges is governed by the maturities of contracts signed before the reform.

Keywords: Wastewater services, Water tariffs, Intermunicipal cooperation, Uniform pricing, Cross-subsidies, Concession contracts

JEL classification: L95, L51, H77, Q25

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1 Introduction

In most jurisdictions, the pricing of water and sanitation services proceeds without an independent regulator. No sectoral authority imposes a cost-reflective tariff, and no price cap constrains it; the tariff is set, service by service, by several thousand local governments, each subject to a balanced-budget requirement but to no external control of the price it charges. Reform of such a system, when it comes, seldom takes the form of regulation. It takes the form of consolidation: services are grouped into larger perimeters, and the authority to set the tariff is moved to a higher tier of government. Italy and Portugal have pursued this path over the past two decades, France is pursuing it now, and England and Wales did so forty years ago. Underlying each of these reforms is a premise that is rarely stated and never tested, namely that vesting a single authority with pricing power over an enlarged territory will, in due course, produce a single tariff over that territory. This paper subjects the premise to a direct empirical test. We find that it does not hold, or holds only after a transition long enough to alter the terms on which the reform should be assessed.

Three features of the French institutional setting account for the wedge between a single tariff-setting authority and a single tariff. First, administrative law permits one local government to operate several distinct services, and hence to maintain several distinct tariffs, since the principle of equal treatment before the public service binds within a service rather than across a jurisdiction. Second, tariff harmonisation, where an authority undertakes it, is characteristically phased in over successive budgetary exercises rather than imposed at a stroke. Third, and most consequentially, delegation contracts survive the transfer of competence: the receiving intermunicipal body is substituted by operation of law into the rights and obligations of the transferring municipality, and the tariff of the delegated perimeter remains governed by the contract until its term. The latter two features are what dissociate price from cost. An enlarged authority may unify tariffs for reasons of governance, as the equal-treatment principle eventually requires, well before and independently of any efficiency gain that consolidation might yield, with the consequence that a single price redistributes across member municipalities even where the total cost of the service is unchanged. Whether tariffs converge, at what speed, and subject to what constraint, is therefore a question that the law leaves open and that only evidence can settle.

The reform we exploit is the *loi NOTRe* of 2015, which mandated the transfer of the wastewater competence from municipalities to intermunicipal bodies. The transfers were not simultaneous. Statutory deadlines fell in 2018 and 2020, a blocking minority allowed a fraction of municipalities to defer, and the obligation was ultimately repealed in April 2025. This uneven implementation generates a staggered rollout across close to two thousand services, and it furnishes the treatment variation on which our identification rests.

Our evidence is drawn from a panel of 20,224 wastewater management entities observed annually between 2008 and 2024 in the national reporting system. The empirical strategy turns on a property of these records that is more often an inconvenience than an asset. The identifier of a management entity is preserved through the transfer of its organising authority, so that the same operational unit can be followed before and after the transfer without recourse to any external concordance between municipalities and authorities. We measure the speed of convergence by comparing, within a given receiving perimeter, services transferred to the

same authority in the same year but entering it from different initial tariffs. This comparison dispenses with a never-treated counterfactual altogether, and it proves markedly more robust than the average level effect on which the existing literature has concentrated.

Four findings emerge. A French intermunicipal authority operates, on average, ten distinct wastewater tariffs, and this figure does not decline in the five years following its acquisition of the competence. Convergence towards the population-weighted average tariff of the perimeter is genuine but slow: the convergence coefficient is -0.29 on average and -0.52 at a five-year horizon, with no plateau in sight, so that half of the initial gap between a service and its new perimeter persists half a decade after the transfer. The constraint that governs this pace is contractual rather than political. Among delegated services, convergence attains only -0.15 while the concession remains in force and -0.38 once it has expired. The incidence of harmonisation, finally, is decreasing in the size of the service: units serving fewer than 500 inhabitants experience a tariff increase of 12.6 per cent on average, and of 24 per cent four years after the transfer.

The paper contributes to three literatures. The first, on intermunicipal cooperation and municipal amalgamation, estimates average effects on aggregate expenditure (Bel and Warner, 2015; Blom-Hansen et al., 2016; Allers and Geertsema, 2016; Guelmamen et al., 2025). An aggregate outcome cannot, by construction, reveal the distribution of effects within the merged entity, in which a null mean is fully consistent with large transfers of opposite sign; we recover that internal distribution. The second, on uniform pricing and cross-subsidisation in network industries (Cremer et al., 2001; Laffont and Tirole, 2000), formalises the implicit transfer that a single tariff imposes upon a territory of heterogeneous cost, but does so for a uniform tariff already in place; we observe the period over which that tariff is constructed, which permits us to date the transfer as well as to size it. The third, on the contractual governance of water services (Chong et al., 2006, 2015; Mayol and Saussier, 2021), examines the choice between direct management and delegation, and the terms obtained when a contract is renewed, but not what a running contract prevents a newly constituted authority from doing before it expires. It is on this last point that our contribution rests: the inherited contract, rather than the authority's own preferences, is the binding constraint upon its tariff policy.

Our choice of wastewater in preference to drinking water, on which the French empirical literature is almost exclusively concentrated, is dictated by the mechanism at issue and not merely by data availability. The quality of a wastewater discharge is unobservable to the user, so that the demand-side yardstick competition that disciplines drinking-water tariffs cannot be expected to operate with the same force. Economies of scale at the treatment stage are more pronounced than in distribution. And the initial dispersion of tariffs is wider, which magnifies the stakes of harmonisation and renders its speed a quantity worth estimating rather than a matter of detail.

The remainder of the paper is organised as follows. Section 2 sets out the French institutional background, and in particular the two features that render the question of interest live: the lawful coexistence of several tariffs under a single authority, and the survival of delegation contracts across the transfer of competence. Section 3 situates the paper within the three literatures identified above and states the hypotheses. Section 4 describes the data and the

construction of the matched panel; Section 5 develops the convergence and contractual specifications; Section 6 reports the results and Section 7 their robustness. Section 8 draws out the implications for the design of consolidation reforms, and Section 9 concludes.

2 Institutional background

2.1 Who sets the tariff

Wastewater services in France are organised by approximately 8,400 local authorities, each of which sets the price of the service it operates by deliberation of its assembly. No sectoral regulator reviews that price, and nothing comparable to the ex ante cap of the England and Wales regime applies. Oversight is exercised only ex post, through three channels: the regional financial courts audit the accounts of the service, the basin water agencies make their subsidies conditional upon technical and financial performance, and the environmental services enforce the discharge standards to which each treatment facility is subject.

The operative constraint on the tariff is thus budgetary rather than regulatory. The service is administered through an ancillary budget required to balance on its own resources, so that user charges must cover the full cost of the service and the general budget of the authority may not, as a matter of principle, subsidise it (Article L.2224-1 CGCT). The configuration is an uncommon one: the price of a local natural monopoly is set locally and left uncapped, yet subordinated to an obligation of cost recovery. That obligation binds at the level of the individual service, which is precisely why consolidation alters the base over which costs must be recovered without relaxing the requirement that they be recovered in full.

2.2 Direct management and delegation

An authority may operate its wastewater service directly, through a public undertaking of its own (*régie*), or delegate its operation to a private firm under a concession or comparable contract (*délégation de service public*). Delegated services account for 24.4 per cent of units but 38.4 per cent of the population served, the discrepancy reflecting the concentration of delegation among the larger services. The delegation contract stipulates the share of the tariff accruing to the operator, the formula by which that share is indexed, and the duration of the arrangement, which in wastewater customarily extends from eight to fifteen years.

One feature of this arrangement is central to the argument that follows. The transfer of competence does not extinguish the running contracts. The receiving intermunicipal body is substituted by operation of law into the rights and obligations of the transferring municipality, and each contract continues, on its existing perimeter and at its existing tariff, until its own term.¹ On the day the competence changes hands, accordingly, the receiving authority does not acquire the power to set a single tariff across its perimeter. It acquires that power only in increments, as the contracts it has inherited reach maturity, and it is this staggered release of pricing discretion whose empirical footprint the paper identifies.

¹The substitution follows from the rules governing the transfer of competences between municipalities and their groupings; see Article L.5211-5 III CGCT, and Article L.5211-17 where the transfer proceeds by extension of competences.

2.3 One authority, several tariffs

The principle of equal treatment before the public service prescribes a single tariff within a given service, not a single tariff across a given authority. The distinction is consequential. An authority may lawfully operate several distinct wastewater services in parallel, each with its own perimeter and its own tariff, provided the users of any one service are treated alike. Differentiated tariffs across the services of a single authority are therefore not an irregularity to be remedied but a permissible and potentially enduring state of affairs, and it is this that permits several tariffs to coexist under one authority for years after the underlying authorities have merged. A related budgetary provision bears on the same terrain and merits notice here. Article L.2224-2 CGCT prohibits an authority from meeting the operating costs of an industrial and commercial public service out of its general budget, while exempting municipalities of fewer than 3,000 inhabitants and groupings none of whose members exceeds that threshold; a small municipality availing itself of the exemption would forfeit it upon joining a grouping that contains a larger member, and would then be obliged to raise its tariff to full cost recovery irrespective of the tariffs of its new peers. This furnishes a size-related account of the incidence documented below that is distinct from convergence, and one that the data do not, in the event, support (Section 7.4). What is material at this stage is only that differentiated tariffs within a single authority are both lawful and durable, which is what makes the paper’s question, namely how rapidly such tariffs in fact converge, an open one rather than one the law has already resolved.

2.4 The 2015 reform and its reversal

The *loi NOTRe* of 7 August 2015 required the wastewater competence to be transferred to the intermunicipal level, with effect initially set for 2020. The obligation was subsequently attenuated on more than one occasion. A law of 2018 introduced a blocking minority, whereby a quarter of the member municipalities, representing a fifth of the population, could defer the transfer to 2026; the *loi Engagement et proximité* of 2019 and the *loi 3DS* of 2022 further adjusted its terms; and the Act of 11 April 2025 abolished the obligation altogether, leaving the transfer to the discretion of each grouping. The timing of transfers is in consequence dispersed across authorities and years, which supplies the variation the empirical analysis exploits. The repeal carries a further advantage for identification: municipalities still organising their own service at the close of the period are unlikely to transfer thereafter, so that the never-treated group is genuinely stable rather than merely right-censored. The parliamentary debate preceding the 2025 repeal turned in large part on the apprehension that the transfer would raise tariffs in small rural municipalities, and it is that apprehension to which the paper supplies the first causal evaluation.

3 Related literature

The paper stands at the intersection of three literatures: the consolidation of local utilities, uniform pricing under heterogeneous cost, and the contractual governance of water services. None of them addresses the question posed here, which concerns what determines the speed

at which a newly consolidated authority equalises the tariffs it inherits, as opposed to whether consolidation shifts the average tariff or the average cost. We consider each in turn.

3.1 Consolidation of local utilities

The literature on intermunicipal cooperation and municipal amalgamation takes scale economies as its point of departure and returns effects that fall consistently short of that expectation, modest on average and heterogeneous across services and countries. The meta-analysis of [Bel and Warner \(2015\)](#) records this pattern across a large body of studies. The individual reform evaluations reinforce it: [Blom-Hansen et al. \(2016\)](#), exploiting the 2007 Danish amalgamations, and [Allers and Geertsema \(2016\)](#), examining the Dutch mergers, find no reliable reduction in local expenditure, and [Blesse and Baskaran \(2016\)](#) reach only qualified conclusions for Germany. On the French case, [Tricaud \(2025\)](#) analyses the incentives that govern which municipalities join a grouping and which stay out, while [Guelmamen et al. \(2025\)](#), the closest precedent to the present study, examine intermunicipal cooperation in French drinking-water services.

These contributions share a feature that circumscribes what they can detect. Their dependent variable is, almost without exception, an aggregate defined at the level of the merged entity, whether total expenditure, average cost or a representative price. Yet consolidation is, by its very construction, a redistributive operation among the municipalities it brings together: it raises the burden borne by some members and lowers that borne by others. An effect estimated on the aggregate averages over these movements and so is silent on their existence, and a mean of zero is entirely compatible with transfers of considerable magnitude running in opposite directions within the perimeter. Identifying such transfers requires that the unit of observation be the individual member service rather than the entity into which it has been absorbed, which is the level at which the analysis of [Section 6.2](#) is conducted.

3.2 Uniform pricing and cross-subsidisation

The second literature addresses the classical problem of a uniform price levied over a territory of unequal cost, under which low-cost areas implicitly subsidise high-cost ones. The universal-service literature on network industries has formalised this mechanism and its consequences for efficiency and for the financing of the subsidy ([Cremer et al., 2001](#); [Laffont and Tirole, 2000](#)). The French principle of equal treatment before the public service constitutes the local analogue, mandating a single tariff across the perimeter of a given service, and thereby transposing the universal-service problem to the intermunicipal scale once tariff-setting authority is consolidated.

These contributions, however, analyse cross-subsidisation for a uniform tariff that is already an established feature of the territory, typically the operating zones of a national or regional operator. They do not observe the interval over which such a tariff is first assembled, following a redrawing of the perimeter over which it must apply. It is precisely that interval that we observe, which permits us to report not only the eventual magnitude of the implicit transfer but the time it requires to materialise.

3.3 Contracts as a constraint on tariff policy

The third literature concerns the contractual governance of water services. It has approached the contract from two angles, neither of which is ours. The first treats the mode of governance as an object of choice and asks what price that choice produces: the decision between direct management and delegation, and its consequences for the level of the tariff, is the subject of [Chong et al. \(2006\)](#) and, for the French case, [Guelmamen \(2025\)](#). The second turns to what is at stake at the moment a contract is renewed. [Chong et al. \(2015\)](#) show how the size of the municipality and its bargaining power shape the price it secures at the renewal of a franchise, and [Mayol and Saussier \(2021\)](#) document the pattern of renewals and reversions to direct management in French water. In each case the contract is an instrument the authority selects or renegotiates, and the analysis is trained on the terms it obtains.

What none of this work considers is what a contract already in force prevents a different, newly constituted authority from doing before that contract expires. A concession concluded by a municipality is not reopened when the municipality relinquishes its competence: the receiving body is substituted into it by operation of law and assumes its term together with its tariff. The contract thus ceases, for the duration that remains, to be an instrument of policy and becomes a rigidity that the new authority did not choose but must accommodate. It is this dimension, the inherited contract as a constraint on harmonisation rather than as a decision about governance, that the present paper exploits.

3.4 Why wastewater differs from drinking water

Wastewater departs from drinking water in respects that bear directly on the mechanisms just described. The quality of the discharge is unobservable to the household, as the taste, turbidity or sanitary status of tap water is not, so that the yardstick competition across neighbouring services that partly disciplines drinking-water tariffs ([Shleifer, 1985](#); [Besley and Case, 1995](#)) should operate with markedly less force on the demand side. Scale economies are more pronounced besides: the treatment plant is a lumpy fixed asset whose unit cost declines steeply up to several tens of thousands of population-equivalents ([Hernández-Sancho et al., 2011](#)), more so than any counterpart on the drinking-water distribution side. And the initial dispersion of tariffs is wider, so that harmonisation has correspondingly more to accomplish. The empirical literature on wastewater, for its part, has been directed principally to the technical efficiency of treatment plants ([Marques and De Witte, 2011](#)) and only seldom to tariff governance, which is the gap the present paper is intended to fill.

3.5 Hypotheses

The mechanisms set out above yield four hypotheses, formulated so as to be empirically separable from one another in Section 6.

H1 — Consolidating the authority does not consolidate the tariff. The transfer of competence creates a single tariff-setting authority but not, of itself, a single tariff. Tariff perimeters inherited from the antecedent municipal or syndicate structure should outlast the

merger of the authorities, and this should be discernible as a number of distinct management units, and hence of distinct tariffs, per authority that remains approximately constant over time.

H2 — Convergence is partial and gradual. Under a uniform-pricing constraint and a balanced-budget rule, the initial tariff position of a service relative to its new perimeter should predict both the direction and the magnitude of the adjustment it subsequently undergoes. Phased harmonisation and inherited constraints imply, however, that the adjustment is spread over time, so that the convergence coefficient should increase in absolute value with the interval elapsed since the transfer, without ever attaining unity.

H3 — The binding constraint is contractual. This is the paper’s central hypothesis. A service under direct management may be repriced by simple deliberation of the new authority’s assembly; a delegated service may not, before the term of its contract, since the authority is substituted into that contract, tariff included. Two implications follow. Convergence should be faster for directly managed services than for delegated ones. And within the delegated services, it should be faster once the inherited concession has expired than while it remains in force, since only expiry restores to the authority the power to reset the price.

H4 — The adjustment falls on the smallest members. Small services labour under a twofold disadvantage. Their tariffs are more dispersed, and hence more frequently distant from the average of the perimeter they join, and they carry little weight in the population-weighted mean that fixes the point of convergence. The adjustment they bear should therefore be decreasing in the size of the service.

4 Data

4.1 The register and the unit of observation

French local authorities have been required to produce an annual report on the price and quality of their water and wastewater services since the 1995 Environmental Protection Act, now codified in Article L.2224-5 of the General Local Authorities Code (CGCT).² The 2006 Water Act entrusted the national water agency with building an information system collecting these reports.³ A 2007 decree introduced a standardised set of technical and financial indicators whose definitions are fixed by ministerial order.⁴ Because the indicators are defined by statute rather than by the reporting authority, they are comparable across services and over time.

Each annual vintage is organised around three linked tables: organising authorities, management units and treatment facilities. The distinction between the first two is central to this paper. The organising authority is the local government body legally responsible for the service

²Article 73 of Act no. 95-101 of 2 February 1995; implementing Decree no. 95-635 of 6 May 1995, codified in Articles D.2224-1 to D.2224-5 CGCT.

³Act no. 2006-1772 of 30 December 2006. The system is operated successively by ONEMA, AFB and, since 2020, the Office français de la biodiversité.

⁴Decree no. 2007-675 of 2 May 2007, issued for the application of Article L.2224-5 and amending Annexes V and VI CGCT; Order of 2 May 2007, as amended by the Order of 2 December 2013.

— a municipality, an intermunicipal body with own tax-raising powers, or a single-purpose or mixed syndicate — and it sets the tariff by deliberation of its assembly. The management unit is the operational service itself: a sewerage network, its associated treatment capacity, a defined perimeter of served municipalities and, critically, a single tariff schedule. In 2024, 2,759 management units are operated by only 589 intermunicipal authorities.

The distinction also delivers the property on which our design rests. When a municipality transfers its wastewater competence, the service does not disappear: the network, the treatment plant and the customer base are taken over by the receiving authority, and the register records this as a change of organising authority for an unchanged management unit identifier. Over the period we observe 2,875 units switching from municipal to supra-municipal status while retaining their identifier, against 12,697 units that remain municipal throughout and 4,572 that are supra-municipal from the outset. We can therefore follow the same operational service before and after the transfer of authority, and fix the unit of analysis at the level at which the tariff is actually set rather than at the level of the body that sets it.

We use the seventeen vintages covering fiscal years 2008 to 2024. Over this period the number of wastewater management units falls from 16,099 to 11,121 and the number of organising authorities from 15,558 to 8,381, while the population served remains stable at around 66 million. The share of that population served by a municipal authority falls from 37.7% to 11.9%.

Reporting compliance improves over the period for a regulatory reason. While producing the annual report has been mandatory for all services since 1995, filing its indicators electronically became compulsory only in 2016, and only for authorities serving more than 3,500 inhabitants.⁵ We exclude the 2025 and 2026 vintages, whose reference files are not consolidated.

4.2 The tariff variable

Our outcome is the all-inclusive price of collective wastewater services in euros per cubic metre, computed for a reference annual consumption of 120 m³ and measured at 1 January of the year following the reporting fiscal year.⁶ Its construction is fixed by ministerial order rather than left to the reporting authority, and it is evaluated at a common reference consumption, which makes tariff schedules of different shapes directly comparable.

The register also reports the components from which this price is built: the tax-exclusive amounts accruing respectively to the private operator and to the organising authority, a combined line covering the levies collected on behalf of the water agencies together with value-added tax, and the annual standing charge. These components sum exactly to the tax-inclusive bill for 120 m³. The tax rate moved twice within our window, from 5.5% to 7% on 1 January 2012 and to 10% on 1 January 2014;⁷ both shocks are national and simultaneous and are absorbed by the year fixed effects throughout.

We restrict the estimation sample to management units performing all three functions — collection, transport and treatment — which represent 81.4% of unit-year observations. The

⁵Decree no. 2015-1820 of 29 December 2015.

⁶Exact variable definitions and their register codes are given in Appendix A.

⁷Article 279(b) of the General Tax Code, as against Article 278-0 bis for the supply of drinking water, which remains at the reduced rate.

tariff reported by a unit that only collects wastewater covers a fraction of the bill actually paid by its users.

Cleaning is deliberately asymmetric. Of the 91,702 reported tariff observations, we discard 334 (0.36%): 282 zeros, which reflect non-response coded as zero rather than a free service, no such thing existing in French law; six values below 0.10 €/m³, isolated in a gap of the density; and 46 values above 10 €/m³, which are annual bills entered in the unit price field. We apply no winsorisation. The 1,248 observations below 0.50 €/m³ are not measurement error: 95.6% are municipal services, 98% serve fewer than 3,000 inhabitants, and their median population served is 156. They form the low tail of a continuous distribution rather than a separate mode, and on a paper whose object is tariff dispersion, compressing the tails would compress the outcome itself.

Tariffs are expressed in constant euros, deflated by the national consumer price index lagged by one year to match the timing of the tariff variable. All figures below are in January 2025 euros. The adjustment matters: between 2022 and 2024 the median nominal tariff rises from 2.15 to 2.20 €/m³ while the median real tariff falls from 2.23 to 2.20.

4.3 Descriptive statistics

Table 1: Sample coverage and headline tariffs

Year	Units and coverage			Reporting	Tariff (€/m ³)		
	Units	Authorities	Pop. (m)	% reporting	Nominal	Real	Real, wtd
2008	16,099	15,558	61.7	7.5	1.69	2.22	2.12
2010	16,582	15,838	63.4	30.0	1.65	2.09	2.22
2012	16,705	15,884	63.6	33.9	1.81	2.22	2.31
2014	16,144	15,035	63.7	40.9	1.85	2.26	2.42
2016	15,661	14,263	64.2	41.7	1.94	2.34	2.45
2018	14,022	11,700	64.5	48.3	1.97	2.31	2.44
2020	12,423	9,211	64.1	54.2	2.04	2.34	2.46
2022	11,949	8,914	65.7	58.1	2.15	2.23	2.39
2024	11,121	8,381	66.2	70.0	2.20	2.20	2.38

Notes. Even years only. Tariffs are medians across management units; the last column is weighted by population served. Real tariffs are in January 2025 euros.

By 2024, municipal services still account for two thirds of management units but serve only 11.9% of the population; intermunicipal bodies with own tax-raising powers serve 64.7% and syndicates a further 21.0%. Delegation to a private operator is stable over the period, at between 23.5% and 26.1% of units but between 38.4% and 44.2% of population served.

Table 2 reports the tariff distribution by size of service. Two features matter for what follows. The median rises with size and flattens above a few thousand inhabitants. And the coefficient of variation declines monotonically with size, from 0.48 among services below 500 inhabitants to 0.25 above 50,000: tariff heterogeneity in France is a small-commune phenomenon. Since consolidation aggregates precisely the most dispersed units, it mechanically creates internal dispersion within the enlarged perimeter. The table also records an association we exploit later:

management mode is closely tied to size, 95% of the smallest services being directly managed against fewer than half above 2,000 inhabitants.

Table 2: Tariff distribution and structure by service size, 2024

Population served	n	p_{10}	Median	p_{90}	CV	Fixed share	% direct
Under 500	2,470	0.89	1.81	3.18	0.482	0.214	94.6
500–1,000	1,380	1.31	2.13	3.51	0.397	0.219	81.7
1,000–2,000	987	1.49	2.41	3.66	0.357	0.207	60.0
2,000–3,000	413	1.75	2.61	3.71	0.319	0.201	40.9
3,000–10,000	808	1.73	2.59	3.79	0.306	0.187	41.0
10,000–50,000	520	1.82	2.62	3.65	0.268	0.184	45.4
Over 50,000	191	1.64	2.37	3.06	0.250	0.118	56.0

Notes. Full-service management units with a reported tariff, 2024, in January 2025 euros. “Fixed share” is the annual standing charge as a proportion of the tax-exclusive bill for 120 m³. “% direct” is the share of units under direct public management rather than delegation.

Finally, we decompose the population-weighted Theil index of tariffs into a component measuring inequality between organising authorities and a component measuring inequality within them. Total tariff inequality is stable over seventeen years, varying only between 0.042 and 0.051 with no trend. What changes is where it sits: the share located within organising authorities is multiplied by seven between 2012 and 2020, then recedes by about a third. Consolidation does not reduce tariff inequality; it relocates it inside the new perimeters.

Table 3: Theil decomposition of wastewater tariffs

Year	Total	Between authorities	Within authorities	% within
2008	0.0507	0.0500	0.00066	1.3
2012	0.0454	0.0448	0.00060	1.3
2016	0.0442	0.0429	0.00136	3.1
2018	0.0419	0.0392	0.00266	6.4
2020	0.0430	0.0392	0.00378	8.8
2022	0.0453	0.0423	0.00308	6.8
2024	0.0442	0.0420	0.00227	5.1

Notes. Theil index of the real tariff, weighted by population served, full-service units only. The decomposition is exact and additive; the index is scale-invariant, so deflation does not affect it. The within component is zero by construction for authorities operating a single management unit, so its level is mechanically low and its evolution is what matters.

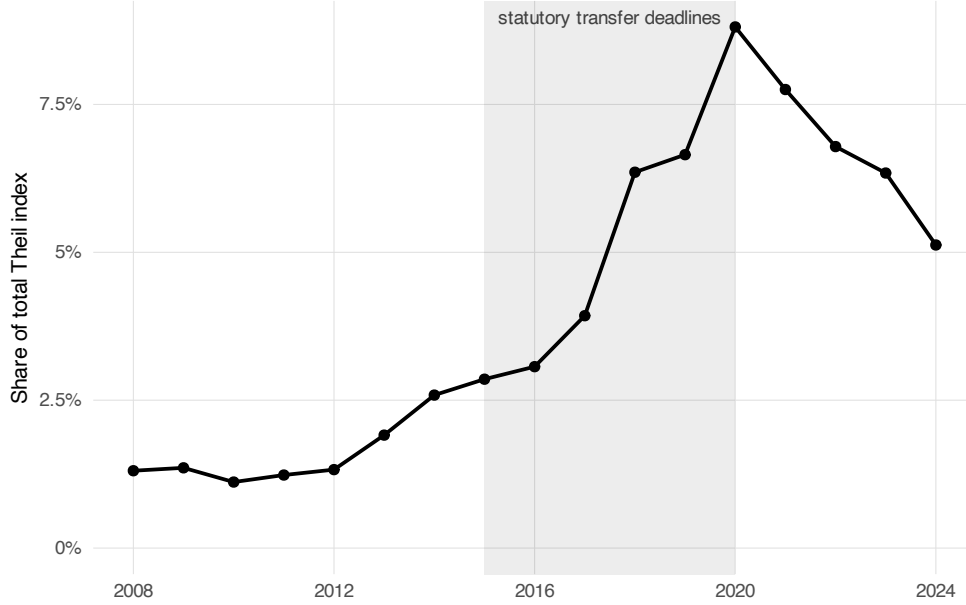


Figure 1: Share of tariff inequality located within organising authorities

Notes. Within-authority component as a share of the total Theil index. Shaded area marks the period over which the statutory transfer deadlines fell.

5 Empirical strategy

5.1 Treatment and sample

A management unit is treated in the first year in which its organising authority is no longer the municipality itself but an intermunicipal body or a syndicate. Treatment is absorbing. Because transfers occurred on a staggered calendar, units are sorted into cohorts indexed by their year of transfer; we retain cohorts between 2013 and 2021, which contain 1,937 units, the two largest being 2018 and 2020 — the statutory deadlines.

5.2 Measuring convergence

Our central object is the speed at which a receiving authority aligns the tariffs it inherits. For each treated unit i we compute a pre-transfer tariff p_i^{pre} as the mean of its real tariff over the three years preceding the transfer. We define the receiving perimeter $E(i)$ as the set of units transferred to the same organising authority in the same year, and compute

$$\bar{p}_{E(i)}^{\text{pre}} = \sum_{j \in E(i)} \omega_j p_j^{\text{pre}}, \quad \omega_j = \frac{n_j}{\sum_{k \in E(i)} n_k},$$

the population-weighted mean of the pre-transfer tariffs of the units the authority takes over. Weighting by population is the relevant choice: under a uniform tariff and a balanced budget, it is the volume-weighted average of pre-existing unit costs that the new tariff must recover.

One feature of the reform requires the definition of $E(i)$ to be stated precisely. Because a blocking minority allowed part of a grouping's members to defer, several authorities received transfers in more than one year, typically in 2018 and again in 2020. Where an authority receives

transfers in multiple years, $E(i)$ is the set of units transferred in the same year as unit i , not the full set of units eventually falling under that authority’s competence. This ensures that $\bar{p}_{E(i)}^{\text{pre}}$ is computed over units for which the authority acquires pricing discretion simultaneously with unit i . The alternative, defining the benchmark over the authority’s eventual perimeter, would measure convergence towards a target the authority does not yet control at the date of the early transfer, and would mechanically overstate the speed of adjustment for the earlier cohort. The cost of our choice is that an authority receiving two waves has two benchmarks, one per cohort; since the perimeter is defined on the authority-by-year pair, this is consistent with the way the estimation treats them. The quantity of interest is the gap $d_i = p_i^{\text{pre}} - \bar{p}_{E(i)}^{\text{pre}}$, zero on average within each perimeter by construction, positive for units that were expensive relative to their new peers and negative for those that were cheap. It can be computed for perimeters taking over at least two units, which leaves 128 perimeters and 791 units. Its interquartile range runs from -0.42 to $+0.31$ €/m³ against a median tariff of about 2.2: a quarter of our units joined a perimeter whose average tariff differed from their own by more than fifteen per cent.

We estimate

$$p_{it} = \alpha + \beta d_i \times \text{Post}_{it} + \gamma \text{Post}_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (1)$$

where Post_{it} equals one from the year of transfer onwards, μ_i is a unit fixed effect and λ_t a year fixed effect. The gap d_i is time-invariant and absorbed by μ_i ; only its interaction with Post is identified. We estimate in levels rather than logs because it is in levels that β has a direct interpretation. If the enlarged authority immediately imposed a single tariff equal to the population-weighted average of the tariffs it inherited, each unit would move by exactly $-d_i$ and β would equal -1 . A value between -1 and zero indicates partial convergence; a value near zero indicates that differentiated tariffs persist despite the merger of authorities. Standard errors are clustered on the receiving perimeter.

Because convergence is expected to be gradual, we also estimate

$$p_{it} = \alpha + \sum_{k \neq -1} \beta_k d_i \times \mathbf{1}\{t - g_i = k\} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (2)$$

which traces the speed at which the gap is absorbed. The pre-treatment coefficients serve as a placebo: a gap that does not yet exist should not predict tariff movements.

5.3 Identification

The parameter β is identified from heterogeneity in the pre-transfer position of units within the same receiving perimeter, all of which change authority on the same date. This has a direct consequence for what the design requires. Because the comparison is between units treated simultaneously and subject thereafter to the same tariff-setting body, identification does not rest on a counterfactual drawn from units that were never treated, and therefore does not require their tariff paths to be parallel to those of the treated. What it requires is that the pre-transfer gap be uncorrelated with unit-specific tariff trends within the perimeter — an assumption we probe through the pre-treatment coefficients of equation (2).

Selection into transfer, which is a genuine feature of this reform, operates on the comparison

between transferring and non-transferring municipalities. It would threaten β only if it acted differentially on the expensive and the cheap units of the same future perimeter, which is difficult to motivate.

5.4 The contractual constraint

5.4.1 Why a running contract binds the receiving authority

When a municipality transfers its wastewater competence, the receiving intermunicipal body does not acquire a blank slate. It is substituted by operation of law in the rights and obligations of the transferring municipality, and the contracts in force continue on their existing terms until they expire.⁸ A delegation contract in French wastewater runs typically for eight to fifteen years and fixes both the share of the bill accruing to the operator and the formula by which it is indexed. Where such a contract is running at the moment of the transfer, the receiving authority inherits a tariff it did not set and cannot unilaterally revise.

The constraint is real but partial, and the distinction matters for what we should expect to find. The bill is composed of two parts, one accruing to the operator and one to the organising authority. The contract fixes the first; the second remains a matter for deliberation. An authority determined to harmonise could therefore adjust its own share even under a running contract, at the cost of moving the two components of the bill in opposite directions. Hypothesis H3 predicts slower convergence under delegation, not necessarily its complete absence.

5.4.2 Specification

We first split the convergence term by the management mode of the unit in the year preceding the transfer,

$$p_{it} = \alpha + \beta_R d_i \times \text{Post}_{it} \times R_i + \beta_D d_i \times \text{Post}_{it} \times (1 - R_i) + \gamma \text{Post}_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (3)$$

where R_i equals one for units under direct public management. Measuring R_i before the transfer matters: the management mode may itself change afterwards, and an authority that lets a contract lapse and takes the service back in hand is doing something we want to observe rather than condition on. Under H3, $|\beta_R| > |\beta_D|$.

This comparison is informative but coarse. A binary distinction conflates services whose contract expires the year after the transfer with services locked in for a further decade. We therefore exploit the terms of the contract directly. For each delegated unit we observe the contractual expiry date recorded in the register, and we let c_i denote the calendar year in which the inherited concession reaches its term.

The functional form follows from the legal mechanism rather than from convenience. A concession does not bind a little less with each year that brings its term closer: it fixes the operator's share of the tariff in full until it expires, and ceases to constrain the authority thereafter. The constraint is a step, not a slope, and our principal specification imposes that shape. Splitting the post-transfer years of each delegated unit at its own expiry date, we

⁸Art. L.5211-5 III and L.5211-17 CGCT.

estimate

$$p_{it} = \alpha + \beta_C d_i \times \mathbf{1}\{g_i \leq t \leq c_i\} + \beta_X d_i \times \mathbf{1}\{t > c_i\} + \gamma \text{Post}_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (4)$$

where β_C measures convergence while the concession is still running and β_X convergence once it has expired. Under H3, $|\beta_X| > |\beta_C|$. The comparison is within unit: each delegated service observed on both sides of its own expiry date contributes to both coefficients, so nothing fixed at the unit level can account for the difference between them.

As a specification test we also estimate a version in which the constraint is allowed to fade progressively rather than to lift at once. Writing $\tau_i = c_i - g_i$ for the residual duration of the concession at the moment of the transfer,

$$p_{it} = \alpha + \beta_0 d_i \times \text{Post}_{it} + \beta_\tau d_i \times \text{Post}_{it} \times \tau_i + \gamma \text{Post}_{it} + \gamma_\tau \text{Post}_{it} \times \tau_i + \mu_i + \lambda_t + \varepsilon_{it} \quad (5)$$

on the delegated units. This imposes that convergence be linear in the horizon remaining, so that a unit whose contract has nine years to run adjusts three times less than one whose contract has three. The legal mechanism gives no reason to expect such a relationship, and equation (5) is reported to establish that the evidence for the contractual channel does not depend on finding one.

5.4.3 What identifies the contractual effect

The two ingredients of τ_i are set by processes that have nothing to do with one another. The expiry date is written into a contract signed years before the reform, at a moment when no party could have anticipated that the competence would change hands; the transfer year is set, for the large majority of our units, by a statutory deadline applying uniformly across the country. Contracts in this sector run for eight to fifteen years, so a reform applying from 2018 encounters a portfolio of concessions signed at every point of the preceding decade and a half. Two services identical in every respect but transferred at the same date can face a constraint that binds for one year or for a decade, for reasons predating the reform.

The identification does not require that delegation itself be exogenous. Equation (5) is estimated on delegated units only, and compares services that all made that choice; what varies is when they happened to sign. The question is therefore whether, among those that delegate, contractual horizon is related to the tariff adjustment through a channel other than the constraint it imposes.

Two such channels deserve attention. Contract length is not random with respect to the characteristics of the service: larger and more capital-intensive services tend to sign longer concessions, and larger services are also those for which the required adjustment is smaller. We address this by interacting the convergence term with log population alongside residual duration. And contracts can be amended, so τ_i measures an intention to treat rather than a binding constraint; this attenuates the estimates towards zero.

Equation (4) avoids both concerns by staying within the unit. A service whose tariff was immobile while its concession ran, and which begins to converge in the years that follow, cannot be explained by its size, by the identity of its operator, or by anything else fixed at the unit

level. The concerns bear on equation (5), which compares services with different contractual horizons and is for that reason the auxiliary of the two.

5.5 Effects on the tariff level

The convergence specification measures how the tariffs of a perimeter move relative to one another. It is silent on where the perimeter as a whole ends up, since d_i sums to zero within each perimeter by construction. For that we estimate a conventional event study,

$$\ln p_{it} = \sum_g \sum_{k \neq -1} \delta_{g,k} \mathbf{1}\{g_i = g\} \mathbf{1}\{t - g_i = k\} + \mu_i + \lambda_t + \varepsilon_{it}, \quad (6)$$

with the 8,175 units that remain municipally organised throughout as controls; units already supra-municipal in the first vintage are excluded. The cohort-specific coefficients are aggregated following Sun and Abraham (2021), which avoids the negative weights a two-way fixed effects specification would generate here. Standard errors are clustered on the organising authority.

Equation (6) differs from equation (1) in a respect that determines the weight we place on it. It requires that treated and never-treated units would have followed parallel tariff paths absent the transfer, whereas the convergence specification builds its counterfactual within the receiving perimeter and requires no such assumption. We state at the outset that the parallel-trends assumption is rejected in our data: the joint test of the pre-treatment coefficients returns a p -value below 0.001, and the sensitivity analysis of Rambachan and Roth (2023) places the confidence interval across zero once the post-treatment violation is allowed to reach a quarter of the largest pre-treatment deviation (Section 7.1). Estimates from equation (6) are therefore reported as descriptive magnitudes and not as causal claims, and none of the paper’s conclusions rests upon them. The same specification, estimated separately within bands of pre-transfer population, yields the incidence of the adjustment reported in Section 6.4; that comparison is between bands of treated units, so a trend common to the treated differences out.

6 Results

6.1 Consolidation does not merge tariff perimeters

We begin with the fact that motivates the rest. Table 4 follows 478 authorities from the year they take over a set of wastewater services.

Table 4: Internal tariff dispersion and perimeter structure after consolidation

Years since consolidation	0	1	2	3	5
Coefficient of variation, all authorities	0.158	0.137	0.135	0.118	0.088
Coefficient of variation, balanced panel	0.168	0.162	0.154	0.131	0.103
Ratio of highest to lowest tariff	1.70	1.66	1.57	1.49	1.35
Management units per authority	10.2	10.3	10.3	10.4	9.7

Notes. Population-weighted coefficient of variation of the real tariff across the management units of a given authority. The balanced panel comprises the 66 authorities observed over the entire post-consolidation window.

Two facts stand out. Internal dispersion falls: the coefficient of variation declines by 39 per cent over five years, and the ratio between the most and the least expensive municipality of a given authority narrows from 1.70 to 1.35. The annual slope of the coefficient of variation is -0.0137 (s.e. 0.0017) and lies between -0.0147 and -0.0136 as the minimum size of a consolidation is raised from three to twenty municipalities. The reduction survives on the balanced panel and is insensitive to how a consolidation is defined.

But the number of management units per authority barely moves — 10.2 at the moment of consolidation, 9.7 five years later. Authorities do not merge the services they take over; they align the tariffs of services they continue to operate separately. A typical French intermunicipal body sets ten different wastewater tariffs, and still does so five years after acquiring the competence. Transferring the competence creates a single tariff-setting body, not a single tariff. This confirms Hypothesis H1 and defines the question the rest of the paper addresses.

6.2 The speed of convergence

Table 5: Convergence towards the average tariff of the receiving perimeter

	(1)	(2)	(3)	(4)
Post $\times$ pre-transfer gap	-0.295^{***} (0.044)	-0.290^{***} (0.041)	-0.294^{***} (0.040)	-0.294^{***} (0.040)
Post	0.060 (0.042)	0.096* (0.040)	0.003 (0.038)	
Unit fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	—	Yes	Yes
Year $\times$ department	No	Yes	No	No
Never-treated included	Yes	Yes	No	No
Observations	55,999	55,914	5,628	5,628
Within R^2	0.013	0.013	0.101	0.101

Notes. Dependent variable: real tariff in €/m³, in levels. Identification rests on 128 receiving perimeters and 791 units. Standard errors clustered on the receiving perimeter. * $p < 0.05$; *** $p < 0.001$.

The convergence coefficient is -0.29 and does not move: it varies by less than half a point across specifications, with or without department-by-year fixed effects, with or without the never-treated group. A unit whose tariff exceeded the average of its future perimeter by one euro per cubic metre sees that gap narrow by twenty-nine cents over the post-treatment window. The gap therefore predicts the adjustment, as Hypothesis H2 requires, but it predicts only part of it.

Figure 2 traces the speed year by year, and the decline is regular rather than driven by any single year. The coefficient falls from -0.10 in the year of transfer to -0.52 after five years, with no plateau on the horizon we observe. Half the initial gap remains after five years. The pre-treatment coefficients are close to zero, as they should be.

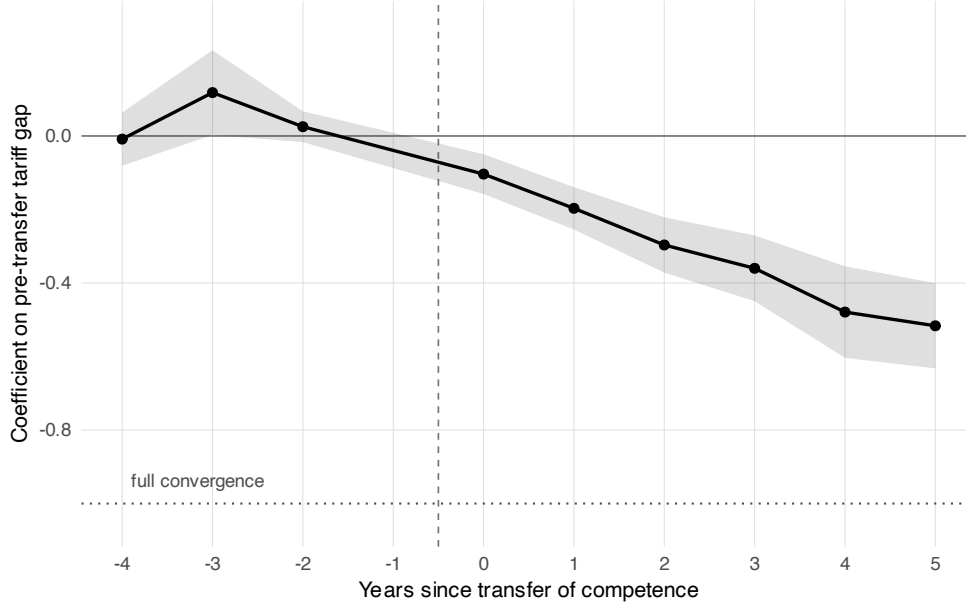


Figure 2: Speed of tariff convergence after the transfer of competence

Notes. Coefficients β_k from equation (2). A value of -1 , marked by the dotted line, would indicate complete convergence towards the population-weighted average of the perimeter.

6.3 What sets the pace: contractual lock-in

Uniform pricing within the enlarged authority is thus an objective approached slowly rather than a constraint applied on the day the competence changes hands. Two explanations are available. Authorities may be smoothing the adjustment deliberately, spreading it across budgetary exercises to limit its political cost. Or they may be unable to adjust, because part of their perimeter is governed by contracts they inherited. This subsection shows that the second explanation carries most of the weight.

6.3.1 Convergence by management mode

We first split the convergence term according to whether the transferred service was under direct public management or under delegation in the year preceding the transfer. Management mode is recorded for all 802 switching units in our window. The two groups enter their new perimeter from comparable positions, which matters for what follows: the mean absolute gap to the future perimeter average is 0.523 €/m³ among delegated units and 0.499 among directly managed ones, with medians of 0.364 and 0.369. Whatever difference in convergence we observe is not a difference in the adjustment required.

Table 6: Tariff convergence by pre-transfer management mode

	(1)	(2)	(3)
Post $\times$ gap	−0.259*** (0.038)		
Post $\times$ gap $\times$ direct management		−0.288*** (0.046)	−0.320*** (0.044)
Post $\times$ gap $\times$ delegated		−0.223*** (0.047)	−0.194*** (0.048)
Post	0.015 (0.040)	0.012 (0.040)	−0.108 (0.087)
Difference between slopes		0.065 (0.057)	0.126* (0.054)
Unit fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	—
Year $\times$ department	No	No	Yes
Observations	4,474	4,474	4,409
Within R^2	0.079	0.080	0.122

Notes. Sample: 607 transferred units in 116 receiving perimeters for which pre-transfer management mode is recorded, of which 364 directly managed and 243 delegated. Standard errors clustered on the receiving perimeter; the difference between slopes and its standard error are computed from the full variance-covariance matrix. Interacting the convergence term further with log population leaves both coefficients imprecisely estimated, management mode and service size being strongly associated in this sector. * $p < 0.05$; *** $p < 0.001$.

Directly managed services converge faster, by 0.065 with year fixed effects and by 0.126 once local cost shocks are absorbed by department-by-year fixed effects. Only the second difference is significant at conventional levels. Read on its own, the pooled comparison is therefore suggestive rather than conclusive — and this is what one should expect, since it averages over years in which the contractual constraint binds and years in which it has already lapsed, diluting precisely the contrast it is meant to capture.

6.3.2 The dynamics

Table 7: Convergence by year and management mode

Years since transfer	−4	−3	−2	0	1	2	3	4	5
Direct management	−0.076	−0.038	0.017	−0.124	−0.212	−0.342	−0.433	−0.537	−0.635
Delegated	0.044	0.055	0.047	−0.029	−0.120	−0.174	−0.191	−0.393	−0.401

Notes. Coefficients β_k from equation (2), estimated separately on directly managed and delegated units. Confidence intervals are shown in Figure 3.

Three features stand out. In the year of the transfer itself, directly managed services have already closed 12.4 per cent of their gap while delegated services have closed 2.9 per cent, a ratio of more than four to one. An authority taking over a service in direct management can revise its tariff at the next budget; an authority taking over a delegated service cannot.

By the fifth year the directly managed group has closed 63.5 per cent of the initial gap and

the delegated group 40.1 per cent. Contractual inheritance does not merely delay harmonisation, it leaves a durable difference in how far it goes within the horizon we observe.

And the delegated path is not smooth. It advances slowly through the third year and then jumps, from -0.191 to -0.393 between $t + 3$ and $t + 4$. The median residual duration of the delegation contracts in our sample is four years. The break occurs when the median contract expires.

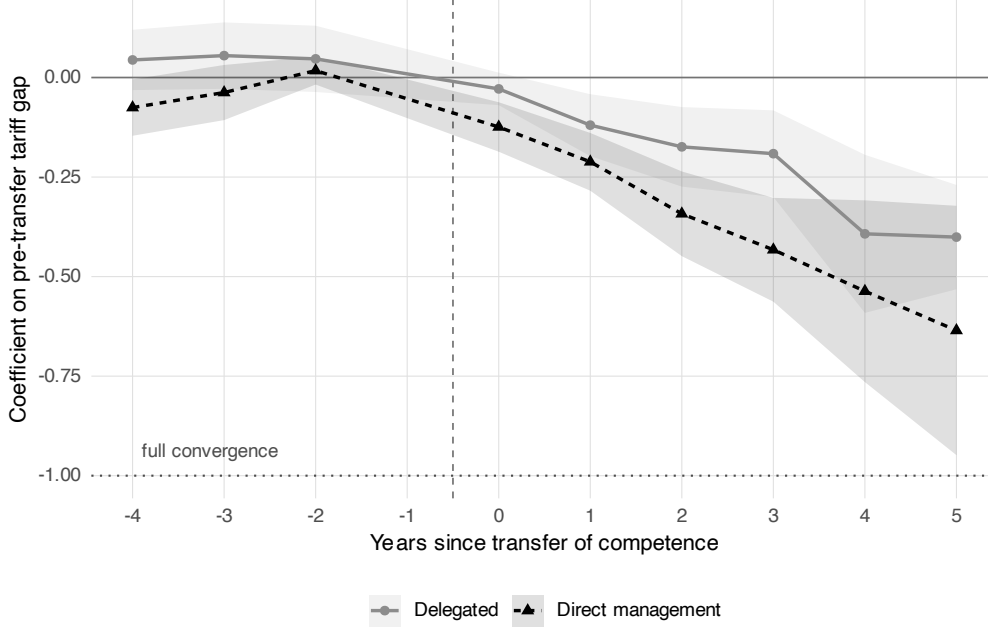


Figure 3: Speed of tariff convergence by pre-transfer management mode

Notes. Coefficients β_k from equation (2), estimated separately by management mode. A value of -1 , marked by the dotted line, would indicate complete convergence. Shaded areas give 95 per cent confidence intervals.

6.3.3 Before and after contractual expiry

That coincidence invites a direct test. For 340 of the 347 delegated units in our window the register records the contractual expiry date, from which we compute the residual duration at the moment of the transfer: median four years, interquartile range one to seven, maximum nineteen. We can therefore split the post-transfer years of each delegated service into those during which its concession was still running and those following its expiry, and compare the same service with itself across that date. Table 8 reports this step specification alongside the linear one against which we test it.

Table 8: Convergence before and after contractual expiry, delegated services

	(1) Baseline	(2) Step	(3) Specification test	(4)
Post $\times$ gap	−0.180*** (0.044)		−0.229** (0.073)	0.315 (0.291)
Gap $\times$ Post, contract still running		−0.154*** (0.040)		
Gap $\times$ Post, contract expired		−0.383*** (0.078)		
Difference (expired – running)		−0.229 (0.067)		
Post $\times$ gap $\times$ residual duration			0.009 (0.010)	0.010 (0.010)
Post $\times$ gap $\times$ log population				−0.077 [†] (0.041)
Unit and year fixed effects	Yes	Yes	Yes	Yes
Observations	1,695	1,695	1,695	1,662
Within R^2	0.046	0.066	0.048	0.055

Notes. Delegated services only: 227 units in 82 receiving perimeters. Column (2) reports equation (4): the post-transfer years of each service are split at its own expiry date, with 826 post-transfer observations falling before it and 138 after. Columns (3) and (4) report equation (5), in which convergence is constrained to be linear in the residual duration of the concession. The difference between the two regimes and its standard error are computed from the full variance-covariance matrix; its wild cluster bootstrap p -value is 0.196 (Section 7.3). Standard errors clustered on the receiving perimeter. [†] $p < 0.10$; ** $p < 0.01$; *** $p < 0.001$.

Column (2) reports equation (4), the specification the legal mechanism implies. While the concession is still running, a delegated service closes 15.4 per cent of its gap to the perimeter average; once it has expired, it closes 38.3 per cent. Convergence is two and a half times faster after the contractual constraint is lifted, and the difference between the two regimes is -0.229 (s.e. 0.067, $t = -3.40$). The comparison is within service: each delegated unit contributes observations to both regimes, so nothing fixed at the unit level — its size, its network, the identity of its operator, the characteristics of the municipality it serves — can account for the difference.

Two qualifications attach to this estimate. Only 138 post-transfer observations fall after expiry, spread across 82 receiving perimeters, so the conventional standard error is optimistic; a wild cluster bootstrap imposing the null returns a p -value of 0.196 for the difference between regimes (Section 7.3). We therefore report the contrast as a magnitude rather than as a test, and rest the contractual reading on the concordance of this estimate with the two others of Table 6 and Table 7 rather than on its significance alone. Residual duration also fails to predict tariff movements before the transfer, as it should: interacted with a pre-treatment trend it gives 0.0044 with a standard error of 0.0032.

Columns (3) and (4) report the specification test of equation (5), which constrains convergence to be linear in the horizon remaining. The interaction is 0.009 with a standard error of 0.010: services locked in for a decade adjust no more slowly, year for year, than those whose

concession expires shortly after the transfer. This is what the step specification predicts. A concession that binds fully until its term and not at all thereafter generates no gradient in residual duration among units still under contract, and the absence of one is evidence for the mechanism rather than against it. Column (4), which adds an interaction with size, leaves all terms imprecisely estimated on 227 units and is reported for completeness.

6.3.4 Interpretation

Taken together these results identify the binding constraint on the tariff policy of a consolidated authority. It is not the political difficulty of raising prices in the municipalities that must catch up, nor a deliberate choice to phase the adjustment in. It is the stock of delegation contracts the authority inherits, whose terms it must honour and whose expiry dates it did not choose. A consolidation that takes over predominantly directly managed services can harmonise within a few years; one that takes over a portfolio of running concessions harmonises at the pace at which those concessions expire.

The mechanism also explains a feature of the aggregate results that would otherwise be puzzling. Section 6.2 found convergence still incomplete after five years, with no plateau. Five years is close to the median residual duration of the contracts in force at the moment of transfer, so a substantial part of our sample spends most of the observation window under a constraint that lifts only towards its end. What looks like slow harmonisation is in part harmonisation that has not yet been allowed to begin.

6.4 Who bears the adjustment

Convergence towards a common tariff is a transfer between the members of the new perimeter, and Table 9 shows on whom it falls.

Table 9: Tariff adjustment by size of the transferred service

Population served	Treated units	Estimate	Std. error	95% CI
Under 500	247	0.126	0.028	[0.071 ; 0.182]
500–1,000	255	0.045	0.016	[0.013 ; 0.077]
1,000–2,000	254	0.046	0.017	[0.014 ; 0.078]
2,000–3,000	112	0.010	0.019	[−0.028 ; 0.048]
3,000–10,000	168	−0.025	0.012	[−0.048 ; −0.002]
Over 10,000	50	−0.007	0.015	[−0.036 ; 0.022]

Notes. Equation (6) estimated separately within each size band, so that cohorts are weighted correctly inside each group; the never-treated group is common to all six regressions. Size is the mean population served over the three years preceding the transfer. Dependent variable: log of the real tariff. The size gradient survives when the sample is restricted to directly managed services (available on request), confirming that it is not driven by the management-mode composition of each size band

The gradient is monotone and changes sign between two and three thousand inhabitants. Services below five hundred inhabitants see their tariff rise by 12.6 per cent; those between three and ten thousand see it fall by 2.5. The pattern is not an artefact of the size bands: estimating the same effect on overlapping windows of log population, without any partition, reproduces it from +0.128 at 125 inhabitants down through zero at about 3,300 and −0.024 at 7,000.

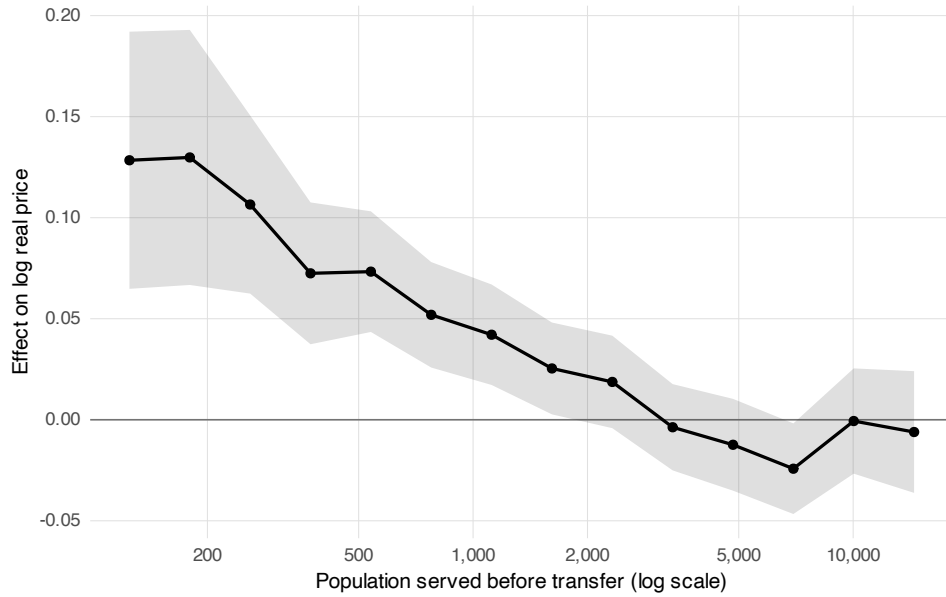


Figure 4: Tariff adjustment as a continuous function of service size

Notes. Effect estimated on sliding windows of log population, each window spanning a factor of about two on either side of its centre, with the full never-treated group as controls. Shaded area gives the 95 per cent confidence interval.

The magnitudes are worth stating in the units in which they are felt. At the median tariff of the smallest stratum, 1.81 €/m^3 , an increase of 12.6 per cent represents about 29 € a year for a household at the reference consumption. That is an average over the post-treatment window and understates the terminal figure: among the smallest services the adjustment reaches 24 per cent four years after the transfer, close to 60 € a year on a bill of some 220 €.

Table 10: Dynamics of the adjustment, by size of the transferred service

Years since transfer	Under 500	500–1k	1k–2k	2k–3k	3k–10k	Over 10k
0	0.031	0.018	0.017	0.016	−0.001	−0.016
2	0.143	0.055	0.032	−0.029	−0.032	−0.007
4	0.240	0.101	0.044	0.002	−0.012	−0.010
5	0.179	0.087	0.111	0.040	−0.038	0.011

Notes. Coefficients from equation (6) estimated separately within each size band. Confidence intervals are reported in Figure 5; they are widest in the smallest band, which contains 247 treated units.

Among the smallest services the adjustment is not immediate but cumulative: 3.1 per cent in the year of transfer, 14.3 after two years, 24.0 after four. The larger strata show no comparable pattern. Whatever holds tariffs back in the first years binds hardest where the required adjustment is largest.

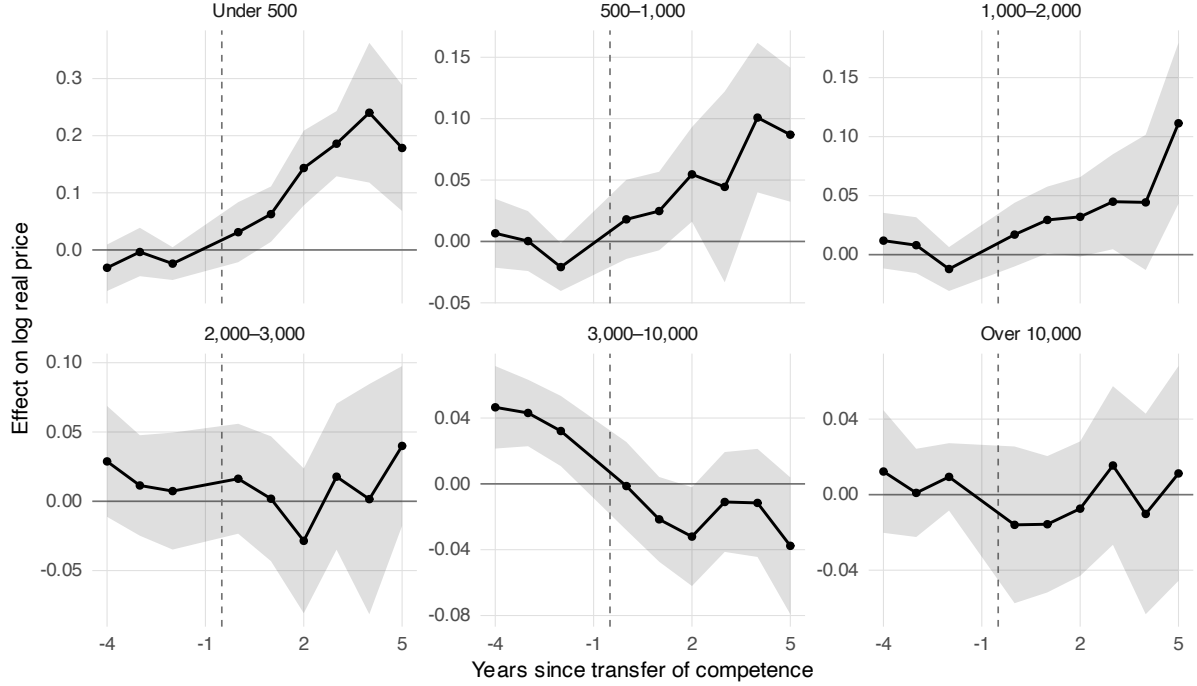


Figure 5: Dynamics of the tariff adjustment, by size of the transferred service

6.5 Average effect on the tariff level

For completeness we report the average effect of the transfer on the tariff level. Estimated by [Sun and Abraham \(2021\)](#) on 1,937 treated and 8,175 never-treated units, it is 0.047 (s.e. 0.012); the doubly robust estimator of [Callaway and Sant’Anna \(2021\)](#) gives 0.036 (s.e. 0.014). At the 2024 median tariff this is roughly 12 € a year for a household at the reference consumption. The profile rises over four years rather than jumping, consistent with the gradual convergence documented above. This estimate is reported as context rather than as a claim of the paper, for reasons set out in Section 7.

7 Robustness checks

7.1 Alternative estimators and parallel trends

The doubly robust estimator of [Callaway and Sant’Anna \(2021\)](#) gives an average effect on the tariff level of 0.036 against 0.047, with the same sign and significance; at three and five years the two estimators give 0.048 and 0.055 against 0.071 and 0.068.

That estimator also delivers a joint test of the pre-treatment coefficients, which rejects. The pre-treatment path is not flat: it runs from +0.013 at $k = -4$ to -0.020 at $k = -2$. Applying the sensitivity analysis of [Rambachan and Roth \(2023\)](#) to the level effect, the confidence interval covers zero once the post-treatment violation is allowed to reach a quarter of the largest pre-treatment deviation. The average effect on the tariff level is therefore not robust to a departure from parallel trends, and we do not treat it as a finding of the paper.

This does not extend to the convergence results. Equation (1) compares units transferred to the same authority on the same date and does not use never-treated units to build its

counterfactual, so a differential trend between transferring and non-transferring municipalities — which is what the test detects — leaves β unaffected. The relevant placebo for the convergence design is the set of pre-treatment coefficients in equation (2), which are close to zero, and for the contractual result the pre-treatment interaction with residual duration reported in Section 6.3.

7.2 Robustness of the size gradient

Estimating the gradient by interacting a post-treatment indicator with size bands in a single two-way fixed effects regression preserves the shape but compresses the amplitude, by about four percentage points at each end of the size distribution. This is the bias one expects when treatment timing is staggered and effects are heterogeneous across cohorts: the conventional specification would have understated the redistribution we document.

Table 11 reports the average adjustment under eleven variants of sample construction and cleaning. It lies between 0.042 and 0.053 in nine of them.

Table 11: Sensitivity to sample and cleaning choices

Specification	Estimate	Std. error	Treated units
Baseline	0.047	0.012	1,937
Control group restricted to surviving units	0.047	0.012	1,937
All missions included	0.042	0.010	2,287
Cohorts 2014–2020	0.045	0.013	1,718
Cohorts 2015–2021	0.049	0.013	1,656
Statutory cohorts only (2018, 2020)	0.053	0.018	1,108
Tariff bounds 0.25–8	0.046	0.011	1,937
No upper tariff bound	0.047	0.012	1,937
Winsorised at 1st/99th percentile	0.045	0.011	1,937
Directly managed services only	0.093	0.018	1,135
Delegated services only	0.005	0.010	771

Notes. Average effect on the log real tariff, Sun and Abraham (2021), unit and year fixed effects, standard errors clustered on the organising authority. The last two rows are not a robustness check but a result, consistent with Section 6.3: the tariff level moves in directly managed services and does not move in delegated ones.

7.3 Inference with few clusters

Identification of the convergence coefficient rests on 128 receiving perimeters, and that of the contractual result on 82. Conventional cluster-robust inference is asymptotic in the number of clusters and over-rejects when that number is small, so we recompute all p -values by wild cluster bootstrap with the null imposed, using 999 replications and Rademacher weights drawn at the level of the perimeter (Cameron et al., 2008). Table 12 sets the two sets of p -values side by side.

The convergence coefficient of equation (1) survives intact: the bootstrap p -value is below 0.001, the bootstrap confidence interval runs from -0.387 to -0.203 , and substituting Webb weights leaves both unchanged. The same holds for the two slopes of Table 6, each significant at below 0.001 in bootstrap. The level coefficient on Post is confirmed indistinguishable from zero,

with a bootstrap p -value of 0.93, which settles the question of whether harmonisation proceeds towards a point above the inherited average: it does not.

The contractual contrast is where the correction bites. The coefficient on the expired regime returns a bootstrap p -value of 0.036 against a conventional one below 10^{-6} , and the difference between the two regimes, significant at the one per mille level under conventional inference, returns a bootstrap p -value of 0.196. The 138 post-expiry observations are concentrated in a minority of perimeters, and resampling at that level widens the distribution of the test statistic considerably. We report that difference as a magnitude throughout the paper for this reason, and the contractual reading rests on the concordance of three independent cuts of the data rather than on this coefficient alone.

Table 12: Conventional and wild cluster bootstrap inference

Coefficient	Estimate	t	Conventional p	Bootstrap p	Clusters
<i>Convergence, equation (1)</i>					
Post $\times$ gap	-0.294	-7.31	<0.001	<0.001	128
Post	0.003	0.08	0.935	0.930	128
<i>By management mode, equation (3)</i>					
Direct management	-0.288	-6.33	<0.001	<0.001	116
Delegated	-0.223	-4.72	<0.001	<0.001	116
<i>By contractual regime, equation (4)</i>					
Contract still running	-0.154	-3.84	<0.001	<0.001	82
Contract expired	-0.383	-4.91	<0.001	0.036	82
Difference (expired – running)	-0.229	-3.40	0.001	0.196	82

Notes. Wild cluster bootstrap with the null imposed, 999 replications, Rademacher weights drawn at the level of the receiving perimeter. The smallest attainable bootstrap p -value is therefore 0.001. Substituting Webb weights on the convergence coefficient leaves the p -value and the confidence interval unchanged. The difference between contractual regimes is obtained by reparametrising equation (4) so that the coefficient on the expired regime measures the difference directly.

7.4 A budgetary mechanism ruled out

Article L.2224-2 CGCT forbids a local authority from covering the costs of an industrial and commercial public service out of its general budget, but exempts municipalities of fewer than 3,000 inhabitants and intermunicipal bodies none of whose members exceeds that threshold. This suggests an alternative account of the size gradient: a small municipality subsidising its service would lose the exemption on transferring to a body containing a larger member, and its tariff would rise to full cost recovery irrespective of what its new peers charge.

The data do not support it. Among treated units below the threshold, those transferring to a body containing a larger member — and so losing the exemption — experience an average increase of 4.4 per cent, against 17.1 per cent for those transferring to a body composed entirely of small municipalities, which retain it. And the share of units reporting a pre-transfer tariff below one euro per cubic metre is 4.2 per cent among the first group and 4.3 per cent among the second. The gradient is a size effect, continuous and without discontinuity at the statutory threshold, rather than the consequence of a budgetary rule.

8 Discussion

8.1 Transferring the competence is not transferring the price

The premise underlying consolidation reforms is that vesting a single authority with pricing power over an enlarged territory will produce a single price over that territory. Our results indicate that the first proposition does not entail the second, and that the interval separating them is long enough to matter for how such reforms should be assessed.

A French intermunicipal authority operates ten distinct wastewater tariffs on average, and this figure is essentially unchanged five years after it acquires the competence. What the reform creates immediately is a single tariff-setting body; what it creates only slowly, if at all within our window, is a single tariff. Nor is this a transitional irregularity awaiting correction. As Section 2 sets out, the equal-treatment principle binds within a service rather than across an authority, so differentiated tariffs under one authority are lawful and may persist indefinitely. An authority that never harmonises is not in breach of anything.

Convergence does occur, but it is partial and it does not accelerate. The coefficient falls from -0.10 in the year of transfer to -0.52 after five years, and half of the initial gap remains at that horizon with no plateau in sight. A municipality whose tariff exceeded the average of its new perimeter by fifty cents per cubic metre still pays roughly twenty-five cents more than its new peers half a decade after the authorities merged.

The implication for reform design is that a transfer of competence is a necessary condition for tariff unification and not a sufficient one. Where uniformity is the objective — and the parliamentary debate of 2025 suggests that legislators believed it would follow automatically — the instrument must be specified accordingly. Several regulators impose harmonisation schedules when operators merge, requiring convergence within a stated horizon; nothing comparable governs the French wastewater reform, and the outcome is a decade of lawful tariff heterogeneity inside jurisdictions that were merged precisely to eliminate it.

8.2 Contracts as the pacing constraint

If harmonisation is slow, the natural explanation is political. Raising the tariff of the municipalities that must catch up is costly for an assembly in which those municipalities are represented, so authorities phase the adjustment in. Our evidence points elsewhere. The pace is set, to a substantial degree, by the stock of delegation contracts the authority inherits and whose expiry dates it did not choose.

The pattern is consistent across three cuts of the data. Services under direct management converge faster than delegated ones, by 0.13 once local cost shocks are absorbed. In the year of the transfer itself, directly managed services have already closed 12.4 per cent of their gap against 2.9 per cent for delegated ones. And the delegated convergence path advances slowly through the third year and then breaks, at the point where the median inherited concession reaches its term. Within delegated services, the point estimate of convergence is -0.15 while the concession runs and -0.38 once it has expired, though this last contrast rests on few post-expiry observations and we treat it as a magnitude rather than as a test (Section 6.3).

The mechanism is not peculiar to wastewater or to France. Any territorial reorganisation

of a partially delegated sector inherits a portfolio of contracts, and the maturities in that portfolio govern the speed at which the reform can take economic effect. A reform may be legally immediate and economically spread over a decade. Which of the two it is depends on the distribution of contractual maturities at the moment of enactment — a variable no reformer chooses, that appears in no impact assessment, and that is nonetheless observable in advance.

This suggests a design implication that is unusual in its concreteness. The expected pace of a consolidation reform can be forecast, before enactment, from the maturity structure of the contracts in force in the sector concerned. Where that structure is unfavourable, the legislator has a choice: accept a slower transition, or provide expressly for the renegotiation or early termination of inherited contracts, which is legally possible in French law but requires compensation of the operator and is therefore costly. Our estimates do not price that trade-off, but they do establish that it exists and that ignoring it means accepting a transition of roughly the length of a concession.

8.3 Who pays, and how visibly

Convergence towards a common tariff is a transfer among the members of the new perimeter, and its incidence is regressive in service size. Units serving fewer than 500 inhabitants see their tariff rise by 12.6 per cent on average and by 24 per cent four years after the transfer, which at the median tariff of that stratum amounts to some 60 € a year for a household consuming the reference volume, on a bill of roughly 220 €. Units between three and ten thousand inhabitants see a small decrease. The gradient is monotone and survives estimation without any partition of the size distribution.

Two features of this redistribution deserve emphasis. It is not a by-product of efficiency gains passed through unevenly: it follows directly from uniform pricing over a territory of heterogeneous cost, and would occur even if consolidation changed no cost at all. And it is not announced. The transfer of competence was presented as an efficiency reform; the redistribution it produces among member municipalities appears in no impact assessment and was not quantified when Parliament debated the repeal of the obligation in 2025.

That debate turned on the apprehension that transferring the competence would raise tariffs in small rural municipalities. Our estimates indicate that the apprehension was well founded in direction, and that the relevant threshold lies around two to three thousand inhabitants rather than at any figure invoked in the debate. They also indicate that the adjustment is small in any single year — three per cent in the year of the transfer among the smallest services — which raises a question the evidence alone cannot settle. Slow harmonisation spreads the burden and renders it less salient, which may be desirable if the objective is to avoid a tariff shock in municipalities with limited capacity to absorb one. It also means that a redistribution of consequential magnitude proceeds without ever presenting itself as a decision that anyone took. Whether that is a virtue of the arrangement or a defect of its transparency is a judgement we leave to the reader, but it is a judgement that ought to be made explicitly rather than inherited from the contractual calendar.

8.4 Limitations

Three limitations bear on how the results should be read.

Reporting below 3,500 inhabitants is voluntary, so the smallest services in our sample are those that chose to report, plausibly the better administered among them. Our estimates for that range describe reporting services rather than all small services.

Units dissolved into a pre-existing service at the moment of the transfer leave the sample. They are disproportionately directly managed and smaller than those that survive as identifiable units — consistent with the contractual mechanism of Section 6.3, since a delegated service cannot be merged before its contract expires — and their exclusion attenuates the estimates.

Finally, the tariff we observe is a single point on the schedule, the bill for a reference consumption of 120 m³. Convergence in that point need not imply convergence in the whole schedule, and an authority could in principle align headline tariffs while retaining differentiated standing charges.

9 Conclusion

Consolidation reforms in local utilities rest on the premise that vesting a single authority with pricing power over an enlarged territory will produce a single price over that territory. Using the universe of French wastewater services between 2008 and 2024, and following 1,937 municipal services through the transfer of their competence to an intermunicipal body, we have subjected that premise to a direct test. It does not hold within the horizon we observe, and the reasons why are informative for the design of such reforms elsewhere.

Three findings support this conclusion. Consolidated authorities do not merge the services they take over: a French intermunicipal body operates ten distinct wastewater tariffs on average, and this figure is unchanged five years after it acquires the competence. Convergence towards the population-weighted average tariff of the perimeter does occur, but partially and without acceleration: the convergence coefficient moves from -0.10 in the year of transfer to -0.52 after five years, so that half the initial gap survives half a decade of common authority. And the pace of that convergence is governed less by political choice than by the stock of delegation contracts the authority inherits. Services under direct management close 12.4 per cent of their gap in the year of the transfer against 2.9 per cent for delegated ones; among delegated services the convergence path advances slowly and then breaks at the point where the median inherited concession reaches its term.

The incidence of harmonisation, when it comes, falls on the smallest members of the new perimeter. Services below 500 inhabitants see their tariff rise by 12.6 per cent on average and by 24 per cent four years after the transfer, which amounts to some 60 € a year for a household at the reference consumption; services above three thousand inhabitants see a small decrease. This is redistribution in the strict sense, following from uniform pricing over a territory of heterogeneous cost rather than from any change in the cost of the service, and it received no quantification when Parliament debated the repeal of the transfer obligation in 2025.

The mechanism we identify is not specific to wastewater, nor to France. Any territorial reorganisation of a partially delegated sector inherits a portfolio of contracts whose maturities

govern the speed at which the reform can take economic effect, and a reform that is legally immediate may in consequence be economically spread across a decade. Italy and Portugal have pursued comparable consolidations in water and sanitation, and the question of whether England and Wales should reorganise the boundaries of its regional monopolies recurs periodically; in each case the maturity structure of contracts in force is observable before enactment, and would permit the expected pace of the transition to be anticipated rather than discovered.

Two questions we cannot settle bear directly on how these results should be read. The first is whether tariff convergence is accompanied by cost convergence. We observe prices, not the costs behind them, and the two coincide only where a cost-recovery constraint is effectively enforced; if consolidation generates operating savings, part of the movement we attribute to harmonisation may reflect a genuine change in cost. The ancillary budget accounts of the authorities would settle the matter, and we regard this as the most promising extension of the present work. The second is what happens beyond five years. Convergence has not plateaued at the end of our window, and we cannot say whether it eventually completes, stabilises at partial harmonisation, or resumes as further concessions expire. The last of these is what our mechanism predicts, and it becomes testable as the panel lengthens.

What the evidence does establish is that creating a single tariff-setting authority is not the same as creating a single tariff, and that the distance between the two is measured in contract years.

Statements and Declarations

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Data availability. The data that support the findings of this study are publicly available from the Système d’information sur les services publics d’eau et d’assainissement (SISPEA), operated by the Office français de la biodiversité, at <https://www.services.eaufrance.fr>. The code used to assemble the panel and to produce the results reported in the paper is available from the corresponding author on reasonable request.

Author contributions. Both authors contributed to the study conception and design. Data collection and analysis were performed by Mehdi Guelmamen. The first draft of the manuscript was written by Iannis Reuter, and both authors commented on previous versions. Both authors read and approved the final manuscript.

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A Data construction

This appendix documents the construction of the panel, the correspondence between the variables used in the paper and their codes in the national register, the cleaning rules applied to the tariff variable, and the coverage of the resulting sample. All computations are reproducible from the replication scripts.

A.1 Variable definitions and register codes

The register identifies its indicators by codes of the form $Dnnn$, $Pnnn$, $VP.nnn$ and $DC.nnn$, the first two designating published indicators and the last two the underlying reported values. Table 13 gives the correspondence with the variables used in the paper.

Table 13: Correspondence between paper variables and register codes

Paper variable	Code	Definition
Tariff	D204.0	All-inclusive price per cubic metre for an annual consumption of 120 m ³ , in force on 1 January of the year following the reporting fiscal year
Operator's share	VP.177	Tax-exclusive amount accruing to the private operator for 120 m ³
Authority's share	VP.178	Tax-exclusive amount accruing to the organising authority for 120 m ³
Levies and tax	VP.179	Levies collected on behalf of the water agencies, inclusive of value-added tax, for 120 m ³
Standing charge, operator	VP.190	Annual fixed charge accruing to the operator, tax-exclusive
Standing charge, authority	VP.191	Annual fixed charge accruing to the organising authority, tax-exclusive
Tax rate	VP.213	Applicable rate of value-added tax
Population served	—	Population served by the management unit, excluding double counting
Municipalities served	—	Number of municipalities having transferred the competence to the management unit
Functions	—	Three binary indicators for collection, transport and treatment
Management mode	—	Direct public management or delegation, with the statutory form of the contract
Contractual expiry	—	End date of the delegation contract in force

Notes. The three components VP.177, VP.178 and VP.179 sum to the tax-inclusive bill for 120 m³, so that D204.0 is their sum divided by 120. Variables without a code are descriptive fields of the reference table rather than numbered indicators.

A.2 Panel assembly and entity tracking

The register is published as one file per fiscal year. We stack the seventeen vintages covering 2008 to 2024, harmonising column labels across vintages and reading all fields as text before coercing types, so that a field left empty in one year does not alter the type of the stacked column. The 2025 and 2026 vintages are excluded: no indicator is reported for either, and the count of municipal management units rises between them, from 6,838 to 7,529, indicating that units already dissolved are still listed in the reference file.

Each management unit is then classified according to the sequence of organising authorities recorded over its lifetime. A unit is a *switcher* if it is organised by a municipality up to some year and by a supra-municipal body from the following year onwards, without reversal; *always municipal* if no supra-municipal organiser is ever recorded; *always supra-municipal* if no municipal organiser is ever recorded. Eighty units display an irregular sequence, alternating between the two statuses, and are excluded throughout. Table 14 reports the resulting classification.

Table 14: Classification of management units

Status	Units
Always municipal	12,697
Always supra-municipal	4,572
Switching from municipal to supra-municipal	2,875
Irregular sequence	80
Total	20,224

Of the 2,875 switchers, 1,937 transfer between 2013 and 2021 and form the treated sample. Earlier cohorts have too few pre-transfer years given that reporting is thin before 2012; later ones have too few post-transfer years before the panel ends.

A.3 Cleaning of the tariff variable

Of the 91,702 reported tariff observations, 334 are discarded. The rule is asymmetric by design, and Table 15 sets out its components.

Table 15: Tariff observations discarded

Rule	Observations	Rationale
Tariff equal to zero	282	Non-response coded as zero; a wastewater service provided free of charge does not exist in French law
Tariff in $(0, 0.10]$	6	Isolated in a gap of the density; consistent with a factor-of-ten or factor-of-hundred entry error
Tariff above 10	46	Annual bills entered in the unit price field; verifiable from the components, the largest reported value of 274 corresponding to a bill of 244 € for 120 m ³
Total	334	0.36% of reported observations

No winsorisation is applied. The 1,248 observations below 0.50 €/m³ are retained: 95.6% are municipal services, 98% serve fewer than 3,000 inhabitants, and their median population served is 156. They form the low tail of a continuous distribution rather than a separate mode, and compressing them would compress the outcome the paper measures.

Two further restrictions apply to the estimation sample. Units not performing all three functions are excluded, since their tariff covers only part of the bill paid by users; they represent 18.6% of unit-year observations. And the convergence specification is restricted to receiving perimeters taking over at least two units, without which the perimeter benchmark cannot be computed.

A.4 Coverage

Table 16: Annual coverage of the panel

Year	Units	Authorities	Municipalities	Population (m)	Tariffs reported	% reporting
2008	16,099	15,558	27,439	61.7	1,214	7.5
2009	16,546	15,895	28,559	62.8	4,961	30.0
2010	16,582	15,838	29,070	63.4	4,977	30.0
2011	16,689	15,919	29,485	63.6	5,478	32.8
2012	16,705	15,884	29,542	63.6	5,664	33.9
2013	16,606	15,585	29,938	63.7	6,535	39.4
2014	16,144	15,035	29,575	63.7	6,596	40.9
2015	16,059	14,759	29,533	63.8	6,615	41.2
2016	15,661	14,263	29,174	64.2	6,532	41.7
2017	15,211	13,383	28,881	64.5	6,849	45.0
2018	14,022	11,700	29,058	64.5	6,778	48.3
2019	13,305	10,851	28,773	63.7	6,861	51.6
2020	12,423	9,211	28,832	64.1	6,739	54.2
2021	12,263	9,071	28,697	64.1	6,847	55.8
2022	11,949	8,914	28,511	65.7	6,941	58.1
2023	11,608	8,672	28,277	65.8	7,655	65.9
2024	11,121	8,381	28,369	66.2	7,786	70.0

Notes. “Municipalities” is the sum across management units of the number of municipalities having transferred the competence, and may exceed the number of distinct municipalities where a municipality adheres to more than one unit, for instance where collection and treatment are organised separately.

A.5 Reporting rates by size of service

Reporting is mandatory for authorities serving more than 3,500 inhabitants only since 2016, and voluntary below that threshold throughout. Table 17 reports the share of municipal management units reporting a tariff, by year and by size band.

Table 17: Share of municipal management units reporting a tariff (per cent)

Year	<500	500–1k	1k–2k	2k–3k	3k–10k	10k–50k	>50k
2008	2.6	5.3	9.2	14.1	16.6	13.7	45.5
2009	16.3	27.2	37.0	44.4	53.1	63.1	58.8
2010	17.3	29.9	39.4	43.3	46.2	40.4	53.3
2011	23.1	33.8	39.9	41.3	44.2	38.8	57.1
2012	21.4	35.2	42.8	44.0	48.9	42.0	78.6
2013	26.4	41.6	47.8	52.4	52.8	46.5	85.7
2014	27.0	42.7	48.9	49.3	52.3	54.1	85.7
2015	27.0	42.3	46.4	49.6	55.6	53.5	100.0
2016	27.8	41.6	46.5	51.0	56.0	63.2	100.0
2017	30.6	44.6	48.3	52.9	55.9	61.4	100.0
2018	32.3	45.3	50.8	49.7	54.3	60.8	88.9
2019	36.2	49.0	50.8	49.2	55.3	60.0	71.4
2020	35.7	48.8	53.8	57.7	61.5	50.0	100.0
2021	37.7	50.3	53.3	58.1	62.8	54.9	100.0
2022	40.4	52.7	56.7	59.5	69.1	62.0	100.0
2023	51.8	63.8	66.0	65.8	71.9	77.6	100.0
2024	56.8	66.5	70.1	73.0	77.2	81.8	100.0

Notes. Municipal management units only. Size bands are defined on population served. The statutory reporting obligation introduced in 2016 applies above 3,500 inhabitants, which falls inside the 3,000–10,000 band; reporting below that threshold remains voluntary throughout the period. The rates in the largest band are computed on small numbers of units, which explains their volatility.

Among the 1,937 treated units, 39.7% report a tariff in at least one of the three years preceding their transfer and therefore enter the convergence sample, with 2.1 pre-transfer observations on average. Comparing those that do with those that do not, the two groups differ little in management mode — the share under direct management is 77.6% and 80.7% respectively — and more in size and equipment: median population served of 760 against 565, and 1.22 treatment plants on average against 0.72. The latter difference indicates that non-reporting units are disproportionately collection-only services already connected to a separately organised treatment facility, which the functional restriction excludes in any case.