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Résumé: Si dans de nombreux pays, les municipalités sont les principaux pourvoyeurs d'emploi au niveau local, les déterminants de la demande municipale de travail sont étonnamment peu étudiés. Dans la mesure où l'inter-communalité prive les communes de certaines de leurs compétences, l'emploi inter-communal augmente mais la nature et l'ampleur de la réaction des municipalités (en termes d'emploi) sont a priori inconnues. Nous exploitons un panel original de 8362 communes de plus de 1000 habitants sur la période 2002 à 2008. Pour identifier l'effet causal du salaire et de l'emploi inter-communal, nous construisons des instruments inspirés d'une méthodologie utilisée en économie industrielle. Nous utilisons la carte des zones d'emploi et des EPCI (Établissements Publics de Coopération Inter-Communale) pour définir le voisinage d'une municipalité et calculons une moyenne pour le salaire et l'emploi inter-communal sur ce voisinage. Nous mettons d'abord en évidence que les salaires des employés municipaux, les dotations de l'État, le revenu médian des habitants et la richesse fiscale communale expliquent la demande,les salaires étant le facteur le plus important. Ensuite, l'intensité de la coopération inter-communale, mesurée par l'ampleur de l'emploi inter-communal, est un autre déterminant clé, l'emploi inter-communal affectant positivement la demande municipale (effet direct de la coopération). Nous identifions par ailleurs un effet indirect de la coopération, selon lequel la coopération pousse les municipalités à embaucher quand le chômage augmente. Enfin,en contrôlant pour l'ampleur de l'emploi inter-communal, nous montrons que l'effet indirect de la coopération est plus fort pour les communes appartenant à des EPCI dans lesquels l'emploi inter-communal est important que pour celles qui sont hébergées dans des EPCI « coquilles vides » (où l'emploi inter-communal est faible).
Mots-clés: demande de travail municipal ; coopération inter-communale ; modèle de l'électeur médian ; variables instrumentales ; données de panel.
Codes JEL: H70, J45, C23

Inter-Municipal Cooperation and Municipal Employment: Evidence from France

Abstract: While in many countries municipalities are major employers, studies of the determinants of their labor demand are surprisingly scarce. Since municipalities in inter-municipal cooperation (IMC) bodies lose some of their responsibilities, IMC employment increases but the nature and the size of the municipal reaction are a priori unknown. We build an original balanced panel dataset of 8,362 municipalities of more than 1,000 inhabitants in France over the 2002-2008 period. In order to identify the causal effect of wages and IMC employment, we construct instruments inspired from the industrial organization methodology. We take advantage of the geographical partitions of the French employment zones and IMC bodies to delimit a neighborhood on which we calculate an average wage and average IMC employment.We first show that wages, grants, median income and tax capacity explain the labor demand, wages being by far the main driving force. Second, we evidence a positive impact of the IMC employment on municipal employment (direct IMC effect). Third,we find that IMC leads mayors to increase municipal employment when unemployment is higher (indirect IMC effect). Finally, controlling for the magnitude of the IMC employment level, it turns out that the indirect IMC effect is greater for municipalities nested in large employment cooperation bodies than in small ones.
Keywords: Inter-municipal cooperation, Municipal employment, Median voter model, Instrumental variables, Panel data
JEL Codes: H70, J45, C23

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1 Introduction

Since municipalities are important employers in many countries, it is an important issue to understand what explains their labor demand (see Bergström et al. (2004) and Lundqvist et al. (2014) for studies on Swedish data). Our objective in the present paper is to adress this question using French data over the period 2002-2008, which to the best of our knowledge has not been studied yet.

There are actually different reasons to tackle the question of disentangling the driving forces of municipal labor demand. First, the French municipalities represent 64 % of total employment at the local governments level[1] in 2002 and 57 % in 2008[2]. Second, the French municipalities' wage bill[3] increased on average by 3,51% each year over the period[4]. As governments and specially local ones are operating in tight budgetary contexts, the sources of this increasing trend should be identified in order to reduce or control these expenditures[5]. Third, it is important to understand the causes of municipal employment in a context of increasing cooperation between municipalities. As one of the inter-municipal cooperation (IMC) justification was the costs savings[6], it is interesting to consider the relationship between the employment decisions at the municipal and inter-municipal levels respectively. If the competencies transfer from municipalities to IMC bodies leads naturally to an increase of employment at the IMC level, the way it translates in terms of employment at the municipal level remains unknown at first glance. Finally, since unemployment is a major concern, we also investigate whether the local unemployment has an impact on municipal employment.

We exploit an original balanced panel dataset of 8,362 French municipalities of more than 1,000 inhabitants over the 2002-2008 period. We estimate our labor demand equation using a 2SLS method where all variables are first-differenced and assuming fixed municipal effects. Our results, detailed below, are obtained using an IV estimation method owing to endogeneity issues. First, the municipal employees' wage might be suspected of endogeneity. Though there exists a national wage scale fixing the base salary, mayors can decide to give bonuses a greater share in the wages and benefits package. They can also make the promotion process faster. Moreover, mayors decide on the labor force composition in terms of skills. Second, the IMC employment level can not be considered as exogenous since, first, mayors transfer to the IMC level some competencies that they used to have, and second, they send delegates chosen among municipal counsellors to represent the municipality in the IMC council.

[1] The regions, counties and municipalities constitute the local governments.

[2] Bulletin Informations Statistiques 75 de la DGCL, 2010 and the report Les collectivités locales en chiffres, 2019.

[3] Over the period the wage bill weighed around 50% of the operating budgets.

[4] From 2000 to 2019, it increased on average by 2,63 % each year.

[5] Despite the decrease, over the period, of the wage base point that determines the public sector pay, the wage bill increased. This may happen if mayors hire more personnel but also for reasons on which they have no control: the seniority rules governing the personnel careers increase mechanically the wage bill as well as the measures adopted at the national level and implemented at the local level.

[6] A large number of municipalities being very small (80 % of them have less than 1,000 inhabitants), besides IMC, merging was alos recommended and resulted in the creation of new municipalities (see e.g. Blesse and Baskaran (2016) for the impact of mergers on costs).

In order to identify the causal impact of the municipal wage on the municipal employment, we exploit the geographical partition in terms of employment zones (EZs) which are used to study the sectoral structure of employment in local labor markets. We build an instrument inspired from the industrial organization methodology (Hausman et al. (1994) and Azar et al. (2019)), *i.e.* an average public wage computed on the neighborhood of the EZ to which the municipality belongs. As endogeneity might be generated by local inobservable factors, the neighboring[7] average wage is likely to reflect movements of wages that are independent of local circumstances.
Along the same line, we exploit the geographical partition of the IMC bodies in order to instrument IMC employment. The average IMC employment and the average share of second homes[8] calculated on the IMC body's neighborhood[9] constitute our two instruments.

We first give causal estimates of municipal employment elasticities with respect to the main factors identified in the literature[10], such as the public employees' wages, grants received from the central government, the tax capacity and households median income. We show that the impact of wages on municipal labor demand is highly significant, with an estimated elasticity of less than one in absolute value. This makes wages the main driving force behind labor demand. As far as we know, this is the first work on French data providing an estimate of this elasticity. The impact of the main central government transfer is significant and positive although the magnitude of the elasticity is rather small. The median income estimated elasticity is found positive and significant and its magnitude is large compared to grant elasticity (more than four times higher). The data exhibit a political cycle effect[11]. This is in line with the traditional public choice point of view that politicians in office tend to have opportunistic behavior in order to maximize their chances of re-election. We show that mayors have their own self-serving agenda: they increase municipal employment in pre-electoral periods.

Second, we study explicitely the relationship between employment respectively at the municipal and inter-municipal levels. Our analysis provides a positive causal impact of IMC employment on municipal employment, which we call *direct IMC effect*. This finding reveals that IMC does not lead to municipal personnel downsizing, although IMC, according to its advocates, is expected to allow economies of scale inducing cost savings. This positive impact is actually the result of a combined effect of IMC membership. First, the transfer of municipal responsibilities to the IMC level leads to a substitution effect. However, mayors are allowed to offer new municipal public services which yields a complementarity effect. The dominance of the complementarity effect over the substitution effect explains the net positive *direct IMC effect*.

[7] By neighborhood, we mean the municipalities members of EZs close to the EZ to which the municipality belongs, and within the same county.

[8] The number of second homes is taken into consideration to compute the grant allocated by the central government to the municipality.

[9] The IMC neighbors are those having the same population size and fiscal regime as the considered IMC body and located within the county of the IMC chief town.

[10] See Ehrenberg and Schwarz (1986), Gregory and Borland (1999).

[11] Local elections were held on 2001 and 2008 because of presidential elections which were organized in 2002 and 2007.

Third, we focus on the interplay between unemployment in the municipality, IMC membership, the extent of cooperation at the IMC level and local politics. We consider whether the mayor is concerned with local unemployment and whether his hiring decisions might be influenced by political partisanship. We show the existence of an *indirect IMC effect*: mayors employ more people when unemployment is higher. This suggests that when mayors control a reduced range of local public services due to the transfer to the IMC level, as members of an IMC, they tend to be more sensitive to unemployment. Moreover, they have access to additional resources within the IMC body (both fiscal revenues and grants) so that they are more inclined to seek to cope with unemployment.
Controlling for the magnitude of the inter-municipal employment, it turns out that the *indirect IMC effect* is greater for municipalities nested in large employment cooperation bodies than in small ones. Unfortunately, we do not find any effect of local politics.

Among the rare studies on local governments' labor demand, the closest to our analysis focus on municipal labor demand in Sweden. Bergström et al. (2004) studied the effects of grants and wages on municipal labor demand over the period 1988-1995. They also investigate the effects of a reform in 1993 which changed the grants from targeted to general. They find that intergovernmental grants affected municipal labor demand more before the reform than afterwards. Lundqvist et al. (2014) looked at Swedish local public employment over the period 1996-2004, and showed that the impact of grants on total local employment is not statistically significant. Running the estimation to evaluate the impact on the different sectors (childcare, schools, elderly care and social welfare...) they found no impact on employment in the latter sectors but a positive and significant impact on administrative personnel. This result echoes that of Dahlberg and Mörk (2006), based on the study of employment in Swedish municipalities over the period 1990-2002, which shows that increased wages for bureaucrats have a smaller effect on labor demand than increased wages for other types of public employees.
These different papers analysing municipal labor demand in Sweden, and those published earlier by Courant et al. (1979) and others (see surveys by Gregory and Borland (1999) and Alesina et al. (2000)) give contrasting empirical results on the explanatory factors of municipal demand.
The comparison of the magnitude of the respective effects of the median income and the grant on public spending is a common issue in the literature. It has led to the existence of the fly-paper effect[12]. According to this effect, an extra euro of grant leads to larger public spending than would an extra euro of the median voter's income. Our results show that this effect does not hold when municipal employment is studied, whereas former French studies have shown this to be the case when considering total municipal spending. We find a political cycle effect in line with the abundant literature both theoretical on the effect of elections on policies decided by incumbents (Besley and Case (1995) and Besley and Case (2003)) and empirical (see, among others, the analyses of municipalities' spending by Veiga and Veiga (2007) on Portuguese data and Foucault et al. (2008) on French data).

The developing research on the impact of IMC on different economic variables illustrates the importance of the issue. Among the contributions using French data, Tricaud (2019) exploits a natural experiment–the 2010 reform that forced municipalities to join an IMC

[12] See Hamilton (1986) and Hines and Thaler (1995) among others.

body by 2014– and evidences how the determinants of the reluctance to cooperate vary across municipalities. Unfortunately, our dataset (2002-2008) does not allow us to take into account this reform. The other contributions adress the impact of IMC on local taxation (see, among others, Ly and Paty (2020) and Breuillé et al. (2018)) or local spending (see Frère et al. (2014) and Leprince and Guengant (2002)).

As for the relationship between unemployment and public employment, two strands in the literature are worth noting. First, studies of the impact of public employment on the labor market and unemployment exist both at the aggregate level (see Algan et al. (2002)) and the local level (see for example Jofre-Monseny et al. (2020)). Their conclusion is that hiring more public employees leads to lower private sector employment, a crowding-out effect found in different studies (see among others Faggio and Overman (2014) and Caponi (2017)). Second, two important contributions on employment in French hospitals are more directly linked to our work. Clark and Milcent (2011) and Clark and Milcent (2018) found a highly significant and positive impact of unemployment on employment in public hospitals headed by mayors.

The paper is organized as follows. Section 2 presents institutional facts related to French municipalities and focuses on the process of IMC. We develop our theoretical model and its predictions in Section 3. Section 4 lays out the data and the identification strategy and provides an analysis of the instruments validity. The empirical results are given in Section 5. Robustness checks are conducted in Section 6 and Section 7 concludes the present work sketching possible ways of enriching the analysis.

2 Institutional facts about French municipalities

2.1 Municipalities' budgets

The municipalities' resources consist mainly of tax revenues and grants from the central government, borrowing being used only to finance investment spending. More precisely, the municipalities decide on four direct local taxes: the residence tax, the property tax on developed land and the property tax on undeveloped land are levied on households. The base depends on the rental value. The business tax is paid by firms and its base is the firm's capital. The municipal tax capacity is defined as the tax revenues that could be obtained out of the local tax bases if the national average tax rates were applied in the municipality.

The major transfer received from the central government is the *Dotation globale de fonctionnement* (DGF), a lump-sum grant allocated to municipalities in order to help them in their operating budget. It also has a fiscal equalization objective. It is a general grant so that local governments can freely use it. Its allocation is based on a set of criteria reflecting the characteristics of municipalities, among them tax capacity. Besides this DGF, many targeted subsidies are granted to local governments by different State Departments, according to so many different rules that a reform was called for. Therefore, a merging of the different grants was implemented in 2004, the former DGF (in 2003) representing half the new DGF in 2004 at the national level. This could have led the municipalities to the misleading perception that the central government was more generous in 2004 than in 2003.

2.2 Local government architecture in France

France is a unitary country with three tiers of local governments: the regions, counties, *i.e.* *départements* and municipalities[13]—from the largest to the smallest—form the local civil service. Though decisions taken at the national level have to be implemented at the local level, local authorities also do have their own prerogatives. They are responsible for childcare, pre-school and elementary school, care for the elderly, water distribution, waste collection and local roads. However, the law leaves them free to develop a wide range of additional and optional local public services such as tourism, sports and culture. Moreover, the principle of free administration permitted by the French Constitution allows the local authorities to set public employment at the level they wish.

Over our period of study (2002-2008) the number of municipalities is almost constant (36,569 in 2008, excluding overseas). The high fragmentation at the municipal level—20,200 municipalities have less than 500 inhabitants—has motivated governments to foster IMCs. The objectives were to reduce tax competition between municipalities in the same employment zone, to reduce the costs of local public services via economies of scale, and to create new public services that were not provided before. This movement, first initiated by a 1992 Act (followed by a 1999 Act), has successfully promoted the creation of many IMC structures. There were 2,601 IMC bodies in 2009. The 2010 Act required every municipality to be a member of an IMC structure by 2014 (there are 1,258 in 2019).

IMC structures differ according to their jurisdictional type, fiscal regime, population size and the scope of competencies that may be transferred. The principal jurisdictional types are the *communautés de communes* (hereafter CC), chosen in majority by municipalities in rural areas, the *communautés d'agglomération* (CA) and the *communautés urbaines* (CU) preferred by municipalities in urban areas. The main groups of competencies, which by law have to be transferred to the IMC body, are the economic development, space management, social housing planning and urban policy. Choosing to be part of a CC is less demanding in terms of transfer than choosing a CU. As a result, the CU is the most integrated form of cooperation leaving the fewest degrees of freedom to its members.

There exist two IMC taxation regimes. In the additional taxation regime (ATR), the IMC body and member municipalities share the four tax bases, *i.e.* both the IMC and the municipalities can set the rates for each of the four taxes. Under the single business tax regime (SBT), the IMC body sets the business tax rate that applies to all IMC members. This business tax is levied on the municipalities' pooled business tax bases. IMC members remain responsible for the other three taxes.

IMC bodies can be created and may disappear (in net terms, their number increased from 2,160 in 2002 to 2,567 in 2008) and their scope may also change when, for instance, they admit a new member. They may also shift from the ATR to SBT regime as a consequence of the fiscal and financial incentives provided by law (July 12th, 1999 Act).

Table 1 describes the IMC bodies classification[14].

[13] As of 2019, there are 34,970 municipalities.

[14] The syndicat d'agglomération nouvelle (SAN) is the fourth jurisdictional type of IMC structures, yet it has specific features that makes it different from the others. They were too few over the period of study to be considered. Moreover, they have disappeared since 2017.

Table 1: IMC structures

Jurisdictional Type	Fiscal regime	Size (inhabitants)	Sets of transferred competencies
CC	ATR or SBT	no restriction	2 compulsory and 1 optional
CA	SBT	$> 50,000$	4 compulsory and 3 optional
CU	ATR or SBT	$> 500,000$	All the competencies are transferred

Note that for CC, the composition of each set is freely determined.

Figures 1 and 2 display the respective pictures of the IMC bodies in 2001, right after July 12th 1999 Act, and in 2008. They illustrate the spread of the IMC bodies in France and in particular the shift toward the SBT regime over the period.

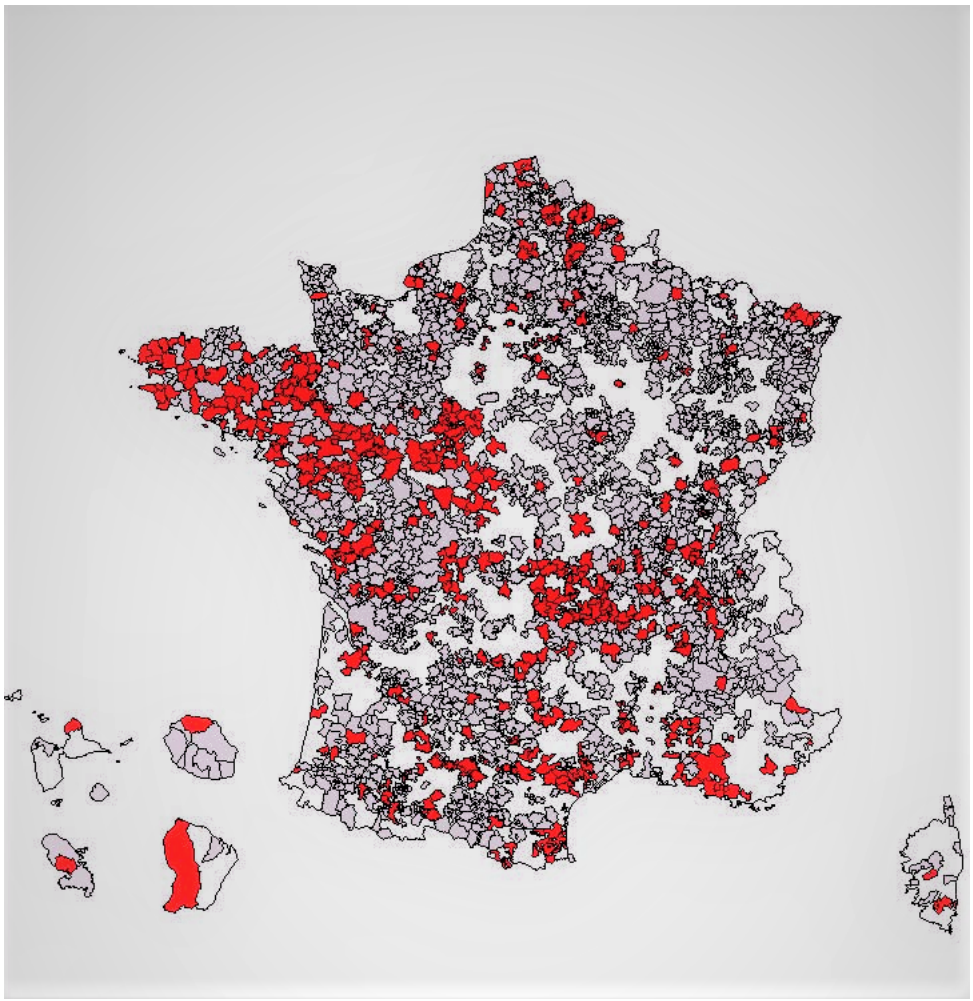

Figure 1: IMC by fiscal regime in 2001.
SBT (red), ATR (grey), No IMC (white). Source: DGCL.

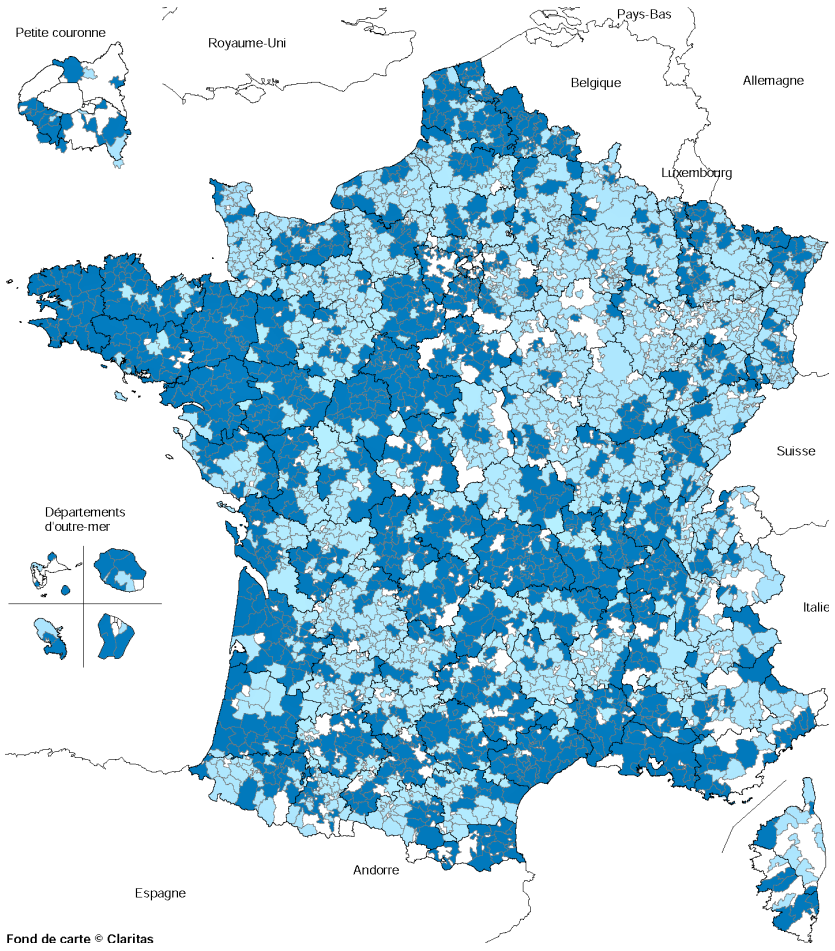

Figure 2: IMC by fiscal regime in 2008.
SBT (dark blue), ATR (light blue), No IMC (white). Source: DGCL.

Last, the jurisdictional type of the IMC structure, its fiscal regime and the will of its members determine the set of competencies that a municipality eventually transfers to the IMC level. Therefore, the allocation of local competencies between the municipal and inter-municipal levels is highly diversified and changes over time. The distribution of local employees between the two layers differs across IMC bodies and is the result of interdependent decisions taken at the municipal and inter-municipal levels.

3 Theoretical background

We adopt the classical approach in public finance when dealing with matters such as fiscal choice and government spending levels. Elections are the channel through which citizens can express their desired policy. When citizens, endowed with unimodal preferences, vote on a one dimensional public good, and the majority rule is used, it is known that the electoral outcome is congruent with the median voter's preferred policy. As predicted by Hotelling (1929) and Downs (1957), electoral competition will drive policies towards the outcome preferred by the median voter. Our baseline model is adapted from Courant et al. (1979).

3.1 Assumptions

We consider a municipality with N inhabitants that provides public services mainly through direct employment: we assume that the production of public services is measured by the level of public employment E. The citizens have preferences defined on private consumption, denoted C with a price normalized to 1, and public consumption E. The utility function $U(C, E)$ representing these preferences is quasi-concave. The annual income of the decisive voter is denoted by y^m. The municipality levies local taxes, denoted t, and receives a grant G from the central government. Let w be the annual wage received by public employees. The total municipal resources should cover the production costs of the public services, *i.e.* the wage bill wE. We express utility as follows $U(C, e)$ where $e = E/N$ is per capita public employment. Similarly, we will denote by $g = G/N$ the per capita grant.

3.2 The determination of labor demand

The median voter's demands for private and public goods are derived from the maximization of $U(C, e)$ subject to his own budget constraint and that of the local government. The local tax revenues stem from the imposition of a tax rate t on the sum of tax bases in the municipality. Let B denote the total tax base (the sum of the households' tax base and the firms' tax base) of the municipality and $b = B/N$ the per capita local tax base. It follows that the local government's budget constraint is written as $tb + g = we$.
The median voter budget constraint is given by $C + tb_m = y^m$, where b_m denotes his tax base. Solving for t from the local government's budget constraint and substituting it in the median voter's budget constraint, we obtain $y^m + (b_m/b)g = C + (b_m/b)we$ showing that the citizen has an income augmented by his share of the grant, allowing him to pay for his private and public consumptions. The ratio of the median voter tax base to the average tax base in the municipality b_m/b is the tax ratio[15] that reflects the marginal cost in terms of increased taxes to get an additional unit of public good. We denote it τ.
The demand for public services is obtained by replacing the median voter budget constraint in $U(y^m + \tau g - \tau we, e)$ and maximizing it with respect to e. The median voter's desired level of public employment e^* is given by the equality of the marginal rate of substitution between public and private consumptions and the tax price, τw, *i.e.* what the individual pays for an additional unit of public services.

$$U_e(C, e^*)/U_C(C, e^*) = \tau w$$

This equality shows that the principal driving forces of municipal labor demand are the median voter's income y^m, the per capita grant g, the public workers' wage w and the tax ratio τ:

$$e^* = e(w, g, y^m, \tau) \tag{1}$$

[15] Note this tax ratio is defined as the ratio of the median voter's income to the average income in Bergström et al. (2004). It is relevant for Sweden as there exists an income tax at the local level but not for France, where the income tax is set at the national level.

3.3 Predictions of the model

As predicted by the theoretical model, we should expect a negative relationship between e and both the municipal employees wage w and the tax ratio τ. It is likely that there will be a positive relationship between e and both the per capita grant g and the citizen's income y^m. However, a question remains: should we retain the median voter's income y^m or the augmented median voter's income defined as $y^m + \tau g$? Empirically, it is documented that demand reacts differently to an increase (of the same amount) in income or grant. This is known as the fly-paper effect. Owing to this approach, we will distinguish the two, as in Bergström et al. (2004).

4 Empirical test of the relationship

4.1 The dependent and independent variables

The dependent variable, denoted by e, is the employment rate[16] defined as the ratio of the number of employees expressed in full-time equivalent terms—taking into account part-time workers—to the population in the municipality. We consider total municipal employment, but do not distinguish between public employees and employees who are not civil servants, nor between employees operating in different types of services.

Municipal labor demand is governed by the following set of variables. The resources of municipalities are central to explaining differences in municipal employment. Total municipal revenues come from taxation and a grant g from the central government. Both the tax capacity in level to capture the total wealth of the municipality or in structure using the tax ratio are relevant. Choosing the tax ratio τ, as recommended by our basic model in equation (1), we implicitly assume that the median voter is a household occupying a house subject to the occupancy tax. This is rather classical in the literature on local public economics. Naturally, the households' median income y^m plays a key role.
Public services provision costs also matter: the wages of public employees, w, are crucial. Following Bergström et al. (2004) and Buch and Lipponer (2010), we compute the mean personnel expenditure per municipal employee dividing the total wage bill by the number of employees. Finally, we exploit the municipality's membership in an IMC body and the public employment rate at the IMC level, denoted I.

We also control for other variables of interest such as the chief characteristics of the municipalities. First, we take into consideration the inhabitants, both in density and structure (by computing the share of young people aged 3-16). We also compute the respective shares of social housing (subsidized) and of second homes as well as the unemployment rate (defined as the ratio of job-seekers at the end of the month to the municipal population). We use the Herfindhal-Hirschman Index denoted H[17] measuring the concentration of employment across sectors within the employment zone to which the municipality belongs. Moreover the mayor's political party is introduced into the analysis.

[16] We will express this ratio per 1,000 inhabitants.
[17] H is defined as the sum of the squared shares of the salaried employment in each sector.

4.2 The Data

Several datasets are used in this study. First, employment data in the municipalities and their IMC structures come from the COLTER survey handled by INSEE[18]. This survey gives raw labor employment at each level of local government, and various sub-variables. We exploit the full-time equivalent (FTE) employment which controls for the widespread use by municipalities of part-time jobs. We use this information both at the municipal and inter-municipal levels.

Second, we use the INSEE database to generate the population level in each municipality which is used both to create the dependent variable and to control for a density effect. We exploit the 1999 and 2006 legal municipal population variables and generate the annual data thanks to a linear interpolation from 2002 to 2005 and use the legal census population figures from 2006 to 2008. We retain the median income per unit of consumption, an indicator that controls for the number of people in the household. We also exploit the local employment dataset available at the EZ, *zone d'emploi*[19] level.

Third, the DGFIP[20] database provides us with the municipal employees' payroll thanks to which we calculate w for each municipality. As w is suspected to be endogenous, we build an instrument: the average public wage, $\overline{w}$, computed over the other EZs within the same county in the neighborhood of the EZ to which a given municipality belongs. We will comment on this instrument in the following section.

We use the DGCL[21] annual database, providing the criteria used by the central government to allocate its grants to local jurisdictions. This enables us to calculate the following variables both at the municipal and IMC levels : per capita grant, population density, shares of subsidized housing and of second homes, share of young people (3-16) and tax ratio.

We also consider the endogeneity of the employment at the IMC level using an additional database[22]. We exploit the geographical distribution of IMC bodies in France over the period to define two instruments: $\overline{I}$ and $\overline{SH}$ which denote respectively the average IMC employment level and the average number of second homes computed both on the other IMC bodies in the county where the considered IMC chief town is located. The way these instruments are built is detailed in the next section.

We make use of a DARES[23] dataset and compute a share of the local population being unemployed each year.

Finally, to account for the mayor's political party, we exploit the outcomes of the 2001 municipal election made available by the Department of Home Affairs. These data constrain

[18] Institut National de la Statistique et des Etudes Economiques

[19] An EZ is a geographical space in which the workers live and work and where firms can find a large share of their labor force. The partition is based on the flows of workers' commuting journeys. We use the 2010 geographical partition that provides information for 321 EZs of France (excluding Mayotte). The employment is available for activities aggregated into 5 sectors: Agriculture, Industry, Construction, Market Services and Non-Market Services.

[20] Direction Générale des Finances Publiques

[21] Direction Générale des Collectivités Locales

[22] Source: https://www.collectivites-locales.gouv.fr/liste-et-composition-des-epci-a-fiscalite-propre

[23] Direction de l'Animation de la Recherche et des Etudes et des Statistiques, Ministère du Travail.

us to consider only municipalities above 3,500 inhabitants because of the availability of electoral outcomes. All the monetary data are expressed in real values (2018 euros).

We have set up a balanced panel dataset of municipalities of more than 1,000 inhabitants, this threshold being observed in 1999. The matching process and the merging of all these different datasets led to the loss of 305 municipalities[24]. We eventually built an original balanced panel database of 8,362 French municipalities over the 2002-2008 period. Summary statistics are provided in table 10 in the appendix.

4.3 Methodology and identification strategy

Following Hamermesh (1996) we choose a log-linear specification of equation (1) that allows to interpret directly the coefficients as elasticities:

$$ln(e_{it}) = \beta_w ln(w_{it}) + \beta_g ln(g_{it}) + \beta_m ln(y^m_{it}) + \beta_\tau ln(\tau_{it}) + \beta_I ln(I_{it}) + \sum_j \gamma_j ln(X^j_{it}) + u_i + \delta_t + \epsilon_{it} \quad (2)$$

where i denotes the municipality index and t denotes time and variables X are control variables. u_i and δ_t denote respectively the municipal and time effects.

4.3.1 Instruments

As far as the wage w is concerned, it is difficult to find an instrument correlated with labor supply which does not affect at the same time labor demand. Ideally, simultaneously estimating the two sides of the labor market (supply and demand) would have been relevant, but because of lack of information, we estimated a reduced form.
In practice, as documented by Lichter et al. (2015) in their meta-analysis, many studies assume that wages are exogenous from the perspective of the individual employer (see Hamermesh (1996)). The validity of the wage exogeneity assumption is debated, and many attempts have been made to find instruments for the wage rate[25].
Exploiting the partition in terms of EZs, we build an instrument inspired from the industrial organization literature (Hausman et al. (1994)). The intuition is that a job seeker is likely to compare the wage set by municipality i to the average of wages proposed by the other municipalities in the neighborhood. Since endogeneity might stem from local inobservable factors, the neighboring average wage will reflect movements of wages that are independent of local circumstances. We then instrument the municipal wage set by a given municipality i by the average wage[26], denoted $\overline{w}$, set by the municipalities in the neighborhood of municipality i, but excluding municipalities in the same EZ as i. This is in line with the identification

[24] We have lost observations because of a lack of information and/or of abnormal values (overseas municipalities were excluded). The attrition is the consequence of the matching process between municipal employment, unemployment, the geographical partition at the EZ and IMC levels and the wage bills.

[25] Lagged values of endogenous variables are commonly used as instruments, but serious concerns have been raised about their validity (Angrist and Krueger (2001)).

[26] Since we estimate a log-linear model, we compute the average logarithm of the wages at the EZ level.

strategy used in Azar et al. (2019). By neighborhood, we mean the municipalities members of EZs close[27] to the EZ to which i belongs, and within the same county[28]. The choice for the average wage computation at the county level generates large enough variability in the instrument $\overline{w}$.

Regarding the IMC employment variable I, it is worth recalling that IMC competencies, and therefore I, are the result of a combination of political and/or economic motivations. We use the average[29] IMC employment $\overline{I}$ and the average share of second homes[30] $\overline{SH}$ in the neighboring IMC bodies, proceeding in the same vein as for the instrumentation[31] of the wage. More precisely, the IMC neighbors are those having the same population size and fiscal regime as the considered IMC body and located within the county of the IMC chief town[32]. As for the IMC population size, we considered four categories: less than 5,000 ; between 5,000 and 10,000 ; between 10,000 and 20,000 and over 20,000 inhabitants. We also take the changing partition of the IMC bodies over time [33] into account.

4.3.2 Instruments validity

We begin by displaying the municipal wage and the average wage distributions taken over the period 2002-2008.

[27] Two EZs are considered as close when they share a common border.

[28] This instrumentation strategy allows for an indirect consideration of the spatial interactions between municipalities. This approach is similar to applying a contiguity matrix, based on the EZs partition, to the endogenous explanatory variable w.

[29] We compute the average logarithm of the IMC employment levels and of the share of second homes.

[30] The computation of the grant is based on the number of municipal inhabitants and the latter is augmented by the number of second homes.

[31] We actually calculated two other instruments, the average density and the average share of young. We tested different combinations of these four instruments and retained the one that gave the most significant results in the first stage regression.

[32] This approach is similar to applying a contiguity matrix, based on the IMC bodies partition, to the endogenous explanatory variable I.

[33] In order to build the neighborhood, we choose to use the IMC bodies partitions corresponding to 2002, 2004 and 2008. This is justified since the size distribution of the IMC bodies is almost constant over the period and their distribution in terms of tax regime only changes at the very beginning of the period.

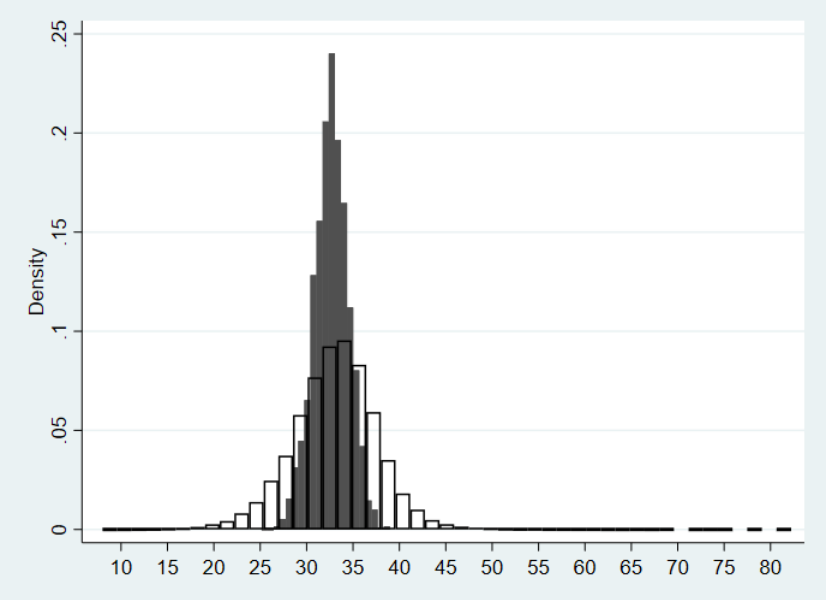

Figure 3: Wage distributions.
Average wage (grey). Municipal wage (white).

The wage distribution shows that annual wages range from 20,000 to 45,000 euros which suggests a large variance among municipalities. This could be the result of different composition of personnel skills or allocation of employees across services, and different promotion process and/or different share of bonuses in the wages and benefits package. In order to explore the relevance of our instrument $\overline{w}$, we run regressions of w both in level and in first difference[34]. The results are given in table 2:

Table 2: Dependent variable: municipal wage w.

	Pooled OLS	Pooled OLS fd
$\overline{w}$	0.600***	0.115***
	(0.0148)	(0.0294)
$\overline{I}$	0.00340***	0.000516
	(0.000926)	(0.00169)
$\overline{SH}$	-0.00638***	0.00205^{+}
	(0.000755)	(0.00116)
Exogenous regressors	Yes	Yes
Time dummies	Yes	Yes
N	49636	41096
R^2	0.158	0.007

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors.

Table 2 shows that the neighboring average wage has a significant effect on the municipal

[34] The first-difference pooled OLS allows to eliminate the fixed municipal effect and to provide consistent estimates.

wage. Yet, as evidenced by the poor R^2, we are not able to explain the variance of municipal wages though we have considered all the available exogenous variables. This suggests that it might depend on other inobservable factors such as the structure of the municipal labor force as noticed above. However we conjecture that wages in public sector are, to a large extent, determined at the national level (see Jaaidane (2010) and Clark and Milcent (2011)). We will come back to the municipal wage exogeneity question in section 5 as we run different post-estimation tests.

We now turn to the analysis of the instrumentation of I. The comparison of employment distributions at the municipal and IMC levels is insightful. As shown in table 10 in the appendix, the municipal employment is on average equal to 10.95 employees for 1,000 inhabitants with a variance equal to 41.06; while the IMC employment is on average equal to 1.90 per 1,000 inhabitants and with a variance equal to 4.30. As expected, the data reveals that $\overline{I}$ has a more concentrated distribution than I.
We distinguish the IMC bodies according to their jurisdictional type and fiscal regime as it will turn to be important for the analysis. Table 3 gives the distribution of the municipalities over the period according to the IMC structures' jurisdictional forms and fiscal regimes respectively.

Table 3: Allocation of municipalities in IMC bodies in our sample

	ATR	SBT	Total
No IMC	7,531	0	7,531
CC	17,257	20,248	37,505
CA	0	12,392	12,392
CU	197	1,986	2,183
SAN	0	239	239
Total	24,985	34,865	59,850

As already mentioned in section 2.2, the SAN are ignored in our analysis.

In order to explore instrument validity, we investigate whether a change in a municipality's neighborhood in terms of average IMC employment ($\overline{I}$) has an impact on the employment at the municipal (e) and IMC (I) levels. To do so, we proceed as if the change in the environment resulted from a treatment and follow the Differences-in-Differences (DiD) approach. To be more precise, the treatment is defined as the shift from a low neighboring IMC employment to a large one which we call an integrated environment. We consider the sub-sample gathering 3,872 municipalities whose IMC neighboorhood in 2002 is below the first quartile of the $\overline{I}$ distribution, and observed in 2002 (before the treatment) and 2008 (after). The control group is composed of 2,196 municipalities remaining in 2008 below the first quartile. The 1,676 treated municipalities are those that moved in 2008 from below the first to above the third quartile. The following table 4 gives the results of the DiD estimation:

Table 4: Impact of the average IMC employment $\overline{I}$ (DiD)

Dependent variable	e	I
2008	0.0376^{+}	-0.000166
	(0.0226)	(0.0358)
integrated	-0.101***	0.293***
	(0.0276)	(0.0340)
integrated*CC	-0.147***	-0.730***
	(0.0372)	(0.0840)
integrated*CA	0.0412	0.425***
	(0.0522)	(0.0719)
2008*integrated	-0.320***	2.568***
	(0.0849)	(0.0442)
2008*integrated*CC	0.374***	-1.662***
	(0.0893)	(0.0986)
2008*integrated*CA	0.311**	-2.531***
	(0.0990)	(0.0905)
cons	2.435***	-0.157***
	(0.0156)	(0.0218)
N	3872	3872
R^2	0.030	0.141

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. OLS. Robust standard errors.

The coefficient of the interaction term 2008*integrated is highly significant both when the dependent variable is e and I. This shows that indeed the change in one's municipality environment in terms of IMC employment influences the municipal employment (e). Therefore, we will use $\overline{I}$ as an instrument for I for the estimation of the municipal labor demand. Moreover, table 4 suggests that the environment impact differs strongly with the jurisdictional type. More precisely, for the municipalities in CC, the impact is positive (-0.320+0.374), almost 0 for CA (-0.320+0.311) and negative for CU (-0.320). These results will be useful to conduct our robustness analysis (see section 6).

5 Results

Table 5 presents the estimation of equation (2) using six different models. Model (1) corresponds to the pooled OLS method ignoring the panel structure of our sample. From models (2) to (6), all variables are first-differenced[35] (except the time dummies) so that the municipal effects—assumed fixed—are eliminated. Model (2) is estimated by pooled OLS ignoring the endogeneity issue. Models (3) to (6) are estimated with a pooled IV method. In model (3) w is instrumented by $\overline{w}$ and models (4) and (5) instrument I by $\overline{I}$ and $\overline{SH}$. Finally in model (6) w and I are instrumented by $\overline{w}$, $\overline{I}$ and $\overline{SH}$.

From the robust score Chi2 tests of endogeneity, we can conclude that the municipal wage w can be considered as an exogenous regressor (p=0.2045) and that the IMC employment I is endogenous (p=0.00). This confirms our study of instruments validity. The conjecture made above turns out to be true: public municipal wages are indeed mainly driven by the base salary decided at the national level. We therefore concentrate on results of models (4) and (5) in this section.

[35] See table 11 in the appendix for a comparison between the within and the first-difference methods.

Table 5: Municipal labor demand. Dependent variable e. Whole sample.

	(1) P_OLS	(2) P_OLS_fd	(3) P_IV_w_fd	(4) P_IV_I_fd	(5) P_IV_I_fd	(6) P_IV_w_I_fd
Wage (w)	-0.637***	-0.768***	-0.529**	-0.768***	-0.768***	-0.587**
	(0.0148)	(0.00577)	(0.199)	(0.00585)	(0.00584)	(0.187)
Grant (g)	0.185***	0.0117***	0.0134***	0.0118***	0.0117***	0.0131***
	(0.0177)	(0.00227)	(0.00272)	(0.00229)	(0.00229)	(0.00268)
Grant*Reform	0.0916***	-0.00401**	-0.00451**	-0.00417**	-0.00414**	-0.00458**
	(0.0185)	(0.00152)	(0.00157)	(0.00153)	(0.00153)	(0.00157)
Income (y^m)	0.647***	0.0557**	0.0488*	0.0517**	0.0522**	0.0458*
	(0.0160)	(0.0171)	(0.0193)	(0.0173)	(0.0173)	(0.0190)
TaxRatio (τ)	-0.361***	-0.0186*	-0.0148+	-0.0176*	-0.0192*	-0.0150+
	(0.00473)	(0.00749)	(0.00850)	(0.00755)	(0.00757)	(0.00819)
IMCemp (I)	-0.00470**	-0.00704***	-0.00738***	0.0114***	0.0116***	0.0102**
	(0.00158)	(0.00101)	(0.00108)	(0.00308)	(0.00307)	(0.00332)
Unemp	0.385***	0.00244	0.00417	0.00120	0.000657	0.00253
	(0.00761)	(0.00219)	(0.00277)	(0.00223)	(0.00225)	(0.00271)
Unemp*IMC	0.0158***	0.00135*	0.00115+	0.00300***	0.00337***	0.00274***
	(0.00143)	(0.000563)	(0.000603)	(0.000634)	(0.000666)	(0.000693)
Unemp*IMC*Q1					-0.000822*	
					(0.000365)	
Unemp*IMC*Q3					0.00180***	
					(0.000497)	
Density	0.117***	-0.142	-0.145	-0.143	-0.143	-0.145
	(0.00208)	(0.102)	(0.103)	(0.103)	(0.103)	(0.104)
SocHouse	0.0570***	0.000475	0.000325	0.000419	0.000415	0.000310
	(0.000976)	(0.000668)	(0.000710)	(0.000677)	(0.000677)	(0.000703)
Young	-0.180***	0.0253**	0.0291**	0.0238**	0.0235**	0.0266**
	(0.00966)	(0.00902)	(0.00977)	(0.00903)	(0.00905)	(0.00958)
SecHome	0.0824***	-0.0669+	-0.0481	-0.0666+	-0.0680+	-0.0523
	(0.00174)	(0.0377)	(0.0409)	(0.0381)	(0.0382)	(0.0407)
H	8.072***	-0.696+	-0.441	-0.655+	-0.640+	-0.458
	(0.439)	(0.375)	(0.462)	(0.385)	(0.385)	(0.453)
H^2	-9.168***	1.052*	0.793	0.942+	0.925+	0.742
	(0.614)	(0.522)	(0.616)	(0.538)	(0.538)	(0.605)
2003	-0.251***					
	(0.0312)					
2004	-0.142***	0.000902	-0.00370	0.000151	0.000311	-0.00333
	(0.00554)	(0.00272)	(0.00470)	(0.00274)	(0.00274)	(0.00453)
2005	-0.127***	0.0159***	0.0114**	0.0154***	0.0154***	0.0120**
	(0.00547)	(0.000960)	(0.00392)	(0.000977)	(0.000977)	(0.00368)
2006	-0.119***	0.0149***	0.0116***	0.0141***	0.0141***	0.0117***
	(0.00540)	(0.000965)	(0.00299)	(0.000987)	(0.000986)	(0.00276)
2007	-0.0548***	0.0204***	0.0152***	0.0203***	0.0203***	0.0164***
	(0.00516)	(0.000933)	(0.00445)	(0.000941)	(0.000940)	(0.00414)
cons	2.402***	0.00354***	0.00379***	0.00273***	0.00295***	0.00294***
	(0.0982)	(0.000803)	(0.000892)	(0.000821)	(0.000824)	(0.000891)
N	50322	41935	41935	41096	41096	41096
R^2	0.532	0.604	0.546	0.598	0.598	0.566
Robust score χ^2			1.609 (p=0.2045)	34.734 (p=0.00)		

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors.

5.1 The baseline results

Hereafter, we choose to comment on results of model (4) since model (5), discussed in the next subsection, provides quite similar results as far as the usual determinants are concerned.

First, the impact of wage on municipal labor demand is highly significant, with an estimated elasticity of less than one in absolute value (-0.768). As far as we know, this is the first work on French data providing an estimate of this elasticity. Bergström et al. (2004) already cited above display estimates of wage elasticities of labor demand using data from Swedish municipalities in 1988-1995: their estimates lie between -0.896 (long run elasticity) and -0.533 (short run elasticity)).

Second, the impact of the main central government transfer is positively significant but the magnitude of the elasticity is rather small (0.0118). Moreover, the 2004 reform—merging the main grants allocated by the central government to municipalities—mitigates this impact: it is likely that the municipalities have internalized that the overall grant level would not increase (they anticipated that different subsidies would be rationalized into a global unchanged subsidy). Bergström et al. (2004), who studied the impact of the shift in 1993 from a targeted to a general grant, provide a basis for comparison, bearing in mind that the French grant under consideration is general. They found that respectively before and after the shift, elasticities range from 0.06 (short run) to 0.10 (long run) for the targeted grant and from 0.025 (short run) to 0.042 (long run) for the general grant.

The impact of the median income is congruent with the outcome of median voter models: the estimated elasticity is positive and significant and its magnitude is large as compared to the grant elasticity (more than four times higher). Similar results are obtained by Bergström et al. (2004): they show that the median income elasticity is much higher than the general grant elasticity. We do not find a fly-paper effect when municipal employment is studied, whereas former French studies, cited above, have found that total municipal spending displayed a fly-paper effect. As expected, the tax ratio elasticity is negative and significant with a coefficient equal to -0.0176.

Education services being labor intensive, the intuition suggests that we should expect a positive and significant effect of the share of young people in the municipality on labor demand. Model (4) shows this to be the case with a magnitude equal to 0.0238. We find a significant negative effect of H[36] and a positive effect of H^2. As one of the five sectors dominates in the EZ (*i.e.*, a sector concentrates a large share of the employment), the municipal employment declines but less and less.

We also introduced time dummies to take into account the impact of the political cycle on municipal labor demand. We choose 2008 when municipal election was held as the reference year. Moreover, 2002 and 2003 dummies are dropped because of first differences and the unemployment first lag. At mid-term, the mayor begins to hire municipal employees until the next election in 2008. As suggested by electoral competition models, as elections become closer the prospect of being re-elected gives incentives to increase municipal labor.

[36] This variable is not taken in logarithm since we wanted to evidence a quadratic effect.

5.2 Unemployment and IMC effects

Given that, on average over the period studied, 87.42% municipalities were members of an IMC body, it is a central issue to control for this cooperation effect. We study here the direct impact of IMC taking into consideration the IMC employment level. As a result of the freedom left by the central government to the municipalities as to how they organize their cooperation, IMC structures are different in the scope of the local public services offered, and the number of inter-municipal employees needed to provide these services.
Since I is endogenous, we use $\overline{I}$ and $\overline{SH}$ as instruments in the IMC employment first stage regression, the results of which are displayed in table 6. The computation of the partial R^2 (0.12) and the robust partial F test (p=0.000) for the joint significance of the instruments in the first stage regression leads to reject the weak instruments hypothesis. Moreover, the over-identifying restrictions robust score test reveals that our set of instruments is exogenous (p =0.1317).

Table 6: First stage regression of model (4).

	IMC employment (I)
$\overline{I}$	0.0255***
	(0.00597)
$\overline{SH}$	0.3288 ***
	(0.00454)
Exogenous regressors	yes
Time dummies	yes
N	41,945
Partial R^2	0.12
Robust Partial F	161.99 (p=0.000)
OIR score χ^2	2.27 (p=0.1317)

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors.

We find a significant and positive effect of $\overline{I}$ on I confirming our conclusion that the environment matters. When the neighbors increase their employment level, the IMC reacts by increasing its own employment level. $\overline{SH}$ turns out to have a positive and highly significant impact on I. The larger the share of second homes the larger the fiscal resources at the municipal level and therefore at the IMC level, which enables the IMC body to increase its employment. These comments suggest a mimetism in the IMC bodies behavior.
Regarding the impact of the IMC employment level on municipal employment, models (4) and (5) reveal positive and highly significant elasticities (around 0.0115), which we call an *direct IMC effect*[37]. More precisely,

Higher IMC employment induces higher municipal employment.

In order to understand this finding, it is worth noting that within an IMC body, municipal employment might decrease if municipalities transfer responsibilities. It might also increase

[37] Remark that in models (1) to (3) where I is not instrumented, the direct IMC effect turns out to be significantly negative.

when municipalities supply new public services and provide for additional facilities which did not exist before they joined the IMC body. This positive impact is actually the result of a combined effect of IMC membership. First, the transfer of municipal responsibilities to the IMC level leads to a substitution effect. However, municipalities are often reluctant to be marginalized by IMC structures and mayors tend to develop new municipal public services so as to be still considered powerful by voters (complementarity effect). The dominance[38] of the complementarity effect over the substitution effect explains the net positive *direct effect* of IMC employment on municipal employment.

Our second focus is to understand how local unemployment impacts municipal labor demand and investigate whether IMC plays a role in this unemployment effect. The choice of the first-lagged unemployment avoids endogeneity issues and is also motivated by the larger significance of the lagged-unemployment coefficient as compared to its contemporaneous value. Models (4) and (5) show that only municipalities within an IMC body react positively and significantly to unemployment, even though the magnitude of the elasticity is rather small (around 0.003). There is no impact of unemployment on municipalities outside an IMC structure. Outside an IMC body, it seems that mayors directly provide so many services to their electorate that they can avoid fighting unemployment without being sanctioned. Moreover, as a member of an IMC structure, mayors are endowed with more fiscal revenues and/or additional aid provided by the IMC structure to its members. As a result, mayors in IMC bodies have the opportunity to cope with unemployment, though this issue is mainly a central government concern. This provides evidence of an *indirect IMC effect*. More precisely,

IMC leads mayors to employ more people when unemployment is higher.

This interplay between unemployment and IMC calls for the consideration of the extent of cooperation to obtain more refined results. In model (5) we focus on two types of municipalities: those belonging to IMC structures either with a low employment level (below the first quartile Q1) or with a high employment level (above the third quartile Q3). In municipalities with low inter-municipal employment level –which could be called "empty shell" IMC bodies[39]– the impact of unemployment is mitigated: mayors are less sensitive to unemployment, although the total effect of unemployment on municipal employment is still significant and positive. The reverse holds for municipalities with high inter-municipal employment levels–which we call "integrated" IMC structures– where the impact of unemployment on municipal labor is strengthened. This suggests that mayors in these IMC structures, due to the loss of direct control over many public services, use municipal employment to cope with issues such as unemployment. We therefore give additional evidence in support of the *indirect IMC effect*. Not only IMC *per se* changes the reaction of mayors to unemployment, but also the magnitude of the IMC employment level.

Indirect IMC effect is mitigated in "empty shell" IMC bodies and strengthened in "integrated" IMC structures.

[38] A similar dominance of the complementarity effect was found by Guengant and Leprince (2006) on municipal spending.

[39] See West (2007) for the expression.

Exploring the interplay between unemployment, IMC membership and partisanship and its consequence on municipal employment decisions, we find no significant difference between mayors[40]. More preciseley, the positive *indirect IMC effect* holds whatever the size of the municipality and the mayor's party[41].

As a concluding remark, we compare the different estimated elasticities of municipal employment with respect to the main variables of interest for our analysis.

First, wages are the main driving force of municipal labor demand[42] since the associated elasticity is the largest (-0.768). A second key factor appears to be the median income with an elasticity equal to 0.052. The tax ratio, grant and IMC employment respective elasticities have comparable magnitudes (in absolute values) between 0.01 and 0.02.

6 Robustness

We check the robustness of our results exploring the relevance of model (4). We re-estimate it on various sub-samples defined respectively by the characteristics of IMC bodies (jurisdictional type and fiscal regime) and the municipal population size. The results are given in the following tables 7, 8 and 9.

[40] These results are not displayed here but will be made available upon request.

[41] We distinguish Left-wing, Right-wing and count for the Far-Right.

[42] We run partial regressions of model (4) in order to identify the respective contributions of our key variables in explaining the municipal employment variance. When the municipal wage is ignored in the estimation of the labor demand, the R^2 drastically falls as could be expected (see table 12 in the appendix).

Table 7: Municipal labor demand. Dependent variable e.
Sub-samples with municipalities outside and inside IMCs defined by jurisdictional type.

	No IMC	CC	CA	CU
Wage (w)	-0.816***	-0.757***	-0.782***	-0.752***
	(0.0159)	(0.00736)	(0.0117)	(0.0227)
Grant (g)	0.00426	0.0150***	0.00286	0.0138*
	(0.00440)	(0.00361)	(0.00372)	(0.00569)
Grant*Reform	-0.00213	-0.00415+	-0.00380+	-0.0112*
	(0.00455)	(0.00237)	(0.00214)	(0.00498)
Income (y^m)	0.109*	0.0456*	0.0796+	-0.0480
	(0.0498)	(0.0207)	(0.0417)	(0.100)
TaxRatio (τ)	-0.0478*	-0.0115	-0.0289+	0.0122
	(0.0230)	(0.00923)	(0.0174)	(0.0400)
IMCemp (I)		0.00872**	0.0249+	-0.00456
		(0.00310)	(0.0140)	(0.0215)
Unemp	0.00458	0.00265***	0.00219+	0.00242
	(0.00711)	(0.000706)	(0.00131)	(0.00685)
Control variables	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
N	4030	26390	9008	1526
R^2	0.697	0.584	0.599	0.605

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

Pooled IV. Variables in first-differences. Robust standard errors.

Table 7 shows that our results are robust for the key variables of the labor demand (wage, grant and income), and that the degree of integration seems to mitigate the impact of IMC employment on municipal employment, as already evidenced in table 4. The *direct IMC effect* is positive for municipalities in CC and CA, but is much larger in the latter. For CC and CA, the positive *direct IMC effect* reflects the dominance of the complementarity effect over the substitution effect. As far as CU are concerned, the coefficient is negative although non significant. As a result, in CU, the most integrated form, there is no impact of IMC employment on municipal employment probably because the substitution effect is larger and offsets the complementarity effect. However, the municipalities in CU seem to behave in a distinct way since the income and the tax ratio coefficients are not significant.

Table 8: Municipal labor demand. Dependent variable e.
Sub-samples contrasting municipalities outside and inside IMCs defined by fiscal regime.

	No IMC	ATR	SBT
Wage (w)	-0.816***	-0.746***	-0.772***
	(0.0159)	(0.00985)	(0.00794)
Grant (g)	0.00426	0.0110*	0.00914**
	(0.00440)	(0.00534)	(0.00307)
Grant*Reform	-0.00213	-0.0124**	-0.00415*
	(0.00455)	(0.00398)	(0.00182)
Income (y^m)	0.109*	0.0116	0.0666**
	(0.0498)	(0.0299)	(0.0233)
Tax ratio (τ)	-0.0478*	-0.0187	-0.0173
	(0.0230)	(0.0118)	(0.0105)
IMCemp (I)		0.00217	0.0198***
		(0.00291)	(0.00571)
Unemp	0.00458	0.000202	0.00473***
	(0.00711)	(0.000803)	(0.000920)
Control variables	yes	yes	yes
Time dummies	yes	yes	yes
N	4030	11464	25607
R^2	0.697	0.605	0.573

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Pooled IV. Variables in first-differences. Robust standard errors.

Table 8 shows that the wage and grant coefficients remain significant and that the fiscal regime seems to lessen the impact of IMC employment on municipal employment. In the municipalities which have chosen the SBT regime the *direct* and *indirect IMC effects* hold. These effects are not significant for municipalities under ATR regime, mostly CC. This finding might be explained by the combination of the CC form of cooperation and ATR regime which leaves the municipalities with larger degrees of freedom.

The next table 9 displays the labor demand estimation for different municipal population size. The small sub-sample covers municipalities below 2,000 inhabitants, the medium the municipalities between 2,000 and 10,000, the large the cities between 10,000 and 50,000 and the very large those with more than 50,000 inhabitants.

Table 9: Municipal labor demand. Dependent variable e.
Sub-samples by municipal population size

	small	medium	large	very large
Wage (w)	-0.759***	-0.778***	-0.863***	-0.846***
	(0.00772)	(0.00941)	(0.0170)	(0.0558)
Grant (g)	0.00863*	0.0108***	0.0268***	0.0418**
	(0.00402)	(0.00273)	(0.00619)	(0.0148)
Grant*Reform	-0.00368	-0.00290+	-0.00903**	0.00453
	(0.00289)	(0.00176)	(0.00327)	(0.0162)
Income (y^m)	0.0520*	0.0516*	0.0201	0.356+
	(0.0229)	(0.0262)	(0.0641)	(0.194)
Tax ratio (τ)	-0.000169	-0.0345***	-0.0637**	0.0677+
	(0.0108)	(0.0104)	(0.0222)	(0.0392)
IMCemp (I)	0.0155*	0.00975*	0.00541	-0.0000013
	(0.00666)	(0.00417)	(0.00334)	(0.00293)
Unemp	0.00549+	-0.00673*	-0.0187+	-0.0646+
	(0.00285)	(0.00343)	(0.0110)	(0.0349)
Unemp*IMC	0.00166+	0.00395***	0.00528**	0.00487+
	(0.000973)	(0.000986)	(0.00181)	(0.00289)
Control variables	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
N	18632	18321	3647	496
R^2	0.605	0.579	0.688	0.764

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

Pooled IV. Variables in first-differences. Robust standard errors.

Again, our main results remain valid when we consider size-based sub-samples, as shown in table 9. As for the *direct IMC effect*, we notice that it is significantly positive for small and medium municipalities while it is null for large and very large cities. Since the latter are more likely to be members of CA and CU, more integrated structures than CC, the *direct IMC effect* does not hold since substitution and complementarity effects offset. It is worth noting that the positive *direct IMC effect* evidenced on the whole sample is actually driven by the behavior of small and medium municipalities, which weigh 90% of the total observations. Whatever the municipal population size, the *indirect IMC effect* holds. However, for very large cities, the median income elasticity is way larger than for the others, and surprisingly the tax ratio elasticicity turns out to be positive. This could reveal a specific behavior of those few municipalities (around a hundred in our sample).

7 Conclusion

To the best of our knowledge, our contribution is the first to adress municipal labor demand on French data. In this study, exploiting a French panel database of municipalities of more than 1,000 inhabitants over the 2002-2008 period, we have identified the main driving forces of municipal labor demand. As suggested by our theoretical model, our evidence reveals that increases in public employees' wages or tax ratios lead to smaller municipal employment, while increases in grants from the State level or median income lead to higher municipal labor demand.

We provide three additional results. We first find that higher IMC employment induces higher municipal employment (*direct IMC effect*). We also show that IMC leads mayors to hire more when unemployment is higher (*indirect IMC effect*) and that this *indirect IMC effect* is stronger in "integrated" IMC bodies than in "empty shell" IMC bodies.

In order to complete our study, a natural extension would exploit more recent data on municipalities. The analysis could be improved considering other elements of interest. First, instead of the aggregate employment level, we could distinguish between employees operating in different types of services (Administration, Security, Technical services, Culture and Sports, Medical and Social services) and also consider the status of employees (whether tenured or not). Second, since many public services (water distribution, urban transportation and waste collection) can be outsourced, this might have an impact on the wage bill (see Jaaidane and Gary-Bobo (2008) and Levin and Tadelis (2010)) so that it would be interesting to exploit the disparities of choices made by municipalities.

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8 Appendix

Table 10: Summary statistics

Variable	Panel	Mean	sd	min	max	Observations
e	Overall	10.95	6.41	0	149.54268	N = 59850
	Between		6.33	0	139.41838	n = 8550
	Within		0.98	-5.5135103	30.866799	T = 7
w	Overall	33.07	4.68	8.7960749	82.226929	N = 59836
	Between		3.86	14.561098	73.703644	n = 8548
	Within		2.65	8.2286368	62.050439	T = 7
g	Overall	0.21	0.08	0	1.6296254	N = 59850
	Between		0.08	.04768843	1.1441682	n = 8550
	Within		0.03	-.93063674	.86729053	T = 7
y^m	Overall	19.84	3.78	9.6341839	49.925819	N = 59850
	Between		3.72	10.0587	46.799254	n = 8550
	Within		0.64	14.661918	23.952013	T = 7
τ	Overall	0.28	0.11	.01088804	.59268051	N = 59850
	Between		0.11	.01300792	.54242024	n = 8550
	Within		0.01	.13013978	.52954358	T = 7
dumIMC	Overall	0.87	0.33	0	1	N = 59850
	Between		0.28	0	1	n = 8550
	Within		0.17	.0170259	1.7313116	T = 7
I	Overall	1.90	2.07	0	55	N = 52319
	Between		1.95	0	28.663721	n = 7924
	Within		0.68	-20.677038	33.823497	T = 6.6026
Unemp	Overall	0.03	0.01	0	.34935445	N = 58961
	Between		0.01	.01037694	.30307642	n = 8423
	Within		0.01	-.04625522	.09551555	T = 7
Density	Overall	5.04	13.49	.05394441	262.34439	N = 59850
	Between		13.48	.05535764	254.19722	n = 8550
	Within		0.33	-10.125841	17.691969	T = 7
SocHouse	Overall	0.09	0.11	0	.96845865	N = 59850
	Between		0.11	0	.87412886	n = 8550
	Within		0.01	-.25184112	.37966303	T = 7
Young	Overall	0.17	0.03	.05784441	.3855488	N = 59850
	Between		0.03	.07817043	.32058945	n = 8550
	Within		0.01	.0830613	.35312402	T = 7
SecHome	Overall	0.08	0.14	0	1.7280285	N = 59850
	Between		0.14	0	1.5975441	n = 8550
	Within		0.01	-.05633817	.21814396	T = 7
H	Overall	0.33	0.04	.24759132	.49391836	N = 58723
	Between		0.04	.25214111	.4850697	n = 8389
	Within		0.00	.25609466	.39875542	T = 7
$\overline{w}$	Overall	32.64	1.85	25.752411	38.976479	N = 58723
	Between		1.47	28.529547	37.725256	n = 8389
	Within		1.11	28.8162	35.745947	T = 7
$\overline{I}$	Overall	1.44	1.14	.001	19.659594	N = 51556
	Between		0.99	.001	14.125583	n = 7900
	Within		0.59	-8.1552869	10.891703	T = 6.5260
$\overline{SH}$	Overall	0.08	0.08	.0001	1	N = 51549
	Between		0.07	.00432195	1	n = 7899
	Within		0.03	-.54552693	.86556209	T = 6.5260

Table 11: Municipal labor demand. Dependent variable e. Comparison between within and first-difference methods.

	IV within	Pooled_IV_fd	Within	Pooled_OLS_fd
Wage (w)	-0.739***	-0.763***	-0.735***	-0.763***
	(0.00801)	(0.00582)	(0.00789)	(0.00575)
Grant (g)	0.0234***	0.00779***	0.0233***	0.00792***
	(0.00278)	(0.00183)	(0.00268)	(0.00180)
Grant*Reform	-0.00579***	0.00249***	-0.00717***	0.00250***
	(0.000700)	(0.000514)	(0.000637)	(0.000508)
Income (y^m)	0.443***	0.122***	0.472***	0.127***
	(0.0242)	(0.0170)	(0.0230)	(0.0168)
Tax ratio (τ)	-0.0706***	-0.0149*	-0.0794***	-0.0164*
	(0.0125)	(0.00754)	(0.0122)	(0.00749)
IMCemp (I)	0.0106**	0.00989**	-0.00760***	-0.00695***
	(0.00363)	(0.00307)	(0.00135)	(0.00101)
Unemp	-0.0218***	0.00474*	-0.0242***	0.00632**
	(0.00310)	(0.00212)	(0.00313)	(0.00207)
Unemp*IMC	0.00207*	0.00276***	0.00209*	0.00124*
	(0.000867)	(0.000632)	(0.000854)	(0.000562)
Density	-0.157+	-0.146	-0.159+	-0.145
	(0.0824)	(0.103)	(0.0859)	(0.103)
SocHouse	0.00291**	0.000360	0.00335**	0.000505
	(0.00105)	(0.000663)	(0.00103)	(0.000655)
Young	0.0625***	0.0286**	0.0665***	0.0302***
	(0.0133)	(0.00890)	(0.0135)	(0.00887)
SecHome	-0.384***	-0.0780*	-0.407***	-0.0787*
	(0.0507)	(0.0383)	(0.0522)	(0.0379)
H	-1.062	-0.420	-1.182+	-0.451
	(0.709)	(0.385)	(0.691)	(0.376)
H^2	1.987*	0.865	2.206*	0.947+
	(1.005)	(0.537)	(0.975)	(0.523)
cons	2.510***	0.0139***	2.339***	0.0150***
	(0.178)	(0.000613)	(0.175)	(0.000576)
N	49636	41096	50322	41935
R^2	0.445	0.594	0.452	0.599

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors. I instrumented.

Table 12: Municipal labor demand. Dependent variable e. Partial regressions on model (4).

	Model (4)	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
Wage (w)	-0.768***		-0.768***	-0.768***	-0.768***	-0.768***	-0.764***
	(0.00585)		(0.00585)	(0.00585)	(0.00585)	(0.00578)	(0.00590)
Grant (g)	0.0118***	0.0174***		0.0118***	0.0114***	0.0117***	0.0117***
	(0.00229)	(0.00309)		(0.00229)	(0.00227)	(0.00227)	(0.00229)
Grant*Reform	-0.00417**	-0.00593**		-0.00426**	-0.00405**	-0.00407**	-0.00406**
	(0.00153)	(0.00200)		(0.00153)	(0.00153)	(0.00153)	(0.00153)
Income (y^m)	0.0517**	0.0268	0.0513**		0.0516**	0.0548**	0.0365*
	(0.0173)	(0.0276)	(0.0173)		(0.0173)	(0.0171)	(0.0161)
TaxRatio (τ)	-0.0176*	-0.00662	-0.0141$^+$	-0.0175*		-0.0179*	-0.0142*
	(0.00755)	(0.0114)	(0.00751)	(0.00753)		(0.00749)	(0.00723)
IMCemp (I)	0.0114***	0.00636	0.0119***	0.0114***	0.0114***		0.0145***
	(0.00308)	(0.00390)	(0.00312)	(0.00308)	(0.00308)		(0.00258)
Unemp	0.00120	0.00683$^+$	0.00139	0.00107	0.00126	0.00188	
	(0.00223)	(0.00360)	(0.00223)	(0.00223)	(0.00223)	(0.00219)	
Unemp*IMC	0.00300***	0.00190*	0.00306***	0.00300***	0.00294***	0.00196***	
	(0.000634)	(0.000890)	(0.000637)	(0.000635)	(0.000634)	(0.000563)	
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	41096	41096	41096	41096	41096	41935	49357
R^2	0.598	0.001	0.597	0.598	0.598	0.603	0.584

$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors. Pooled IV, variables in first differences.