# Do Firms Move?
# Evidence from a French Enterprise Zone Program

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**Abstract**

I study the long-run effects of an ambitious French enterprise zone program: the Zone Franche Urbaine (ZFU) policy. This policy grants tax credits to businesses located within selected distressed urban neighborhoods. I show that this program increased zone-level employment by about 30% and the number of establishments by more than 40%. The impact on overall city-level employment and establishments is small, suggesting within-city reallocation of jobs rather than net creation. I use reduced-form effects to identify the incidence of this program as well as the structural parameters governing them. Preliminary results suggest that firms and workers capture each almost half of the gains.

## 1 Introduction

Most developed countries exhibit marked geographic disparities in economic outcomes, both across cities and across the neighborhoods of a same city. In France, unemployment rates in some of the so-called *banlieues* reach almost 20% of the labor force–more than twice the national rate. In order to revitalize those areas, the French government initiated in 1996 a large-scale enterprise zone program granting tax credits to firms that would settle in targeted neighborhoods. In 2007, exemptions amounted to a total of more than 600 million of euros.

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Officially, this policy's goal was to boost local employment by attracting new businesses. However, there is limited evidence on the impact of such program on firms' location decisions.

The motivation for studying enterprise zones is twofold. First, they are a particular example of place-based policies adopted to help lagging regions. Governments across the globe increasingly resort to policies targeting specific areas rather than groups of individuals, calling for a better evaluation of such programs. Do they succeed in bringing jobs to ailing areas? Do they merely displace employment from neighboring places? Are potential benefits to selected areas persistent? Second, enterprise zones reveal how firms respond to variations in local costs which, in turn, informs us about the dynamics of regional labor markets. Enterprise zones are an experiment that allows to observe the behavior of firms facing differences in local production costs. Are new firms moving towards lower-cost areas? Do incumbent firms hire new workers? Are there frictions hampering firms' mobility and restricting spatial arbitrage of local costs? Blanchard and Katz [1992] spatial equilibrium framework suggests that the long-run impact of an adverse regional shock on employment is determined by the relative magnitudes of local labor demand and local labor supply wage elasticities. In other words, do new firms settle down faster than workers move out? However, few attempts have been made to measure how (im)perfectly mobile firms truly are.

In this paper, I evaluate the French Zone Franche Urbaine (ZFU) policy. I exploit neighborhood-level variations in payroll and corporate tax rates enacted as part of this program to describe the dynamic response of firms to local costs incentives. Specifically, I combine reduced-form responses of employment and wages to tax changes with a spatial equilibrium model to identify local labor demand and labor supply elasticities.

The ZFU policy offers a unique environment to go beyond the evaluation of a specific policy and derive primitives that underly the success of similar programs and govern regional dynamics. Nearly one hundred ZFUs have been implemented across the country in three waves (1996, 2004, 2006), allowing to observe the long-run impact of a large-scale program. Targeted zones were chosen among a broader group of potential candidates based on a synthetic index, whose formula has been released, and a population threshold. Such a selection process provides several margins that can be exploited to estimate the causal impact of becoming a ZFU. Available exemptions in selected zones were decided nationally. The existence of official rules for local subsidies are central to the estimation of the structural parameters governing both the impact of enterprise zone policies and regional dynamics.

Another attractive feature is the availability of linked employer-employee administrative data. They cover the universe of employees at French companies for the whole period considered. The data contain information on individuals' annual earnings and hours worked, industry, occupation as well as some basic demographics.

I start by evaluating the effect of creating a ZFU on zone-level employment, stock of establishments and wages. I apply a simple difference-in-differences estimator comparing zones that were targeted by the program to similarly distressed zones that were not. I find a substantial increase in both employment and in the number of establishments, which grow respectively by around 30% and 40%.

I estimate the impact at the city level. I find that the number of establishments in cities hosting a ZFU increases slightly as compared to similar cities not hosting a ZFU. However, there is no clear response of employment.

I then develop a structural model of firm and worker location, which I estimate structurally using my reduced-form estimates. I estimate a local labor demand elasticity of -2.0647. The intensive margin, capturing how much firms decrease employment after a wage hike conditional on location, is equal to -1.24. On the extensive margin, within-city elasticity, representing how much establishments move across neighborhoods of a same city after a wage bump, is equal to -0.81, whereas across-city elasticity is -0.61. These figures imply the existence of frictions hindering firm mobility.

If firms were perfectly mobile, all the incidence of local taxes would fall on workers. Workers would capture all gains from a local decrease in the tax burden. Here, preliminary results suggest that workers and firms capture almost half of the gains each.

**Related literature** The analysis in this paper adds to a growing literature evaluating the impact of place-based policies. Important works in this area include Kline and Moretti [2014]'s assessment of the Tennessee Valley Authority and Busso et al. [2013]'s evaluation of the Empowerment Zones. These studies concluded the existence of substantial employment gains from these programs. A few papers examine the ZFU program [Rathelot and Sillard, 2008; Gobillon et al., 2012; Givord et al., 2013; Briant et al., 2015; Givord et al., 2018]. Rathelot and Sillard [2008] and Givord et al. [2013] focus on the second generation of ZFUs, and show that they had a positive effect on employment and establishment creation. They however noticed that most of establishment influx were due to mere transfers, not ex nihilo creation. Gobillon et al. [2012] show that in Paris region the first generation of ZFUs increased modestly the rate at which unemployed workers find a job. My analysis departs from these papers by taking a structural approach which allows me to go beyond the analysis of a particular program and uncover structural parameters that govern their impact.

This paper also contributes to a related literature exploring the influence of corporate taxes and business regulations on firms' location decisions. Pioneering work by Holmes [1998] demonstrates that firms tend to concentrate at the border of pro-business states, as proxied by the adoption of a right-to-work law. Recent papers deploy spatial general equilibrium frameworks to evaluate the incidence of corporate taxes using state-level variations in rates across the United States [Suárez Serrato and Zidar, 2016] and estimate the costs of tax heterogeneity due to misallocation [Fajgelbaum et al., 2018]. Giroud and Rauh [2019] study the response of the number of establishments and employment to corporate and personal tax rates. One important implication of this later work is that firms are imperfectly mobile across states. My analysis builds on these papers, but differs from them in two notable ways. First, I consider tax variations occurring at the neighborhood or the city level. Smaller geographic units are relevant when considering place-based policies. They also constitute a sensible level to study the dynamics of local labor markets. Second, I exploit a sharper variation in local costs. This variation can be credibly instrumented drawing on the selection process of ZFUs.

This project also closely connects to an older literature dating back to Hamermesh [1993] that engaged in the estimation of labor demand elasticity. To credibly estimate this elasticity, economists have looked for labor supply shocks leaving labor demand curve unchanged. For instance, Angrist [1996] traced the Israeli demand curve for migrant labor by exploiting restrictions to workers' mobility following the 1987 Palestinian uprising. In this project, I do estimate the labor demand elasticity of incumbent firms in treated neighborhoods. The intuition for identification here is based on Zoutman et al. [2018]. Specifically, Zoutman et al. show that a change in any ad-valorem tax allows to identify both demand and supply elasticities. The payroll tax credit granted in ZFUs act as a similar instrument. However, this whole literature stayed away from mobility estimation. That is, the elasticities estimated were interpreted as the change in labor demand in response to a wage move *conditional on location*. They corresponded to the compounded effect of the substitution of labor for capital and of scale change. Besides this production component, I estimate a mobility component. It captures the number of establishments that move to some area following a local wage decrease.

Firm mobility is a key ingredient to understand the dynamics of local labor markets. In their seminal paper, Blanchard and Katz [1992] underline that when an adverse shock hits a certain region, two balancing mechanisms bring back wages and unemployment to their steady state levels: workers' out-migration and firms' in-migration. They show empirically at the macro level that most of the adjustment actually comes from workers migration, whereas firms' spatial arbitrage is limited. My results complement their approach by examining at the micro level how firms react to local drop in wages. They also aim at clarifying why negative shocks to local labor markets have a long-lasting impact, as pointed by a series of recent empirical papers [Autor et al., 2013; Mian and Sufi, 2014; Dix-Carneiro and Kovak, 2017]. Specifically, I try to explain why firms don't seem to move towards distressed regions despite lower labor costs.

I first present zone-level and city-level reduced-form effects. I then turn to the structural model, which I estimate in the last part of the paper.

# 2 The ZFU Program

Several features of the ZFU policy make it a good setting for studying the impact on firm location decisions of enterprise zone subsidies. First, the selection process of the zones targeted by this program permits a credible identification of the causal impact of becoming an enterprise zone. Second, the local exemptions were quantitatively substantial. Third, national rules applied indiscriminately in all these zones.

I start by an overview[1] of the ZFU policy and a description of the tax package available to firms in the neighborhoods where this policy has been implemented. I then provide descriptive statistics on the areas benefiting from the policy.

[1] Refer to appendix **??** or a more detailed history of the program and a precise account of the rules defining the exemptions.

## 2.1 Institutional Setting

### 2.1.1 Policy History

In 1996, French authorities defined 751 *Zones Urbaines Sensibles* (sensitive urban zones, hereafter ZUS). They were distressed urban areas considered as high-priority targets for urban policy. They were characterized by high unemployment levels and large housing developments. Overall, these neighborhoods totalized about 4.7 million inhabitants in 1999.

The most distressed ZUSs were classified as *Zones de Redynamisation Urbaine* (urban renewal zones, hereafter ZRU) and *Zones Franches Urbaines* (urban tax-free zones, hereafter ZFU). The 416 ZRU represent more than two thirds of the ZUS population. The ZFUs are ZRUs totalizing more than 10,000 inhabitants and necessitating more public aids. They were created in three waves: 38 in 1997, 41 in 2004, and 15 in 2006.

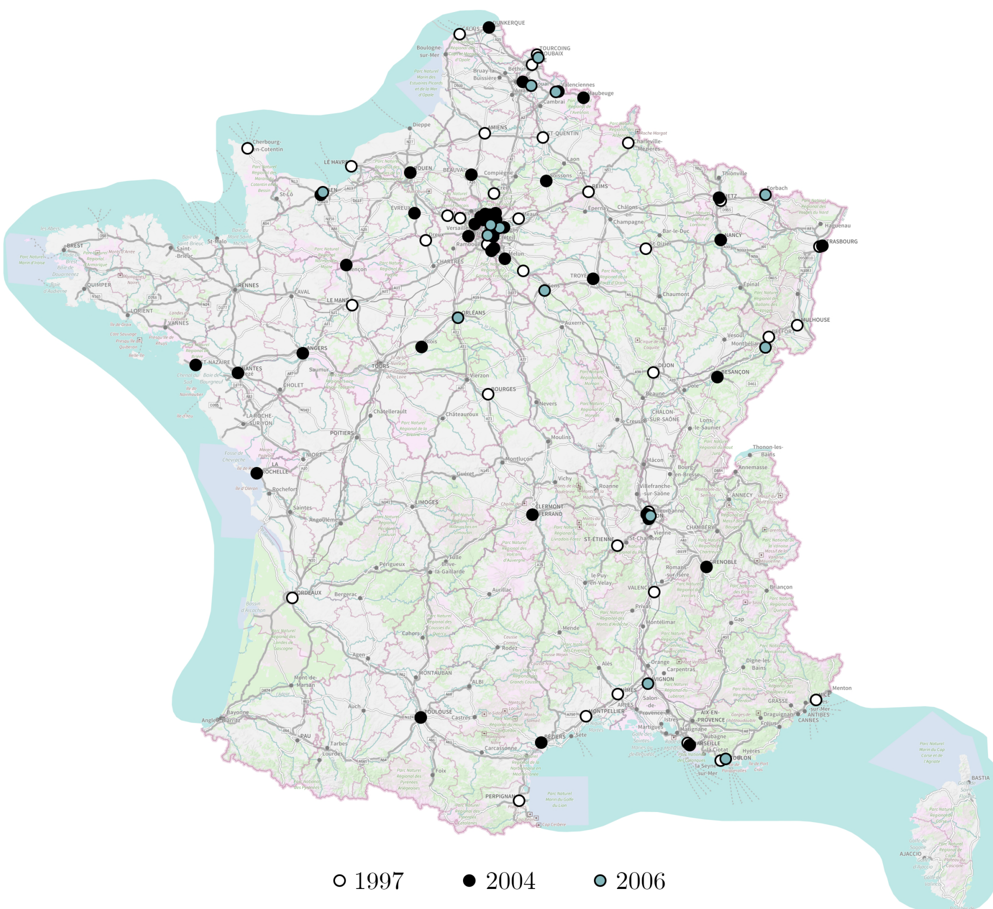



Figure 1: Map of the ZFUs

**Notes.** White dots represent the 1st generation of ZFUs (1997), black dots the 2nd generation (2004) and blue dots the 3rd generation (2006).

Firms that settle in ZRUs and ZFUs are eligible for a variety tax credits conditional on some employment and sales revenue criteria. Those exemptions encompass the four main taxes paid by French firms:

- the corporate income tax;
- the payroll tax;
- the local business tax;
- the property tax.

The corporate income tax and the payroll tax represent together the bulk of taxes paid by firms in France. When the policy was voted in 1996, the regular corporate tax rate was equal to 33.3% and the employer's social contributions represented 30 to 45% of the wage depending on the pay level.

Exemptions offered in ZFUs are distinctively more generous than those available in ZRUs. In particular, the corporate income tax credit is only available to newly-created firms and payroll tax exemptions are reserved to new job creations in ZRUs. Exemptions in ZRUs are also more limited over time. Payroll tax exemptions last only for one year in ZRUs versus eight in ZFUs. Corporate tax exemptions last for five years in ZRUs versus fourteen in ZFUs.

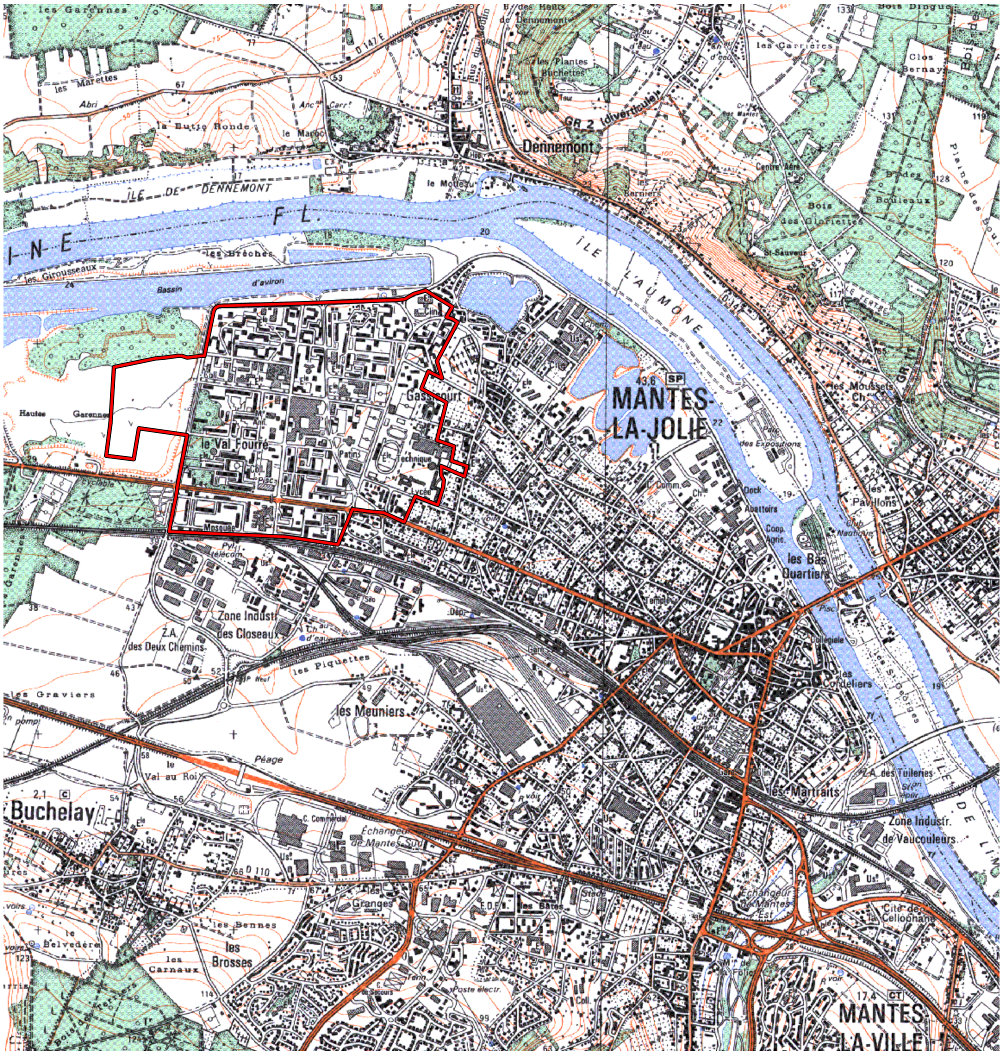



Figure 2: An example of ZFU: Mantes-la-Jolie

**Notes.** The ZFU is the area inside the red perimeter.

#### 2.1.2 Selection Process

The selection process of ZRUs among ZUSs was precisely described in official texts. For each ZUS, a synthetic index was calculated based on four criteria:

1. the unemployment rate;
2. the share of young people (under 25) in the population;
3. the share of people over 15 without any qualification;

4. the tax potential[2] of the city.

The synthetic index was defined as the product of the first three criteria divided by the last one. This index is adjusted when several urban sensitive zones are present in a municipality[3].

This index has been used both to select ZRUs among ZUSs and to select the first generation of ZFUs among ZRUs in 1997. Legislators indicated that the synthetic index was "an exclusive criterion of selection" without excluding, at the margin, a "qualitative appreciation" of particular difficulties and of the situation of the neighborhood within the city. The population of a ZFU also had to be above 10,000. The synthetic index was also used to pick new ZFUs in 2004 and 2006.

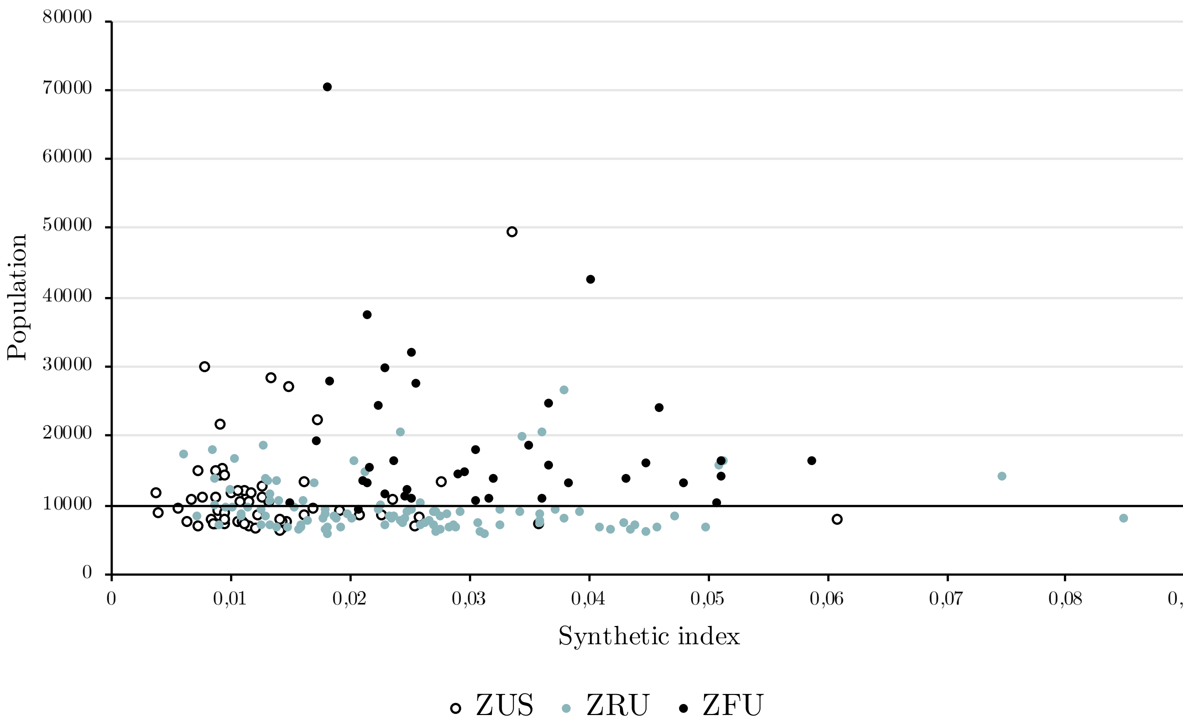



Figure 3: Synthetic index and population

**Notes.** Each dot represents a zone. White dots stand for ZUSs, blue dots for ZRUs and black dots for the first wave of ZFUs. The population threshold of 10,000 appears to be broadly enforced, with only one ZFU below this cutoff. A larger synthetic index visibly increases the probability of becoming a ZFU.

### 2.1.3 Tax Package

Exemptions granted in ZRUs and ZFUs involve the four main taxes paid by firms in France. Table 1 summarizes the different tax credits available.

[2]The tax potential (*potentiel fiscal*) of a city is equal to the amount that would yield the four local direct taxes to this municipality if the average national tax rates of each of these taxes were applied.

[3]See **??** for details.

| | ZRU | ZFU |
|---|---|---|
| **Corporate income tax** | | |
| Eligibility | only newly-created firms | all firms of at most 50 employees |
| Exemption | total for 2 years, then declining for 3 years | total for 5 years, then declining for 9 years |
| **Payroll tax** | | |
| Eligibility | only newly-created jobs | all firms of at most 50 employees |
| Exemption | total for 1 year | total for 5 years, then declining for 3 to 9 years |
| | *full exemption up to 1.4 minimum wage, then linearly decreasing; no exemption above 2.4 minimum wage* | |
| **Local business tax** | | |
| Eligibility | all establishments of at most 150 employees | all establishments of at most 50 employees |
| Exemption | total for 5 years, then declining for 3 years | total for 5 years, then declining for 3 to 9 years |
| **Property tax** | | |
| Eligibility | all firms | |
| Exemption | 5 years of full exemption | |

Table 1: Comparison of exemptions available in ZRUs and ZFUs in 2009

All exemptions are subject to a number of conditions. First, firms must exert an actual profit-generating activity in the zone. Second, total employment must be below 50. Third, at least one third of employees must reside in the ZFU (this portion has been raised to one half since 2012). Fourth, total sales must be less than 10 millions euros. Additionally, the firm can't be owned for more than 25% by a company of more than 250 employees or which sales are above 50 millions euros.

Authorities are well aware of the incentives for firms to misreport the location of their activity or their employee numbers. However, it is doubtful that this can be a major factor driving the results. Nationally, the French state employs more than 2,000 control agents to monitor firms compliance to regulations. Firms established in enterprise zones are closely scrutinized: Inspectors check the reality of firm activity in the zone, the number of workers, and their addresses of residence.

**Corporate income tax** In ZFUs, all firms of at most 50 employees benefit from a total exemption the corporate tax for five years. After the end of those five years, the firms benefit from a declining partial exemption for nine additional years. For multi-establishment firms, profits eligible for exemptions are apportioned according to the local business tax paid by the different establishments.

In ZRUs, only newly-created firms can benefit from exemptions. Tax credits are total for two years, then declining for three years.

**Payroll tax** In both ZRUs and ZFUs, payroll tax exemption is full for employees whose hourly wage is below 1.4 times the minimum wage. Then, the percentage rate of exemption is linearly decreasing until 2.4 hourly minimum wage. There is no exemption above this threshold.

In ZFUs, all firms employing less than 50 workers can claim payroll tax credits. The exemption is total for five years, then declining for three to nine additional years. In ZRUs, only newly-created jobs may benefit from a total exemption of one year.

It is worth noting that various measures alleviated payroll tax for wages below 1.6 hourly minimum wage since 1995. These tax reliefs have grown over time. They may not be combined with ZRU and ZFU advantages. Consequently, the alleviation of labor costs is relatively less valuable in those zones in recent years.

**Local business tax** All establishments of at most 50 employees are fully exempt of local business tax in ZFUs for five years. The exemption decreases afterwards for three to nine years. In ZRUs, the exemption is available for all establishments of at most 150 employees. It is also total for five years, and then declines for three years.

**Property tax** In both ZFUs and ZRUs, all firms can claim an exemption of the property tax for five years.

## 2.2 Descriptive Statistics

Areas designated as ZUSs, ZRUs and ZFUs are particularly distressed neighborhoods. They have been chosen for the existence of important disequilibrium between residence and employment and the presence of large housing blocks. Table 2 presents summary statistics on these neighborhoods and on the cities hosting them.

Data confirm that selected zones are characterized by high unemployment rates, low level of education and a high proportion of youth: unemployment is almost twice as high as the national level. They house a substantial fraction of foreigners. The majority of people living there (nearly 60%) live in social housing, while it is the case of only 15% of the overall population.

ZFUs appear to be comparatively more deprived than other ZUSs and ZRUs. They are also bigger: the average population of a ZFU in 1990 is 19,148, as opposed to 6,598 in other ZUSs. Their area is also three times wider on average.

Cities where zones are located are broadly similar to overall country.

Figure 4 reports the main sectors of private sector employment in the different zones in 1995. Sectoral composition of the zones is surprisingly similar to the composition in France. Manufacturing however is slightly less prevalent in ZUSs, while retail trade is a bit less.

| | Zones | | | France |
|---|---|---|---|---|
| | ZUS | ZRU | ZFU | |
| **Zone level** | | | | |
| Population | 6,598 | 9,718 | 19,148 | 56.6 million |
| Unemployment rate | 0.14 | 0.20 | 0.22 | 0.11 |
| Labor force participation | 0.63 | 0.59 | 0.59 | 0.55 |
| Share under 25 | 0.38 | 0.43 | 0.47 | 0.34 |
| Share without qualification | 0.26 | 0.28 | 0.30 | 0.23 |
| Share of foreigners | 0.18 | 0.17 | 0.22 | 0.06 |
| Share of social housing | 0.47 | 0.63 | 0.68 | 0.15 |
| Number of establishments | 76 | 44 | 138 | 1.3 million |
| Employment | 629 | 397 | 1,456 | 10.4 million |
| Median hourly wage | 6.34 | 6.02 | 6.51 | |
| Surface (square miles) | 0.24 | | 0.78 | |
| **City level** | | | | |
| Population | 56,633 | 55,631 | 92,676 | 56.6 million |
| Unemployment rate | 0.13 | 0.16 | 0.15 | 0.11 |
| Labor force participation | 0.46 | 0.43 | 0.45 | 0.55 |
| Share under 25 | 0.37 | 0.38 | 0.39 | 0.34 |
| Share without qualification | 0.40 | 0.41 | 0.40 | 0.23 |
| Number of establishments | 1,049 | 956 | 1,569 | 1.3 million |
| Employment | 11,001 | 9,626 | 16,674 | 10.4 million |
| Median hourly wage | 6.45 | 6.25 | 6.49 | |
| Tax potential (2017) | 1,175 | 1,118 | 1,146 | |

Table 2: Summary statistics

**Sources.** Demographic information is from the 1990 French Census (Recensement de la Population).

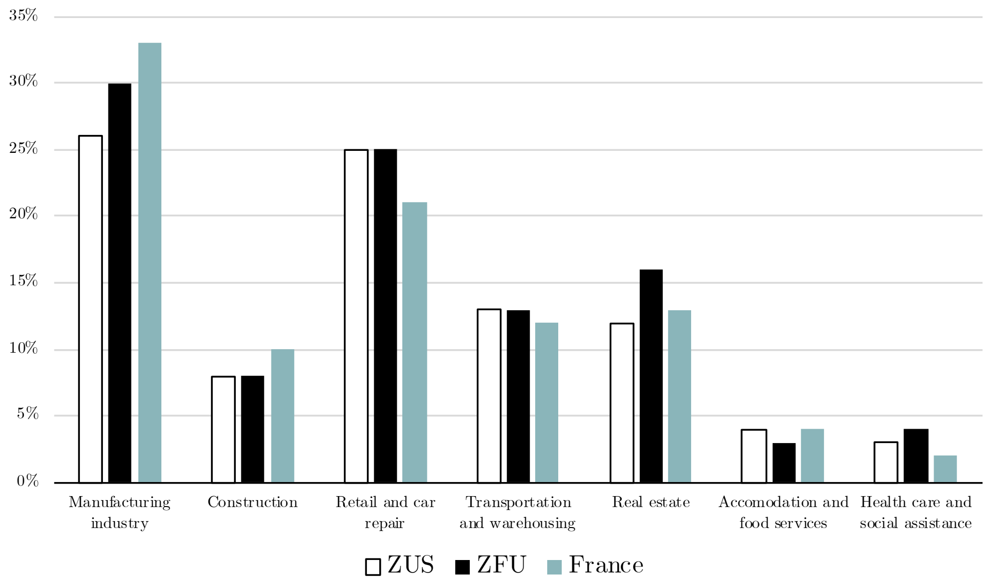



Figure 4: Sectoral composition

**Notes.**

# 3 Impact on Employment and Earnings

## 3.1 Data

I combine two main sources of administrative data: an employer-employee matched database and the business register. More information about on the data are provided in appendix **??**.

The employer-employee matched database, known as DADS, is derived from employer's social contribution reports. These tax declarations are mandatory for any employing firm. They contain all the positions held by the employees, with associated number of days and hours worked, pre-tax and post-tax income, occupation and industry. They also provide some basic demographic information including sex, age and birthplace.

The business register is assembled from two datasets. The publicly available Sirene dataset compiles information on all firms and their establishments. Besides the firm and establishment identifiers, it includes the exact address of each establishment. However, this directory is not updated consistently regarding discontinuing businesses. The Insee–French Census–cross-checks several administrative sources to build the REE, which contains reliable stocks, creations and transfers of firms and establishments.

## 3.2 Empirical Strategy

To identify the effect of creating a ZFU on outcomes of interest, I apply two different econometric models: difference-in-differences and weighting on propensity score.

**Difference-in-differences** First, I run a simple difference-in-differences using as a control group the ZRUs that never became ZFUs. In my baseline regression, I pool the three waves of ZFUs together. I estimate an event study model:

$$\log y_{zt} = \sum_{\tau=-6}^{10} \alpha_\tau I_{zt}^\tau + \mu_z + \rho_t + u_{zt} \tag{1}$$

I include 6 lead years before treatment, and 10 periods after treatment capturing the short-run and long-run effects. Dummy variable $I_{zt}^\tau$ is equal to one when $\tau$ is equal to the number of years relative to treatment for zone $z$ in period $t$. I omit the dummy for $\tau = 0$ to center the results in 0. The terms $\mu_z$ and $\rho_t$ are respectively zone and time fixed effects.

**Weighting on propensity score** As an alternative strategy, I take advantage of the selection process of ZFUs among ZRUs. I compute the synthetic index defined by authorities. Figure 3 shows that a higher synthetic index increased the chances to become a ZFU.

I first run on the sample of ZRUs a logit regression where the outcome is a dummy equal to one for zones that became ZFUs and to zero otherwise. For now, I focus on the first wave of ZFUs–those that were implemented in 1997. I run logit regressions with the synthetic index, a dummy for population above 10,000, and the stock of establishments as explanatory variables. I also include the components of the synthetic index. Table 3 reports the results of these regressions.

Both the synthetic index and having a population above 10,000 appear to be strong determinants of being designated as a ZFU. The exiting stock of establishments does not seem to play a role. Among the components of the synthetic index, the share of population below 25 years old and the portion of adults with no qualification were pivotal. In what follows, I keep regression (2) as my baseline propensity score regression.

I use (inverse) predicted values of the propensity score to weight the difference in difference regression (see Rosenbaum and Rubin [1983]). That is, I run regression:

$$\log y_{zt} = \sum_{\tau=-2}^{10} \alpha_\tau I_{zt}^\tau + \mu_z + \rho_t + u_{zt} \tag{2}$$

and weight observations by:

$$\frac{1_{z_i \in \text{ZFU}} - \hat{p}(X_i)}{\hat{p}(X_i)(1 - \hat{p}(X_i))}. \tag{3}$$

| | Probability of becoming a ZFU | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Synthetic index | 34.402** | 47.106** | 45.990** | |
| | (14.459) | (19.715) | (19.429) | |
| Population > 10,000 | | 4.842*** | 5.198*** | 6.519*** |
| | | (1.076) | (1.153) | (1.502) |
| Unemployment rate | | | | -9.905 |
| | | | | 7.688 |
| Percentage below 25 years old | | | | 40.277*** |
| | | | | (10.278) |
| Percentage with no qualification | | | | 19.083** |
| | | | | (9.468) |
| Stock of establishments (log) | | | -0.376 | 0.357 |
| | | | (0.391) | (0.559) |
| Constant | -1.959*** | -5.785*** | -4.105** | -29.043*** |
| | (0.460) | (1.256) | (2.120) | (7.140) |

Table 3: Probability of becoming a ZFU in 1997 conditional on being a ZRU

## 3.3 Zone-level Results

In this section, I present the impact of becoming a ZFU on employment, establishments and wages inside the zone.

### 3.3.1 Effect on Employment

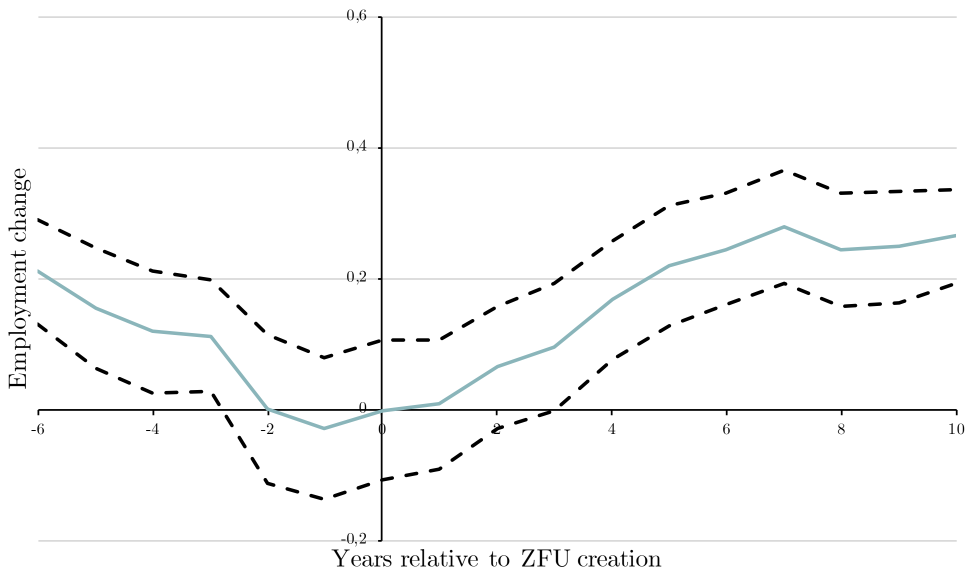
Figure 5 displays the response of total employment in the zone to becoming a ZFU. The first chart 5a displays the results of the difference-in-differences regression, while the second 5b represents the results of the propensity score weighting regression.

According to the difference-in-differences specification, employment grows by nearly 30% after the implementation of a ZFU. The presence of a downward pre-trend suggest that this figure is likely to be a lower bound of the effect of a ZFU on employment.

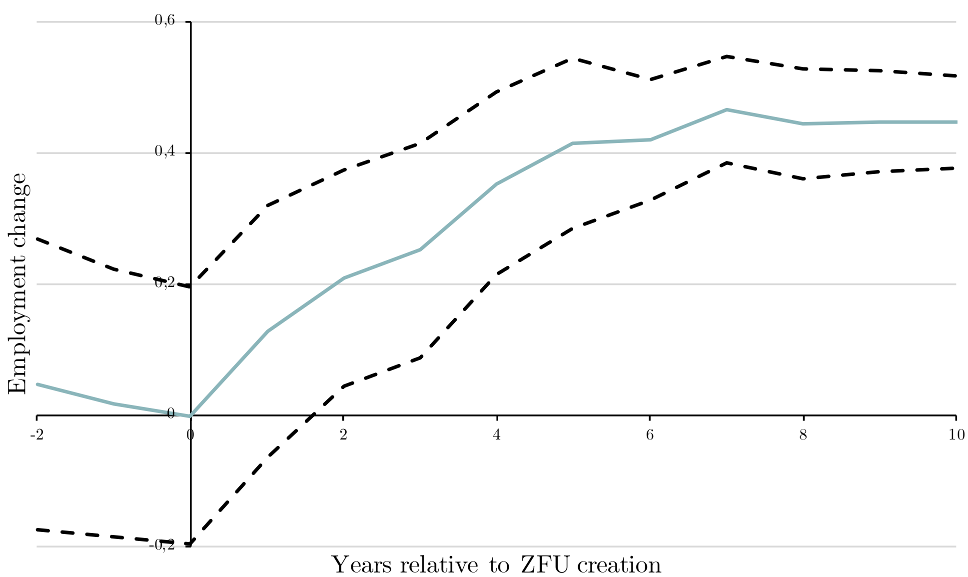
The weighting on propensity score specification, which focuses on the first wave of ZFUs, points at even stronger effects. Zone-level employment of has grown by nearly 45%. Difference-in-difference regression restricted to the first generation of ZFUs confirms larger effects of the first generation. Those stronger effects are consistent with more valuable payroll tax exemptions during the first wave due to less extended national-level mitigation of employers' social contributions on low wages at that time.

Detailed results by sector are reported in appendix A, figure 11. The growth in total employment is driven by the construction sector, which grows by 70%. Retail trade, accommodation and food services, health care and social assistance and educational services grow substantially as well. Notably, manufacturing employment does not seem to increase at all.

The average establishment size declines in ZFUs, as shown in figure 6. This fact suggests a selection of smaller establishments among the new establishments that moved or were created in ZFUs.




(a) Difference-in-differences




(b) Weighting on propensity score

Figure 5: Impact on total employment

**Notes.** This figure shows the impact of the creation of a ZFU on the logarithm of total employment. Graph 5a represents the results of difference-in-differences specification (1). The three generations of ZFUs are pooled together, and ZRUs that never became ZFUs are used as controls. Graph 5b represents the results of propensity score weighting specification (2). It focuses on the first generation of ZFUs. ZRUs that never became ZFUs are again used as controls. In both graphs, the grey lines represent the 95% confidence intervals.

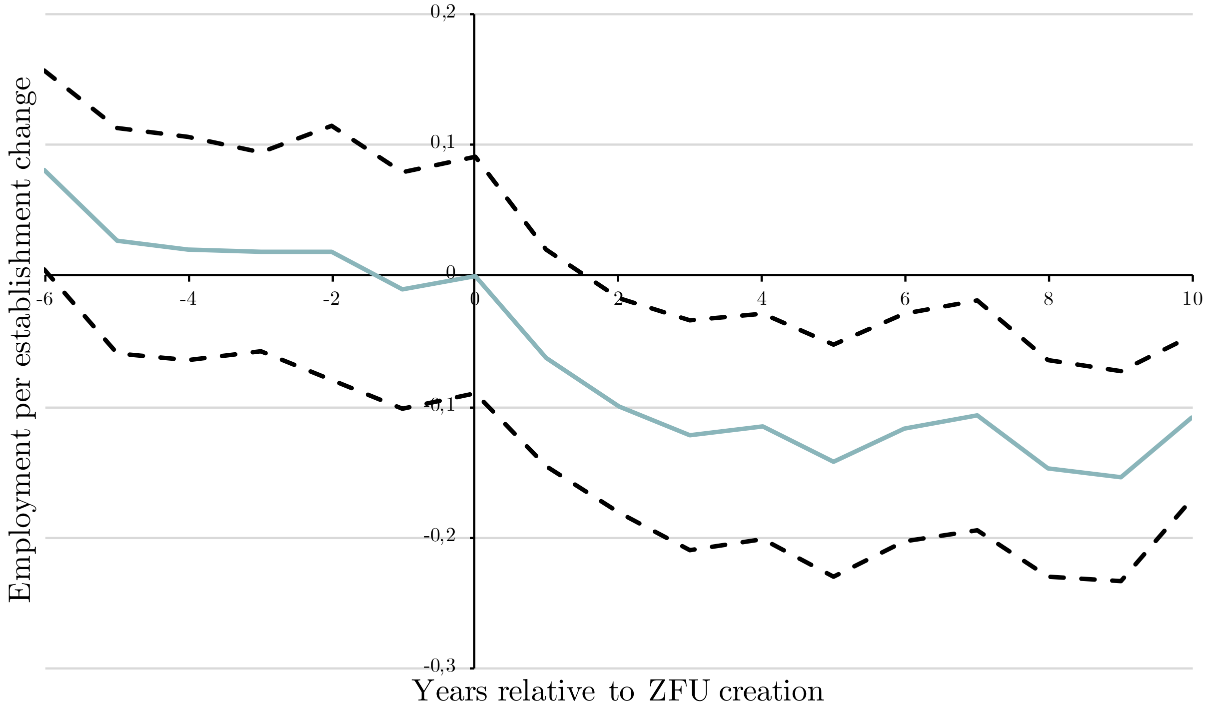
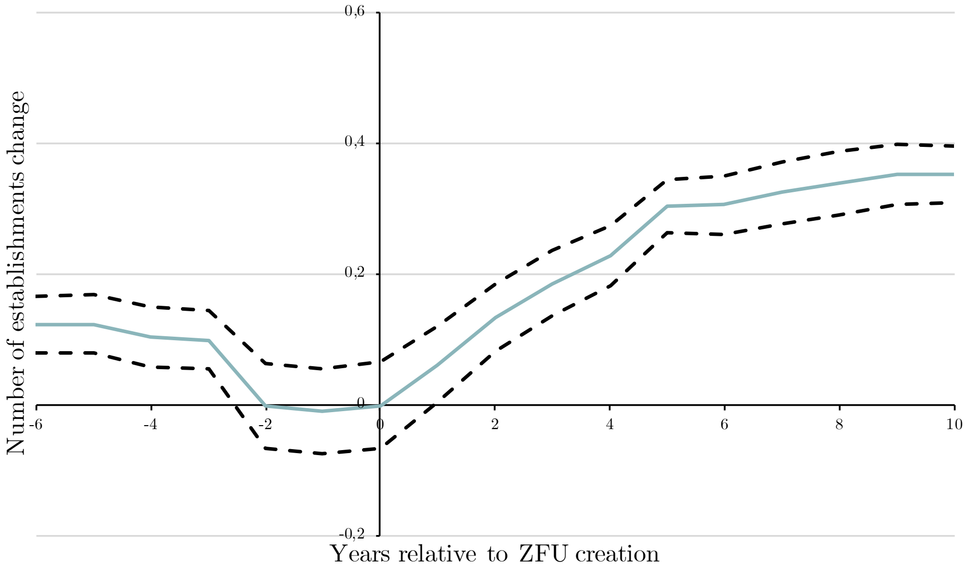



Figure 6: Impact on average establishment size

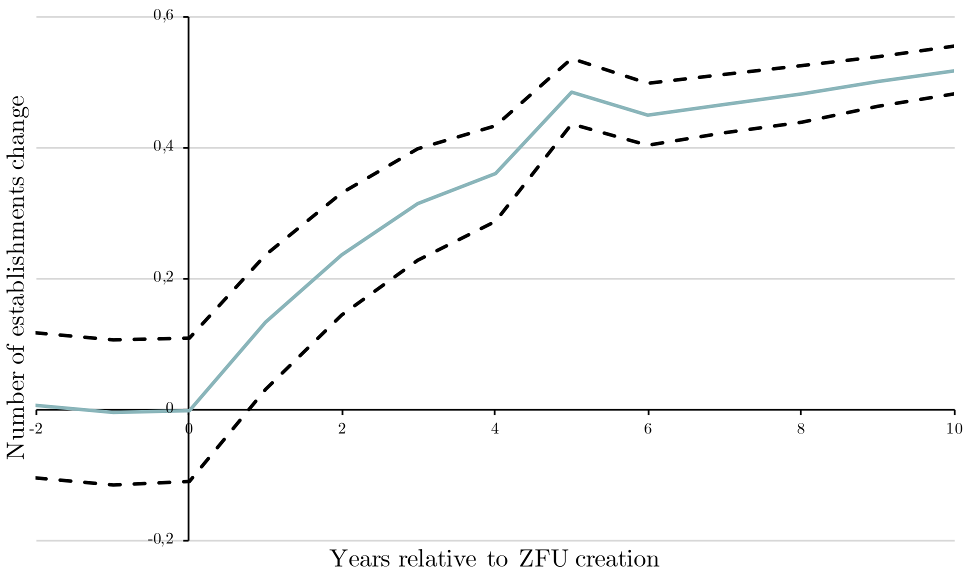
#### 3.3.2 Effect on Establishments

Figure 7 represents the response of the stock of establishments to the creation of a ZFU. Both imply an important effect, from 35 to 50%. Again, the first generation of ZFUs appear to generate larger effects than the following ones. The effect is primarily driven by mono-establishment firms (see 12 in appendix A).

Figure 11 in appendix A confirms the employment results: construction is the sector reacting the most, along with retail, accommodation and food services, health care and social assistance and educational services.




(a) Difference-in-differences




(b) Weighting on propensity score

Figure 7: Impact on the number of establishments

**Notes.** This figure shows the impact of the creation of a ZFU on the logarithm of total employment. Graph 5a represents the results of difference-in-differences specification (1). The three generations of ZFUs are pooled together, and ZRUs that never became ZFUs are used as controls. Graph 5b represents the results of propensity score weighting specification (2). It focuses on the first generation of ZFUs. ZRUs that never became ZFUs are again used as controls. In both graphs, the grey lines represent the 95% confidence intervals.

### 3.3.3 Effect on Wages

Median wage decreases slightly in ZFUs. This fact suggests that jobs created following the creation of an enterprise zone are relatively low paid.

I adjust wages for age, sex and occupation to obtain more reliable estimates.

(IN PROGRESS)

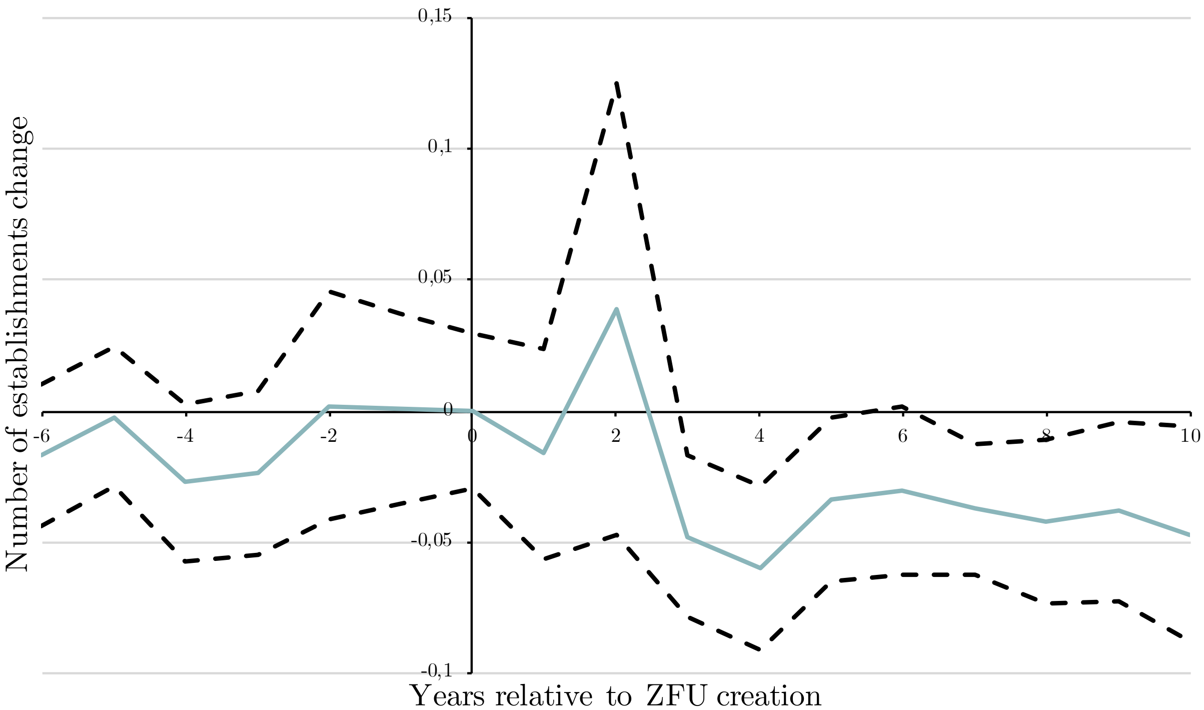
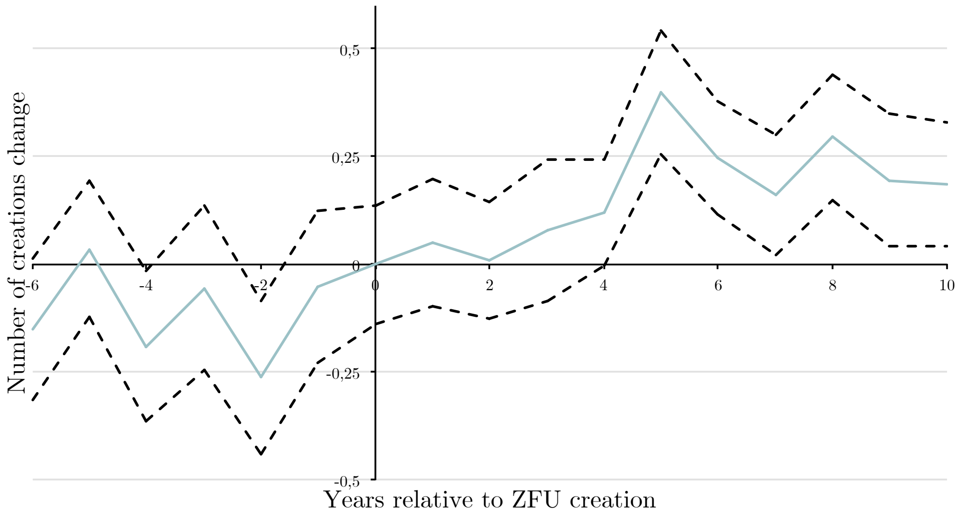



Figure 8: Impact on gross wage

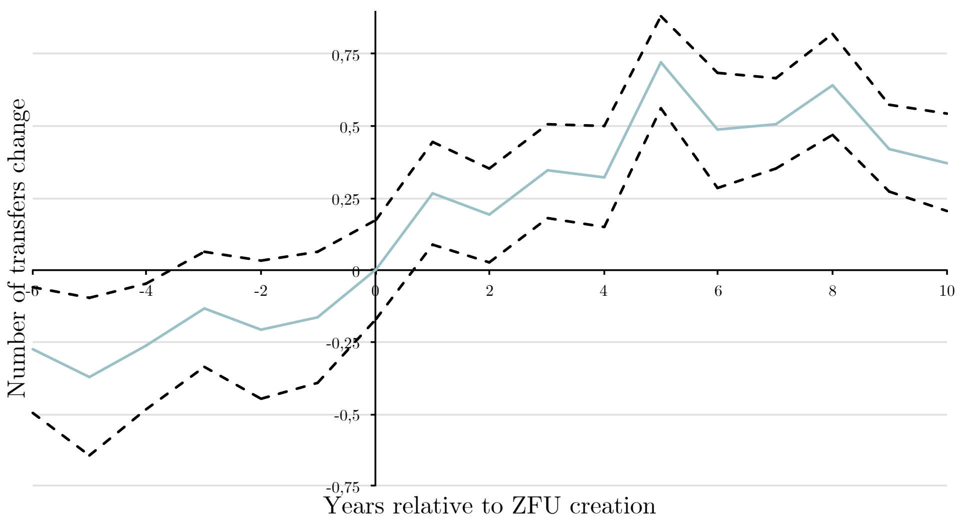
## 3.4 Displacement Effects

Figure 9a presents the impact of ZFU implementation on annual creations of establishments in the zone. There is a visible positive impact of around 20%.

Similarly, figure 9b shows a positive impact on transfers, reaching nearly 40%.




(a) Creations




(b) Transfers

Figure 9: Impact on creations and transfers of establishments

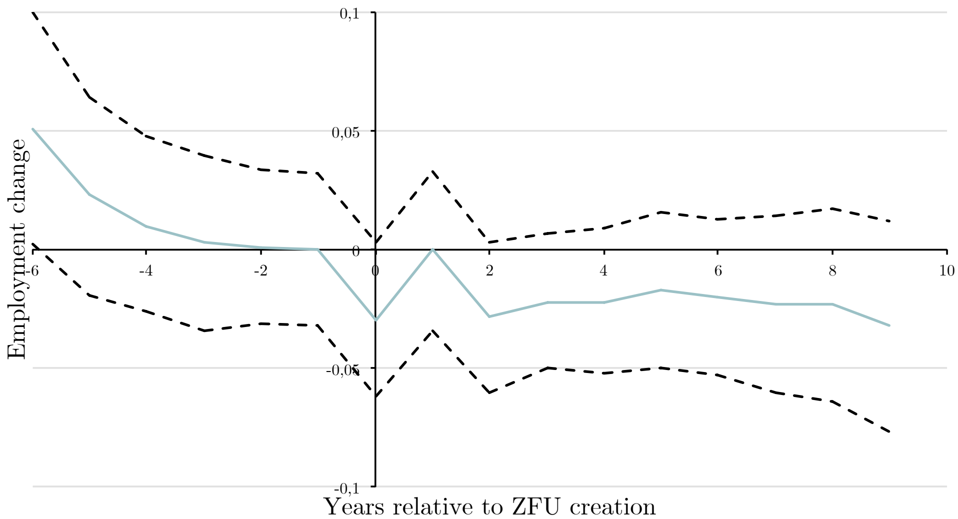
**Notes.**

## 3.5 City-level Results

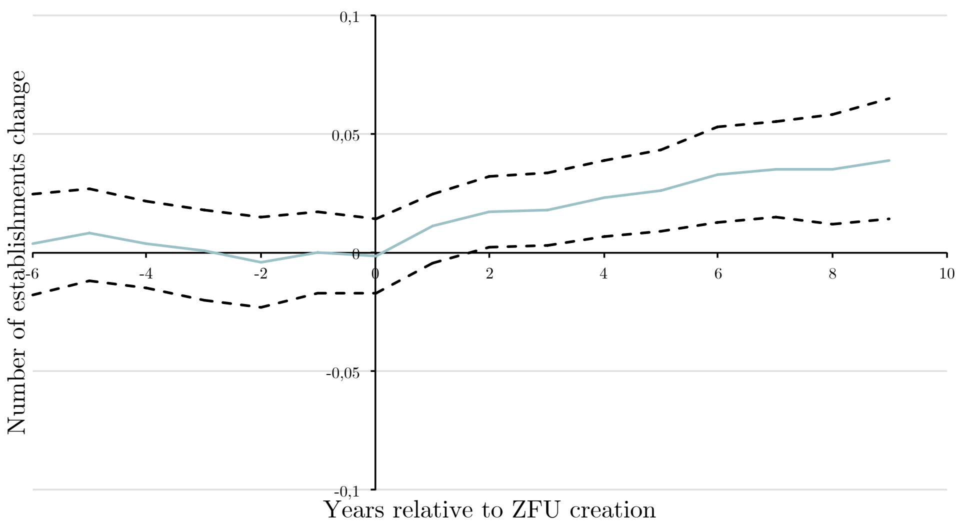
To measure city-level impact on employment and stock of establishments, I proceed in two steps.

First, I use synthetic controls to predict the outcomes of each city hosting a ZFU or a ZRU. I use as predictors total population in 1990, shares of different age groups (0-24, 25-44, 45-64, 65 and over), unemployment rate, shares of adults with no qualification and with college degree. I use as a control group all cities hosting a ZRU (but no ZFU), except the city considered itself. I measure the gap between the actual outcomes and predicted ones for each city.

Second, I run a difference-in-differences on those gaps. I find a small increase of the stock of establishments, by about 3%, but no clear response of employment.




(a) Employment




(b) Number of establishments

Figure 10: Impact on city-level outcomes

**Notes.**

# 4 A Model of Firm Mobility

## 4.1 Households

There is a mass one of households who are assumed to have Cobb-Douglas preferences on goods. They maximize:

$$\max_{(x_\nu)} \ln A + \ln \left( \int_{\nu \in F} x_\nu^{\frac{\varepsilon^{PD}+1}{\varepsilon^{PD}}} d\nu \right)^{\frac{\varepsilon^{PD}}{\varepsilon^{PD}+1}} \quad \text{s.t.} \quad \int_{\nu \in F} p_\nu x_\nu d\nu = w \tag{4}$$

where $A$ are amenities, $w$ is wage, $p_j$ are good prices, $\varepsilon^{PD} < -1$ is the product demand elasticity, and $P$ is the CES price index.

Each individual supplies inelastically one unit of labor.

**Location choice** Amenities and wages depend on location. I consider here two nested geographical levels: the neighborhood $n$ and the city $c$. There are $N_c$ neighborhoods in each city $c$. The indirect utility of household $h$ in neighborhood $n$ of city $c$ is given by:

$$V_{h,cn}^W = a_0 + \ln w_{cn} + \ln A_{h,cn} \tag{5}$$

where $a_0$ is a constant and the amenities $A_{h,cn}$ can be decomposed between a common location-specific term $\overline{A}_{cn}$ and a location-specific idiosyncratic preference $\xi_{h,cn}$. Then:

$$V_{h,cn}^W = \underbrace{a_0 + \ln w_{cn} + \ln \overline{A}_{cn}}_{\equiv u_{cn}} + \xi_{h,cn}. \tag{6}$$

Households maximize $V_{h,cn}^W$ over locations $(c, n)$. Their preferences over locations are given by a nested logit model. Specifically, I assume that for each $h$, $(\xi_{h,cn})_{cn}$ follows a generalized extreme value distribution:

$$F((\xi_{h,cn})_{cn}) = \exp\left( -\sum_{c=1}^{C} \left( \sum_{n=1}^{N_c} e^{-\xi_{h,cn}/\sigma^W \lambda^W} \right)^{\lambda^W} \right) \tag{7}$$

where $\sigma^W$ is the dispersion parameter and $\lambda^W \in [0, 1]$ is the within-city correlation and that the $\xi_h$ are i.i.d. over $h$.

The population living in city $c$ is then:

$$Q_c = \frac{\left( \sum_{n=1}^{N_c} e^{u_{cn}/\sigma^W \lambda^W} \right)^{\lambda^W}}{\sum_{c=1}^{C} \left( \sum_{n=1}^{N_c} e^{u_{cn}/\sigma^W \lambda^W} \right)^{\lambda^W}} \tag{8}$$

and the share of the population of city $c$ living in neighborhood $n$ is:

$$\frac{Q_{cn}}{Q_c} = \frac{e^{u_{cn}/\sigma^W \lambda^W}}{\sum_{n'=1}^{N_c} e^{u_{cn'}/\sigma^W \lambda^W}}. \tag{9}$$

Importantly, I'm going to interpret $Q_{cn}$ and $Q_c$ as the number of people *working* in neighborhood $(c, n)$ or city $c$. That is, my labor supply elasticities will partly capture the willingness of workers to commute to neighborhood $n$.

**Labor supply elasticity** The labor supply elasticity in neighborhood $n$ of city $c$ can be decomposed in a within-city component and a between-city component:

$$\varepsilon^{LS} = \frac{\partial \ln Q_{cn}}{\partial \ln w_{cn}} = \underbrace{\frac{\partial \ln Q_{cn}/Q_c}{\partial \ln w_{cn}}}_{\equiv \varepsilon^{LS}_{\text{within}}} + \frac{\partial \ln w_c}{\partial \ln w_{cn}} \underbrace{\frac{\partial \ln Q_c}{\partial \ln w_c}}_{\equiv \varepsilon^{LS}_{\text{across}}} \tag{10}$$

where:

$$w_c = \left( \sum_{n=1}^{N_c} \tilde{A}_{cn} w_{cn}^{1/\sigma^W \lambda^W} \right)^{\sigma^W \lambda^W} \tag{11}$$

is the amenities-weighted city wage index, with $\tilde{A}_{cn} = (e^{a_0} \overline{A}_{cn})^{1/\sigma^W \lambda^W}$.

The across-city elasticity is:

$$\varepsilon^{LS}_{\text{across}} = \frac{1}{\sigma^W}(1 - Q_c) \tag{12}$$

and the partial derivative of the wage index:

$$\frac{\partial \ln w_c}{\partial \ln w_{cn}} = \frac{Q_{cn}}{Q_c}. \tag{13}$$

Intuitively, the most idiosyncratic preferences over locations (corresponding to a higher value of $\sigma^W$), the lower the across-city elasticity. Moreover, the larger the share of the population living outside city $c$ (corresponding to a higher $1 - Q_c$), the more people potentially able to move into city $c$ if the local wage $w_c$ increases[4].

The within-city elasticity is:

$$\varepsilon^{LS}_{\text{within}} = \frac{1}{\sigma^W \lambda^W} \left( 1 - \frac{Q_{cn}}{Q_c} \right). \tag{14}$$

This elasticity has a similar interpretation. The most idiosyncratic preferences over neighborhoods (corresponding here to a higher value of $\sigma^W \lambda^W$), the lower the within-city elasticity. $\lambda^W$ can be interpreted as a factor that determines how much closer neighborhoods are within the same city than cities across the country are. It also captures lower costs of moving to a closer location. Besides, the larger the share of the population in city $c$ living outside neighborhood $n$ (corresponding to a higher $1 - \frac{Q_{cn}}{Q_c}$), the more people potentially able to move into the neighborhood if the local wage $w_{cn}$ increases.

[4] Even if the modeling of the supply of labor is simplistic here, one might think of these effective elasticities as capturing other margins. In particular, they might incorporate a component corresponding to variations in individual labor supply. They also encompass the feedback loop due to the endogenous rents changes described in Suárez Serrato and Zidar [2016]. Embedding the housing market would lead to $\varepsilon^{LS}_{\text{across}} = \frac{1+\eta-\alpha}{\sigma^W(1+\eta)+\alpha}(1-Q_c)$ with $\alpha$ the share of household's expenses on housing and $\eta$ the housing supply elasticity. However, I don't try to disentangle those different channels, as I focus on the mobility of demand (and don't have data on rental prices for now).

## 4.2 Firms

Establishments are monopolistically competitive and have productivity $B_{f,cn}$ that depends on location $(c,n)$. Their production function is given by:

$$y_{f,cn} = B_{f,cn} k_{f,cn}^{\alpha} l_{f,cn}^{\beta} M_{f,cn}^{1-\beta-\alpha} \tag{15}$$

where $y_{f,cn}$ is output, $l_{f,cn}$ is labor, $k_{f,cn}$ is capital, and $M_{f,cn} = \left( \int_{\nu \in F} (x_{\nu,f,cn})^{\frac{\varepsilon^{PD}+1}{\varepsilon^{PD}}} d\nu \right)^{\frac{\varepsilon^{PD}}{\varepsilon^{PD}+1}}$ is the bundle intermediate goods. The shares of capital, labor, and intermediate goods are respectively given by $\alpha$, $\beta$ and $1-\alpha-\beta$.

At a given location $(c,n)$ featuring a local wage $w_{cn}$, an establishment maximizes its profits $\pi_{f,cn}$ given by:

$$\pi_{f,cn} = \max_{l_{f,cn}, k_{f,cn}, (x_{\nu,f,cn}), p_{f,cn}} (1-\tau_{cn}^{c}) \left( p_{f,cn} y_{f,cn} - (1+\tau_{sc}^{w}) w_{cn} l_{f,cn} - \int_{\nu \in F} p_{\nu} x_{\nu,f,cn} d\nu \right) - \rho k_{f,cn} \tag{16}$$

where $\rho$ is the national rental rate of capital and $p_\nu$ are national prices. $\tau_{cn}^{c}$ and $\tau_{cn}^{w}$ are respectively the local business tax rate and the local payroll tax. The corporate tax affects the cost of capital as the returns to equity holders are not tax deductible.

Local profits can then be expressed as:

$$\pi_{f,cn} = (1-\tau_{cn}^{c})(1+\tau_{cn}^{w})^{(\varepsilon^{PD}+1)\beta} w_{cn}^{(\varepsilon^{PD}+1)\beta} \rho^{(\varepsilon^{PD}+1)\alpha} (1-\tau_{cn}^{c})^{-(\varepsilon^{PD}+1)\alpha} B_{cn}^{-(\varepsilon^{PD}+1)} \kappa \tag{17}$$

for some constant $\kappa$.

**Location choice** Firm-owners choose the location $(c,n)$ that maximizes their profits. As for households, I assume that firm's local productivity $B_{f,cn}$ has a common location-specific component $\overline{B}_{cn}$ and an idiosyncratic component $\zeta_{f,cn}$ and that firms' location choices are given by a nested logit model. That is, the $\zeta_f$'s are i.i.d. over firms with each $(\zeta_{f,cn})_{cn}$ following a generalized extreme value distribution for each firm $f$.

Establishment $f$'s value function in location is defined as:

$$V_{f,cn}^{F} = \underbrace{\left( \frac{1}{-(\varepsilon^{PD}+1)} + \alpha \right) \ln(1-\tau_{cn}^{c}) + \overline{B}_{cn} - \beta \ln(1+\tau_{cn}^{w}) - \beta \ln w_{cn} - \alpha \ln \rho + \frac{\ln \kappa}{-(\varepsilon^{PD}+1)}}_{\equiv v_{cn}} + \zeta_{f,cn}. \tag{18}$$

The number of establishments in city $c$ is then:

$$E_c = \frac{\left( \sum_{n=1}^{N_c} e^{v_{cn}/\sigma^F \lambda^F} \right)^{\lambda^F}}{\sum_{c=1}^{C} \left( \sum_{n=1}^{N_c} e^{v_{cn}/\sigma^F \lambda^F} \right)^{\lambda^F}} \tag{19}$$

and the share of city $c$ establishments housed by neighborhood $n$ is:

$$\frac{E_{cn}}{E_c} = \frac{e^{v_{cn}/\sigma^F \lambda^F}}{\sum_{n'=1}^{N_c} e^{v_{cn'}/\sigma^F \lambda^F}}. \tag{20}$$

**Labor demand elasticity** The labor supply elasticity in neighborhood $n$ of city $c$ can be decomposed between the extensive margin, which itself breaks into a within-city component and a between-city component, and the intensive margin:

$$\begin{aligned}
\varepsilon_w^{LD} &= \frac{\partial \ln E_{cn}}{\partial \ln w_{cn}} + \frac{\partial \ln \bar{l}^*_{cn}}{\partial \ln w_{cn}} \\
&= \underbrace{\underbrace{\frac{\partial \ln E_{cn}/E_c}{\partial \ln w_{cn}}}_{\equiv \varepsilon^{LD,\text{ext}}_{\text{within},w}} + \underbrace{\frac{\partial \ln E_c}{\partial \ln w_c}}_{\equiv \varepsilon^{LD,\text{ext}}_{\text{across},w}} \frac{\partial \ln w_c}{\partial \ln w_{cn}}}_{\text{extensive margin}} + \underbrace{\underbrace{\frac{\partial \ln \bar{l}^*_{cn}}{\partial \ln w_{cn}}}_{\equiv \varepsilon^{LD,\text{int}}_{w}}}_{\text{intensive margin}}
\end{aligned}$$

where:

$$\begin{aligned}
\bar{l}^*_{cn} &= \mathbb{E}_\zeta \left[ l^*_{f,cn} | \; (c,n) = \arg\max_{(c',n')} \{V_{f,c'n'}\} \right] \\
&= (1+\tau^w_{cn})^{\beta\varepsilon^{PD}+\beta-1} w_{cn}^{\beta\varepsilon^{PD}+\beta-1} \rho_{cn}^{(1+\varepsilon^{PD})\alpha} (1-\tau^b_{cn})^{-(\varepsilon^{PD}+1)\alpha} \kappa e^{-(\varepsilon^{PD}+1)\overline{B}_{cn}} z_{cn}
\end{aligned}$$

is the average labor demand of firms choosing location $(c,n)$ and:

$$w_c = \left( \sum_{n=1}^{N_c} \tilde{B}_{cn} w_{cn}^{1/\sigma^F\lambda^F} \right)^{\sigma^F\lambda^F} \tag{21}$$

is the productivity-weighted city wage index.

$z_{cn}$ is a term increasing in the idiosyncratic productivity of draws $\zeta_{f,cn}$ housed by location $(c,n)$.

The across-city elasticity of the extensive margin is:

$$\varepsilon^{LD,\text{ext}}_{\text{across},w} = -\frac{\beta}{\sigma^F}(1-E_c) \tag{22}$$

and the partial derivative of the wage index:

$$\frac{\partial \ln w_c}{\partial \ln w_{cn}} = \frac{E_{cn}}{E_c}. \tag{23}$$

The within-city elasticity is:

$$\varepsilon^{LD,\text{ext}}_{\text{within},w} = -\frac{\beta}{\sigma^F\lambda^F}\left(1 - \frac{E_{cn}}{E_c}\right). \tag{24}$$

The intuitions for those two elasticities are similar as in the household case. The additional factor $\beta$ comes from the fact that firms will be more willing to move the higher the share of labor in their production.

The elasticity of the intensive margin is:

$$\varepsilon^{LD,\text{int}}_w = \beta - 1 + \beta\varepsilon^{PD}. \tag{25}$$

The term $\beta - 1$ corresponds to the substitution between factors and $\beta\varepsilon^{PD}$ to the scale of production.

Finally, the effective labor demand elasticity can be decomposed as:

$$\varepsilon_w^{LD} = \overbrace{\underbrace{\beta - 1}_{\text{substitution}} + \underbrace{\beta\varepsilon^{PD}}_{\text{scale}}}^{\text{intensive margin}} \overbrace{\underbrace{-\frac{\beta}{\sigma^F}(1 - E_c)\frac{E_{cn}}{E_c}}_{\text{across-city location}} \underbrace{-\frac{\beta}{\sigma^F\lambda^F}\left(1 - \frac{E_{cn}}{E_c}\right)}_{\text{within-city location}}}^{\text{extensive margin}} \tag{26}$$

**Elasticities with respect to tax changes** As before, elasticity of labor demand with respect to taxes breaks into a within-city and an across-city components on the extensive margin, and an intensive margin component:

$$\varepsilon_c^{LD} = \underbrace{\underbrace{\frac{\partial \ln E_{cn}/E_c}{\partial \ln(1-\tau_{cn}^c)}}_{\equiv \varepsilon_{\text{within},c}^{LD,\text{ext}}} + \underbrace{\frac{\partial \ln E_c}{\partial \ln(1-\tau_c^c)}}_{\equiv \varepsilon_{\text{across},c}^{LD,\text{ext}}} \frac{\partial \ln(1-\tau_c^c)}{\partial \ln(1-\tau_{cn}^c)}}_{\text{extensive margin}} + \underbrace{\underbrace{\frac{\partial \ln \bar{l}_{cn}^*}{\partial \ln(1-\tau_{cn}^c)}}_{\equiv \varepsilon_c^{LD,\text{int}}}}_{\text{intensive margin}}. \tag{27}$$

The across-city elasticity is:

$$\varepsilon_{\text{across},c}^{LD,\text{ext}} = \frac{\frac{1}{-(\varepsilon^{PD}+1)} + \alpha}{\sigma^F}(1 - E_c) = \frac{\mu - 1 + \alpha}{\sigma^F}(1 - E_c) \tag{28}$$

with $\mu - 1 \equiv \frac{1}{-(\varepsilon^{PD}+1)}$ the net markup.

The within-city elasticity is:

$$\varepsilon_{\text{within},c}^{LD,\text{ext}} = \frac{\mu - 1 + \alpha}{\sigma^F\lambda^F}\left(1 - \frac{E_{cn}}{E_c}\right) \tag{29}$$

Here, the corporate tax can influence the location through two channels. First by diminishing the revenues of firm-owners, which is reflected in the markup $\mu - 1$, and second by increasing the local cost of capital, which is captured by the share of capital in production $\alpha$.

Turning to the intensive margin, we have:

$$\varepsilon_c^{LD,\text{int}} = -\alpha - \alpha\varepsilon^{PD} \tag{30}$$

where $-\alpha$ corresponds to substitution between capital and labor and $-\alpha\varepsilon^{PD}$ to the scale of production.

A similar decomposition exists for the elasticity with respect to the labor tax. It's easy to check that:

$$\frac{\partial \ln E_{cn}/E_c}{\partial \ln(1+\tau_{cn}^w)} = \varepsilon_{\text{within},w}^{LD,\text{ext}}, \tag{31}$$

$$\frac{\partial \ln E_c}{\partial \ln(1+\tau_c^w)} = \varepsilon_{\text{across},w}^{LD,\text{ext}}, \tag{32}$$

and:

$$\frac{\partial \ln \bar{l}_{cn}^*}{\partial \ln(1+\tau_{cn}^w)} = \varepsilon_w^{LD,\text{int}}. \tag{33}$$

# 5 Structural Estimation

This section describes the estimation procedure for the structural parameters of the structural model exposed in section 4 that rationalize the reduced-form estimates of section 3. The first subsection describes the minimum distance estimator used. I then turn to the choice of calibrated parameters. The results are set out in the last part.

## 5.1 Structural equations

The simultaneous equations model of exact derivative is given by[5]:

1. the across-city labor supply equation (12):

$$\Delta \ln Q_c = \frac{1}{\sigma^W} \frac{Q_{cn}}{Q_c} \Delta \ln w_{cn}; \tag{34}$$

2. the within-city labor supply equation (14):

$$\Delta \ln Q_{cn}/Q_c = \frac{1}{\sigma^W \lambda^W} \left(1 - \frac{Q_{cn}}{Q_c}\right) \Delta \ln w_{cn}; \tag{35}$$

3. the across-city labor demand equation (22):

$$\Delta \ln E_c = -\frac{\beta}{\sigma^F} \frac{E_{cn}}{E_c} \Delta \ln w_{cn} - \frac{\beta}{\sigma^F} \frac{E_{cn}}{E_c} \Delta \ln(1+\tau^w_{cn}) + \frac{\mu - 1 + \alpha}{\sigma^F} \frac{E_{cn}}{E_c} \Delta \ln(1-\tau^c_{cn}); \tag{36}$$

4. the within-city labor demand equation (24):

$$\begin{aligned}\Delta \ln E_{cn}/E_c = -\frac{\beta}{\sigma^F \lambda^F} \left(1 - \frac{E_{cn}}{E_c}\right) \Delta \ln w_{cn} - \frac{\beta}{\sigma^F \lambda^F} \left(1 - \frac{E_{cn}}{E_c}\right) \Delta \ln(1+\tau^w_{cn}) \\ + \frac{\mu - 1 + \alpha}{\sigma^F \lambda^F} \left(1 - \frac{E_{cn}}{E_c}\right) \Delta \ln(1-\tau^c_{cn});\end{aligned} \tag{37}$$

5. the intensive margin labor demand equation (25):

$$\Delta \ln Q_{cn}/E_{cn} = (\beta - 1 + \beta\varepsilon^{PD}) \Delta \ln w_{cn} + (\beta - 1 + \beta\varepsilon^{PD}) \Delta \ln(1+\tau^w_{cn}) - (\varepsilon^{PD}+1)\alpha \Delta \ln(1-\tau^c_{cn}). \tag{38}$$

[5] To simplify the estimation, these exact derivatives are all approximated at the order $O(Q_{c,n}/Q_c)$ at the neighborhood level and $O(Q_c)$ at the city level. This approximation eliminates all cross-elasticity terms. Even though the share $Q_c$ of country population that lives in a given city $c$ seems negligible, this assumption is not fully satisfactory as the share $Q_{cn}/Q_c$ of the population of a city $c$ that lives in a given neighborhood $n$ might be first-order. Similar assumptions are made for the stocks of establishments $E_c$ and $E_{cn}/E_c$. In particular, as changes in taxation occur in a single neighborhood of each city, this assumption allows to get rid of cross-neighborhood and cross-cities elasticities in the system of structural equations.

Stacking the system into the structural form, we obtain:

$$\mathbf{A}\mathbf{Y}_{cn,t} = \mathbf{B}\mathbf{Z}_{cn,t} + \mathbf{e}_{cn,t} \tag{39}$$

with:

$$\mathbf{A} = \begin{pmatrix} -\frac{1}{\sigma^W} & 1 & 0 & 0 & 0 & 0 \\ -\frac{1}{\sigma^W \lambda^W} & 0 & 1 & 0 & 0 & 0 \\ \frac{\beta}{\sigma^F} & 0 & 0 & 1 & 0 & 0 \\ \frac{\beta}{\sigma^F \lambda^F} & 0 & 0 & 0 & 1 & 0 \\ -(\beta - 1 + \beta\varepsilon^{PD}) & 0 & 0 & 0 & 0 & 1 \end{pmatrix}, \tag{40}$$

$$\mathbf{B} = \begin{pmatrix} 0 \\ 0 \\ -\frac{\beta}{\sigma^F}\Delta\ln(1+\tau^w) + \frac{\mu-1+\alpha}{\sigma^F}\Delta\ln(1-\tau^c) \\ -\frac{\beta}{\sigma^F\lambda^F}\Delta\ln(1+\tau^w) + \frac{\mu-1+\alpha}{\sigma^F\lambda^F}\Delta\ln(1-\tau^c) \\ (\beta-1+\beta\varepsilon^{PD})\Delta\ln(1+\tau^w) - (\varepsilon^{PD}+1)\alpha\Delta\ln(1-\tau^c) \end{pmatrix}, \tag{41}$$

$$\mathbf{Y}_{cn} = \begin{pmatrix} \Delta\ln w_{cn} \\ (Q_c/Q_{cn})\Delta\ln Q_c \\ \Delta\ln Q_{cn}/Q_c \\ (E_c/E_{cn})\Delta\ln E_c \\ \Delta\ln E_{cn}/E_c \\ \Delta\ln Q_{cn}/E_{cn} \end{pmatrix}, \tag{42}$$

and:

$$\mathbf{Z}_{cn} = \begin{pmatrix} 1_{\mathrm{ZFU}} \end{pmatrix}. \tag{43}$$

## 5.2 Method

To estimate the four structural parameters $\sigma^W$, $\lambda^W$, $\sigma^F$, and $\lambda^F$, I use a minimum distance estimator (see, e.g. Newey and McFadden [1994]). More specifically, the minimum distance estimator $\hat{\theta}$ solves the minimization problem:

$$\hat{\theta} = \arg\min_{\theta\ \in\Theta}[\mathbf{A}(\theta)\hat{\pi} - \mathbf{B}(\theta)]'\mathbf{W}[\mathbf{A}(\theta)\hat{\pi} - \mathbf{B}(\theta)] \tag{44}$$

where $\theta = (\sigma^W, \lambda^W, \sigma^F, \lambda^F)$, $\hat{\pi}$ is the vector of reduced-form estimates, and matrices $\mathbf{A}$ and $\mathbf{B}$ are defined in equations (40) and (41) respectively as functions of $\theta$ and the calibrated parameters $\beta$, $\alpha$, $\varepsilon^{PD}$, $\mu$, $\tau^w$ and $\tau^c$. When the weighting matrix $\mathbf{W}$ is equal to $\mathbf{V}^{-1}$, with $\mathbf{V}$ the covariance matrix of OLS estimates, $\hat{\theta}$ is the optimal minimum distance (OMD) estimator.

## 5.3 Calibrated parameters

I use for $\alpha$ and $\beta$ the same values as Suárez Serrato and Zidar [2016]. For the tax rates, I use a rough estimation of the average rates due in France.

| | Parameter value |
|---|---|
| **Elasticities** | |
| Output elasticity of capital $\alpha$ | 0.17 |
| Output elasticity of labor $\beta$ | 0.15 |
| **Tax rates** | |
| Average corporate tax rate $\tau^c$ | 0.33 |
| Average payroll rate $\tau^w$ | 0.30 |

Table 4: Calibrated parameters

| Structural parameter | Estimate |
|---|---|
| $\sigma^W$ | 1.2804 |
| $\lambda^W$ | 0.0314 |
| $\sigma^F$ | 2.4768 |
| $\lambda^F$ | 0.0559 |
| $\varepsilon^{PD}$ | -2.5799 |

Table 5: Estimation of the structural parameters

## 5.4 Results

The (preliminary) estimated structural parameters are presented in table 5.

Table 6 presents the implied elasticities computed with those values of the structural parameters.

## 5.5 Incidence of the program

I now use my estimates to measure the incidence of the ZFU policy. Equation (45) gives the ratio of workers and firms welfare gains.

As usual, the factor that has the lowest elasticity bears more of the incidence. This means that if firms are less mobile than workers, they will benefit relatively more from the tax credits.

Relative welfare gains also depend on initial compensation. If there is almost no profits ($\mu$ close to 1), firm owners will have a large welfare gain due to log utility (the marginal utility is high). The same is true for workers: if the share of labor beta is low, their marginal utility is high and their welfare gains are large.

| Elasticity | Estimate |
|---|---|
| **Labor supply** | |
| $\varepsilon^{LS}_{\text{within}}$ | 18.6546 |
| $\varepsilon^{LS}_{\text{across}}$ | 0.7810 |
| $\varepsilon^{LS}$ | 18.8499 |
| **Labor demand** | |
| $\varepsilon^{LD,\text{int}}$ | -1.2370 |
| $\varepsilon^{LD,\text{ext}}_{\text{within}}$ | -0.8125 |
| $\varepsilon^{LD,\text{ext}}_{\text{across}}$ | -0.606 |
| $\varepsilon^{LD}$ | -2.0647 |

Table 6: Estimation of the labor supply and labor demand elasticities

**Notes.** The weighting coefficients $Q_{cn}/Q_c$ and $E_{cn}/E_c$ in the overall elasticities are taken as their average values among ZUSs in 1990.

Finally, there are additional gains for workers if firms respond more to the corporate tax change on the intensive margin than on the extensive margin.

Empirically, I find that this ratio is equal to 0.46, meaning that firms capture 54% of the gains.

$$\frac{\Delta \mathcal{W}^W_{cn}/L_{cn}}{\Delta \mathcal{W}^F_{cn}/E_{cn}} = \frac{\mu - 1}{\beta} \frac{|\varepsilon^{LD}_w|}{\varepsilon^{LS}_w} \frac{1}{1 + |\varepsilon^{LD}_w| \frac{\frac{\varepsilon^{LD,\,ext}_c}{\varepsilon^{LD,\,ext}_w} - \frac{\varepsilon^{LD}_c}{\varepsilon^{LD}_w}}{\Delta \ln L_{cn}} \Delta \ln(1 - \tau^c_{cn})} \tag{45}$$

# 6 Counterfactual

(IN PROGRESS; ultimately, the goal of this paper is to compare the ZFU policy to a counterfactual policy subsidizing workers from ZFU neighborhoods wherever they work)

# 7 Conclusion

In this paper, I evaluate a French enterprise zone program targeting distressed neighborhoods. I find large effects on zone-level employment and stock of establishments, but little response at the city level.

I exploit those variations to estimate the structural parameters governing the effects of this policy. I use them to measure the incidence of this program. I find that firms and workers capture each about half of the gains.

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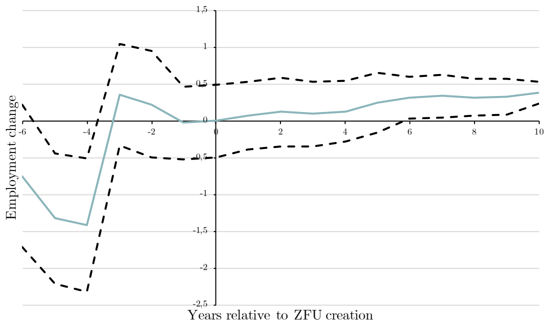
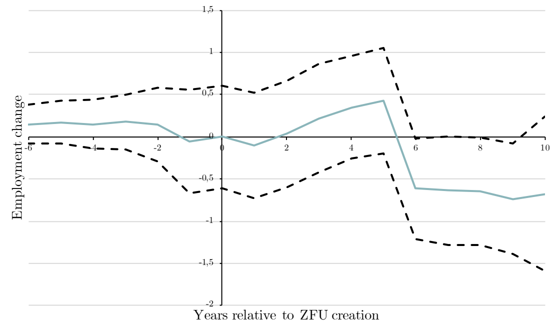
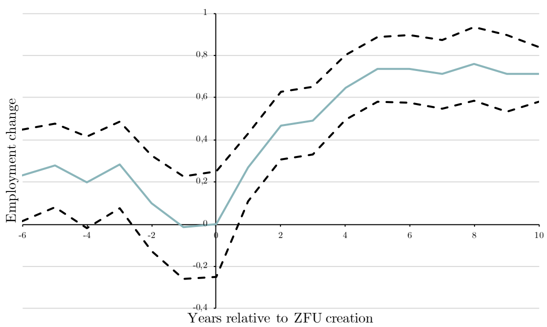
# A Supplementary Tables and Figures



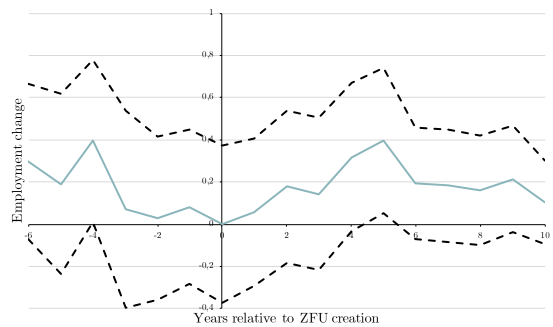

(a) Extractive industry



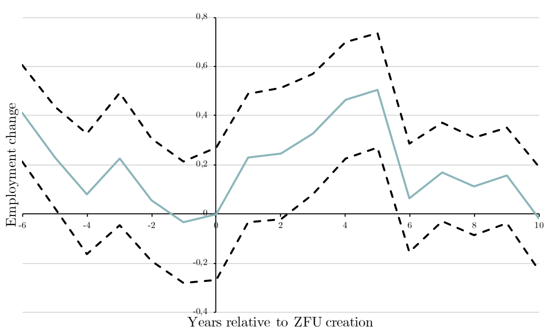

(b) Manufacturing industry



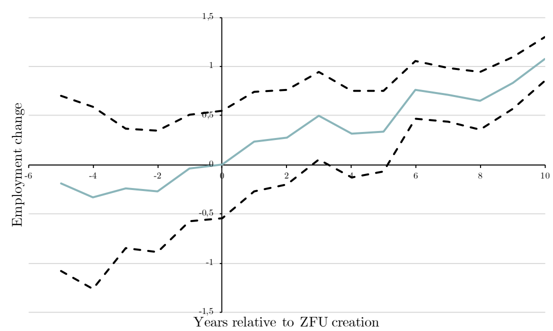

(c) Construction




(d) Transportation and warehousing

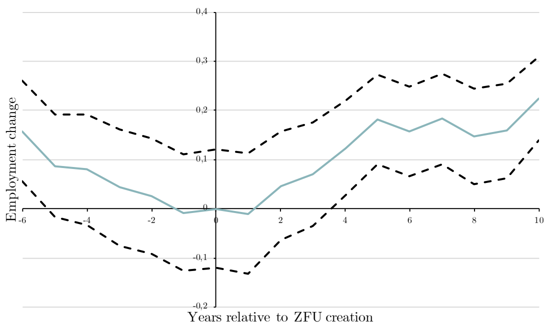



(e) Real estate

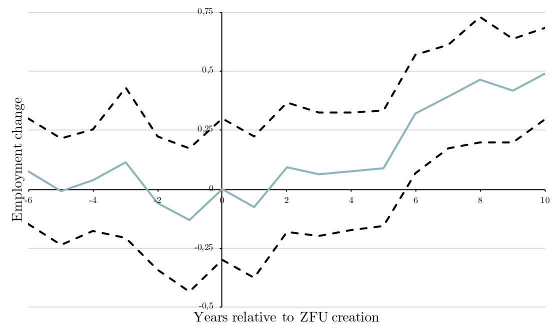



(f) Finance and insurance

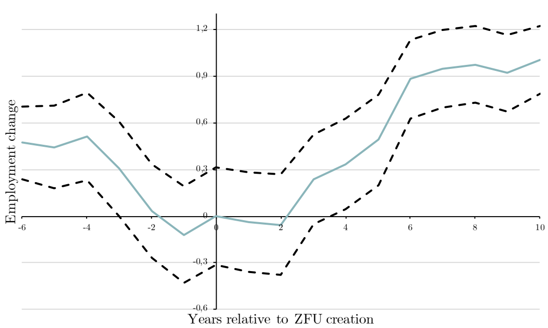
Figure 11: Impact on employment by sector



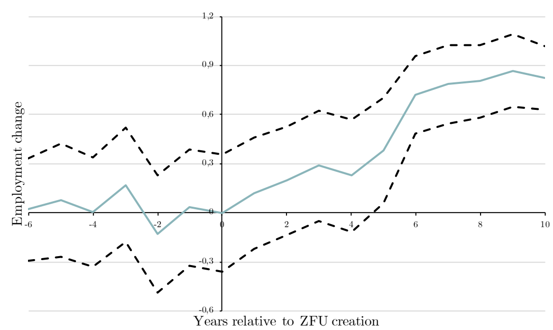

(g) Retail trade, car and motorcycle repair




(h) Accommodation and food services



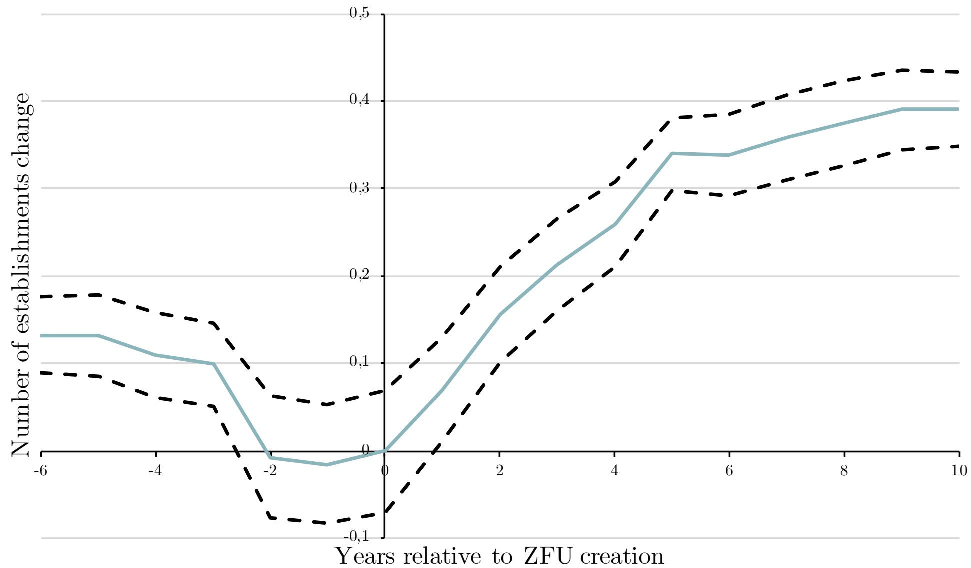

(i) Health care and social assistance



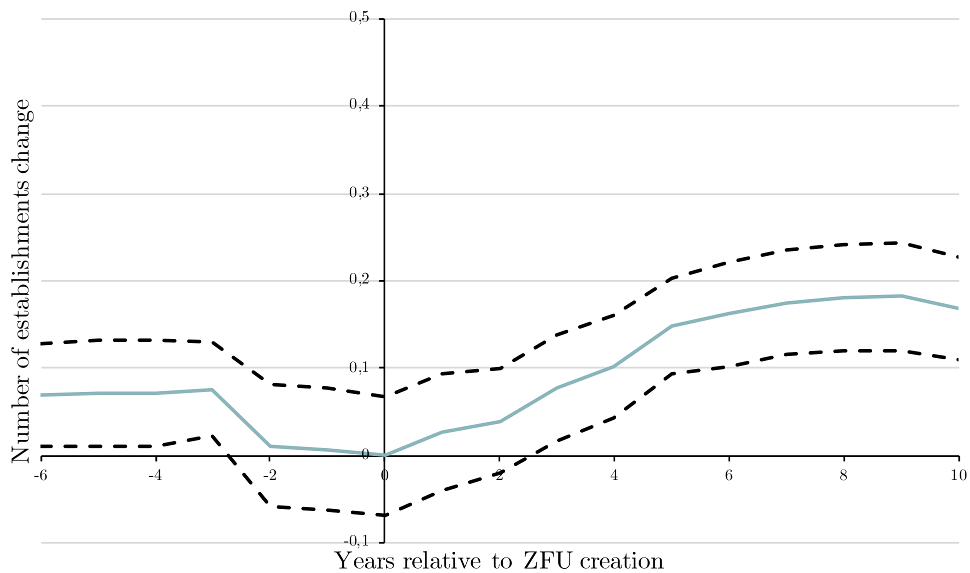

(j) Educational services

Figure 11: Impact on employment by sector

**Notes.**



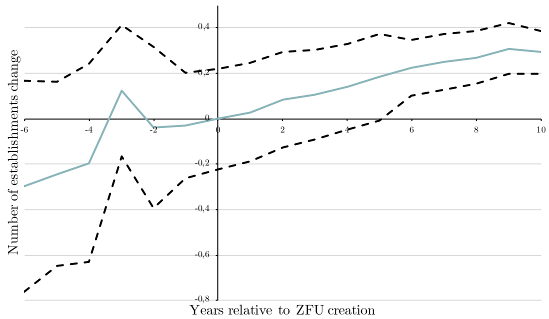

(a) Mono-establishment firms



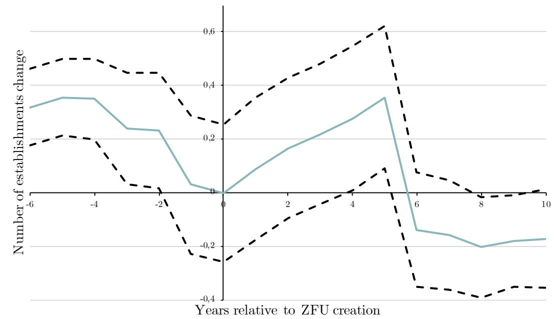

(b) Multi-establishment firms

Figure 12: Impact on the number of mono- and multi-establishments firms

**Notes.**




(a) Extractive industry

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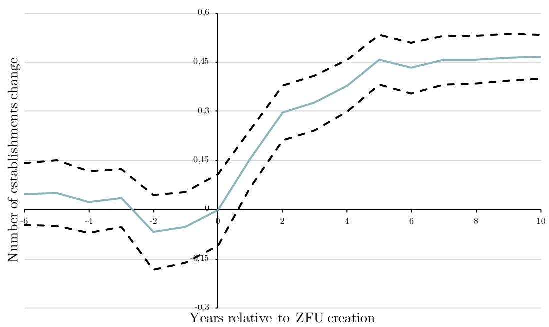
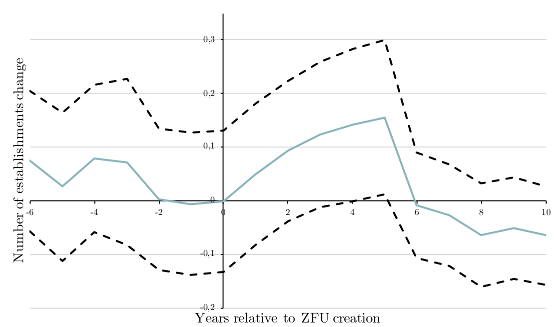
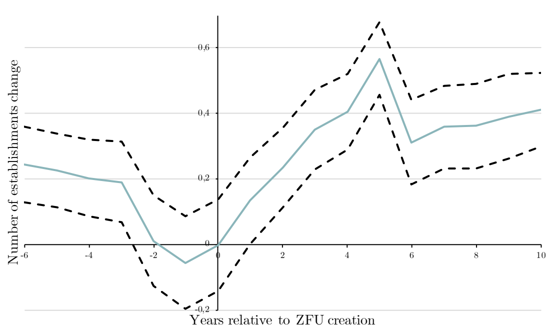


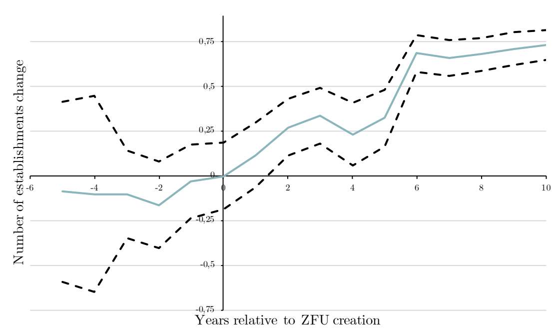

(c) Construction




(d) Transportation and warehousing

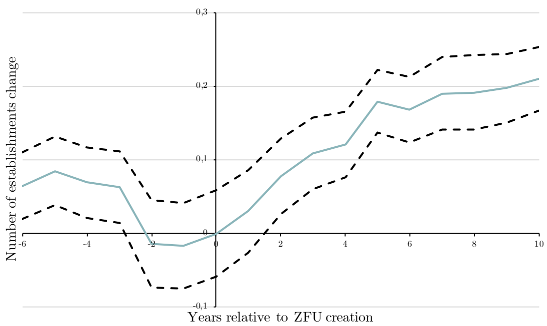



(e) Real estate

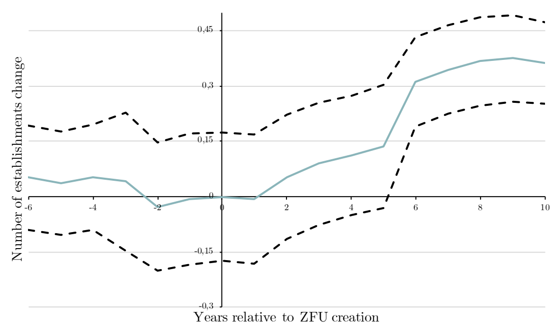



(f) Finance and insurance

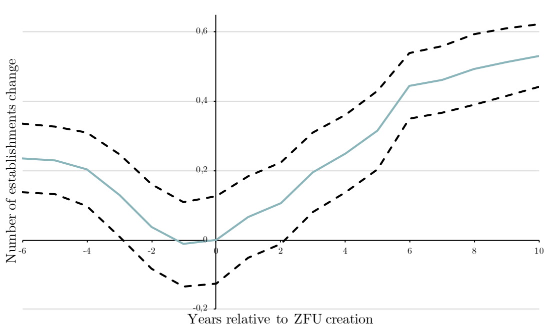
Figure 13: Impact on number of establishments by sector



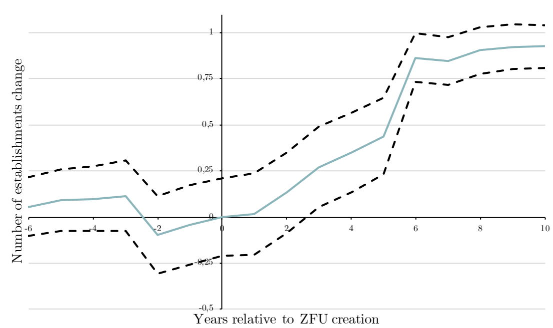

(g) Retail trade, car and motorcycle repair




(h) Accommodation and food services




(i) Health care and social assistance




(j) Educational services

Figure 13: Impact on number of establishments by sector

**Notes.**