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ABSTRACT

The Impact of Urban Enterprise Zones on Establishments' Location Decisions: Evidence from French ZFUs*

In this paper, we study the impact of a French enterprise zones program – the "Zones Franches Urbaines" (ZFUs) policy – on establishments' location decisions. Our empirical analysis is based on a micro-geographic dataset which provides exhaustive information on the location of establishments in France over the period 2000-2007 at the census block level. We use a difference in difference approach combining spatial and time differencing. We also do triple difference estimations, using the fact that targeted urban areas have been selected in different waves over time. Finally, we exploit a discontinuity in the eligibility criteria of the policy as an exogenous source of variation to estimate the impact of the treatment. Our results show that the French ZFU policy has a positive and sizeable impact on location choices. However, we also find that the policy mostly generates displacement effects, in particular through relocation of firms from the untreated to the treated part within municipalities. Finally, the impact is shown to be highly heterogeneous across zones, firms and industries. The overall cost of moving establishments within municipalities is relatively high.

JEL Classification: R12, R38 and R58
Keywords: enterprise zones and firm location

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1 Introduction

As in many countries, spatial inequalities within French municipalities are striking. Some urban areas featured by low income, high unemployment rate, low level of education and deprived social housing coexist with wealthy neighborhoods. These urban disparities have important social and economic implications. They are often linked to social segregation and exclusion phenomena, and in some circumstances, may lead to urban violence, as was the case during the riots in French suburbs in 2005. As a response, several countries, including the US, the UK and France, have provided tax incentives to promote the economic development of these lagging areas.

The efficiency of such schemes is controversial (Peter and Fishers, 2004). The objective of this paper is to evaluate the impact of a French enterprise zones program on establishments' location decisions. Initiated in 1996, this program aims at encouraging the relocation of economic activity, reducing unemployment and improving welfare in deprived urban areas of French municipalities. Three types of zones, whose geographical boundaries were set by decree, are defined: the "Zones Urbaines Sensibles, (ZUS)", the "Zones de Redynamisation Urbaine, (ZRU)" and the "Zones Franches Urbaines, (ZFU)". Facing an increasing degree of economic difficulties, these zones benefit from an increasing package of tax exemptions.

In this paper, we focus on the evaluation of the ZFU policy on business location in targeted zones. It represents the most important effort by public authorities in favor of depressed urban areas in France. In the ZFU areas, existing establishments or new establishments can be exempted from employer social contributions, taxes on corporate profits, business taxes and property tax on built lands. The ZFU policy is sizable in terms of financial effort when compared to other experiments abroad, and as such deserves particular attention. Indeed, the size of the incentives might partly determine the size of the effects generated by the policy. In 2007, the French government spent on average 1,800 euros per worker and 360 euros per resident in the ZFU targeted areas. As a matter of comparison, 240 dollars per worker were spent for enterprise zones in California in 2005 (see Neumark and Kolko, 2010) and 60 pounds per resident in the working-age population were spent for Local enterprise Growth Initiative areas in the UK (see Einio and Overman, 2011).

ZFUs also have the particularity to have been created in three waves over time, the first generation in 1996, the second in 2004 and the third in 2006.[1] Our empirical analysis, which is based on the evaluation of the 2004 ZFU wave, is based on a micro-geographic dataset which provides exhaustive information on the location of establishments in France over the period 2000-2007 at the census block level. Information on the exact boundaries of the geographical urban areas targeted by the policy is gathered using a Geographic Information System.

Most recent research on the evaluation of similar programs over the world has focused on

[1] ZFUs of the third wave were actually chosen in August 2006 only, so that treatment in terms of location decisions for this year is less obvious.

labor market outcomes.[2] However the impact on business creation *per se* is also an important dimension to evaluate. First, the primary goal of these promotion policies is, in most cases, to revitalize the areas they target. To this purpose, attracting new firms and establishments is a crucial tool. There is strong empirical evidence that firms location decisions are largely influenced by agglomeration effects (see in particular Crozet, Mayer, and Mucchielli, 2004; Devereux, Griffith, and Simpson, 2007). Attracting new firms is therefore likely to generate positive dynamics on business entry in targeted zones. Second, there are two margins to employment growth: creation of jobs in existing establishments and creations of jobs by new entrants. Due to the lumpiness of employment, attracting new firms can be an important component of local employment growth (Rathelot and Sillard, 2008b; Billings, 2009). Moreover, some studies suggest that investigating the effect of such a program on establishment dynamics largely contributes to the understanding of the effects on local employment (Greenbaum and Engberg, 2004; Bondonio and Greenbaum, 2007; Neumark and Kolko, 2010). Finally, the presence of new establishments might have positive externalities well beyond direct job creations by enhancing local demand for shops, restaurants, infrastructures, cultural activities, thereby creating new employment opportunities but also new perspectives in terms of quality of life for residents of targeted zones.

Our contribution to the literature is threefold. First, we use a new estimation strategy which allows us to correct for unobserved characteristics and simultaneity issues the evaluation of enterprise zones programs often suffers from. We first adopt a difference in difference approach which combines spatial and time differencing, in the spirit of Duranton, Gobillon, and Overman (2011). We also implement a triple differences estimation, using areas designated in 2006 as a control group for areas treated in 2004. Finally, the institutional design of the ZFU policy allows us to exploit discontinuities in the eligibility criteria linked to firms' size as an exogenous source of variation to properly assess the impact of the policy. This is a significant improvement with respect to preceding evaluations of enterprise zones, often subject to endogeneity issues. Second, we have very detailed establishment-level data that allow us to precisely investigate location decisions (at the census block level). We can also discriminate between "pure creations" and "relocations". We can thus assess whether the policy generates business creation or business diversion in targeted zones, and we can study how the un-treated part of municipalities hosting these zones is impacted. Finally, by analyzing firm's individual response to location decisions, we are able to investigate the potential heterogeneous impact of the policy depending on area-level, sector-level and establishment-level characteristics, which allow us to go much deeper in the understanding of the mechanisms that drive average changes in the level of economic activity in targeted zones.

We find that the probability to locate in the ZFU part rather than in the non-ZFU part

[2]For studies evaluating US enterprise zones, see in particular Bondonio and Engberg (2000); O'Keefe (2004); Hanson (2009); Ham, Swenson, Imrohoroglu, and Song (2011); Elvery (2009); and Busso, Gregory, and Kline (2010). For studies on the French enterprise zones program, see Rathelot and Sillard (2008b); Gobillon, Magnac, and Selod (2012) and Givord, Rathelot, and Sillard (2011).

of a municipality increases by 2.6 percentage points on average, once the ZFU part of the municipality officially benefits from tax incentives. The probability of locating in the ZFU part of a municipality being initially equal to 8.4% on average, this means that it increases by 31% thanks to the policy. Results are qualitatively the same whether we use double differences, triple differences or double differences combined with stratification of the sample based on firms' size, so as to exploit the discontinuities in the eligibility criteria. However, the impact of the policy appears to be highly heterogeneous; it is stronger for initially less depressed ZFU areas and for establishments in sectors in which relocation costs are lower. Results also indicate that ZFU areas attract smaller firms. Finally, there is no significant increase in the stock or flow of establishments at the municipality level after the implementation of the policy, while the increase in the probability to locate in the ZFU part of a municipality is almost four times higher for relocations than for "pure" creations. These last two results indicate that the policy mainly leads to an intra-municipal shift of economic activity, driven by opportunistic (re)locations of existing and new establishments. The positive impact we measure is thus mainly obtained at the expense of the rest of the municipality.

The rest of the paper is organized as follows. Section 2 presents a brief overview of previous research and describes the policy we evaluate. Section 3 details the estimation strategy. In Section 4, we present the data and some descriptive statistics. Section 5 analyzes the results on the average effect of the ZFU policy and on its spatial pattern. Results on the heterogeneous impact of the ZFU policy are presented in Section 6. Finally, Section 7 provides a quantification exercise of the cost of moving establishments in targeted areas. The last section concludes.

2 Previous research and presentation of the ZFU policy

Our paper relates to two strands of the literature. First, it contributes to the analysis of the impact of taxation on firm's location decisions. Second, it contributes to the literature on the evaluation of urban enterprise zones programs. In this section, we briefly present the recent advances of previous research and we discuss how we depart from existing studies, before presenting the policy we evaluate.

2.1 Firms' location decisions and tax differential

Most enterprise zones programs rely on the assumption that tax incentives are an efficient tool to attract firms in specific locations. An important literature has tried to quantify the elasticity of firms' location decisions to tax differentials. At the international level, several studies, based on nested logit model estimations, show that multinational firms' location decisions are somehow sensitive to local tax differential between countries (see in particular Devereux and Griffith, 1998; Head and Mayer, 2004). However, at an infra-national level, the evidence is more mixed. Using a regression discontinuity design approach combined with

instrumentation, Rathelot and Sillard (2008a) find on French data that higher local corporate taxes discourage firms' location, but this effect is shown to be weak. Duranton, Gobillon, and Overman (2011) use spatial differencing, time differencing and instrumentation to assess the effect of local taxation in the UK on the level of economic activity. They find that the level of property tax set up by Local Authorities has a negative effect on firm-level employment growth, but does not affect firm entry. Finally, several studies suggest that the influence of tax differentials is even weaker when it comes to policies aimed at attracting firms in depressed areas. Related to our paper, Crozet, Mayer, and Mucchielli (2004) find a weak impact of European structural funds and of the French "Prime d'Aménagement du Territoire" on the location of FDI in French regions.[3] Devereux, Griffith, and Simpson (2007) evaluate a similar policy in favor of lagging regions in the UK (the Regional Selective Assistance Scheme). They show that the effect of these subsidies is weak, but magnified when the number of plants in targeted areas is higher. This suggests that subsidies cannot compensate for the lack of agglomeration externalities in deprived areas. Our paper shows that a tax differential at an infra-municipal level, introduced by the ZFU policy, affects firms' location decisions but also highlights that the effect of the policy is stronger the lower the attractiveness differential between the targeted zone and the rest of the municipality.

2.2 Evaluation of enterprise zones schemes

The literature on enterprise zones has recently grown, in line with an increase in the implementation of such policies. However due to the specificity of each program, studies differ largely in terms of outcomes of interest and methodologies.

Recent research has mainly relied on the evaluation of US enterprise zones programs. Most studies focus on labor market outcomes and the evidence is mixed. Many studies find no significant effect on employment growth in targeted zones or on the employment status of zones' residents, while some other studies find a positive effect, at least in the short run.[4] The literature on business location is however more scarce. Some studies have analyzed business creations along with employment effects. While Billings (2009) finds no significant effect of enterprise zones in Colorado on the number of establishments in targeted zones, Neumark and Kolko (2010) tend to find a negative effect in the case of the program conducted in California. However, some studies suggest that more complex dynamics may be at work, the benefits of such programs on the entry of new firms being potentially compensated by the exit of some firms due to competition effects (Greenbaum and Engberg, 2004; Bondonio and Greenbaum, 2007).

Studies on European countries are far less numerous. A very recent paper by Einio and

[3] "Prime d'Aménagement du Territoire" is a subsidy granted to firms located in lagging regions.

[4] For studies finding no effect on employment growth see Boarnet and Bogart (1996); Bondonio and Engberg (2000), Lynch and Zax (2011); and Hanson (2009). For studies finding no effect on the employment status of zones' residents, see Elvery (2009) ; and for some studies finding a positive effect on employment, see O'Keefe (2004); Ham, Swenson, Imrohoroglu, and Song (2011) and Busso, Gregory, and Kline (2010).

Overman (2011) evaluates Local Employment Growth Initiative areas in the UK. They find a positive effect on employment, obtained however at the expense of the immediate periphery of targeted zones. In the case of France, three recent papers study the effect of French ZFUs. Gobillon, Magnac, and Selod (2012) focus on the effect of French enterprise zones in the Paris region. They find a small effect on the rate at which unemployed workers in targeted areas find a new job; however, this effect is significant in the short-run only. Rathelot and Sillard (2008b) and Givord, Rathelot, and Sillard (2011) use propensity score matching techniques and show that this program had a positive impact on the net plant creation growth rate and on the employment growth rate in targeted areas, but their results suggest again short-run effects only. Givord, Rathelot, and Sillard (2011) show in addition that the policy has no impact on the survival rate and on the financial health of incumbent firms but find some evidence of negative spillovers in neighboring areas of targeted zones. However, they work at the targeted zone level and not at the establishment level. They consequently cannot investigate establishment-level sources of heterogeneity in the impact of the policy. Finally, Briant, Lafourcade, and Schmutz (2011) focus on the role of physical geography on the impact of enterprise zones.

We depart from these studies in several ways. First, we analyze firms' location response to tax exemptions. This is an important outcome, as attracting new firms is crucial for reviving economic activity. Second, we study the impact of the ZFU program on individual establishment location decisions. This has three main advantages. First, we are able to exploit discontinuities in establishments' eligibility rules as exogenous sources of variation in the treatment; to the best of our knowledge, this method has been used by Criscuolo, Martin, Overman, and Van Reenen (2012) only.[5] Second, we investigate the heterogeneous impact of the policy according to establishment-level, industry-level and area-level characteristics. Finally, we have information on stock and flows of establishments and are able to distinguish creations from relocation of existing establishments, which allows us to pay particular attention to the spatial pattern of the effect we measure.

Previous research has also widely varied in terms of empirical strategies. A first major challenge in the evaluation of enterprise zones is that zones designated by the policy are different from non-targeted zones. Consequently, evaluations of such enterprise zones must be able to distinguish outcomes that result from prior economic conditions in the targeted areas from outcomes attributable to the implementation of policy. Ideally, one would like to compare outcomes in targeted areas with outcome in un-treated areas that have similar characteristics. A second major concern is that there might be unobservable factors varying over time which coincide with the implementation of the policy. Attempts to control for such endogeneity issues have been diverse. They include before/after comparisons (Papke, 1994;

[5]Criscuolo, Martin, Overman, and Van Reenen (2012) exploit changes in regions' eligibility rules defined by the EU to estimate the impact of RSA, in UK, on plant-level employment, productivity, investment and entry/exit.

Greenbaum and Engberg, 2004), combined with i) a control group consisting of areas eligible for enterprise zone designation or which applied but were rejected (Boarnet and Bogart, 1996; Hanson, 2009), ii) a control group consisting of areas later designated as enterprise zones (Busso, Gregory, and Kline, 2010; Neumark and Kolko, 2010)), iii) propensity score matching (O'Keefe, 2004; Rathelot and Sillard, 2008a; Givord, Rathelot, and Sillard, 2011; Elvery, 2009), or border analysis (Billings, 2009). We contribute to the literature by implementing an estimation strategy in three steps. We first adopt a difference in difference estimation which combines spatial and time differencing, in the spirit of Duranton, Gobillon, and Overman (2011). This controls for time invariant differences between targeted and non targeted zones and for both time-varying and time-invariant characteristics which are common to the two zones. We then adopt triple differences, using municipalities with a ZFU designated in 2006 as a control group. We finally exploit two discontinuities in the eligibility criteria as a falsification test, so as to control for potential idiosyncratic shocks at the zone level.

2.3 Presentation of the policy

In 1996, the French Government launched the "Pacte de relance de la ville" which defines three types of zones, whose geographical limits were set by decree: i) the "Zones urbaines sensible, (ZUS)" (Sensitive Urban Zones), ii) the "Zones de Redynamisation Urbaines, (ZRU)" (Revitalisation Urban Zones) and iii) the "Zones Franches Urbaines (ZFU)" (Urban Enterprise Zones). These zones are selected according to different criteria, and are facing an increasing degree of economic and social difficulties. Therefore, ZFUs benefit from higher tax incentives than ZRUs, and the same applies to ZRUs with respect to ZUSs.

The *Zones Urbaines Sensibles* are infra-municipal urban areas characterized by *the presence of damaged social housing and by a high unemployment rate*. Their selection has thus relied on qualitative criteria. Firms which decide to locate in these areas benefit from corporate tax exemptions if local authorities have agreed on this. The French government labeled 751 ZUSs in 1996.

Among these ZUSs, 416 have been classified as *Zones de Revitalisation Urbaine (ZRU)*. They face stronger difficulties than the other ZUSs. These difficulties are assessed thanks to an "index" taking into account economic characteristics and social conditions in the zones. This index remains the main criterion for the selection of ZRUs. It is based on the number of inhabitants, the unemployment rate, the proportion of population under 25 years-old, the share of population above 15 years-old without any diploma and the tax base in the area. The computation of the index has relied on the availability of data at that time (population census of year 1990 and tax base of year 1996). Firms in ZRUs benefit from a more substantial package of tax exemptions (see Appendix for details).

Finally, the *Zones Franches Urbaines (ZFU)* are of particular interest for us. First, they were chosen among the biggest (more than 10,000 inhabitants) and the most deprived ZRUs.

Second, ZFUs were chosen in three waves. The first 44 ZFUs were created in 1997 and correspond to existing ZRUs. The second generation (41 ZFUs), created in 2004, was also selected among ZRUs, but their spatial boundaries do not necessarily match the ones of ZRUs. The same applies to the 15 ZFUs created in 2006. A map of the location and distribution of the ZFUs on the whole French territory is available in the Appendix.

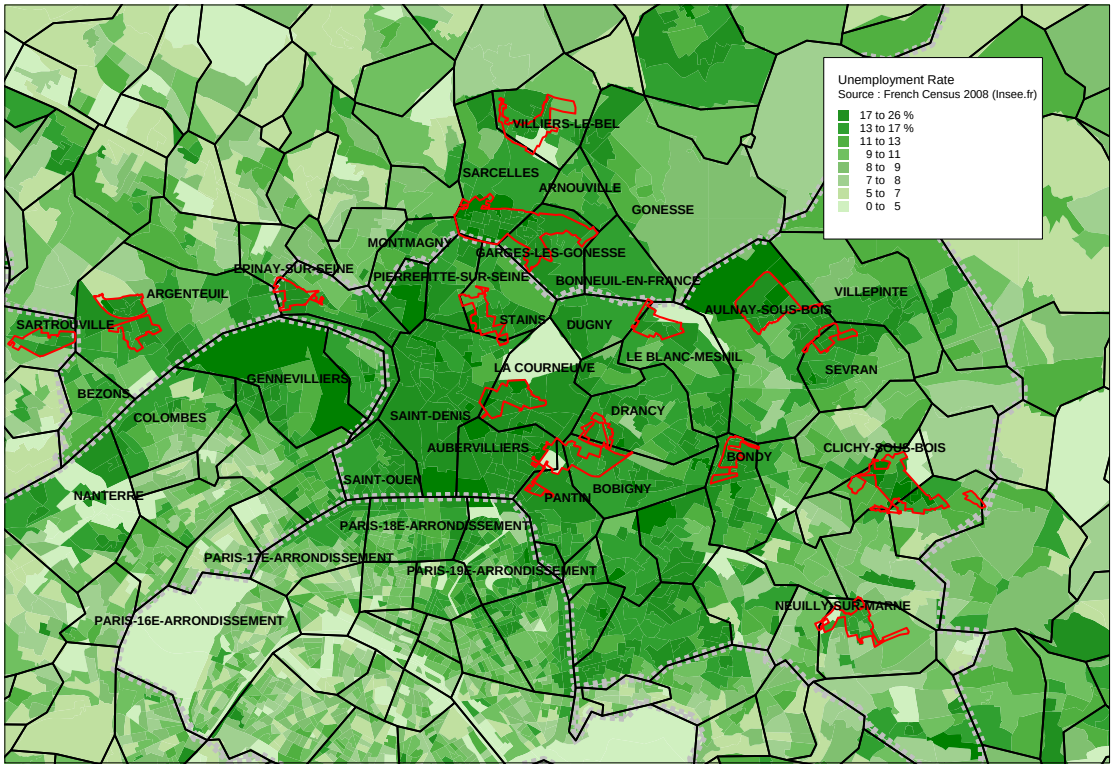


Figure 1: ZFUs and unemployment rate in the Northern suburbs of Paris

In Figure 1, we zoom on the Northern suburbs of Paris, where many ZFUs are concentrated, to show examples of the size, shape and relationship of ZFUs with local unemployment rates (one of the criteria for the area to be treated). Recalling that our identification strategy relies on a comparison within municipalities (borders of which are in black), it is interesting to note that the ZFU usually occupies a non-negligible, but non-dominant share of the city's area. As to the relationship with unemployment, it is also quite striking that some municipalities, despite quite high unemployment rates, do not feature a treated section. For some cases, it is because other initiatives with expected positive local impacts were underway at the same time.[6] In other cases, it might be because the other characteristics of the area were less bleak (less "damaged social housing", which entered as a primary criterion, for instance). Finally, note that inside the municipality, the unemployment rate does not seem to be a per-

[6]This is clearly the case of Saint-Denis, where the Stade de France has been constructed for the 1998 soccer world cup, accompanied with a vast program of modern office building around the stadium.

fect predictor of treatment. Establishments in ZFUs clearly benefit from the highest package of tax incentives. An existing establishment or a newly created establishment in a ZFU is:

- entirely exempted from employer social contributions, both for existing jobs and for newly created jobs, during the first five years, and then at a decreasing rate for a period ranging from three to nine years. This exemption is limited to firms with less than 50 employees and with a turnover lower than 10 millions euros. It is subject to a local hiring condition, meaning that from the third employee hired by the firm, exemptions apply if and only if one third of firm's employees reside in the ZUS of the urban agglomeration the ZFU is located in.

- entirely exempted from tax on corporate profits during the first five years, and then during nine years at a decreasing rate. This exemption only applies to firms with less than 50 employees and with a turnover lower than 10 millions euros;

- entirely exempted from business tax during the first five years, with possible extensions during the next three to nine years at a decreasing rate, depending on the number of employees. This exemption again applies to firms with less than 50 employees and with a turnover lower than 10 millions euros ;

- exempted from property taxes on built lands (up to five years);

- exempted from personal social contribution in the case of artisans and shopkeepers during five years.

Even though some of the exemptions concern local taxes (business and property taxes), the funding of these programs entirely relies on national solidarity. Indeed, in France, national transfers compensate the tax resources losses experienced by municipalities following local taxes exemptions decided at the national level.

These three types of zoning were initially supposed to last 5 years, and to end in 2002. Even firms which entered in the final year of the program would still benefit from tax and social contributions exemptions for the total period of time allowed by the program.[7] However the French program has been extended first in 2002, then in 2007 and once again in 2011. This shows that the development of distressed urban areas remains an important issue in France.

[7]If for instance, an establishment locates in a ZFU in 2001, while the program is supposed to end in 2002, it can still benefit from business tax exemptions during five years until 2006. However, exemptions in the targeted zones will be possible for existing or for new firms which locate in the zone before 2002 only. With the program being extended, more firms were able to benefit from tax and social contributions exemptions, but a same firm could not benefit twice from such exemptions.

3 Estimation Strategy

Our evaluation of the impact of the ZFU policy on establishments location decisions focuses on the ZFUs labeled in 2004. Being the most deprived urban areas in France, ZFUs benefit from the highest package of tax incentives and their study is thus worth of interest when dealing with policies in favor of lagging urban areas in France. Second generation ZFUs are also good "candidates" in terms of data availability. Indeed, for the evaluation, we need sufficient information on establishments location decisions before and after the implementation of the policy we evaluate. We have exhaustive data on establishments location decisions from 1995 to 2007, and on establishments stocks every two years from 1995 to 1999 and every year from 2002 to 2007. ZFUs labeled in 2004 are thus a good fit in terms of data. Third, we can take advantage of the fact that ZFUs have been labeled in three different waves to use ZFU areas labeled in 2006 as a potential control group for the evaluation of ZFUs labeled in 2004. Finally, eligibility criteria specific to ZFUs feature two clear discontinuities in terms of firm size that we can use as an exogenous source of variation to estimate the impact of the policy. In the next section, we first present the baseline empirical specification we implement to measure the average effect of the policy on establishments location choices. We then discuss the tests we carry out to further qualify the results we obtain.

3.1 Estimating the impact of ZFU using spatial and time differencing

Since the ZFU policy targets deprived areas within municipalities, the appropriate level of analysis is infra-municipal. We want to assess whether the implementation of the policy increases the probability that an establishment decides to locate in areas that benefit from the ZFU program. A standard approach consists in assuming that firms locate in areas where their profits are higher. Assume a very reduced form of profits for establishment i locating in zone z of municipality m at time t, $\Pi_{izm,t}$, such that

$$\Pi_{izm,t} = \alpha X_{i,t} + \beta C_{m,t} + \delta_m + \gamma Y_{z,t} + \theta_z + \eta ZFU_{z,t} + \epsilon_{izm,t} \quad (1)$$

- $X_{i,t}$ stands for plant-level characteristics at time t
- $C_{m,t}$ captures characteristics of municipality m at time t,
- δ_m captures time-invariant characteristics of municipality m
- $Y_{z,t}$ captures location characteristics of zone z at time t
- θ_z captures time-invariant characteristics of zone z
- $ZFU_{z,t}$ is a dummy equal to 1 if zone z benefits from the ZFU scheme at time t
- $\epsilon_{izm,t}$ is an error term

This empirical location decision model is generally estimated thanks to a conditional logit model. However, in the current context, a number of issues arise with such an approach. First, ZFUs are infra-municipal urban areas and there are 36,571 municipalities in France. Estimating a conditional logit model in which potential locations would be all municipalities in France, and possibly infra-municipal zones, would be computationally difficult. Second, exhaustive data on the characteristics that are likely to influence location decisions are not available at such a small geographical unit. Third, the conditional logit model relies on the crucial assumption of "independence of irrelevant alternatives", which is likely to be violated as the number of alternatives increases. Nested logit models deal with this issue (see Train, 2003). However, identifying the appropriate nest structure is also hard when the number of potential locations is high. Fourth, not all municipalities are affected by the policy, which raises issues on the appropriate geographical level of analysis and on the relevant urban areas that might constitute a control group. Finally, there are several endogeneity issues linked to the evaluation of the impact of the ZFU policy. In particular, ZFUs are selected for being the most deprived urban areas in France. They are therefore likely to be less attractive for new establishments; the effect of the policy might be underestimated if all locations are considered as potential alternatives, and if this "structural" attractiveness differential is not taken into account.

To cope with these issues, we propose an estimation strategy close to the one developed by Duranton, Gobillon, and Overman (2011) to study the impact of local taxation on local entry in the UK. This strategy is based on a difference-in-differences strategy that combines spatial and time differencing. Indeed, we focus on the probability that a given establishment chooses to locate in the ZFU part rather than in the non-ZFU part of a municipality, conditioning on the fact that it has chosen to locate in this municipality. This amounts to spatial differencing at the municipality level. We then study how this probability changes after the implementation of the policy, which amounts to time differencing.

This approach has three main advantages. First, working at the infra-municipal level is important as municipalities are the smallest geographical units with administrative boundaries and delegated state's power in France. Municipalities have therefore the autonomy to set a number of local factors (such as local tax rate, price of public transport, etc...) which generates important heterogeneity between them in terms of location characteristics. Second, restricting the analysis to municipalities which have a ZFU zone reduces the number of observations, and considering the probability to locate in each part of the municipality reduces the number of alternatives since, for each establishment, only two potential locations are considered as relevant. Finally, comparing the change in the "relative" probability to locate in the ZFU part of the municipality over time allows us to control for the fact that targeted zones are probably "structurally" less attractive. Doing so, we have a very tractable framework to estimate the effect of the policy, controlling for time-invariant unobserved characteristics of the treated zones.

We now characterize the decision of establishment i to locate in zone z_1, the ZFU part of municipality m, rather than in zone z_2, the non-ZFU part of municipality m. Assuming that the establishment locates in the zone that yields the highest expected profit, this probability depends on the expected profit differential between z_1 and z_2. This probability can be written as follows:

$$\begin{aligned} P[i \in z_1 | i \in (z_1, z_2),\ z_1, z_2 \in m] &= P[\Pi_{iz_1m,t} - \Pi_{iz_2m,t} > 0] \\ &= P[\gamma(Y_{z_1,t} - Y_{z_2,t}) + (\theta_{z_1} - \theta_{z_2}) + \eta ZFU_{z_1,t} + (\epsilon_{iz_1,t} - \epsilon_{iz_2,t}) > 0] \end{aligned} \quad (2)$$

Note that plant-level characteristics $X_{i,t}$ as well as municipality-level characteristics $C_{m,t}$ and δ_m disappear, as they do not vary between the two zones. In this simple framework, they do not affect the decision of plant i to locate in z_1 rather than in z_2.

Consider now the probability to locate in one of the two zones, before and after the implementation of the policy. This change in probability can be written as follows:

$$\Delta P[\Pi_{iz_1c,t} - \Pi_{iz_2c,t} > 0] = \Delta P[\gamma(Y_{z_1,t} - Y_{z_2,t}) + \eta ZFU_{z_1,t} + (\epsilon_{iz_1,t} - \epsilon_{iz_2,t}) > 0] \quad (3)$$

Time-invariant attractiveness differential between the two zones $(\theta_{z_1} - \theta_{z_2})$ washes out. The coefficient γ measures the effect of time-varying characteristics, $(Y_{z_1,t} - Y_{z_2,t})$, that affect the relative attractiveness of z_1 and z_2. To control for this, we introduce the relative stock of establishments between the two zones of the municipality, lagged one year. We first consider the total number of existing establishments in a given location, which is often used to control for unobservable factors that affect the attractiveness of a location. We also consider the ratio of the number of establishments in a given location in the operating industry of the entrant, in order to capture agglomeration effects or unobservable factors that affect the attractiveness of a location for a particular industry.

The parameter η is our coefficient of interest. It appears clearly now that it is obtained by comparing the probability to locate in z_1 rather than in z_2 before and after the implementation of the policy, $ZFU_{z_1,t}$ taking the value 1 for the ZFU part of the municipalities after it has officially become a ZFU in 2004. The underlying estimation process involves a difference-in-differences approach that combines both spatial and time differencing. If we assume that, controlling for the lagged relative stock of establishments in the two zones, nothing else than the implementation of tax exemptions affects the relative attractiveness of ZFU zones with respect to the non-ZFU part of municipalities over the period, η is an unbiased measure of the impact of the ZFU policy. The empirical model is estimated using logit regressions.

3.2 Tackling simultaneity issues: triple differences and falsification tests

One might worry that policy-makers have chosen beneficiaries of the policy on the basis of specific information about the evolution of economic conditions in the targeted zones. In this case, there would be a simultaneity bias that our difference-in-difference approach would not correct for. To verify that we do not observe a change in the probability to locate in the ZFU part of a municipality before 2004, we first estimate equation (3) replacing the treatment variable by a set of year dummies. However, even if this test is passed, it could be the case that the implementation of the ZFU exactly coincides with a specific shock on the relative attractiveness of targeted zones (other than the policy itself). To rule out such an hypothesis, we adopt two different strategies:

1. A triple differences approach, comparing the results obtained for municipalities with a ZFU labeled in 2004 to the evolution of the relative attractiveness of ZFUs labeled in 2006. The rationale for this test is that the third generation ZFUs are not very different from the second generation ZFUs, because these areas were very close to obtaining the label in 2004. They should thus be subject to the same economic conditions except that they do not benefit from tax exemptions before 2006. Moreover, the reason why the ZFUs labeled in 2006 have not been labeled in 2004 is likely to be exogenous since the designation criterion regarding the size of areas decreased from 10,000 inhabitants in 2004 to 8,500 in 2006.

2. A falsification test approach, taking advantage of the existence of two discontinuities in eligibility criteria. First, tax exemptions in ZFUs are limited to firms with less than 50 employees. We check that the policy only affects the firms eligible to tax exemptions, i.e. below 50 employees. Second, there also exists a limit in terms of turnover (10 millions euros). These restrictions being completely exogenous to the definition of targeted zones, we can safely assume that all the unobserved time-varying characteristics of the zones are the same for firms eligible and non eligible to ZFU policy. These discontinuities consequently offer a nice potential for a falsification test.

This empirical strategy allows us to measure the average effect of the policy. We then further analyze the (re)location mechanisms unerlying this average effect, and we study potential heterogeneity in the impact of the policy depending on area, industry, and firm-level characteristics.

3.3 Spatial scale of the policy, creations, relocations

Though our strategy has a number of advantages in terms of tractability and biases taken into account, it has also some potential drawbacks. First, limiting the location decision of an establishment to a within-municipality alternative amounts to assuming that two areas with different socio-economic characteristics within a municipality are more substitutable than two

areas that are more similar but belong to two different municipalities. This is equivalent to assuming that the policy does not affect the location choice at the municipal level. To address this issue, we investigate, with a difference-in-differences approach, how the stock and flow (of entrants) of establishments varies after 2004 in municipalities with a ZFU labeled in 2004, as compared to municipalities that will obtain a ZFU in 2006. In the absence of any effect on the net creation of establishments at the municipality level, our focus on infra-municipal location decisions would be validated.

This would also mean that the policy does not create economic activities *per se*, but acts as a spatial shifter for existing establishments or for establishments which would have been created regardless of the implementation of the policy. The data we use are extremely detailed and provide information on whether an establishment creation is a "pure" creation, or a relocation of an existing establishment. Moreover, in the latter case, we know the municipality the establishment comes from. We are thus able to finely describe the spatial pattern of the impact of the policy, and to study potential spatial externalities and windfall effects, which are usually not considered due to insufficient data.

3.4 Measuring a potential heterogeneity in the effect of the policy

We enrich the previous framework to investigate potential heterogeneous effects of the policy according to existing industrial structure, size of establishments and sector of activity. In order to do so, we introduce interaction terms and make different estimations on appropriate subsamples, which amounts to assuming a more complex structure of establishment-level profit than the one described in equation (1).

First, the efficiency of the policy might vary according to the characteristics of targeted zones. Based on the Regional Selective Assistance in the UK, Devereux, Griffith, and Simpson (2007) show that firms are less responsive to government subsidies in areas where there are fewer existing establishments in their industry. This suggests that location subsidies alone are not enough to overcome the attractiveness gap of targeted zones. We thus investigate whether the impact of the French policy depends on the attractiveness differential between the ZFU and the non-ZFU part of the municipality.

Second, theoretically, different types of firms might respond differently to location subsidies. On the one hand, Baldwin and Okubo (2006) show that more productive firms self-select in big regions. Indeed, they benefit more from agglomeration economies and are less harmed by the tougher competition at play in bigger markets than less productive firms. As a consequence, less productive firms are more responsive to lump-sum subsidies favoring the relocation of plants from core to peripheral regions. On the other hand, bigger and more productive firms could be more responsive to tax differentials. Baldwin and Okubo (2009) show that when a tax on operating profits is considered, bigger and more productive firms are more likely to relocate to lower tax regions, since they make bigger profits and thus gain

more from lower tax rates. In the case of French ZFUs, exemptions are limited to firms under 50 employees. We use this threshold for a falsification test, but we also investigate potential heterogeneous impact of the policy among eligible firms, using an interaction term between treatment and firm size.

Last, the impact of the policy is likely to vary according to the sector (Lynch and Zax, 2011; Neumark and Kolko, 2010). In particular, sectors are likely to face different sunk production costs, which translate into different relocation costs. We study in detail such a potential heterogeneous impact, comparing industries with different degree of geographic mobility.

4 Data and descriptive analysis

4.1 Data

To build our dependent variable, we use the uniquely detailed SIRENE dataset provided by the French National Institute of Economics and Statistics (INSEE). This dataset gathers exhaustive information on the location of firms at the establishment-level over the period 1995-2007. For each establishment entering a new location in France, we know whether this establishment is newly created or already existed and relocated. In the latter case, the origin of the establishment is known at the municipality level. Valuable for our purpose, the location of each establishment is registered at the "ilot" level, which is the smallest geographical unit used for population census in France. An "ilot", referred to as a city block hereafter, consists of a group of houses or buildings, and is thus very small in terms of area. In order to assess whether the establishment is located in a ZFU or not, we have information on the exact geographical boundaries of ZFUs and city blocks, provided by the SGCIV, the French administration in charge of urban policies. Using a Geographical Information System software (Mapinfo), we approximate a ZFU area as a group of city blocks. We consider that a city block belongs to a ZFU as soon as its barycenter belongs to the ZFU.[8] We are thus able to identify municipalities which have a ZFU as well as the generation of the given ZFU. The sample consists of 49 municipalities with a ZFU area labeled in 2004 and 24 municipalities with a ZFU in 2006.[9] Since for each newly located establishment, we are able to identify whether the establishment locates in a city block pertaining to the ZFU part of the municipality or not, our dependent variable takes the value 1 if the establishment locates in the part of the

[8] As a robustness check, we also considered the case for which a city block is said to be part of the ZFU if it has a simple intersection with the actual boundaries of the ZFU. As results were very similar, we present the results with the strict definition of ZFUs only.

[9] The number of ZFUs created in 2004 is 41 and the number of ZFUs created in 2006 is 15. The reason why the number of municipalities identified as having a ZFU is higher than the actual number of ZFUs is that the boundaries of some ZFUs encompass two municipalities. However, as noted earlier, we prefer to work at the infra-municipal level as many factors vary between municipalities (such as local tax rates) and are likely to affect location decisions.

municipality that is (or that will become) a ZFU and 0 if the establishment chooses to locate in the non-ZFU part of the municipality.

In order to measure the effect of area-level characteristics on establishments' location decisions, we use the SIRENE database on firm stocks (at the establishment-level) for the period 1995-2007. The information is available every two years from 1995 to 1999, and every year from 2002. We can thus calculate the total number of establishments at the city block and the industry level. Such information will be very valuable to construct proxies for agglomeration economies. The ratio of the total stock of establishments in both parts of the municipality can also be seen as a proxy for the relative attractiveness of the ZFU within the municipality.

Finally, we use the BIC-BRN database, which provides balance sheet data for all French firms over the same period, to take into account firm-level characteristics such as size in terms of employees or sales. Note that for the sample of firms locating in municipalities with a ZFU in 2004 or in 2006, 73% of firms are mono-establishment, 18% have two establishments, and 9% have more than two establishments. Therefore, firm size is also a good proxy for establishment size in our sample of analysis.

In order to assess the effect of the policy, we need sufficient observations before and after its implementation. We therefore choose to limit our study to the evaluation of the ZFUs created in 2004 and to restrict the period of analysis to the years 2000-2007.

4.2 Descriptive Analysis

We present in this section a descriptive analysis of the potential effect of the ZFU policy. To this purpose, we first analyze stocks and flows of establishments in ZFUs labeled in 2004 and in 2006, before and after they obtain the ZFU status (since ZFU from the third generation have been chosen in August 2006, we consider that treatment start in 2007 in this case).

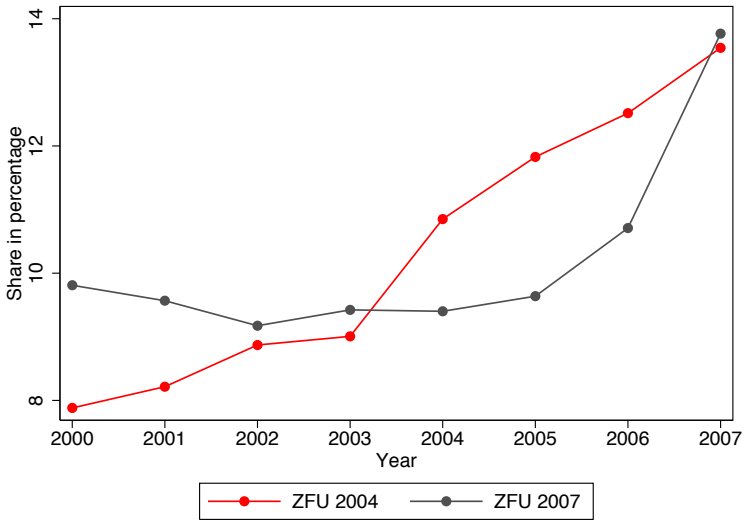
Table 1: Stocks and flows of establishments in the ZFU part of municipalities

			ZFUs 2004		ZFUs 2006	
			Year$<$ 2004	Year$\geq$ 2004	Year$\leq$ 2006	Year$>$ 2006
Stock	Level	Average	192	233	168	191
		Median	158	190	101	117
	Share	Average	14.54	15.35	15.29	15.45
		Median	8.11	9.20	8.53	8.07
Flow	Level	Average	39	62	31	50
		Median	32	47	17	25
	Share	Average	16.54	20.41	16.81	19.57
		Median	10.40	14.79	10.55	15.69

Table 1 reveals that ZFU areas represent a small share of the activities in the municipalities they are located in (around 15% of the total stock of establishments and less than 20% of establishment entries over the period). However, for both waves of ZFUs, the average and the median number of establishments located in targeted areas in terms of stock have increased

after the implementation of the policy. In both cases, this growth cannot be attributed to a specific trend at the municipality level, since not only the number of establishments, but also the share of the stock of establishments located in the ZFU areas slightly increase. This is even more striking for establishment flows, which share increases on average from 16.54% to 20.41% after the implementation of the policy for ZFUs labeled in 2004, and from 16.81% to 19.57% for ZFUs labeled in 2006. These simple descriptive statistics cannot be interpreted as causal, but suggest an increase in the attractiveness of ZFU areas for business locations after the implementation of the policy.

Figure 2: Share of establishment entries in ZFU part and non-ZFU part of municipalities



This suggestive evidence is reinforced by the graphical analysis of establishments' locations occurring in municipalities that obtain a ZFU in 2004 and in 2006. Figure 2 plots the evolution of the average share of establishments locating in the ZFU part of the municipalitiy for the second and the third generations of ZFUs. Several remarks can be made from this graph.

First, in case of a positive impact of the policy, we expect to observe an increase in the share of plants locating in the ZFU part of municipalities after the implementation of the policy (starting in 2004 for ZFUs labeled in 2004 and starting in 2006 for ZFUs labeled in 2006, even though this is less clear in the second case since ZFUs are designated in August 2006 for the third generation). Figure 2 shows that this is actually the case.[10]

Second, one might worry that anticipation about the ZFU designation could play a role in the location decisions of establishments the years before the implementation of the policy.

[10]Unreported figures show that the increase in this share can be explained by an increase in the number of establishments locating in the ZFU part of municipalities after the implementation of the policy, the number of establishments locating in the non ZFU part of the municipality being relatively constant.

Two cases must be distinguished:

- If establishments are certain about future ZFU status and the boundaries of the zone, we should observe an increase in the number of establishments locating in the ZFU part before the implementation of the policy, while the number of establishments locating in the non-ZFU area should at best be stagnant.

- In the case of uncertainty about ZFUs and their boundaries, some establishments might decide to postpone their (re)location decision in the municipality, in order to wait for the right information. This should affect disproportionately establishments which would prefer to locate in the non-ZFU part of municipalities in the absence of the policy. For establishments that would have located in the future ZFU anyway, the possibility of benefiting from exemptions will represent a windfall effect but their decisions should not be affected *ex ante*. We should in this case observe, the years before the implementation of the policy, a decrease in the number of locations occurring in the non-ZFU part of municipalities, and at best a stagnation of the number of entries in the ZFU part.

In both cases, the share of establishments locating in the ZFU-part of the municipality should increase before the implementation of the policy. Hence, in case of any anticipation effects, there would be a downward bias in the estimation of the impact of the policy on the relative probability to locate in the ZFU part rather than in the non-ZFU part of municipalities.

Figure 2 shows that the risk of bias is limited. Indeed, for municipalities with a ZFU in 2004, we observe a slight increase in the share of establishments locating in the ZFU part of the municipality between 2002 and 2003 but there is a large increase starting in 2004, i.e, when the ZFU area actually benefits from tax exemptions. Regarding municipalities with a ZFU in 2006, the share of establishments locating in the ZFU part of the municipality remains nearly constant before 2006, and then increases in 2006 and in 2007. These evolutions are not suggestive of very strong anticipation effects.

Finally, unreported graphs show that municipalities with a ZFU labeled in 2004 and municipalities with a ZFU in 2006 seem to be exposed to the same cyclical evolution over the period 2000-2007: the number of locations at the municipality level evolves in the same way over the period in both types of municipalities. The only difference is that there is a clear positive shock on the number and share of establishments locating in the ZFU part of municipalities, which coincides with the year of implementation of the policy for each wave. Municipalities with a ZFU in 2006 should thus constitute an appropriate control group for municipalities with a ZFU in 2004.

This assumption can be justified further by the similarity of the industrial composition of activities in ZFUs labeled in 2004 and in ZFUs labeled in 2006. Table 2 presents the share of plants active in a given industry in 2002 for municipalities obtaining a ZFU in 2004 and in 2006 respectively. Regarding ZFU areas with respect to the rest of the municipality, these simple statistics show that construction, retail and transport/telecommunication industries

tend to be over-represented in ZFUs. On the opposite, real estate and business services tend to be under-represented. These differences between the targeted zone and the rest of the municipality they are located in appear for both waves of ZFUs, though they are less pronounced for municipalities obtaining a ZFU in 2006. However, if one compares ZFU areas labeled in 2004 with the ones labeled in 2006, they are very similar in terms of industrial composition. While the retail sector tends to be more represented and the industry of construction tends to be less represented in ZFUs labeled in 2006 relative to ZFUs labeled in 2004, the representation of the manufacturing industry, of the transport & telecommunication industry and of Real Estate & Business Services sector are very similar in both waves of ZFUs.

Overall, this first descriptive analysis suggests that the policy has a positive effect on the probability that establishments locate in the ZFU part of a municipality. The econometric analysis will now allow a rigorous assessment and quantification of this effect.

5 Average impact of the French enterprise zones program and spatial pattern of the effect

In this section, we assess the average impact of the policy on establishments' location decisions and we analyze the spatial pattern of this effect.

5.1 Difference-in-differences

We first assess the average effect of the enterprise zones program on establishment location decisions using a difference-in-differences estimation. We compare the probability that an establishment locates in the ZFU part of a municipality rather than in the non-ZFU part, before and after the implementation of the ZFU policy. Our dependent variable is equal to 1 if a plant chooses to locate in the ZFU part rather than in the non-ZFU part of the municipality. We focus on the second wave of ZFUs, and the variable "ZFU policy" consequently equals 1 for the years 2004 to 2007, i.e. for years following the implementation of the tax exemptions.

Table 2: Business composition of ZFU municipalities in 2002-Share of plants

	ZFUs 2004		ZFUs 2006	
	ZFU part	Non ZFU part	ZFU part	Non ZFU part
Manufacturing	6.7	7.8	8.3	8.3
Water/Elec. distrib.	0.4	0.4	0.3	0.3
Construction	14.8	6.9	10.0	9.0
Retail	28.5	28.2	35.4	30.0
Hotels/Restaurants	5.3	8.3	8.6	8.1
Transport/Telecom.	8.0	4.0	7.0	5.4
Real estate/Business serv.	12.6	22.0	11.3	18.6
Adm., educ., household serv.	23.6	22.2	19.0	20.4
Total	100	100	100	100

Marginal impacts measured by logit regressions are presented in Table 3. Column (1) indicates that the implementation of the policy has a positive and significant impact on the average probability that establishments locate in the ZFU part of the municipality they locate in. In column (2), we control for municipality fixed effects. This allows us to take into account the fact that the time-invariant relative attractiveness of the ZFU part, with respect to the non-ZFU part of the municipality, is likely to vary across municipalities. The impact of the ZFU policy, even though reduced, remains sizable and significant, with a marginal effect of 3.11 percentage point. In column (3), we introduce the relative stock of establishments in each part of the municipality, lagged one year. This variable is used as a proxy for the time-varying relative attractiveness of the ZFU within the municipality. It thus controls for unobserved changes in the relative attractiveness between the two zones that could bias our estimation of the impact of the policy. Not surprisingly, the marginal effect of the policy is reduced by almost 15%, suggesting that the probability to locate in the ZFU part of a municipality increases when this ZFU is less different than the rest of the municipality in terms of attractiveness.[11] However, the coefficient on the ZFU policy remains positive and significant. Note that this coefficient should be seen as a lower bound, since the relative stock of establishments might capture part of the dynamic impact of the policy. In column (4), we control for the relative stock of establishments pertaining to the same sector as the new entrant, lagged one year. This variable controls for unobserved changes in the relative attractiveness of the two zones that are specific to the entrants' industry. Results indicate that the probability to locate in a ZFU increases when the attractiveness differential between the two parts of the municipality in the entrants' own industry decreases. Finally, in column (5), we introduce these two variables simultaneously. Our results indicate that establishments are more sensitive to the presence of other establishments pertaining to their own sector. Column (4) is thus our benchmark specification.

Overall, these results indicate that the ZFU policy has a significant and sizable positive impact on establishments' location decisions.[12] The probability to locate in the ZFU part rather than in the non ZFU part of the municipality increases by 2.6 percentage points on average once the ZFU part of the municipality legally becomes a ZFU. The average probability of locating in the ZFU part of a municipality being 8.4% over the period 2000-2003, this marginal impact corresponds to an elasticity of 31%.

[11] The ratio of establishments' stock being smaller than 1 for all ZFUs

[12] Note that this measured effect of the ZFU policy is in fact very strong. We are studying the effect of becoming a ZFU in 2004, but as noted in the description of the policy, these zones have been ZRU zones since 1996. As a ZRU, they were already benefiting from some tax exemptions. While this does not affect our estimation strategy (due to our before and after comparison), this means that if we were comparing the effect of the ZFU policy for zones which did not benefit from any tax exemptions before the implementation of the policy, the estimated effect of such policy might be even stronger.

Table 3: Effect of the policy on the probability to locate in a (future) ZFU

Dependent Variable: Probability to locate in the ZFU part of a municipality logit model (marginal effects)					
	(1)	(2)	(3)	(4)	(5)
ZFU policy	0.0378***	0.0311***	0.0267***	0.0265***	0.0264***
	(0.00557)	(0.00317)	(0.00278)	(0.00268)	(0.00269)
$\log \frac{\text{Nb of establishments (all ind.) in ZFU}_{t-1}}{\text{Nb of establishments (all ind.) in non-ZFU}_{t-1}}$			0.0607***		0.00135
			(0.0158)		(0.0125)
$\log \frac{\text{Nb of establishments (same ind.) in ZFU}_{t-1}}{\text{Nb of establishments (same ind.) in non-ZFU}_{t-1}}$				0.0464***	0.0464***
				(0.00309)	(0.00309)
Municipality fixed effects	No	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes	Yes
Observations	226984	226984	226984	226984	226984
Pseudo R^2	0.0056	0.1606	0.1610	0.1936	0.1936

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

5.2 Triple differences

Even though we include a proxy for the relative attractiveness of the ZFU the year preceding establishment's entry, previous results overestimate the "true" impact if a positive trend in the attractiveness of ZFU areas is present before 2004, or if an unobserved shock in 2004 positively affects the relative attractiveness of ZFU areas. In order to deal with these issues, we first estimate the probability to locate in the ZFU part of a municipality over time. In the absence of any shock other than the policy, we should observe a significant increase in the probability to locate in the ZFU part of a municipality starting in 2004 only for municipalities with a ZFU in 2004, and an increase starting in 2006 for ZFUs labeled in 2006. We then turn to a triple differences estimation, using ZFUs labeled in 2006 as a control group for ZFUs labeled in 2004.

We first analyze the probability to locate in the ZFU part of a municipality over time, replacing in the estimated equation the treatment variable by a set of year dummies. In Table 4, we present results for ZFUs labeled in 2004 and in 2006. The year of reference is 2000. For ZFUs labeled in 2004, in line with the graphical analysis, columns (1) and (2) show that the probability to locate in the ZFU part of a municipality rather than in the non-ZFU part is significantly higher from 2002 onward. However, the coefficient on the year dummy doubles in magnitude in 2004, and remains very strong (it even increases) after this date. Results for the ZFUs labeled in 2006, presented in columns (3) and (4) are very similar, with a positive and significant coefficient for the year 2006, which increases in 2007, since the designation of the third generation ZFUs occurs in August 2006 only.

The increase in the probability to locate in the ZFU part of a municipality up to two years before the implementation of the policy (in the case of second generation ZFUs) could indicate some kind of anticipation effects. However, in both cases, the year from which establishments can start benefiting from exemptions is marked by a spectacular jump in the probability to

Table 4: Probability to locate in a (future) ZFU over time

Dependent Variable: Probability to locate in the ZFU part of a municipality (logit model)				
	ZFU in 2004		ZFU in 2006	
	(1)	(2)	(3)	(4)
year 2001	0.00298	0.00250	-0.000806	-0.000954
	(0.00317)	(0.00292)	(0.00397)	(0.00372)
year 2002	0.0113***	0.00984***	-0.00171	-0.00242
	(0.00304)	(0.00280)	(0.00542)	(0.00539)
year 2003	0.0123***	0.00769**	-0.00127	-0.00454
	(0.00365)	(0.00331)	(0.00628)	(0.00613)
year 2004	0.0264***	0.0244***	-0.00561	-0.00756
	(0.00337)	(0.00334)	(0.00491)	(0.00506)
year 2005	0.0350***	0.0325***	-0.00158	-0.00169
	(0.00390)	(0.00362)	(0.00865)	(0.00692)
year 2006	0.0402***	0.0351***	0.0107**	0.0104*
	(0.00536)	(0.00456)	(0.00529)	(0.00578)
year 2007	0.0475***	0.0330***	0.0343***	0.0310***
	(0.00488)	(0.00371)	(0.00457)	(0.00662)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$		0.0462***		0.0444***
		(0.00311)		(0.00341)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	226984	226984	63245	63245
Pseudo R^2	0.1614	0.1939	0.1293	0.1596

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5%
* significant at 10%.

locate in the ZFU part of municipalities. The comparison of the results for both waves of ZFUs also suggests that the positive impact we measure is only linked to the effect of the policy. Indeed, if there were a shock in 2004 other than the policy, it should have affected both generations of ZFUs. However, dummies for years 2004 and 2005 are close to zero in the case of ZFUs labeled in 2006. This is confirmed by a direct triple differences estimation, using municipalities with a ZFU labeled in 2006 as a control group for municipalities with a ZFU labeled in 2004. As suggested previously, the ZFUs labeled in 2006 are likely to have the same social and economic characteristics as the ZFUs labeled in 2004 as they are also targeted by the ZFU policy; they should only differ in the fact that they benefited from tax exemptions later.

Results of triple differences are presented in Table 5. There is an increase after 2004 in the probability to locate in the ZFU part of a municipality, in municipalities with a ZFU labeled in 2004 as compared to municipalities with a ZFU in 2006. The coefficient obtained is very close to the double differences estimator. It is equal to 2.3 percentage point instead of 2.6. These results suggest that there is no bias in the difference in differences estimation.

Table 5: Triple differences

Dependent Variable: Probability to locate in the ZFU part of a municipality logit model (marginal effect)		
	(1)	(2)
Dummy post 2004	0.00211	0.00244
	(0.00255)	(0.00234)
Dummy post 2004 × municipality ZFU in 2004	0.0246***	0.0227***
	(0.00391)	(0.00362)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$		0.0484***
		(0.00265)
Municipality fixed effects	Yes	Yes
Cluster (municipality level)	Yes	Yes
Observations	250771	250771
Pseudo R^2	0.1532	0.1898

Robust standard errors in parentheses, *** significant at 1%,** significant at 5% and * significant at 10%.

5.3 Falsification tests

Our triple differences estimation is convincing if and only if one agrees that in case of shocks other than the policy, these shocks should affect both waves of ZFUs identically. However, though not very plausible given the distribution of ZFUs on the whole French territory, one could still argue that the obtention of the ZFU label is correlated with shocks that affect specifically the ZFUs labeled in 2004, the year of implementation of the policy, or up to two years before.

This is why we propose an alternative estimation strategy, which exploits two discontinuities in the eligibility criteria to benefit from tax and social contributions exemptions. All the exemptions (except the property tax exemption on built lands) are limited to first, firms with less than 50 employees, and second, firms which turnover is below 10 millions euros. We run two falsification tests based on these discontinuities. The advantage of this stratification framework is that both time-invariant and time-varying unobserved characteristics of the zones are controlled for since they are common to the two groups of firms. If there were an idiosyncratic shock other than the policy, this should affect identically all firms, and we should observe an increase in the probability to locate in the ZFU part of the municipality for both eligible and non-eligible firms. If however we observe an increase in the probability to locate in the ZFUs for eligible firms only, this confirms that our estimation captures the impact of the policy only.

We start the analysis with a falsification test based on firms' number of employees only. We create two samples, a sample of firms with more than 50 employees, and a sample with firms smaller than 50 employees. The construction of the dataset reveals the existence of a mismatch between the year of registration of establishments in the SIRENE database (on establishment locations) and in the BIC-BRN database (on firms characteristics). We decide to use the employment of the firm the first time it appears in the BIC-BRN database over

the period 2000-2007.[13]

Columns (1) to (3) of Table 6 present the results for eligible firms, (4) to (6) for non eligible firms. For all the bandwiths we use, we observe an increase in the probability to locate in ZFUs after 2004 for eligible firms only.[14] The effect of the policy on the probability to locate in the ZFU part of a municipality is positive and significant for eligible firms only. In Table 7, we then consider, among firms smaller than 50 employees, eligible and non-eligible firms in terms of turnover. Results are again similar: the only firms to experience an increase in their probability to locate in ZFUs are firms which turnover is inferior to 10 millions euros.

One could worry that firms around the threshold in terms of employment might manipulate their size so as to benefit from the policy. This could bias our results. Such a manipulation would be possible for firms in the neighborhood of the threshold only. Consequently, we run the same regressions eliminating firms between 45 and 55 employees. Results are presented in Tables A-3 and A-4 in the Appendix, and show that our conclusions remain very much the same.

These two falsification tests confirm that our estimation strategy does not suffer from simultaneity bias. Our previous estimates, based on samples mixing eligible and non eligible establishments, actually under-estimated rather than over-estimated the real impact of the policy. The policy increases on average the probability that a plant locates in the ZFU part rather than in the non-ZFU part of a municipality by 2.65 to 3.45 percentage point, depending on the sample retained for the estimation.

[13] Doing so, we match more observations than we do when using the employment of the firm the exact year of its location. We prefer this measure to average employment of the firm over the period, since firm employment might be impacted by the policy.

[14] We chose the thresholds for the bandwith so as to ensure a sufficient number of observations per cell, and samples of comparable size for eligible and non eligible firms.

Table 6: Falsification test 1: Number of employees eligibility rule

	Dependent variable: Probability to locate in a ZFU part of a municipality logit model (marginal effects)					
Number of employees	(<= 50)	(> 20& <= 50))	(> 30 & <= 50)	(> 50)	(>50& <= 400)	(> 50 & <= 150)
ZFU policy	0.0293***	0.0207**	0.0234*	-0.00136	-0.00468	0.000913
	(0.00284)	(0.00984)	(0.0133)	(0.00547)	(0.00648)	(0.00737)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0440***	0.0260***	0.0354***	0.0159***	0.0117***	0.0188***
	(0.00295)	(0.00283)	(0.00540)	(0.00206)	(0.00212)	(0.00397)
Eligible	Yes	Yes	Yes	No	No	No
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	155758	4010	1776	10244	4661	2042
Pseudo R^2	0.2013	0.2560	0.2454	0.2198	0.1785	0.1587

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

Table 7: Falsification test 2: Number of employees and turnover eligibility rule

	Dependent Variable: Probability to locate in a ZFU part of a municipality logit model (marginal effects)			
<= 50 employees and turnover (millions euros)	(< 10)	(> 1 & <= 10)	(>10)	(>10 & < 50)
ZFU policy	0.0345***	0.0268***	-0.0101	-0.0258
	(0.00305)	(0.00610)	(0.0123)	(0.0158)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0447***	0.0267***	0.0315***	0.0229***
	(0.00267)	(0.00319)	(0.00468)	(0.00514)
Eligible	Yes	Yes	No	No
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	137722	10335	2173	1132
Pseudo R^2	0.1948	0.2044	0.2695	0.1745

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

5.4 Spatial pattern of the effect

Results of the previous section give evidence that the ZFU policy affects positively the probability that firms locate in the ZFU-part rather than in the non-ZFU part of municipalities benefiting from the policy. This increase in the number of establishments locating in targeted areas can however have two different origins. First, the policy may generate a shift of activity between municipalities, attracting new establishments that would have been created, in the absence of the policy, in other municipalities, or inducing relocations of establishments already settled in other municipalities. Second, the policy can also lead to an intra-municipal shift of economic activities, encouraging new establishments, that would have been created in any case in the municipality, to locate in the ZFU-part, or encouraging the relocation of existing establishments from the non-ZFU part to the ZFU-part of the municipality. It is important to identify the origin of the effect for two reasons. First, if the policy attracts firms from other municipalities, our estimation strategy might under-estimate the real impact of the policy. Second, if the policy leads to an intra-municipal shift of economic activity only, this would mean that the positive impact we measure is entirely obtained at the expense of the other part of the municipality.

5.4.1 Inter-municipal or Intra-municipal shift of economic activity

In order to assess the spatial pattern of our effect, we first investigate the evolution of stocks and flows of establishments in municipalities obtaining their ZFU in 2004, taking as a control group municipalities which will have a ZFU in 2006. Table 8 presents the results at the municipality, ZFU part and non ZFU part level. Column (1) shows that the stock of establishments increases after 2004 for both types of municipalities, but municipalities with a ZFU labeled in 2004 do not experience any differentiated increase in their stock with respect to municipalities with a ZFU labeled in 2006. The coefficient associated with the implementation of the policy (variable taking the value one after 2004 for municipalities obtaining a ZFU in 2004) is indeed not significant. However, Bondonio and Greenbaum (2007) show, in the case of American enterprise zones, that this absence of impact on stocks might be due to eviction effects, the entry of new firms at the municipality level being canceled out by the exit of existing establishments. This does not seem to be the case here. Indeed, the policy has no impact on the flows of entering establishments at the municipality level (column (2)). Consequently, the policy does not induce business creations at the municipality level, and there is no shift of activity between municipalities.

On the other hand, the ZFU part of municipalities benefiting from the policy in 2004 exhibits a higher increase of establishment stocks and flows after 2004, as compared to the ZFU part of municipalities hosting ZFUs later (columns (3) and (4)). The positive and significant impact we measure for the ZFU part suggests in reality that the policy generates business diversion, i.e. it shifts towards the ZFU part of the municipalities activities that

Table 8: Number of establishments in municipalities with a ZFU

	Dependent Variable: ln(number of establishments)					
	Municipality (overall)		ZFU part		Non-ZFU part	
	Stock	Flow	Stock	Flow	Stock	Flow
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy ZFU 2004 municip. × post 2004	-6.15e-05	-0.0377	0.0984***	0.157**	-0.00945	-0.0586
	(0.0192)	(0.0390)	(0.0330)	(0.0726)	(0.0230)	(0.0686)
Dummy post 2004	0.0575***	0.191***	0.0257	0.202***	0.0599***	0.153**
	(0.0178)	(0.0341)	(0.0293)	(0.0519)	(0.0207)	(0.0642)
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	415	581	415	581	415	581
Number of municipalities	83	83	83	83	83	83
R^2	0.316	0.282	0.225	0.211	0.188	0.092

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

would have located, in the absence of the policy, in the non-ZFU part. As the policy mainly leads to a shift of economic activity within municipality, the non-ZFU part of the municipality might be negatively affected by the policy. We investigate the evolution of the stock and flow of establishments in the non-ZFU part of the municipality in columns (5) and (6). The non-ZFU part of our "treated" municipalities seems to face a relatively lower increase in the stock and flow of establishments after 2004, the difference with the non-ZFU part of our control group being not significant. The fact that we find a negative but insignificant coefficient for these non-treated parts might be explained by the small size of ZFUs as compared to the rest of the municipality they are located in – recall that on average, the ZFU part of municipalities represents 15% of the stock of establishments and attracts 18% of the flow of establishments over the period 2000-2007. Table A-1 in the Appendix shows that results are very much the same when we consider growth rates of plants stocks and plants flows instead of levels.

5.4.2 Establishment creations and relocations of existing establishments

In this subsection, we try to identify whether the effect we measure for the policy comes from the relocation of existing establishments or from "pure" establishment creations. Indeed, the intra-municipal shift we highlight may be linked to the redirection of new establishment creations toward the ZFU-part of municipalities, or to the relocation of existing establishments, potentially from the non-ZFU part to the ZFU-part.

We know for each establishment location whether it corresponds to the relocation of an existing establishment or to the creation of a new one (we count as creations the appearance of new establishments, reactivation of inactive establishments and cessions). We first decompose the establishments flows analyzed in the previous section into those two categories. Columns (1) to (3) of Table 9 report results for the creation of establishments. Results show that the number of establishment creations tends to decrease at the municipality level, to increase in

Table 9: Establishment flows in municipalities with a ZFU: creations and relocations

	Dependent Variable: ln(number of establishments)					
	Creations			Relocations of existing plants		
	Municip.	ZFU part	non-ZFU part	Municip.	ZFU part	non-ZFU part
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy municip. ZFU 2004 × post 2004	-0.0613*	0.0521	-0.0718	0.0655	0.528***	-0.0206
	(0.0367)	(0.0632)	(0.0657)	(0.0572)	(0.103)	(0.0568)
Dummy post 2004	0.213***	0.211***	0.201***	0.0798*	0.0822	0.0511
	(0.0327)	(0.0548)	(0.0506)	(0.0442)	(0.0796)	(0.0443)
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (municipality level)	yes	yes	yes	yes	yes	yes
Observations	581	581	581	581	581	581
Number of municipalities	83	83	83	83	83	83
R^2	0.301	0.165	0.134	0.055	0.241	0.003

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

the ZFU part and to decrease in the non-ZFU part after the implementation of the policy, in municipalities with a ZFU in 2004 as compared to municipalities with a ZFU in 2006. Coefficients are however weakly significant or insignificant. Turning to the analysis of relocations of existing establishments, it is very clear that the number of relocations dramatically increases after 2004 in the ZFU part of municipalities with a ZFU in 2004, as compared to municipalities with a ZFU in 2006. Again, the number of creations and relocations in the non-ZFU part of municipalities tends to decrease, but the coefficient is insignificant. Together, these results unambiguously confirm that the ZFU policy acts as a spatial shifter of economic activities within municipalities in favor of targeted areas. They moreover suggest that most of the effect is obtained through relocations of existing establishments.

In order to further investigate the role played by the relocation of existing establishments, we re-estimate the impact of the policy using our double difference estimation for creations and relocations. Table 10 shows that the impact of the ZFU policy on the probability to locate in the ZFU part of municipalities, measured at the individual level, differs for creations and relocations (columns (1) and (2)). While the marginal impact is positive for both types of establishments, it is almost 4 times higher for relocations of existing plants than for pure creations. We therefore pay more attention to the geographic origin of establishments in the case of relocations. Over the period 2000-2007, the municipality of origin for relocating establishments is known for 75% of observations. Columns (3) and (4) show that the marginal impact of the policy is not significantly different for relocations within the municipality and inter-municipal relocations. However, 56% of relocations occur within the same municipality. These results therefore confirm that an important part of the effect of the policy can be explained by establishments re-optimizing the location of their business within municipalities, a non-negligible part of them being establishments already located in municipalities hosting the ZFU but relocating toward the ZFU area.

Table 10: Effect of the ZFU policy for creations and relocations

	Dependent Variable: Probability to locate in the ZFU part of a municipality logit model (marginal effects)			
	Creations	Relocation of existing plants		
		all relocations	same municipality	other municipalities
	(1)	(2)	(3)	(4)
ZFU policy	0.0167***	0.0600***	0.0641***	0.0703***
	(0.00255)	(0.00426)	(0.00550)	(0.00859)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0496***	0.0356***	0.0396***	0.0322***
	(0.00359)	(0.00264)	(0.00241)	(0.00497)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (Municipality level)	Yes	Yes	Yes	Yes
Observations	174698	51377	20650	16963
Pseudo R^2	0.1913	0.2156	0.1871	0.2265

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

6 Heterogeneous impact of the enterprise zones program

The average effect of the policy we measure might hide important variations in the efficiency of the policy regarding the initial attractiveness of the ZFU, the size of entrants and the industry of potential entrants. We examine in this section the potential heterogeneous impact of the policy along these three dimensions.

6.1 Impact of the policy and relative attractiveness of the ZFUs

A recent study by Devereux, Griffith, and Simpson (2007) on the evaluation of the Regional Assistance Scheme in the UK shows that firms are less responsive to government subsidies in areas where there are fewer existing establishments in their industry. It is therefore likely that in France, the ZFU policy is more efficient when the attractiveness differential in the industry of the potential entrant between the ZFU part and the non-ZFU part of the municipality is low. In this section, we test this hypothesis by introducing an interaction term between the relative stock of plants in the operating industry of the locating establishment and the ZFU policy dummy.

Table 11 reports the results we obtain for the whole sample, for creations and for relocations. One difficulty with a logit estimation is that the interpretation of the interaction term is not direct (see Ai and Norton, 2003). Therefore, we use a linear probability model. In column (1), results for the whole sample indicate that the effect of the policy is positive and significant, and that establishments are more likely to locate in the ZFU part of a municipality when the differential in attractiveness between the two zones of the municipality is low (when the ratio of the number of establishments in the ZFU part relative to the non-ZFU part of the municipality is high in the industry of the entrant). This is in line with our previous findings. Regarding the interaction term, it is positive and significant which confirms our expectations. The effect of the ZFU policy is magnified when the attractiveness differential between the two

Table 11: Effect of the ZFU policy and existing industrial structure

	Dependent Variable: Probability to locate in a ZFU linear probability model		
	whole sample	creation	relocation
	(1)	(2)	(3)
ZFU policy	0.0548***	0.0356***	0.120***
	(0.00856)	(0.00780)	(0.0153)
$\log \frac{\text{Nb of estab. (same ind.)in ZFU}_{t-1}}{\text{Nb of establishments (same ind.) in non-ZFU}_{t-1}}$	0.0361***	0.0403***	0.0216***
	(0.00704)	(0.00740)	(0.00618)
Pol.$\times \log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of establishments (same ind.) in non-ZFU}_{t-1}}$	0.00955***	0.00627***	0.0208***
	(0.00220)	(0.00197)	(0.00427)
Municipality fixed effects	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes
Observations	226984	174913	51377
R^2	0.0223	0.0226	0.0267

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

parts of the municipality is lower. This result suggests that the ZFU policy is less efficient when targeted areas face a very high degree of economic difficulties as compared to the rest of municipality. In columns (2) and (3) we investigate separately the case of creations and relocations of existing establishments. The effect of the policy is much stronger for existing establishments that decide to relocate than for pure creation of establishments. Moreover, the policy is also more efficient when the number of establishments already located in the ZFU part relative to the non-ZFU part of the municipality in the operation sector of the entrant is high, both for existing and new establishments. However, this magnification effect seems to be stronger for relocations that for pure creations.

6.2 Effect of the ZFU policy and firm size

In this section, we are interested in the potential heterogeneous impact of the policy regarding firm size. Indeed, beyond the threshold effect we have already emphasized, from a theoretical point of view, Baldwin and Okubo (2006) show that the opportunity cost of relocating in peripheral regions is lower for smaller firms. If enterprise zones policies attract small firms, this means that the potential effect of these policies regarding employment creation might be low.

In order to investigate the effect of firm size on location decisions in targeted zones, we introduce an interaction term between the policy variable and establishment size. We proxy establishment size by the total number of employees in the firm (73% of the firms studied being single-establishment). We measure firm size by the number of employees declared the first year it appears in the BIC-BRN over the 2000-2007 period.

Results of linear probability regressions are presented in Table 12. The first column reports the results for the whole sample of firms; again, we show that the policy has a positive effect on the probability to locate in targeted areas. However, the probability to

Table 12: Effect of the policy and firm size

Dependent Variable: Probability to locate in a ZFU (linear probability model)				
	whole sample	(<= 50 employees)		(> 50 employees)
	(1)	(2)	(3)	(4)
ZFU policy	0.0298***	0.0252***	0.0379***	-0.00615
	(0.00438)	(0.00400)	(0.00583)	(0.0126)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0380***	0.0393***	0.0413***	0.0136***
	(0.00637)	(0.00673)	(0.00646)	(0.00334)
Firm Size	-0.00863***	-0.0138***	-0.0141***	-0.00103
	(0.00139)	(0.00288)	(0.00251)	(0.00108)
Firm Size × ZFU policy	-0.00249***	0.00503*	-0.00203	0.000905
	(0.000868)	(0.00263)	(0.00184)	(0.00187)
Firms with 0 employees	Included	Included	Excluded	Not applicable
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	168218	157140	75097	11078
R^2	0.0247	0.0227	0.0294	0.0076

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

locate in ZFU areas is higher for smaller firms (the coefficient on firm size is negative and significant), and the effect of the policy is stronger for smaller firms (the coefficient of the interaction term is negative). This negative sign on the interaction is likely to be linked to the fact that firms with more than 50 employees are not eligible for tax and social contributions exemptions. However, it might still be the case that eligible firms with different size respond differently to the policy. In columns (2) and (3), we thus repeat the analysis for firms with less than 50 employees, column (2) including firms with 0 employees (self-employed workers), and column (3) excluding them. As shown by the number of observations, the number of establishments with self-employed workers is very high. Whatever the subsample, the coefficient associated with the implementation of the policy is positive and significant, and the coefficient associated with firm size is negative. This means that while the policy has a positive effect on establishments' probability to locate in targeted areas, firms locating in these areas are small independently of the policy. Regarding the interaction term between the ZFU policy and firm size, when firms with self-employed workers are included, the probability to locate in the ZFU part of municipalities is higher for bigger firms, but no heterogeneity emerges once firms with 0 employee are excluded. One possible explanation to this result is that firms with 0 employees cannot benefit from social contributions exemptions. They consequently benefit less from the incentives offered and respond less to the policy than firms with at least one employee. Finally we reproduce the same analysis for the sample of firms with more than 50 employees. As expected, the policy has no influence on the location of big firms. On this subsample, there is no heterogeneous impact of the policy depending on firm size.

To sum up, these results show that on average, ZFU zones structurally attract smaller firms, independently of the effect of the policy. When the whole sample of firms is considered,

Table 13: Effect of the policy by sector

Dependent Variable: Probability of location in a ZFU part (logit model, marginal effects)					
	Manufacturing	Construction	Hotel & Restaurant	Retail & Cars	Transports & Communications.
	(1)	(2)	(3)	(4)	(5)
ZFU policy	0.0285***	0.0190**	0.00470	0.0167***	0.0234***
	(0.00618)	(0.00750)	(0.00386)	(0.00406)	(0.00871)
$log \frac{\text{Nb of estabs (same ind.) in ZFU}_{t-1}}{\text{Nb of estabs (same ind.) in non-ZFU}_{t-1}}$	0.0218***	0.0749***	0.0200***	0.0502***	0.0501***
	(0.00336)	(0.00833)	(0.00355)	(0.00205)	(0.0101)
Observations	11519	27586	16423	57941	9181
Pseudo R^2	0.1780	0.1119	0.2196	0.1929	0.1442

	Business services	Education	Health	Collective services
	(6)	(7)	(8)	(9)
ZFU policy	0.0376***	0.0185***	0.0564***	0.0107**
	(0.00506)	(0.00708)	(0.00755)	(0.00457)
$log \frac{\text{Nb of estabs (same ind.) in ZFU}_{t-1}}{\text{Nb of estabs (same ind.) in non-ZFU}_{t-1}}$	0.0267***	-0.0349***	0.0126	0.0116***
	(0.00285)	(0.0104)	(0.0165)	(0.00381)
Observations	61581	3771	18998	13467
Pseudo R^2	0.1996	0.2108	0.2888	0.1803

All regressions include municipality fixed effects and cluster at the municipality level, robust standard errors in parentheses, *** significant at 1%, ** significant at 5%and * significant at 10%.

smaller firms respond more to the ZFU policy, due to the fact that firms smaller than 50 employees are the only ones to be eligible. However, once all thresholds effects linked to the policy are controlled for, no significant heterogeneity of the impact with respect to firm size emerges.

6.3 Heterogeneous impact of the policy according to the sector

In this section, we analyze potential heterogeneity of the policy according to the operating sector of the establishment. There are several reasons why we might expect that different industries react differently to enterprise zones policies: sectors are likely to vary in their fixed (re)location costs, differences in skilled-intensity may make targeted zones more or less attractive, and the level of effective employer contributions exemptions might vary between sectors. Identifying the sectors that are more affected by the ZFU policy can help policy-makers to redefine targeted policies by taking into account industries response to tax and social contributions exemptions.

6.3.1 Impact of the policy by sector

In order to investigate sectoral variations in the efficiency of the policy, we first evaluate the impact of the policy for each sector separately.

Results of this analysis are presented in Table 13. They indicate that the probability that an establishment locates in the ZFU part of a municipality increases significantly after the implementation of the policy in most industries. However, there is some sectoral heterogeneity in the response to the ZFU policy. First, the policy does not affect the sector of Hotels and

Table 14: Effect of the policy and (re)location costs

Dependent Variable: Probability to locate in a ZFU (linear probability model)				
	whole sample		creations	transfers
	(1)	(2)	(3)	(4)
ZFU policy	0.0272***	0.0119***	0.00790***	0.0352***
	(0.00373)	(0.00253)	(0.00267)	(0.00481)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0413***	0.0416***	0.0439***	0.0329***
	(0.00698)	(0.00699)	(0.00742)	(0.00603)
Mobile industries		-0.0132***	-0.00941***	-0.00717
		(0.00346)	(0.00351)	(0.00441)
Mobile industries × ZFU policy		0.0324***	0.0234***	0.0346***
		(0.00625)	(0.00522)	(0.00822)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	226984	226984	174913	52071
R^2	0.0247	0.0227	0.0294	0.0076

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

Restaurants, which is plausible as firms in this sector usually prefer central locations where the demand is potentially higher. The policy has a significant but weak effect in the sectors of Education and Collective services, in which public utility considerations are likely to matter more than economic considerations in location decisions. The effect of the policy is stronger than the average in the manufacturing sector and in the Business services sector. Finally, the effect of the policy is particularly strong in the Health sector, in which the existence of small structures can facilitate the (re)location of establishments in order to benefit from tax and social contributions exemptions. This analysis reveals that there is a strong variation in the effect of the policy depending on the operating sector that must be taken into account when defining and assessing the effect of enterprise zones policies.

6.3.2 Heterogeneous impact of the ZFU policy depending on firms' mobility

We suspect that part of the heterogeneity we observe reflects the fact that sectors in which plants are more mobile will be more responsive to location subsidies.

For a given 3-digit sector, we use the share of relocations among establishments' creations over the period 1995-2007 as a proxy for fixed (re)location costs in the industry. Indeed, if the costs associated with the creation and the settlement of a new plant are high, plants' locations should be rather stable over time. On the opposite, if these costs are low, establishments can be more mobile and we should observe more relocations. In order to avoid any bias in our measure due to the implementation of the ZFU policy, we exclude municipalities obtaining a ZFU over the period for the calculation of the share of relocations in the total number of plants' creations. An industry is said to be mobile if the share of relocations in total plants creations is above 25%, the median in the sample.

We run our benchmark regression and we then include a dummy that identifies plants

active in mobile industries and an interaction term between the treatment variable and this dummy. As shown in Table 14, the impact of the policy is clearly stronger for establishments active in mobile industries. Indeed, while the implementation of the policy increases the probability that a plant locates in a ZFU by 2.72 percentage point on average, column (2) shows that this increase is equal to 1.19 percentage point in sectors with high (re)location costs, and to 4.43 percentage point (1.19+3.24) in mobile industries. The difference between these two types of industries is actually higher for "pure" creations than for relocations: the impact of the policy is 4 times bigger in mobile industries for "pure" creations ($\frac{2.34+0.79}{0.79}$), while it is "only" 98% bigger for relocations ($\frac{3.46+3.52}{3.52}$).

Consistently with the results presented in Table 13, the Health and the Business services sectors, which exhibit on average high shares of relocations in plants' creations, are sectors for which the impact of the policy is the strongest. This heterogeneous impact of the policy depending on (re)location costs is also coherent with the displacement effect we observe. Indeed, plants that can easily relocate to benefit from the subsidies, but also to come back to a more attractive area once subsidies are not provided anymore, are more responsive to the policy.

7 Quantification

Quantifying fully the benefits of this French program goes beyond the scope of this paper but a number of considerations can be made regarding our study. Our empirical analysis gives strong evidence that the ZFU policy succeeded to promote the (re)location of establishments in targeted areas, which was the primary objective of the French program. Our analysis does not allow us to explicitly quantify the achieved benefits regarding the objective of employment growth especially for zone residents. However our results suggest, indirectly, that these benefits might be low, given the (re)location dynamics at work and the heterogenous impact of the policy regarding area, industry, and firm level characteristics. Our results help to explain the weak effects found by two studies that have analyzed the direct impact of the French program on employment growth in targeted zones (Rathelot and Sillard, 2008a) and on employment probabilities of zones residents (Gobillon, Magnac, and Selod, 2012). In the actual debate about the implementation of place-based versus people-based policy, the results therefore suggest that the ZFU place-based policy has been efficient to attract firms in targeted zones but that its impact on improving the economic and social conditions of zones residents are likely to be low.

Having measured the overall impact of the policy on establishments' location decisions, we can however quantify the cost of displacing plants, jobs, turnover and value-added within municipalities. We know from Rathelot and Sillard (2008b) that the total cost of the policy (net of the exemptions that firms would have anyway received in the absence of ZFUs[15]) is

[15]In particular exemptions of social contribution for low-paid jobs.

equal, for the year 2005, to 125 millions euros. To transform this figure in a per-unit cost, we have to determine the number and the characteristics of those plants that have actually moved in ZFUs due to the policy.

Based on the second column of Table 4, we know that 757 plants have located in ZFUs thanks to the policy in 2005.[16] Among all plants locating in ZFUs in 2005, we then have to identify which ones move due to the policy. To do so, we fix some criteria based on the predicted individual probability to locate in a ZFU with and without the policy (prob_without). Those criteria are determined so as to match the exact number of plant locations induced by the policy.

We thus re-estimate column 2 of Table 4 on the sample of eligible firms (i.e. those with employment below 50 employees and turnover below 10 millions euros), introducing firm employment and its interactions with year dummies to obtain a firm-specific predicted probability to locate in a ZFU. For those plants that locate in ZFUs after 2004, the probability of locating in a ZFU in the absence of the policy is recalculated by applying pre-treatment coefficients, i.e. coefficients on year 2003 and its interaction with firm-size. We then identify the 757 plants that are more likely to have moved in 2005 due to the policy in several steps. Among the plants that locate in ZFUs in 2005:

- We first select plants which probability to locate in a ZFU without the policy is not too high: Those plants are the plants for which prob_without is lower than the median of the probability to locate in ZFUs among plants that have actually located in ZFUs in 2003 (thus before treatment). Indeed, we consider that the other plants would have also located in a ZFU in the absence of the policy.

- Among remaining plants, we consider that those plants that move due to the policy are the plants for which the difference between the predicted probability to locate in ZFUs with and without the policy is high enough. To obtain the right number of plants, the threshold is fixed at the 25th percentile of the distribution of the difference in probabilities.

The comparison of columns 1 and 2 of Table 15 shows that this procedure leads to consider as "moving plants" the plants that actually locate in ZFUs in 2005 for which prob_without is not too high (given their observable characteristics, high probability plants would have located in any case in ZFUs) and not too low (low probability plants would have also certainly located in ZFUs due to unobservable characteristics).

We can then calculate the average employment, turnover and value-added of those moving plants.

[16]This figure is obtained calculating the difference between the coefficient on year 2005 dummy and the coefficient on year 2003 dummy, and then multiplying this difference by the number of plants location choices in second-generation ZFU municipalities in 2005.

Thanks to our procedure, we identified 752 moving plants in 2005. Given average characteristics displayed in Table 16, we know that they represent 1541 employees, 175.87 millions euros of turnover and 73.33 millions euros of valued-added.

Table 15: Distribution of prob_without, plants locating in ZFUs in 2005

	ZFU plants 2005	Moving plants 2005
5th	2.58	4.23
25th	7.16	6.57
50th	13.62	9.05
75th	29.26	12.31
Mean	22.94	9.30

Table 16: Plant-level characteristics, plants locating in ZFUs in 2005

	Moving plants 2005			All ZFU plants 2005		
	Emp	Turnover	Value added	Emp	Turnover	Value added
25th	0	27	9	0	25	8
50th	0	64.5	32	0	65	31
75th	2	167.5	84	2	167	8"
Mean	2.05	233.87	97.52	1.84	229.6	100.39
Mean without the biggest	1.99	221.67	92.15	1.81	224.03	97.64

Monetary variables in thousands euros

We can now compute an upper and a lower bound for the cost of each unit of economic activity (plant, job, turnover, value-added) displaced by the policy:

- We first consider that the total cost of (re)locations is 125 millions euros: to attract those 752 plants in ZFUs, public authorities had to provide exemptions to both locating and already located plants. In this case, the average cost of a plant attracted by the policy is around 165,000 euros. The cost per displaced job is equal to 80,000 euros. Finally, to relocate on euro of turnover and value-added, 0.7 and 1.67 euros must be spent respectively.

- We could also consider that exemptions given to already located plants and to locating plants obey to different purposes: maintaining the activities already located in ZFUs and attracting new activities. In this case, we have to calculate the amount spent for locating plants only. By merging information on the stocks of plants and the size of these plants, we calculate that eligible plants in ZFUs represent in 2005 39,383 jobs. Assuming that exemptions are equally distributed across jobs in eligible plants, we find that 3,174 euros per job is spent. On the other hand, we calculate that plants that locate in ZFUs in 2005 account for 7,453 jobs. We can thus estimate that the exemptions provided to all newly located plants in ZFUs in 2005 are approximately equal to 23,656,000 euros (7,453×3,174). When we then apply this total cost spent on locating plants to the 752 plants that moved in ZFUs thanks to the policy, we find that the cost per displaced

plant and displaced job is equal respectively to 31,450 euros and 15,345 euros. We also find that to relocate on euro of turnover and value-added, 0.13 and 0.34 euros must be spent respectively.

In any case, plants benefiting from exemptions for a minimum of five years, and possibly for up to 14 years (see section 2), the cost of displacing activities in targeted zones is high.

8 Conclusion

In this paper, we evaluate the impact of a French enterprise zones policy, the "Zones Franches Urbaines" (ZFU) policy, on establishments' location decisions. In order to deal with endogeneity issues, we first adopt a difference-in-differences approach which combines spatial and time differencing. We then implement a triple difference estimation by taking advantage of the fact that targeted areas have been selected in different waves, making the areas treated in 2006 an appropriate control group for areas treated in 2004. Finally we also exploit two discontinuities in the eligibility criteria of the policy as an exogenous source of variation to estimate the impact of the treatment.

Our results show that the French ZFU policy has a positive and sizable impact on the probability that establishments locate in targeted urban areas: the marginal impact of the policy corresponds to an estimated elasticity of 31%. This effect is robust to our different estimation strategies, both in terms of significance and magnitude of the coefficients. However, this positive average impact of the policy has to be qualified. First, we find that the impact of the policy is stronger when the initial attractiveness differential between the two parts of the municipality is low. This suggests that such tax incentives may be less efficient in most distressed urban areas of French municipalities. Second, we find that areas targeted by the policy attract structurally smaller firms. This means than the potential benefits of such program regarding employment creation by new establishments in targeted zones might be limited. Results also show that the effect of the policy varies a lot depending on the considered industry. Finally results reveal that the policy does not create economic activities *per se* at the municipality level; it generates displacement effects and leads to an intra-municipal shift of economic activity.

However, the short time-span of the analysis presented here might miss some important positive effects for the residents of the zones in the long run. More specifically, public authorities expected that the policy, by attracting new establishments, might contribute to improve the image and the quality of life within the zones. This could have a positive social impact beyond economic outcomes. Such positive externalities are difficult to capture in the current analysis, but it is an important avenue for future research.

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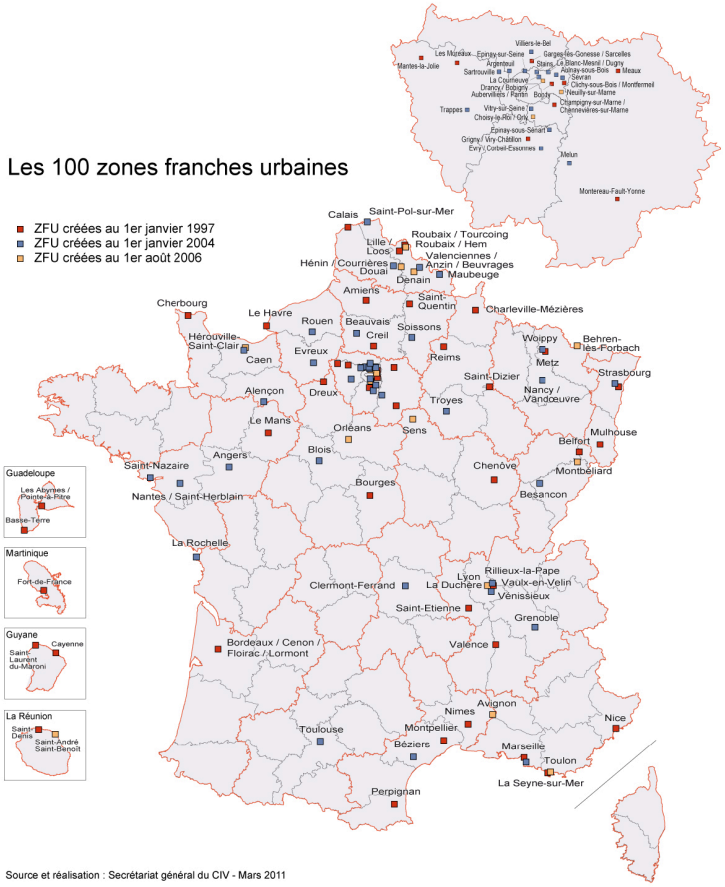
A-1 Appendix

A-1.1 Tax exemptions in ZRUs

An existing establishment or a new establishment in a ZRU is:

- exempted from employer social contributions during twelve months, for any job creation (of a minimum length of one year) that increases the number of employees, up to 50 employees.
- totally exempted from taxes on corporate profits for the first two years and then at a decreasing rate for the next three years. This exemption only applies to firms whose headquarters and plants are located in the targeted zone and excludes firms in banking, finance, insurance, housing and renting, and sea-fishing sectors;
- totally exempted from business tax during five years, with possible extension of the exemption at a decreasing rate during three years. This exemption is limited to establishments with less than 150 employees;
- exempted from property taxes on built lands (up to five years);
- exempted from personal social contribution in the case of artisans and shopkeepers.

A-1.2 Map of municipalities with a ZFU and their year of implementation



A-1.3 Growth of the number of establishments in municipalities with a ZFU

Table A-1: Growth rate of the number of establishments in municipalities with a ZFU

Dependent variable: growth rate of the number of establishments, panel (fixed effects)						
	Municipality (overall)		ZFU part		Non-ZFU part	
	Stock	Flows	Stocks	Flows	Stocks	Flows
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy ZFU 2004 municip. × post 2004	-0.00474	-0.0310	0.0740*	0.140*	-0.0163	-0.0429
	(0.0254)	(0.0352)	(0.0421)	(0.0761)	(0.0293)	(0.0584)
Dummy post 2004	0.0639**	0.180***	0.0395*	0.187***	0.0630**	0.151***
	(0.0257)	(0.0314)	(0.0233)	(0.0567)	(0.0312)	(0.0491)
Number of estab. $_{t-1}$	-1.031***	-0.872***	-0.777***	-0.923***	-0.857***	-0.995***
	(0.106)	(0.0844)	(0.180)	(0.0536)	(0.225)	(0.105)
Cluster (Municipality level)	Yes	Yes	Yes	Yes	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	332	498	332	498	332	498
Number of municipalities	83	83	83	83	83	83
R^2	0.578	0.507	0.396	0.466	0.445	0.510

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%

Table A-2: Growth rate of the number of establishments in municipalities with a ZFU: creations and relocations

Dependent Variable: growth rate of the number of establishments, panel (fixed effects)						
	Creations			Relocations of existing plants		
	Municipality	ZFU part	non-ZFU part	Municipality	ZFU part	non-ZFU part
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy ZFU 2004 × post 2004	-0.0584	0.0440	-0.0626	0.0792	0.507***	-0.0186
	(0.0368)	(0.0723)	(0.0595)	(0.0575)	(0.102)	(0.0564)
Dummy post 2004	0.213***	0.211***	0.201***	0.0798*	0.0822	0.0511
	(0.0327)	(0.0548)	(0.0506)	(0.0442)	(0.0796)	(0.0443)
Lag number of estab. $_{t-1}$	-0.938***	-0.997***	-1.071***	-1.009***	-0.971***	-0.988***
	(0.0734)	(0.0441)	(0.0872)	(0.0753)	(0.0492)	(0.0736)
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Municipality level)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	498	498	498	498	498	498
Number of municipalities	83	83	83	83	83	83
R^2	0.531	0.502	0.550	0.535	0.546	0.498

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%

A-1.4 Falsification exercises: robustness tests

Table A-3: Falsification test bis: Nb of emp. eligibility rule

Probability to locate in a ZFU part of a municipality, results of a logit model, (marginal effects)				
Number of employees	(> 20& <= 45))	(> 30 & <= 45)	(>55& <= 400)	(> 55 & <= 150)
ZFU policy	0.0270***	0.0404**	0.00305	-0.00470
	(0.0104)	(0.0158)	(0.00903)	(0.00692)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0273***	0.0410***	0.0178***	0.0106***
	(0.00303)	(0.00582)	(0.00454)	(0.00223)
Eligible	Yes	Yes	No	No
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	3461	1338	1617	4236
Pseudo R^2	0.2513	0.2491	0.1401	0.1697

Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

Table A-4: Falsification test 2bis: Nb of emp. and turnover eligibility rule

	Probability to locate in a ZFU part of a municipality			
<= 45 employees and Turnover (millions euros)	(< 10)	(> 1 & <= 10)	(>10)	(>10 & < 50)
ZFU policy	0.0346***	0.0273***	-0.00531	-0.0191
	(0.00304)	(0.00616)	(0.0123)	(0.0173)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0447***	0.0268***	0.0334***	0.0260***
	(0.00267)	(0.00323)	(0.00517)	(0.00534)
Eligible	Yes	Yes	No	No
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	137357	9949	1997	961
Pseudo R^2	0.1947	0.2019	0.2747	0.1701

Logit estimations, marginal effects. Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.