The Impact of Urban Enterprise Zones on Establishment Location Decisions - Evidence from French ZFUs *

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Abstract

Governments increasingly provide geographically-targeted tax incentives to promote the economic development of distressed urban areas. In this paper, we study the impact of a French Enterprise zones program (the ZFU policy) on establishment location decisions. Our empirical analysis is based on a microgeographic dataset which provides exhaustive information on the location of establishments in France over the period 1995-2007 at the census block level. In order to deal with endogeneity issues, we adopt a difference in difference approach which combines spatial and time differencing. We alternately implement a triple difference estimation, 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 the probability that establishments locate in targeted areas, this effect being robust to different estimation strategies. We then further investigate the mechanisms that drive this positive average effect and find that the impact of the policy is stronger for targeted areas that are initially less distressed and for sectors in which relocation costs are lower. Additionally, ZFU areas tend to attract smaller firms. However, the analysis of the spatial pattern of the effect reveals that the policy does not create economic activity *per se* at the municipality level, it rather operates as a spatial shifter within municipalities, inducing existing establishments, or new establishments to (re)locate in the ZFU part of the municipality.

Keywords: firm location, enterprise zone, spatial differencing; JEL codes: R12, R38, R58.

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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 exampled by 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 enterprise zones remains however controversial and whether the limited achieved benefits of these targeted policies justify their costs is still a pending issue (Peter and Fishers, 2004).

The objective of this paper is to evaluate the impact of a French enterprise zone program on firm location decisions. Initiated in 1996, this program has aimed 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)".[1] Facing an increasing degree of economic difficulties, these zones benefit from an increasing package of fiscal incentives.

In this paper, we focus on the evaluation of ZFUs on business location in targeted zones. They represent the most important effort by public authorities in favor of depressed urban areas in France. In the ZFU policy, existing establishments or new establishments can be exempted from employer social contributions, taxes on corporate profits, business taxes and property tax on built lands. They 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 2007. Our empirical analysis, which is based on the evaluation of the 2004 ZFU wave, is based on a microgeographic dataset which provides exhaustive information on the location of establishments in France over the period 1995-2007 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 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. In this purpose, attracting new firms and establishments

[1] *i*) the "Zones Urbaines Sensibles, (ZUS)" (Sensitive Urban Zones), *ii*) the "Zones de Redynamisation Urbaines, (ZRU)" (Revitalisation Urban Zones) and *iii*) the "Zones Franches Urbaines (ZFU)" (Urban Enterprise Zones).

[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 evaluation of the French enterprise program, see Rathelot and Sillard (2008b); Gobillon, Magnac, and Selod (2010)

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 a positive dynamic 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). The results of some studies suggest that investigating the effect of such a program on establishment dynamics largely contributes to the understanding of 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 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 zone often suffers from. We 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 difference estimation by using areas designated in 2007 as a control group for areas treated in 2004 and exploit two discontinuities in the eligibility criteria, to properly assess the impact of the policy. Second, we have very detailed establishment-level data that allow us to precisely investigate location decisions (at the census block level), and to discriminate between "pure creations" and "relocations". We can thus assess whether the policy generates business creation or business diversion in targeted zones and study at a higher geographical scale, how the rest 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 according to area-level, sector-level and establishment level characteristics which allow us to go much deeper in the comprehension 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 of a municipality increases on average by 2.6 percentage points once the ZFU part of the municipality officially benefits from fiscal incentives. The probability of locating in a ZFU part of a municipality being 12% on average over the period 2000-2007, this corresponds to an elasticity of 21% of the impact of the ZFU policy. Results are qualitatively the same whether we use double differences, triple differences or double differences combined with a regression discontinuity design (RDD) approach based on the existence of firm size and sectoral activity discontinuities in the eligibility criteria. However, the impact of the policy appears to be 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.

Moreover, there is not a significant increase in the stock or flows 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. Both results indicate that the policy mainly leads to an intra-municipal shift of economic activity which is driven by opportunistic (re)location of existing and new establishments.

The rest of the paper is organized as follows. Section 2 presents a brief overview of previous research while section 3 describes the policy we evaluate. Section 4 details the estimation strategy. In Section 5, we present the data and some descriptive statistics and finally, the results are analyzed in the last sections.

2 Previous research

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. The aim of this section is to briefly present the recent advances of previous research and to highlight how we depart from existing studies.

2.1 Firm location decision and tax differential

Most enterprise zone 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 firm location decisions to tax differentials. At the international level, several studies, based on nested logit model estimations, show that multinational firms location decisions are 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' installation, 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. 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

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

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, 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 Enterprise zones evaluation

The literature on enterprise zones evaluation 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 outcome of interest and methodologies.

Recent research has mainly relied on the evaluation of US enterprise zone 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 employment probabilities of zones residents, while some 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 California's program on the number of establishments in targeted zones, Neumark and Kolko (2010) tend to find a negative effect in the case of Colorado's program. However, some studies suggest that more complex dynamics may be at work, the benefits of such program on different component of economic growth induced by the entry of new firms being compensated by the exit of some firms due to competition effects (Greenbaum and Engberg, 2004; Bondonio and Greenbaum, 2007). In the case of France, two recent papers study the effect of French ZFUs. Rathelot and Sillard (2008b) 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 the year of the implementation of the policy only. Gobillon, Magnac, and Selod (2010) 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. Again, the effect is significant only in the short-run. 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 allows us to 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

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

establishments, which allows us to go beyond an analysis of average effects.

Previous research has also widely varied in terms of empirical strategies. A first major challenge in the evaluation of enterprise zone is that zones designated by the policy are different from non targeted zones. Evaluations of such enterprise zone 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 areas with similar characteristics but lacking of designation status. 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 different and refined. They include before and after comparisons (Papke, 1994; Greenbaum and Engberg, 2004), combined with control groups comprised of areas eligible for enterprise zone designation or which applied but were rejected (Boarnet and Bogart, 1996; Hanson, 2009), control group comprised of areas that have been later designated as enterprise zones (Busso and Kline, 2007; Kolko and Neumark, 2010), matching via propensity scores (O'Keefe, 2004; Rathelot and Sillard, 2008a; Elvery, 2009) or more recently 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 allows to control 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 a triple difference using municipalities with a ZFU designed later as a control group. We finally exploit two discontinuities in the eligibility criteria as a falsification test. This strategy therefore enables us to assess the impact of the ZFU policy by correcting for unobserved characteristics and simultaneity bias some of previous studies suffer from.

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 are 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. ZFUs therefore benefit from higher fiscal 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 therefore relied upon 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)*. These latter face stronger difficulties than the other ZUSs. These difficulties are assessed according to an "index" taking into account business and economic characteristics of the zones with respect the rest of the municipality and also social conditions. 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 fiscal basis in the area. The computation of the index has relied on the availability of data at this time (population census of year 1990 and fiscal basis of year 1996). Firms in ZRUs benefit if they ask for, from a more substantial package of fiscal exemptions. 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 tax 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.

Finally, the *Zones Franches Urbaines (ZFU)* are of particular interest for us. First, they are chosen among the biggest ZRUs (more than 10,000 inhabitants) and the most deprived ZRUs. Second, ZFUs have been 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, has also been selected among ZRUs, but their spatial boundaries do not necessarily match the ones of ZRUs. The same applies to the 15 ZFUs created in 2007. A figure presenting a map of the repartition of ZFUs on the French territory and of their respective years of creation is available in the Appendix. Finally, 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 already 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 10,000,000 euros. It is subject to a local hiring condition;

- 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;
- 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 applies to firms with less than 50 employees
- 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.

These three types of public devices 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 contribution exemptions for the total length allowed by the program.[5] However the French program has been extended first in 2002 and then in 2007. Discussions are ongoing for a possible extension in 2011. This suggests that the development of distressed urban areas remains an important issue in France.

4 Estimation Strategy

Our evaluation of the impact of the ZFU policy on establishment location decisions focuses on the ZFUs labeled in 2004. Being the most deprived urban areas in France, ZFUs benefit from the highest package of fiscal incentives and their study is thus worth of interest when dealing with policies in favor of lagging urban areas in France. ZFUs of the second generation are also good "candidates" in terms of data availability. Indeed, we need for the evaluation sufficient information on establishment location decisions before and after the implementation of the policy we evaluate. We have exhaustive data on establishment location decisions from 1995 to 2007, and on establishment stock 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 2007 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

[5] 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, exonerations in the targeted zones will be possible only to existing or to new firms which locate in the zone before 2002. If the program is then extended until 2007, more firms will be able to benefit from tax and social contribution exemptions, but a same firm cannot benefit two times from such exemptions.

size and sector of activity 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 empirical specification we implement to measure the average effect of the policy on establishment location choices. We then discuss the tests we carry out to further qualify the results we obtain.

4.1 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. Profits of establishment i locating in zone z of municipality m at time t, $\Pi_{izm,t}$, can be written as follows:

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

- $X_{i,t}$ stands for plant-level characteristics at time t
- C_{mt} 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_{zt} 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 through a conditional logit model. However, in the present 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 and the effect of the policy might be underestimated if this "structural" attractiveness differential is not controlled for.

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 temporal 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 probability to locate in each 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 wash out, 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. First we consider respectively the total number of existing establishments in a given location which is often used to control for unobservable factors which affect the attractiveness of a location, as it is based on past location decisions. 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 in 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 as $ZFU_{z_1,t}$ takes the value 1 for the ZFU part of the municipalities that becomes officially 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.

4.2 Tackling simultaneity issues: triple differences and regression discontinuity design

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 difference approach, comparing the results obtained for municipalities with a ZFU labeled in 2004 to the evolution of relative attractiveness of ZFUs in municipalities

with a ZFU labeled in 2007. The rationale for this test is that the 2007 ZFUs are not very different from 2004 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 2007. Moreover, the reason why the ZFUs labeled in 2007 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 2007.

2. A regression discontinuity design 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 some sectors are excluded from tax exemptions, we check that the policy affects only firms pertaining to eligible sectors. 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 very powerful falsification test.

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

4.3 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 also has some 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 2007. In the absence of any effect on the net creation of establishments at the municipality level, our empirical strategy which focuses on the effect of the policy on firm location decisions at an infra-municipal level 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. The data we use are extremely detailed and provide information on whether an establishment creation in a zone 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 lack of data.

4.4 Measuring a potential heterogeneity in the effect of the policy

We enrich the previous framework to investigate potential heterogeneity in the impact 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 lack of agglomeration economies and of attractiveness in 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, different types of firms might theoretically 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 from bigger 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 RDD type estimation of the impact of the policy, but we investigate within each subgroup potential heterogeneous impact of the policy using interaction terms between the treatment and the firm employment variables.

Last, the impact of the policy is likely to vary according to the sector (Lynch and Zax, 2010; Neumark and Kolko, 2010). This can be for different reasons. First, sectors are likely to face different sunk production costs which translate into different relocation costs. Second, sectors are likely to vary in their need for skilled and unskilled workers, which might make targeted zones more or less attractive. Finally, exemptions of social contributions vary depending on the industry. We study this sectoral heterogeneity by running separate regressions for sub-samples of industries.

5 Data and descriptive analysis

5.1 Data

To build our dependent variable, we use the uniquely detailed SIRENE dataset on firm locations provided by the French National Institute of Economic 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 therefore very small in geographical size. 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 of census blocks, provided by the French administration in charge of urban policies. Using a Geographical Information System software (Mapinfo), we approximate a ZFU area as a grouping of city blocks. We consider that a city block belongs to a ZFU as soon as its barycenter belongs to the ZFU.[6] 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 2007.[7] For each establishment which newly locates in municipalities with a ZFU, we are also able to identify whether the establishment locates in a city block pertaining to the ZFU part of the municipality or not. Our dependent variable therefore takes the value 1 if the establishment locates in the part of the 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 establishment 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

[6] 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 only the results with the strict definition of a ZFU.

[7] The number of ZFU created in 2004 is 41 and the number of ZFU created in 2007 is 15. The reason for the higher number of municipalities identified as a ZFU 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 rate) and are likely to affect location decisions.

firms over the same period, to take into account firm-level characteristics such as size in terms of employees or sales. Note that we do not have information on the number of employees at the establishment level. However, over the period 2000-2007, for the sample of firms locating in municipalities with a ZFU in 2004 or in 2007, 73% of firms are mono-establishment, 18% have two establishments, and 9% have more than two establishments. Firm size remains therefore a good proxy for establishment size in our sample of analysis.

ZFU zones have been created in three waves (44 ZFU were created in 1997, 41 in 2004 and 15 in 2007). 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.

5.2 Descriptive Analysis

We present in this section a descriptive analysis of the potential effect of the implementation of the ZFU policy. We first analyze the stock and flow of establishments in ZFUs in 2004 and 2007, before and after they obtain the ZFU status.

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

			ZFUs 2004		ZFUs 2007	
			Year$<$ 2004	Year$\geq$ 2004	Year$<$ 2007	Year$\geq$ 2007
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 part of 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 2007. 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.

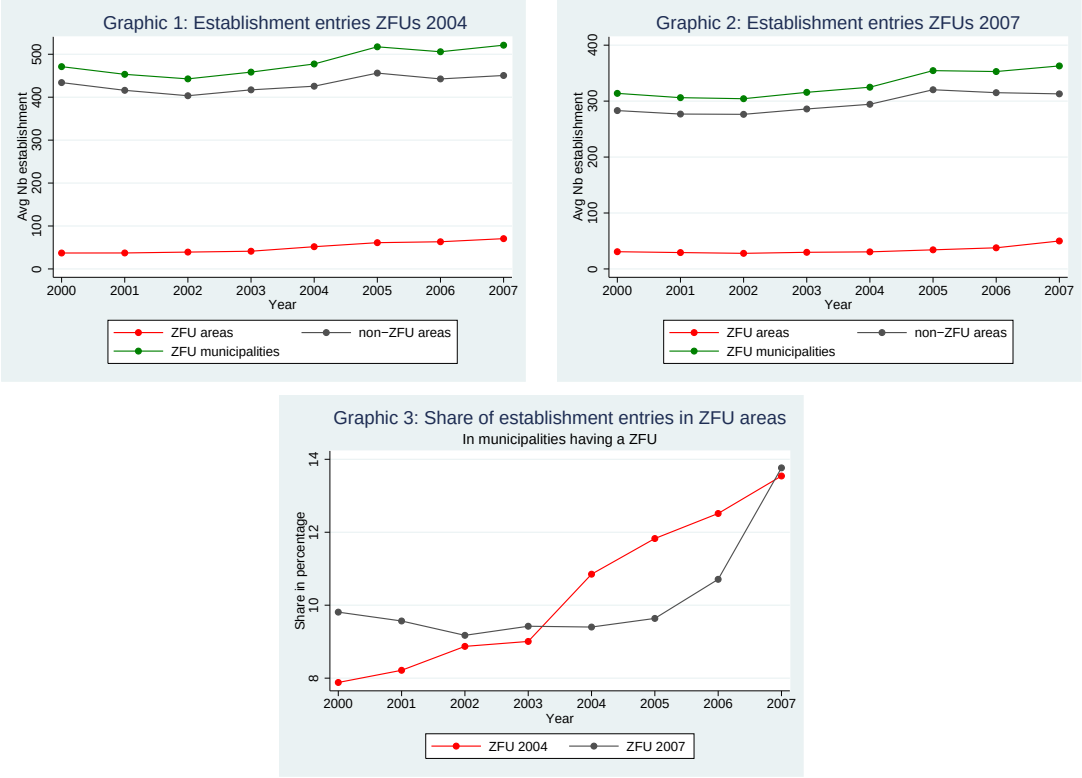

Figure 1: Establishment entries in ZFU part and non-ZFU part of municipalities

This suggestive evidence is reinforced by the graphical analysis of all locations of establishments occurring in municipalities that obtain a ZFU in 2004 and in 2007. Figure 1 plots the evolution over the period 2000-2007 of the average number of establishment locating in municipalities with a ZFU in 2004 and in municipalities with a ZFU in 2007 (graphic 1 and 2 respectively) and of the share of establishments locating in the ZFU part of these municipalities (graphic 3). Several remarks can be made from this graphical analysis.

First, in case of a positive impact of the policy, we expect to observe an increase in the number and 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 2007 for ZFUs labeled in 2007). Figure 1 shows (in graphic 3) that we observe a sizeable increase in the share of establishments locating in the ZFU part of the municipality in the year of implementation for both waves of ZFU, though in 2007 ZFUs, a slight increase is also visible in the prior year. Analysis of graphics 1 and 2 suggests 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 and the number of establishments locating in the non ZFU part of the municipality being relatively constant.

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. Two cases must be distinguished:

- If establishments are certain about future ZFU status and its boundaries, 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 its 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 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, if there are 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 1 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 (graphic 3). Moreover, it appears that before the implementation of the policy, the number of establishments locating in the ZFU part of the municipality stagnates while the number of locations occurring in the non-ZFU part of the municipality decreases in 2001 and 2002 and increases in 2003 (graphic 1). The existence of anticipation effects is not very clear. Regarding municipalities with a ZFU in 2007, the share of establishments locating in the ZFU part of the municipality remains nearly constant before 2007, with a slight increase in 2006. Again, no sizeable increase in the number of establishments locating in the ZFU part of the municipality appears before the implementation of the policy and the number of locations occurring in the non-ZFU part of the municipality increases in 2004 and 2005 but seems to decrease in 2006 and 2007. It appears these evolutions are not suggestive of very strong anticipation effects.

Finally, if one compares the number of locations occurring at the municipality level and in the non-ZFU part, municipalities with a ZFU labeled in 2004 and municipalities with a ZFU in 2007 seem to be exposed to the same cyclical evolution over the period 2000-2007. 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 coinciding with the corresponding years of implementation of the policy for each wave. Municipalities with a ZFU in 2007 should thus constitute an appropriate control group for municipalities with a ZFU in 2004.

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.

6 Assessing the average effect of the enterprise zone program

6.1 Difference-in-differences

We first assess the average effect of the enterprise zone 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 ZFU part, before and after the implementation of the ZFU policy. Our dependent variable is equal to 1 if it chooses to locate in the ZFU part (that is or will become a ZFU) rather than in the non-ZFU part of the municipality. We focus on the 2004 ZFU wave, the variable "ZFU policy" equals 1 for the years 2004 to 2007, i.e. for years following the implementation of the fiscal exemptions.

Marginal impacts measured by logit regressions are presented in Table 2. 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 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 sizeable 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 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 policy impact. 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 municipality in terms of attractiveness. However, the coefficient of the ZFU policy remains positive and significant. In column (4), we control instead for the relative stock of establishments pertaining to the same sector of 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 industry of the new entrant. Results indicate that the probability of locating in a ZFU increases when the attractiveness differential between the two parts of the municipality in the entrant's 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.

Overall, these results indicate that the ZFU policy has a significant and sizeable positive impact on establishment location decisions.[8] The probability to locate in the ZFU part rather

[8]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 fiscal exemptions. While this does not affect our

Table 2: Effect of the policy on the probability to locate in a (future) ZFU

Dependent variable: probability to locate in a ZFU part of a municipality, before and after the implementation of the policy, 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%.

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 12% over the period 2000-2007, this marginal impact corresponds to an elasticity of 21%.

6.2 Triple differences

In spite of the inclusion of a proxy for the relative attractiveness of the ZFU the year preceding establishment's entry, previous results would still be overestimated if a positive trend in the attractiveness of ZFU areas was present before 2004, or if an unobserved shock in 2004 would positively affect the relative attractiveness of ZFU areas the year of the implementation of the policy. In order to deal with these issues, we first estimate the probability to locate in a ZFU part 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 2007 for ZFU labeled in 2007. We then turn to a triple differences estimation using ZFU labeled in 2007 as a control group for ZFU labeled in 2004.

We first analyze the probability to locate in a ZFU part of a municipality over time replacing, in the estimated equation, the treatment variable by a set of year dummies. In Table 3, we present results for both ZFUs labeled in 2004 and in 2007. 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

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: Probability of locating in a (future) ZFU over time

Dependent Variable: Probability to locate in a ZFU part of a municipality (logit model)	ZFU in 2004		ZFU in 2007	
	(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%.

year dummy doubles in magnitude in 2004, and remains very strong (it even increases) after this date. Results for the ZFUs labeled in 2007, presented in columns (3) and (4) are very similar with a positive and (weakly) significant coefficient for the year 2006 and a very strong coefficient in 2007, when establishments actually benefit from tax exemptions. 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 both cases could indicate some kind of anticipation effects. This is particularly true for ZFUs labeled in 2007 which were in reality promulgated in August 2006, but which boundaries were officially defined in December 2006 only. However, in both cases, the year from which establishments can start benefiting from exemptions is marked by a spectacular jump in the probability to 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 was a shock in 2004 other than the policy, it should have affected both ZFUs labeled in 2004 and in 2007 but dummies for years 2004 and 2005 are close to zero in the case of ZFUs labeled in 2007. In order to verify this, we instead implement a direct triple differences estimation using municipalities with a ZFU labeled in 2007 as a control group for municipalities with a ZFU labeled in 2004. As suggested previously, the ZFUs labeled in 2007 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. In

Table 4: Triple differences

Dependent Variable: Probability of locating in a ZFU after the implementation of the policy for municipalities with a ZFU in 2004 as compared to municipalities with a ZFU in 2007, logit model (marginal effect)		
	(1)	(2)
Dummy post 2004	0.00211	0.00244
	(0.00255)	(0.00234)
Dummy for municipality ZFU in 2004	0.0624***	0.0183***
	(0.00197)	(0.00300)
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%.

the absence of simultaneity bias, we should observe a significant increase in the probability of locating in the ZFU part of the municipality after 2004, in municipalities having a ZFU in 2004 as compared to municipalities with a ZFU in 2007.

Results of triple differences are presented in Table 4. There is a positive increase in the probability to locate in the ZFU part of a municipality, in municipalities with a ZFU in 2004 as compared to municipalities with a ZFU in 2007. The coefficient obtained is very close to the double differences estimator of the policy impact. 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 of the impact of the ZFU policy.

6.3 Regression discontinuity design

Our triple difference 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 (the ZFU labeled in 2004 and the ZFU labeled in 2007). However, though not very plausible given the repartition of ZFU on the whole French territory, one could still argue that the obtention of the ZFU label is correlated with shocks that affect specifically the ZFU 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 discontinuity in the criteria of eligibility to tax and social contributions exemptions. One, all the exemptions (except the property tax exemption on built lands) are limited to firms with less than 50 employees, and two, some sectors of activity are excluded from tax and social contributions exemptions. We run two falsification tests based on these discontinuities. The advantage of this RDD-type 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.

Table 5: Falsification test 1: effect of the policy on eligible and non eligible firms

Probability to locate in a ZFU part of a municipality, results of a logit model, (marginal effects)				
Number of employees	(<= 50)	(> 50)	(>= 20 & <= 50)	(> 50 & <= 80)
	(1)	(2)	(3)	(4)
ZFU policy	0.0293***	-0.00136	0.0207**	0.0268
	(0.00284)	(0.00547)	(0.00984)	(0.0179)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0440***	0.0159***	0.0260***	0.0468***
	(0.00295)	(0.00206)	(0.00283)	(0.00935)
Eligible	Yes	No	Yes	No
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	155758	10244	4010	707
Pseudo R^2	0.2013	0.2198	0.2560	0.1965

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

If there was 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 begin the analysis with the falsification test which uses the eligibility criteria based on firm size. We create two samples, a sample of firms with more than 50 employees and a sample with less 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.[9]

Columns (1) and (2) of Table 5 present the results for firms with less and more than 50 employees respectively. The effect of the policy on the probability to locate in the ZFU part of a municipality is positive and significant only for eligible firms. The marginal impact we measure for firms with more than 50 employees (around 3 percentage point) is of course higher than the one obtained before, which was based on a sample mixing eligible and non-eligible firms. However with this threshold, we might compare extremely different groups, both in terms of sample size and in terms of average firm size within each sample. To ensure more comparability, we focus on firms with 20 to 50 employees for the treated group (column (3)), and with 50 to 80 employees for the control group (column (4)). Again, the results indicate that the effect of the policy is strongly positive and significant for small firms only.

We now turn to the implementation of the second falsification test, based on the discontinuity of the policy regarding the sectors eligible. Five sectors of activity, defined according

[9]This measure allows us to match more observations than using the employment of the firm the exact year of its implantation, since we avoid the issue of a mismatch in terms of year between the SIRENE and the BIC-BRN database. We prefer this measure to an average measure of firm employment over the period, since firm employment might be impacted by the policy.

Table 6: Falsification test 2: effect of the policy for eligible and non eligible sectors

Probability to locate in a ZFU part of a municipality, results of a logit model, marginal effects			
	Whole sample	Eligible sectors	Non eligible sectors
	(1)	(2)	(3)
ZFU policy	0.0265***	0.0266***	0.0201
	(0.00268)	(0.00264)	(0.0172)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}_{t-1}}{\text{Nb of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0464***	0.0459***	-0.0120
	(0.00309)	(0.00305)	(0.0253)
Municipality fixed effects	Yes	Yes	Yes
Cluster (municipality level	Yes	Yes	Yes
Observations	226984	223500	3116
Pseudo R^2	0.1936	0.1941	0.1360

Note: Non eligible sectors include car construction, shipbuilding, preparation and spinning of textile artifical or synthetic fibers, steel industry and road transport of commodities. Robust standard errors in parentheses, *** significant at 1%, ** significant at 5% and * significant at 10%.

to the French Nomenclature of Activity, are excluded from the ZFU policy: car construction, shipbuilding, preparation and spinning of textile artificial or synthetic fibers, steel industry and finally road transport of commodities. Given that we have exact information on the sector of activity at the establishment level, we can split our sample into eligible and non-eligible sectors defined at this precise level.

Results of these estimation are presented in Table 6. Column (1) reports the results for the whole sample (benchmark), column (2) for all sectors eligible to tax and social contribution exemptions and column (3) for the sectors of activities which are excluded from the ZFU policy. As expected, the effect of the policy is strongly positive and significant for the whole sample and for the sample of eligible sectors, while the policy has no significant impact on establishments operating in sectors that are not eligible.

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. However, comparison of results show that the difference between the marginal impacts we measure is small. 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 2.93 percentage point.

7 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, by attracting new establishments that would have been created, in the absence of the policy, in other municipalities, or by inducing the 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 obtained at the expense of the other part of the municipality.

7.1 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 stock and flow of establishments in municipalities obtaining their ZFU in 2004, taking as a control group municipalities which will have a ZFU in 2007. Table 7 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 2007 after the implementation in 2004. 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 exhibit 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)). Note that the results regarding the flow of entrants are very comparable in magnitude to our previous findings based on double differences estimations with an estimated elasticity of 16%. The positive and

Table 7: Number of establishments in municipalities with a ZFU

Dependent variable: number of establishments (levels) in municipalities with a ZFU in 2004 as compared to municipalities with a ZFU in 2007, panel (fixed effects)						
	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%

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 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 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, ZFU part of municipalities represent 15% of the stock of establishments and attract 18% of 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.

7.2 Establishment creations and relocation of existing establishments

In this subsection, we attempt to identify whether this effect 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 decom-

Table 8: Establishment flows in municipalities with a ZFU: creations and relocations

Dependent Variable: Flow of establishments, in municipalities with a ZFU in 2004 as compared to municipalities with a ZFU in 2007, panel (fixed effects)						
	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%

pose establishment flow analyzed in the previous section into those two categories. Columns (1) to (3) of Table 8 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 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 2007. Coefficients are however wealkly significant or insignificant. Turning to the analysis of relocation 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 2007. 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 reestimate the impact of the policy using our double difference estimation for creations and relocations. Table 9 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

Table 9: Effect of the ZFU policy for creations and relocations

	Results of the 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)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}}{\text{Nb of estab. (same ind.) in non-ZFU}}$	0.0496***	0.0356***	0.0396***	0.0322***
	(0.00359)	(0.00264)	(0.00241)	(0.00497)
City 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%.

the ZFU but relocating toward the ZFU area.

8 Heterogeneous impact of the enterprise zones program

This relatively strong effect of the policy might however hide important variations in the efficiency of the policy regarding the initial attractiveness of the ZFU, the sector of activity of potential entrants, and the size of entrants. We examine in this the section potential heterogeneous impact of the policy along these three dimensions.

8.1 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 attractiveness of the two parts of the municipality in the operating industry of the locating establishment and the ZFU policy.

Table 10 reports the results of such analysis respectively 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 instead 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 tend to locate more in the ZFU part of a municipality when the diffential 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

Table 10: 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)
$log \frac{\text{Nb of estab. (same ind.)in ZFU}_{t-1}}{\text{Nb of establishments (all ind.) in non-ZFU}_{t-1}}$	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)
Municipalities 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%.

significant which confirms our expectations. The effect of the ZFU policy is magnified when the attractiveness differential between the two 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 creation and relocation of existing establishments. The effect of the policy is much stronger for existing establishments which 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.

8.2 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 such a policy attracts small firms, this means that the potential effect of the policy regarding employment creation by new establishments in targeted zones might be low.

In order to investigate the effect of establishment 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 11. The first column reports the results for the whole sample of firms and again shows that the policy has a positive effect

Table 11: 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)
$\log \frac{\text{Nb of estab. (same ind.) in ZFU}}{\text{Nb of estab. (same ind.) in non-ZFU}}$	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%.

on the probability to locate in targeted areas. However, the probability to 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 contribution exemptions. However, it might still be the case that 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 an effect on the probability for firms 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 these results is that firms with 0 employees cannot benefit from social contribution exemptions. They consequently benefit from less incentives 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 ZFU zones structurally attract on average smaller firms, independently of the effect of the policy. The higher response of small firms to the ZFU

policy when the whole sample of firms is considered can be explained mainly by the limit in the eligibility criterium regarding firm size. However, once all thresholds effects linked to the policy are controlled for, no significant heterogeneity of the impact emerges.

8.3 Heterogeneous impact of the policy according to the sector

In this section, we analyze potential heterogeneity of the policy according to the sector of activity of the establishment. It is indeed likely that different industries react differently to such tax incentives, sectors are likely to vary in their fixed costs of (re)location, differences in skilled-intensity may make targeted zones more or less attractive and the level of employer contribution exemptions varies 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 an industry's response to tax and social contributions exemptions. In order to investigate sectoral variations in the efficiency of the policy, we evaluate the impact of the policy for each sector separately.

Results of this analysis are presented in Table 12. 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 Restaurants, which is plausible as firms in this sector usually prefer central locations in which 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 Transports 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. While this sectoral analysis would be more convincing if we were able to construct an index of sectors which are more likely to be affected by the policy (based on their need to be in central locations, on their relocation costs and on their capital/labor intensity), this analysis reveals that there is a strong variation in the effect of the policy depending on the sector of activity that must be taken into account when assessing the effect and defining such targeted policies.

Table 12: 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)
$log \frac{\text{Nb of estabs (same ind.)in ZFU}}{\text{Nb of estabs (all ind.) in non-ZFU}}$	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
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)
$log \frac{\text{Nb of estabs (same ind.)in ZFU}}{\text{Nb of estabs (all ind.) in non-ZFU}}$	0.0267***	-0.0349***	0.0126	0.0116***
	(0.00285)	(0.0104)	(0.0165)	(0.00381)
Observations	61581	3771	18998	13467
R^2	0.1996	0.2108	0.2888	0.1803

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

9 Conclusion

In this paper, we evaluate the impact of a French public policy, "Zones Franches Urbaines" (ZFU) policy, on establishment 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 1995-2007 at the city block level. Information on the exact boundaries of the geographical urban areas targeted by the policy is gathered using a Geographic Information System. 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 2007 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 sizeable impact on the probability that establishments locate in targeted urban areas: the marginal impact of the policy corresponding to an estimated elasticity of 21%. 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 highly depending on the considered industry. Finally results reveal that the policy does not create economic activities *per se* at the municipality level, it rather leads to an intra municipal shift of economic activity which is driven by the location of new created establishments but mostly by the relocation or existing establishments from the non ZFU part to the ZFU part of the municipality. In presence of opportunistic (re)locations, the benefits of this program, especially for zones residents is likely to be low.

Quantifying the benefits of this French program goes beyond the scope of this paper but a number of considerations can be made regarding our study. First, 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 zone residents (Gobillon, Magnac, and Selod, 2010).

Second, the short time-span of the analysis presented here might miss some important effects. Attracting new firms in targeted areas is likely to have a strong mid-term effect. It can create a positive cycle on business entry in targeted zones in presence of agglomeration economies, and it can also enhance the development of other activities by inducing demand for shops, restaurants, infrastructure, cultural activity that have effects on welfare of residents beyond economic outcomes. It is difficult to capture such positive externalities in the present analysis as we are able to estimate the impact of the policy at most three years after its implementation. In contrast, the positive impact of the policy might be counterbalanced by negative effects that can be hardly taken into consideration given the actual availability of data. One would like to know if an establishment entering targeted zones leaves and relocates elsewhere as soon as it does not benefit from tax exemptions anymore. It would additionally be useful to study the mortality rate of establishments entering targeted zone as it might be possible that the ZFU policy attracts marginal entrants whose life-span is likely to be shorter.

Finally, a careful evaluation of such a program would require a cost-benefit analysis. The National Observatory of the French program estimates the cost of the policy to be in average 500 million euros per year in terms of provided tax and social contribution exemptions. However, estimating the entire benefit of such policy would require a longer-term analysis. New evaluations of such a program will thus probably be needed, especially when the French government is reaffirming its willingness to promote the development of French distressed urban areas and might extend the ZFU program.

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A-1 Appendix

A-1.1 Map of municipalities with a ZFU and their year of implementation

A-1.2 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%