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The impact of Urban Enterprise Zones on establishment location decisions and labor market outcomes: evidence from France

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Abstract

In this article, we study the impact of a French enterprise zone program—the 'Zones Franches Urbaines' (ZFUs) policy—on establishment location decisions and on labor market outcomes. Our main identification strategy, which combines spatial and time differencing, shows that conditional on locating in a municipality that hosts a ZFU, the policy has a positive and sizable impact on the probability to locate in the ZFU part rather than in the non-ZFU part of municipalities. However, the impact is highly heterogeneous across zones, industries and firms. We also show that this positive effect is entirely due to within-municipality diversion effects. Regarding labor market outcomes, the policy has a positive effect on employment, especially for low-wage workers. As for wages, the effect is null for low-wage workers, and negative for high-wage ones.

Keywords: Firm location, enterprise zones, employment, wages, spatial differencing
JEL classifications: R12, R38, R58
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1. Introduction

In many developed countries, policy-makers are concerned by the poor socio-economic conditions in some deprived urban neighborhoods. Residents in these disadvantaged zones are usually very poor, face a high unemployment rate, have a low level of education and live in deteriorated housing. Besides, due to segregation mechanisms, they often live in districts that are far away from the jobs they can apply to (Gobillon et al., 2011); they are therefore exposed to spatial and skill mismatch issues (see e.g., Kain, 1968; Holzer et al., 1994; Gobillon et al., 2007).[1]

1 Job search difficulty increases with distance, due to information costs, and to higher cost/lower quality of transportation (Raphael and Rice, 2002). Briant et al. (2015) show for instance that in France, some deprived urban districts are physically disconnected from the rest of the municipality due to 'natural' barriers such as major roads or rivers, or due to very few (and poor) transport connections. This is why spatial and skill mismatch might engender higher unemployment rates for residents. Some policies actually aim at subsidizing transportation for poor people located in disadvantaged and remote places (Phillips, 2014).

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As a response, many governments, in the UK, in the USA and more recently in France, have established enterprise zone programs. These place-based policies usually provide firms with tax incentives so as to encourage investment, employment and eventually improve social and economic conditions of targeted zone residents. However, the efficiency of such enterprise zones remains controversial. First, the results obtained by the evaluation of various enterprise zone programs are not clear-cut (Kline and Moretti, 2014; Neumark and Simpson, 2015). Second, the question as to whether 'place-based policies' or 'people-based policies' should be implemented is still highly debated (Glaeser and Gottlieb, 2008). The aim of this article is to contribute to this literature by empirically evaluating the impact of a French enterprise zone program on firm location decisions, local employment and wages.

The program we evaluate, the 'Zones Franches Urbaines' (ZFU) policy, was initiated in 1996 and is still ongoing. It aims at encouraging the location of new economic activities, reducing unemployment and improving welfare in deprived urban neighborhoods of French municipalities. It represents the most important effort made by French public authorities in favor of depressed urban districts.[2] In the ZFU areas, existing establishments or new establishments can be exempted from employer social contributions, taxes on corporate profits, business taxes and property tax on built lands for a period of 5 years, with possible extension ranging from 3 to 9 years. ZFUs were created in three different waves: the first generation in 1996, the second generation in 2004 and the third generation in 2007.

Our empirical analysis focuses on the evaluation of second generation ZFUs and relies on the combination of several datasets. First, it is based on a micro-geographic dataset which provides exhaustive information on the location of establishments in France over the period 2002–2007 at the census block level. Second, it relies on worker-level administrative data providing information on worker characteristics and wages. Finally, information on the geographical coordinates of the ZFUs are used to identify, thanks to a Geographical Information System, the exact geographical boundaries of the urban neighborhoods targeted by the policy.

Assessing the causal impact of enterprise zone programs is challenging (Neumark and Kolko, 2010). A first major issue is linked to the selection of targeted zones. Given that ZFU areas were chosen among the most deprived neighborhoods, a simple comparison of the ZFU and non-ZFU areas would certainly lead to an under-estimation of the impact of the policy. A second major issue is that there might be unobservable confounding factors, other than the policy itself, which also affect the outcomes of interest over the period under study. In order to tackle these issues, we combine different methods, and carry out several robustness tests.

In our benchmark estimation strategy, we focus on municipalities hosting a second generation ZFU, and compare the outcomes of interest in the ZFU part and in the non-ZFU part of the municipality, before and after the implementation of the policy in 2004. This spatial and time differencing at the municipality level enables us to control for the 'structural' time-invariant differences between the two parts of the municipalities, and to control for all the time-varying factors that are common to the

2. Three types of zones, whose geographical boundaries were set by decree, were actually defined: the 'ZUS', the 'ZRU' and the 'ZFU'. Facing an increasing degree of economic difficulties, these zones benefit from an increasing package of tax exemptions. The ZFUs benefit, by far, from the largest incentives. See Appendix A for more details.

ZFU and the non-ZFU areas in these municipalities. We then verify that our results are not affected by confounding factors. First, we show that our results are robust when we use as a control group the municipalities that will benefit from the policy in 2007 (third generation ZFUs).[3] A falsification test exploiting discontinuities in eligibility rules based on firm size also corroborates our results.

Regarding location decisions, the probability that an establishment locates in the ZFU part rather than in the non-ZFU part of a municipality increases on average by 2.4 percentage points after 2004. The probability of locating in the ZFU part of a municipality being equal to 8.9% in 2002–2003, this means that it increases by 27% thanks to the policy. This positive effect on targeted zones is however entirely due to diversion of economic activity within municipalities. Indeed, we find that the policy has no effect on the number of establishments at the municipality level, but a positive impact on the number of establishments in ZFU areas, both in terms of stocks and in terms of flows. The impact of the policy is finally heterogeneous; it is stronger for initially less depressed ZFU areas, and for establishments in sectors with lower relocation costs. The effect of the policy is almost four times higher for relocations than for 'pure' creations, and ZFU areas tend to attract smaller firms.

Regarding the impact of the ZFU policy on labor market outcomes, our results indicate that employment increases after 2004 in the ZFU part of municipalities when compared with the non-ZFU part. This is due to both employment growth among incumbent firms (intensive margin), and to job creations thanks to the net entry of new plants (extensive margin). The effect is stronger for 'low-wage' workers than for 'high-wage' workers; this is consistent with the fact that employer contribution exemptions apply to the portion of wages below 1.4 the legal minimum wage. As for wages, those of low-wage workers remain unaffected, while the wages of high-wage workers tend to decrease. This is in line with a relative increase in the demand for low-wage workers in ZFUs (and thus a relative decrease in the demand of high-wage workers), which is satisfied by a higher supply of low-wage workers.

Our contribution to the literature is threefold. First, our study contributes to the literature on local taxation and firm location decisions; we show that the within-municipality tax differential caused by the ZFU policy substantially affects firm location decisions. This result contrasts with previous studies finding at most weak effects of between-municipalities tax differential on firm location decisions (Rathelot and Sillard, 2008; Duranton et al., 2011). Second, we add to the literature on the evaluation of urban enterprise zones, and go deeper in the analysis of their effect on the economic activity of targeted zones. Indeed, by working on location decisions at the establishment level, we provide evidence that the positive average impact of the ZFU policy we measure varies significantly according to firm-level, industry and zone characteristics. Moreover, we are also able to assess how the untreated part of these municipalities is affected. We show that the policy generates intra-municipal business diversion, and is thus a zero-sum game at the level of the municipality. Our results also indicate that the ZFU policy has a positive impact on local employment, especially on

3. The reason why those municipalities obtain a ZFU in 2007 only is likely to be exogenous: the eligibility criterion in terms of ZFU population size decreased from 10,000 inhabitants in 2004 to 8500 in 2007. Moreover, among all the potential control groups, third generation ZFUs are probably the most similar to second generation ZFUs in terms of economic and social characteristics, since their designation is based on the same deprivation index.

'low-wage' jobs, which are more directly targeted by the policy. We believe that these results have important implications for policy-makers willing to improve the design and the efficiency of such schemes. Finally, many issues arise with the quantitative evaluation of enterprise zone programs, and methods to address them have been recently refined (Gibbons et al., 2014). We develop an estimation strategy that follows closely establishment location behavior, and allows to control finely for endogeneity issues. By focusing on the differential between the treated and the untreated parts of the municipalities hosting a ZFU, we reduce issues of municipality-level omitted variables and simultaneity to a larger extent than the evaluations of enterprise zone programs based on control groups that are outside the municipality of the targeted zones.

The rest of the article is organized as follows. Section 2 presents a brief overview of previous research. Section 3 describes the policy we evaluate. Section 4 details the data, the empirical strategy and the baseline results on the average effect of the ZFU policy on establishment location decisions. Section 5 deals with potential endogeneity issues and Section 6 investigates possible heterogeneous impact of the policy on local attractiveness. Results on the effect of the ZFU policy on labor market outcomes are detailed in Section 7. The last section concludes.

2. Previous research

Our article relates to two strands of the literature. First, it contributes to the analysis of the impact of taxes on firm location decisions. Second, it contributes to the literature on the evaluation of urban enterprise zone programs. In this section, we briefly present the recent advances in these fields, and we discuss how we depart from existing studies.

2.1. Firm location decisions and local taxes

Most enterprise zone programs rely on the assumption that tax incentives are an efficient tool to attract firms in some specific locations. An important literature has tried to quantify the elasticity of firm location decisions to tax differentials.

The evidence on how local taxes affect establishment location decisions is mixed. Using a regression discontinuity design approach combined with an instrumentation strategy, Rathelot and Sillard (2008) find on French data that higher local corporate taxes discourage firm location; however, this effect is shown to be weak. Duranton et al. (2011) use spatial differencing, time differencing and instrumentation to assess the effect of local taxation on the level of economic activity in the UK. They show that the level of property tax set up by Local Authorities has a negative effect on firm-level employment growth, but no effect on firm entry.

Several studies suggest that the effect of policies aimed at attracting firms in depressed areas is also at most very weak. Crozet et al. (2004) find a weak impact of the European structural funds and of the French 'Prime d'Aménagement du Territoire' on the location of FDI in French regions.[4] Devereux et al. (2007) evaluate a similar policy in favor of lagging regions in the UK (the Regional Selective Assistance Scheme). The effect of these subsidies is weak, but magnified when the number of plants in targeted areas is higher. The marginal effect of the policy is thus stronger for denser eligible

4. 'Prime d'Aménagement du Territoire' is a subsidy granted to firms locating in lagging regions.

areas, which suggests that this type of subsidies is not the ideal instrument if the goal is to compensate for the lack of agglomeration externalities in deprived areas.

Our results provide evidence that the probability to locate in the ZFU areas increases after the implementation of the ZFU policy. Therefore, they suggest that intra-municipal tax differential caused by the ZFU policy affects strongly and significantly firm location decisions. We also show that the effect of the policy is stronger the lower the initial attractiveness differential between the targeted zone and the rest of the municipality, suggesting that the policy is less effective for the most deprived areas.

2.2. Evaluation of enterprise zone programs: various outcomes of interest

There exists an important literature on the evaluation of urban enterprise zone programs (see Neumark and Simpson (2015) and Kline and Moretti (2014) for recent surveys). Many of the existing papers have focused on labor market outcomes, and the evidence is mixed. Regarding the evaluation of US enterprise zone programs, several studies find no significant effect on employment growth in targeted zones or on the employment status of the residents of these zones; other studies find a positive effect, at least in the short-run.[5]

The literature on business location is however more scarce. Some studies have analyzed business creations along with employment effects. While Billings (2009) finds no significant effect of enterprise zones in Colorado on the number of establishments in targeted zones, Neumark and Kolko (2010) tend to find a negative effect in the case of the program conducted in California. Nevertheless, some studies suggest that more complex dynamics may be at work. Due to competition effects, the benefits of such programs on the entry of new firms might be compensated by the exit of some firms (Greenbaum and Engberg, 2004; Bondonio and Greenbaum, 2007). Regarding studies on European countries, Einio and Overman (2013) evaluate Local Employment Growth Initiative areas in the UK. They find a positive effect on employment and business creation, obtained however at the expense of the immediate periphery of the targeted zones.

In the case of France, Gobillon et al. (2012) focus on the effect of French enterprise zones in the Paris region. They find a small positive effect on the rate at which unemployed workers from targeted areas find a new job; however, this effect is significant in the short-run only. Givord et al. (2013) use propensity score matching techniques and show that this program had a positive impact on the number of establishments and on employment growth in targeted areas. However, their results also suggest short-run effects only. Briant et al. (2015) show that this impact is stronger for zones that are less spatially isolated.

We depart from these studies in several ways. First, we analyze business creation, local employment and wages. Second, we measure the effect of the policy both at the level of the municipality as a whole, and at the level of (un)treated areas within the municipality. We can thus highlight the business diversion effect of the ZFU policy within municipalities. Finally, our impact evaluation goes beyond average effects. We

5. For studies finding no effect on employment growth, see Boarnet and Bogart (1996), Bondonio and Engberg (2000), Hanson (2009), and Lynch and Zax (2011). For studies finding no effect on the employment status of zones' residents, see Elvery (2009); and for studies finding a positive effect on employment, see O'Keefe (2004), Ham et al. (2011) and Busso et al. (2013).

show that the impact of the policy on business entry varies with establishment, industry and area characteristics. Also, the impact of the ZFU policy on employment and wages differs for high-wage and low-wage workers, in a way that we show to be consistent with the specific design of the ZFU policy.

2.3. Evaluation of enterprise zone schemes: different methodologies

The empirical strategies implemented in previous papers vary widely. A first major challenge in the evaluation of enterprise zones is that the zones targeted by these policies are different from non-targeted zones. Consequently, evaluations of such enterprise zone programs must take into account the effect of prior economic conditions. Ideally, one would like to compare outcomes in targeted areas with outcomes in untreated areas that have similar characteristics. A second major concern is that there might be unobservable factors varying over time which coincide with the implementation of the policy. Attempts to control for such endogeneity issues have been diverse. They include before/after comparisons, combined with (i) a control group consisting of zones of the same administrative entity (Papke, 1994; Greenbaum and Engberg, 2004), (ii) a control group consisting of areas eligible for enterprise zone designation, or which applied to the tender but were rejected (Boarnet and Bogart, 1996; Hanson, 2009), (iii) a control group consisting of areas designated later as enterprise zones (Neumark and Kolko, 2010; Busso, Gregory, and Kline, 2013), (iv) propensity score matching (O'Keefe, 2004; Elvery, 2009; Givord et al., 2013) or regression discontinuity design (Billings, 2009; Hanson, 2009).

We contribute to this literature by proposing original estimation strategies based on the specific features of our data, and on the specific design of the ZFU policy. Regarding the impact of the ZFU policy on establishment location decisions, we first implement a before/after analysis based on the probability to locate in the ZFU part rather than in the non-ZFU part of the municipalities hosting the ZFUs. This estimation combines spatial and time differencing, in the spirit of Duranton et al. (2011); it controls for the time-invariant attractiveness differential between targeted and non-targeted zones, as well as for municipality-level time-invariant and time-varying characteristics. We then adopt a difference-in-difference strategy, using municipalities with ZFUs designated in 2007 (third generation ZFUs) as a control group (the reason why these municipalities benefit from the policy in 2007 only being arguably exogenous, as explained later in the article). This washes out any contemporaneous shock that would be common to all waves of ZFUs. We finally exploit, as a falsification test, two discontinuities in the eligibility criteria regarding firm size. This is a way to control for shocks that would be specific to second generation ZFUs. The exploitation of discontinuities in eligibility rules as a way to estimate the causal effect of place-based policies is recent in the literature (Criscuolo et al., 2012; Freedman, 2013).[6]

All the methods we use yield qualitatively and quantitatively similar results. Given the robustness of the results, we then analyze the impact of the ZFU policy on labor market outcomes following our benchmark strategy. We work at an intra-municipal

6. Criscuolo et al. (2012) exploit changes in eligibility rules defined by the European Union to estimate the impact of the UK Regional Selective Assistance policy on plant-level employment, productivity, investment and entry/exit. Freedman (2013) exploits an assignment cutoff rule based on census block group poverty rate to estimate the impact of EZ on the employment of residents in Texas.

level and compare the evolution of employment and wages in the ZFU part and in the non-ZFU part of municipalities, before and after the implementation of the policy.

3. Specificities of the French program

In 1996, the French government launched the 'Pacte de relance pour la ville' which defines three types of zones: (i) the 'Zones urbaines sensible (ZUSs)' (sensitive urban zones), (ii) the 'Zones de Redynamisation Urbaines (ZRUs)' (revitalization urban zones) and (iii) the 'ZFUs' (urban enterprise zones). These zones were selected following a nested structure: 416 ZRUs were chosen among the ZUSs, and 100 ZFUs were chosen among the ZRUs. They face an increasing degree of economic and social difficulties, and thus benefit from an increasingly favorable package of tax exemptions (see Appendix A for more details about the selection process of ZUSs, ZRUs and ZFUs, and comparisons of tax exemptions provided in each type of zones).

We focus in this article on the *ZFUs*. They were selected among the biggest (more than 10,000 inhabitants) and the most deprived urban neighborhoods in France.[7] They were designated in three waves over time: the first generation (44 ZFUs) in 1996, the second generation (41 ZFUs) in 2004 and the third generation (15 ZFUs) in 2007.[8] Since we have exhaustive annual data on establishment flows and on establishment stocks from 2002 to 2007, we focus on ZFUs designated in 2004. Given that ZFUs were chosen among ZRUs, this means that our analysis captures the effect of switching from ZRU to ZFU.[9] Hence, if anything, the effects we estimate would be even stronger if we could focus on zones which did not previously benefited from any tax exemptions.

Establishments in ZFUs benefit by far from the largest package of tax exemptions. In the ZFU areas, existing establishments or new establishments can be exempted from employer social contributions, taxes on corporate profits, business taxes and property tax on built lands for a period of 5 years, with possible extension ranging from 3 to 9 years (see Table A1 in the Appendix). The law does not impose that firms have their entire activity in the ZFU to benefit from the policy. However, they must have a physical plant in the ZFU and they must have part of their activity there. The exemptions are then calculated based on the share of profits made in the targeted zone.

The ZFU policy is sizable in terms of financial support, and this is even more striking when we compare it with other experiments abroad. In 2007, the French government spent on average 1800 Euros per worker and 360 Euros per resident in the ZFU areas. As a matter of comparison, in 2005, 240 dollars (around 200 Euros) per worker were spent in enterprise zones in California (see Neumark and Kolko, 2010) and 60 pounds

7. Based on an index taking into account the number of inhabitants, the unemployment rate, the proportion of population under 25 years old, the share of population above 15 years old without any diploma and the tax base in the area. See Appendix A for more details.
8. Third-wave ZFUs were actually chosen in August 2006, but their exact boundaries were known in December 2006 only, so that treatment in terms of location decisions for this year is less obvious.
9. If we had focused on first-wave ZFUs, we could have estimated the impact of switching from no exemption to ZFU exemptions. We do not do so for two reasons. Unfortunately, we did not have access to the data for the period preceding the implementation of first-wave ZFUs in 1996. Moreover, Givord et al. (2012) already analyze the effect of first-wave ZFUs and show that they are more effective than second or third generation ZFUs. Indeed, in the early 2000s, the specific tax reductions offered in ZFUs became less attractive to firms due to the introduction of generous tax exemptions for low-wage workers on a national basis.

(around 90 Euros) per resident in the working-age population were spent in Local Enterprise Growth Initiative areas in the UK (see Einio and Overman, 2013). Since the size of the incentives might partly determine the size of the effects generated by the program, the French ZFU policy deserves particular attention.

A map showing the distribution of the ZFUs over the whole French territory is available in the Appendix. In Figure 1, we zoom on the Northern suburbs of Paris, where many ZFUs are concentrated. This provides examples of the size, shape and relationship of ZFUs with local unemployment rate (one of the criteria for the area to be treated). Our identification strategy relying on a comparison within municipalities (borders of which are in black), it is interesting to note that the ZFUs (borders of which are in red) usually cover a non-negligible, but non-dominant share of the city's area.[10] As to the relationship with unemployment, it is also quite striking that some municipalities, despite quite high unemployment rates, do not feature a treated section. It might be because the other characteristics of the area were less bleak (less 'damaged social housing', which entered as a primary criterion, for instance). Finally, note that inside the municipality, the unemployment rate does not seem to be a perfect predictor of treatment.

4. Average impact of the ZFU policy on establishment location decisions

In this section, we assess the average impact of the ZFU policy on establishment location decisions. Our evaluation focuses on the ZFUs designated in 2004, i.e., the second generation ZFUs. We first present the data and some descriptive statistics. We then analyze how the ZFU policy affects establishment creations and establishment stocks at the municipality level. We show that there is no impact. Hence, if the ZFU policy improves the attractiveness of targeted zones, it will be due to displacement effects only.[11] We then present our baseline estimation of the average effect of the ZFU policy on establishment location decisions.

4.1. Data and descriptive analysis

4.1.1. Data

To build our dependent variable, we use the uniquely detailed SIRENE dataset provided by the French National Institute for Statistics and Economic Studies (INSEE). This dataset gathers exhaustive information on establishment creations over the period 1995–2007. Valuable for our purpose, the location of each newly located establishment is registered at the 'ilot' level, which is the smallest geographical unit used for the population census in France. An 'ilot', referred to as a city block hereafter, consists of a group of houses or buildings; it is thus very small in terms of surface area. In order to assess whether the establishment is located in a ZFU or not, we use

10. One can see that in some cases, the boundaries of some ZFUs encompass several municipalities. However, in the empirical analysis, we will prefer working at the intra-municipal level; indeed, many factors vary between municipalities (such as local tax rates), and are likely to affect location decisions. This amounts to considering that there are as many ZFUs as municipalities they encompass.
11. Displacement of existing plants or of plants that would have been created anyway in the absence of the policy.

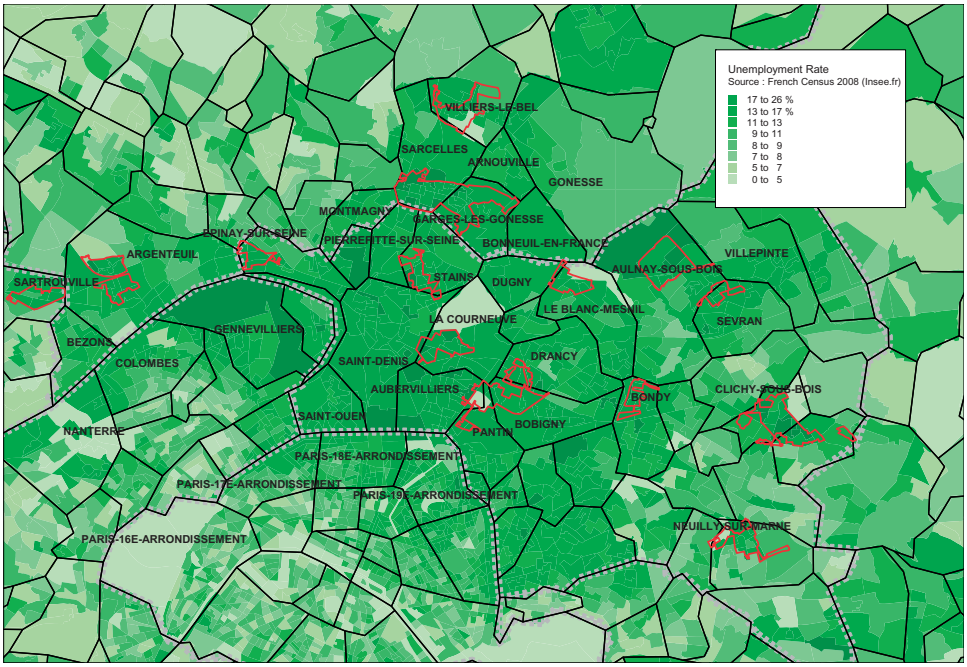

Figure 1. ZFUs and unemployment rate in the Northern suburbs of Paris.
Note: Black borders correspond to the boundaries of municipalities. Red borders correspond to the boundaries of ZFUs.
Source: French population census 2008 (National Institute for Statistics and Economic Studies-INSEE).

information on the exact geographical boundaries of ZFUs and city blocks, provided by the 'Secrétariat général du comité interministériel des villes' (SGCIV), the French administration in charge of the policies targeting depressed urban neighborhoods. Using a Geographical Information System software (Mapinfo), we can approximate a ZFU area as a group of city blocks. We consider that a city block belongs to a ZFU as soon as its barycenter belongs to the ZFU.[12] For each newly located establishment, we are thus able to identify whether the establishment locates in a city block pertaining to the ZFU part of the municipality or not. We conserve municipalities with second and third generation ZFUs only (third generation ZFUs being used at some point as a comparison group for second generation ZFUs). The sample consists in the end of 59 municipalities with a ZFU area designated in 2004 and 24 municipalities with a ZFU designated in 2007.[13]

Note that in addition to its exact location within the municipality, we know whether this establishment is newly created, or already existed and relocated. The establishments

12. As a robustness check, we also allowed a city block to be part of the ZFU when it has a simple intersection with the actual boundaries of the ZFU. Results were very similar. We thus present the results with the strict definition of ZFUs only.
13. Forty-one ZFUs were created in 2004 and 15 were created in 2007. The number of municipalities identified as having a ZFU is thus higher than the actual number of ZFUs. As stated earlier, this is because the boundaries of some ZFUs encompass several municipalities.

have to give this information when registering administratively; it is thus directly available in the SIRENE dataset. We will use this information when studying potential heterogeneous impact of the policy across establishments and industries. It will also be useful to shed light on the spatial patterns of the effect of the ZFU policy. In order to measure the effect of area-level characteristics on establishment location decisions, we use the SIRENE database on establishment stocks. The information is available annually from 2002 only. We can calculate the total number of establishments at the city block and industry level. The ratio of the total stock of establishments in both parts of the municipality will be used as a proxy for the time-varying relative attractiveness of the ZFU within the municipality.

Finally, we use firm-level balance-sheet data from the tax administration, the 'Bénéfices Industriels et Commerciaux et Bénéfices Réels Normaux' (BIC-BRN) dataset. It provides information on firm-level characteristics such as firm size in terms of employees or sales. Note that we have information on size at the firm level, while we study location decisions at the establishment level. However, this is not such an issue since most of the firms in our sample are mono-establishment firms. It will be shown that our results remain robust when limiting the sample to these mono-establishment firms.

Since yearly information on both establishment flows and establishment stocks is available from 2002 onwards only, we chose to limit our study to the evaluation of the ZFUs created in 2004, and to restrict the period of analysis to the years 2002–2007, as other studies on the topic do (Rathelot and Sillard, 2009; Briant, Lafourcade, and Schmutz, 2015). In the end, our sample for the benchmark analysis includes the 172,443 establishments which locate over the period 2002–2007 in the 59 municipalities where a ZFU is designated in 2004. When turning to the difference-in-difference estimations, the sample also includes the 48,364 establishments which locate over the period 2002–2007 in the 24 municipalities hosting a ZFU designated in 2007.

4.1.2. Descriptive analysis

We present in this section a descriptive analysis of establishment location decisions in the municipalities included in our sample. We first analyze stocks and flows of establishments in second and third generation ZFUs. Even though third generation ZFUs were chosen in August 2006, we consider that the treatment actually starts in 2007 because the borders of the targeted zones were published in December 2006 only.

Table 1 reveals that ZFU areas represent a small share of the activities in the municipalities they are located in (around 15% of the total stock of establishments and less than 20% of establishment entries over the period). However, for both waves of ZFUs, the stock of establishments in ZFU areas increased after the implementation of the policy. This is true whether we consider the average or the median number of plants active in ZFU areas. In both cases, this growth cannot be attributed to a specific trend at the municipality level. Indeed, not only the number, but also the share of establishments located in ZFUs slightly increases. This is even more striking for establishment flows, which ZFUs' share increases from 17.11% to 20.41% on average for second generation ZFUs and from 16.83% to 19.57% for third generation ones. These simple descriptive statistics cannot be interpreted as causal, but suggest an increase in the attractiveness of ZFU areas after the implementation of the policy.

Table 1. Evolution of the stock and flow of establishments in the ZFU part of municipalities

			Second generation ZFUs		Third generation ZFUs	
			Year < 2004	Year ≥ 2004	Year < 2007	Year = 2007
Stock	Level	Average	199	237	170	191
		Median	160	196	104	117
	Share	Average	14.77	15.61	15.27	15.45
		Median	8.81	9.52	8.53	8.07
Flow	Level	Average	40	62	32	50
		Median	34	47	17	25
	Share	Average	17.11	20.41	16.83	19.57
		Median	11.06	14.79	10.61	15.69

Note: Second generation ZFUs refer to zones becoming ZFUs in 2004. Third generation ZFUs refer to zones becoming ZFUs in 2007.
Source: Authors' calculations based on the SIRENE dataset (National Institute for Statistics and Economic Studies-INSEE).

This suggestive evidence is reinforced by the analysis of Figure 2 which plots the average share of establishments locating in the ZFU part of municipalities from 2002 to 2007. Several remarks can be made from this graph.

First, in case of a positive impact of the policy, we expect an increase in the share of plants locating in the ZFU part of municipalities after the implementation of the policy, starting in 2004 for second generation ZFUs and in 2007 for third generation ZFUs (even though this is less clear in the latter case since third generation ZFUs are designated in August 2006). Figure 2 shows that this is actually the case. The share of establishments locating in the ZFU part of municipalities hosting a second generation ZFU increases dramatically from 2004 onwards. For municipalities hosting a third generation ZFU, this share starts to increase slightly in 2006, and then more clearly in 2007.

Second, one might worry that anticipations 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 perfectly know there will be a ZFU in the municipality, and also know the boundaries of the zone, we should observe an increase in the number of establishments locating in the ZFU part before the implementation of the policy. On the opposite, the number of establishments locating in the non-ZFU area should at best be stagnant.
- In case of uncertainty about the allocation of ZFUs and about their boundaries, some establishments might decide to wait for the right information, and to postpone their (re)location decision in the municipality. This should affect disproportionately more the establishments which would prefer to locate in the non-ZFU part of municipalities in the absence of the policy. For establishments that would have located in the future ZFU anyway, the possibility of benefiting from exemptions will represent a windfall effect, but their decisions should not be affected *ex ante*. We should in this case observe, the years before the

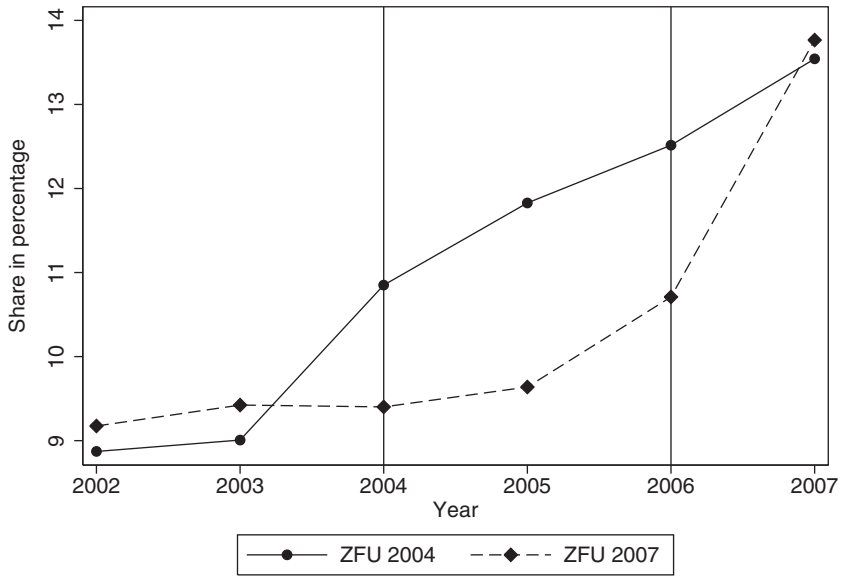

Figure 2. Average share of establishment entries in ZFUs in total municipality-level entries.
Note: Entries refer to both newly created establishments and to existing establishments which relocated.
Source: Authors' tabulations from the SIRENE dataset (National Institute for Statistics and Economic Studies-INSEE).

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: in the first case because the numerator increases faster than the denominator, in the second case because the denominator decreases faster than the numerator. Hence, anticipation effects should introduce a downward bias in the estimation of the impact of the policy.

Figure 2 shows that the risk of bias is limited. Indeed, for both generations, the share of establishments locating in the ZFU part of the municipality remains quite stable before the implementation of the policy; it increases after the implementation of the policy only.

Finally, the composition of economic activities in municipalities with second and third generation ZFUs seems to be very similar. Table 2 presents the share of plants active in a given industry in 2002 for municipalities obtaining a ZFU in 2004 and in 2007, respectively. These simple statistics show that construction, retail and transport/telecommunication industries generally tend to be over-represented in ZFU areas when compared with the rest of the municipality they are located in. On the opposite, real estate and business services tend to be under-represented. These differences between the targeted zone and the rest of the municipality they are located in appear for both waves of ZFUs, though they are less pronounced for municipalities obtaining a ZFU in 2007. Overall, ZFU areas designated in 2004 are very similar to ZFU areas designated in 2007. The retail sector tends to be more represented and the industry of construction

Table 2. Sectoral distribution of economic activities in 2002 in municipalities hosting a ZFU

	Municipalities hosting second generation ZFUs		Municipalities hosting third generation ZFUs	
	ZFU part	Non-ZFU part	ZFU part	Non-ZFU part
Manufacturing	6.7	7.8	8.3	8.3
Water/electric distribution	0.4	0.4	0.3	0.3
Construction	14.8	6.9	10.0	9.0
Retail	28.5	28.2	35.4	30.0
Hotels/restaurants	5.3	8.3	8.6	8.1
Transport/Telecommunication	8.0	4.0	7.0	5.4
Real estate/Business services	12.6	22.0	11.3	18.6
Administrative, education, household services	23.6	22.2	19.0	20.4
Total	100	100	100	100

Note: Second generation ZFUs have been designated in 2004 and third generation ZFUs have been designated in 2007.
Source: Authors' tabulations from the SIRENE dataset (National Institute for Statistics and Economic Studies-INSEE).

tends to be less represented in ZFUs designated in 2007 when compared with ZFUs designated in 2004, but the shares of the manufacturing industry, the transport and telecommunication industry and real estate and business services are very similar in both types of ZFUs.

To sum up, this descriptive analysis suggests that the policy coincides with an increase in the probability that establishments locate in the ZFU part of a municipality. The econometric analysis will now allow for a more rigorous assessment and a more precise quantification of this effect, both at the municipal and at the intra-municipal levels.

4.2. At the municipality level, establishment creation or establishment diversion?

Two mechanisms could explain a positive effect of the policy on the number of establishments locating in targeted areas. First, the policy might generate business creation at the municipality level. Indeed, it might shift economic activities between municipalities, attracting new establishments that would have been created or stayed in other municipalities in the absence of the policy (especially the neighboring ones); it might also favor the emergence of businesses that would have not emerged at all in the absence of incentives. In this case, the ZFU policy would generate establishment creation not only at the zone level, but also at the municipality level. Second, the policy could also lead to an intra-municipal shift of economic activities, encouraging new establishments that would have been created in the municipality anyway to locate in the ZFU part of this municipality. In this latter case, the ZFU policy would only generate establishment diversion: any positive impact for targeted zones would entirely be obtained at the expense of the other part of the municipality. Whether we are in the first or in the second case is important for the empirical strategy to be implemented. In case of pure displacement effects, we do not need to model how establishments choose the municipality they locate in to assess the effect of the policy.

This is why we first study in this subsection how the ZFU policy affects establishment creations at the municipality level. To investigate this issue, we first analyze the evolution of establishment flows in municipalities obtaining their ZFU in 2004, taking as control group municipalities which will have a ZFU in 2007. These municipalities are an appropriate control group for two reasons. First, third wave ZFUs seem to have been designated in 2007, and not in 2004, for exogenous reasons: indeed, the eligibility criterion regarding ZFU population size decreased from 10,000 inhabitants (for second wave ZFUs) to 8500 inhabitants (for third wave ZFUs). Second, among the potential control groups we can think of, third generation ZFUs are probably the most similar in terms of economic and social characteristics to second generation ZFUs, since their designation is based on the same deprivation index. We thus proceed to difference-in-difference estimations. Since the number of establishment locations is a count variable, we use for our estimations a Poisson model with municipality fixed effects.

Results are presented in Table 3. Column (1) shows that the size of establishment flows increases after 2004 for both treated and control municipalities. However, municipalities with a ZFU designated in 2004 do not experience any differential increase in the flow of establishments they attract with respect to municipalities obtaining their ZFU in 2007: the coefficient associated with the implementation of the policy (variable taking the value 1 after 2004 for municipalities obtaining a ZFU in 2004) is indeed not significant and very close to 0. Consequently, the policy does not induce business creation at the municipality level.

Results are different for the ZFU part of municipalities. Column (2) shows that ZFUs designated in 2004 experiment a greater increase in the size of establishment flows after 2004 than the ZFUs designated in 2007. The marginal impact is sizable and very significant, equal to 20.8 percentage point on average.

Put together, these results suggest that the policy generates business diversion: it shifts toward the ZFU part of the municipalities activities that would have located, in the absence of the policy, in the non-ZFU part. This is confirmed by the results in Column (3): comparing the evolution of the number of establishment locations in the non-ZFU part of municipalities treated in 2004 to this same evolution in the non-ZFU part of municipalities treated in 2007, we find a negative coefficient equal to -0.024, with a p-value equal to 0.11.[14]

Column (4) replicates Column (1), using as a control group municipalities pertaining to the same urban area but not benefitting from the policy, neither in 2004 nor in 2007.[15] We do not find neither any differentiated evolution of the total number of business creations in targeted municipalities.[16] This shows that the policy does not induce strong competition effects between municipalities to attract new or existing establishments. If it were the case, these effects should be particularly strong between municipalities that are close to each other, typically in the same urban area. We should then observe a relative increase in the number of business creations in municipalities

14. Note that the marginal impacts we find in the three columns are coherent. In our sample, before 2004, the share of establishment locations occurring in the ZFU part of municipalities with second generation ZFUs is equal to 9%. The overall impact of the policy at the municipality level should thus be equal to $0.09 \times 0.208 - 0.91 \times 0.0242 \simeq -0.003$, i.e., very close to the null impact we measure in Column (1).
15. Urban areas are groups of municipalities defined statistically based on workers' commuting patterns.
16. Since municipalities in the control group do not benefit from the ZFU policy at any point in time, we cannot run the analysis for the ZFU part and the non-ZFU part in this case.

Table 3. Effect of the ZFU policy on the flow of establishments

Dependent variable Poisson model (marginal effects)	Number of establishments locations			
Control group	Municipalities with a ZFU in 2007			Municipalities in same urban area
	Municipality (1)	ZFU part (2)	Non-ZFU part (3)	Municipality (4)
Post-2004	0.104***	0.170***	0.0974***	0.132***
	(0.0145)	(0.0431)	(0.0136)	(0.0101)
ZFU 2004 × Post-2004	0.000195	0.208***	−0.0242	−0.0172
	(0.0175)	(0.0573)	(0.0154)	(0.0146)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality-level)	Yes	Yes	Yes	Yes
Observations	415	415	415	3500
Number of municipalities	83	83	83	600

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the annual count of establishment locations (flow) over the period 2002–2007. In Column (1), the dependent variable is the count of new establishments at the municipality level, using as a control group municipalities hosting a ZFU in 2007. In Columns (2) and (3), the dependent variable is the count of new establishments locating in the ZFU part and the non-ZFU part, respectively, using as a control group their counterparts in municipalities hosting a ZFU in 2007. In Column (4), the dependent variable is the count of new establishments at the municipality level, using as a control group municipalities from the same urban area which never benefit from the ZFU policy. All these difference-in-difference estimations rely on a Poisson model and include municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

benefitting from the policy when compared with the other municipalities from the same urban area.[17]

As usual in difference-in-difference estimations, our estimations rely on the common trend assumption; there must not be, in particular, any specific pre-trend in the evolution of establishment flows in municipalities that benefit from the policy in 2004 when compared with the municipalities in the control group. We check for this in Table A2 in the Appendix, and results show that pre-trends cannot be detected in any of the estimations.

The analysis of the evolution of the stock of establishments reflects the dynamics of the flows. As shown in Table 4, the implementation of the policy does not affect the stock of establishments in the municipalities benefiting from the policy in 2004, when compared with those benefiting from third wave ZFUs in 2007. However, the number of establishments active in the ZFU part of the municipality relatively increases, while the number of establishments in the non-ZFU part tends to relatively decrease (p-value equal to 0.11). We cannot directly investigate the effect of the policy on exits, since the

17. Note that due to the very high number of municipalities in France (36,000), it is computationally impossible to implement a hierarchical location decision model to estimate the effect of the ZFU policy on the municipality choice made by firms. This is why we use an approach based on the count of establishment creations.

Table 4. Effect of the ZFU policy on the stock of establishments

Dependent variable Poisson model (marginal effects)	Number of establishments		
Control group	Municipalities with a ZFU in 2007		
	Municipality (overall) (1)	ZFU part (2)	Non-ZFU part (3)
Post-2004	0.0503***	0.0293	0.0524***
	(0.00513)	(0.0241)	(0.00619)
ZFU 2004 × Post-2004	−0.00343	0.0912***	−0.0111
	(0.00611)	(0.0260)	(0.00705)
Municipality fixed effects	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes
Observations	415	410	415
Number of municipalities	83	83	83

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the annual stock of establishment over the period 2002–2007. In Column (1), the dependent variable is the stock of establishments at the municipality level, using as control group municipalities hosting a ZFU in 2007. In Columns (2) and (3), the dependent variable is the count of the number of establishments located in the ZFU part and the non-ZFU part, respectively, using as a control group their counterparts in municipalities hosting a ZFU in 2007. All these difference-in-difference estimations rely on a Poisson model and include municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

SIRENE database is not properly equipped to trace exits at the exact year they occur. However, these results suggest that the redirection of establishment flows toward the ZFUs is not compensated by an increased number of exits, and that the ZFU policy does not just create churning.

To sum up, the positive impact of the policy on the relative attractiveness of targeted zones seems to be due to a diversion effect of the French enterprise zone policy: the incentives provided by the policy divert toward the ZFU areas establishments that would have located anyway in the municipality. In this sense, any positive effect of the policy on the probability to locate in the targeted zones is obtained at the expense of the non-targeted part of municipalities hosting the ZFUs. We now propose a strategy to estimate this effect, ignoring the choice of the municipality itself.

4.3. At the intra-municipal level: spatial and time differencing

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. We propose an estimation strategy close to the one developed by Duranton et al. (2011) in their study of the impact of local taxation on firm entry in the UK. Our strategy is based on spatial and time differencing at the municipality level: we investigate the determinants of the probability to locate in the ZFU part rather than in the non-ZFU part of a municipality, conditioning on the fact that the establishment locates in a municipality with a (future) second generation ZFU, and we study how this probability

changes over time, i.e., after the implementation of the policy. We therefore do not model how entrepreneurs choose the municipality they locate in, since we showed in the previous subsection that the ZFU policy does not affect location decisions between municipalities.

Focusing on establishment location decisions within municipalities has three main advantages. First, working at the intra-municipal level is important since 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 the local tax rate or the price of public transport for example, which generates important heterogeneity between them; this heterogeneity across municipalities is neutralized by our spatial differencing approach. Second, considering the probability to locate in the ZFU part rather than in the non-ZFU part of the municipalities that (will) benefit from second generation ZFUs reduces the number of observations. For each establishment created between 2002 and 2007 in municipalities that (will) obtain a ZFU in 2004, we have only one observation, for which we create a variable equal to 1 if the location occurs in the (future) ZFU part, 0 otherwise. Finally, studying how the probability to locate in the ZFU part rather than in the non-ZFU part of the municipality changes over time allows us to control for the fact that targeted zones are probably 'structurally' less attractive than the rest of the municipality.

More precisely, we study the decision of an 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, conditioning on the fact that the establishment locates in municipality m. Assuming that the establishment locates in the zone that yields the highest expected profit, this probability depends on the expected log profit differential $\Delta\pi_{iz_km,t}$ between the two zones, which is given by:

$$\Delta\pi_{iz_km,t} = \gamma\Delta y_{z_km,t} + \eta\text{post2004}_t + \Delta\theta_{z_km} + \Delta\epsilon_{iz_km,t}, \tag{1}$$

where

- $\pi_{iz_km,t}$ is the log profit of an establishment i which locates in zone z_k of municipality m at time t;
- $y_{z_km,t}$ captures time-varying location characteristics of zone z_k in municipality m at time t;
- post2004_t is a dummy equal to 1 from 2004 onwards, i.e., when the ZFU part of the municipality actually benefits from tax exemptions linked to the ZFU scheme;
- θ_{z_km} captures time-invariant characteristics of zone z_k in municipality m.

Note that establishment characteristics as well as municipality time-varying and time-invariant characteristics do not appear in the equation. They do not vary between the ZFU and the non-ZFU parts of a municipality m at time t: since we consider the profit differential between the two zones in a given year, they cancel out and do not appear in Equation (1). This would not be the case if such characteristics had heterogeneous effects depending on the part of the municipality we consider. We actually allow for this possibility in Section 6. Assuming that $\epsilon_{iz_km,t}$ is an error term that follows an *i.i.d.* extreme value distribution, the probability that establishment i chooses to locate in zone z_1 of municipality m at time t, P_{iz_1mt}, is logistic. Hence, the probability of choosing z_1,

the ZFU zone, rather than z_2, the non-ZFU zone, conditioning on the fact that i locates in municipality m at time t, can be written as follows:

$$P_{iz_1mt} = \frac{1}{1 + \exp[\gamma \Delta y_{z_k m,t} + \Delta\theta_{z_k m} + \eta \text{post2004}_t + \Delta\epsilon_{iz_k m,t}]}. \quad (2)$$

The determinants of this probability to locate in ZFUs can be estimated by a standard binary logit. They can be classified into three categories.

First, time-varying characteristics ($y_{z_{1m},t} - y_{z_{2m},t}$) affect the relative attractiveness of z_1 and z_2. To control for this, we introduce the ratio of the stock of establishments in the two zones of the municipality, lagged 1 year. We first consider the total number of existing establishments in a given location, which is often used in the literature on plant location decisions to control for unobservable factors that affect the attractiveness of a location (see Head et al., 1995). We also consider the number of establishments in the operating industry of the entrant, in order to capture agglomeration effects or unobservable factors that affect the attractiveness of a location for a particular industry.[18] Unfortunately, we cannot directly control for other variables such as the unemployment rate or the demographic composition of the population. At a such geographically detailed level, the information is available in population censuses that were conducted every 5 years only up to 2006.

Second, another important determinant of the probability to locate in a ZFU is the attractiveness differential between the ZFU part and the non-ZFU part of a given municipality m, ($\theta_{z_1m} - \theta_{z_2m}$), which is fixed over time. This 'structural' attractiveness differential is probably always negative since ZFUs are chosen among the less attractive districts within municipalities, but it might vary in size across municipalities. It will be captured by municipality fixed effects.

Finally, the parameter η is our coefficient of interest. The variable post2004$_t$ takes the value 1 from 2004 onwards. η is thus obtained by comparing, within municipalities, the probability to locate in z_1 rather than in z_2 before and after the implementation of the policy. Assuming that once the lagged relative stock of establishments in the two zones is controlled for, nothing else but the implementation of tax exemptions affects the relative attractiveness of ZFU zones over time, η is an unbiased measure of the impact of the ZFU policy.[19]

We thus implement a logit estimation with municipality fixed effects. We present in the Appendix, a table showing that all the main results are qualitatively and quantitatively similar when using a linear probability model (Table A3). We could have also used a count analysis of the number of establishment locations in ZFU areas. However, our approach at the individual level is more tractable for our falsification

18. The lagged relative stock of establishments mechanically controls for the relative size of the ZFU part and the non-ZFU part of the municipality. However, since we have municipality fixed effects in the estimation, the variations of the lagged relative stock of establishments capture variations of the variable around its mean. We argue that these variations reflect shocks in the relative attractiveness of the two zones in t–1.

19. Note that since we control for the relative stock of establishments, we might underestimate the effect of the ZFU policy. Indeed, part of the effect of the ZFU policy might go through the relative stock of establishments: by attracting new activities in the targeted zones, the policy makes these zones more attractive due to potential agglomeration economies. In this sense, the coefficient we obtain on the policy variable is a lower bound of the overall impact, net of agglomeration effects of the policy.

tests, and for our analysis of the potential heterogeneous impact of the policy depending on firm characteristics or zone characteristics.

4.4. Benchmark results

For our benchmark analysis, our sample is composed of all establishment creations over the period 2002–2007 in municipalities obtaining a ZFU in 2004. Our dependent variable is equal to 1 if the plant chooses to locate in the ZFU part rather than in the non-ZFU part of the municipality. We focus on second generation ZFUs: the treatment variable 'ZFU policy' is consequently equal to 1 for years 2004–2007, i.e., for years following the implementation of the spatially targeted tax exemptions.

Marginal impacts measured by logit regressions are presented in Table 5. All regressions include municipality fixed effects and standard errors are clustered at the municipality level. 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. The impact of the ZFU policy is sizable, with a marginal effect equal to 2.75 percentage points.[20] In Column (2), we introduce the relative stock of establishments in each part of the municipality, lagged 1 year. This variable controls for changes in unobserved factors affecting the relative attractiveness of ZFU areas which could bias our estimation. The coefficient obtained is positive and significant, showing that the probability to locate in the ZFU part of a municipality increases when this ZFU is less different from the rest of the municipality in terms of attractiveness.[21] However, the coefficient on the ZFU policy remains positive and significant. Note that this coefficient should be seen as a lower bound, since the relative stock of establishments might capture part of the dynamic impact of the policy.[22] In Column (3), we control for the relative stock of establishments pertaining to the same three-digit sector as the new entrant, lagged 1 year. This variable controls for changes in the relative attractiveness of the ZFU areas that are specific to the entrants' industry. Results indicate that the probability to locate in a ZFU increases when the industry-specific attractiveness differential between the two parts of the municipality decreases. The positive effect of the policy remains. Finally, in Column (4), we introduce these two variables simultaneously. The number of establishments from the

20. As noted in the description of the policy, the ZFU areas we study have been ZRUs since 1996. As a ZRU, they were already benefiting from some tax exemptions. This does not affect our estimation strategy (due to our before and after comparison). However, this means that if we were measuring the effect of the ZFU policy for zones which were not benefiting from any tax exemptions before, the estimated effect of the policy could be even stronger.
21. The ratio of establishments' stock being smaller than 1 for all ZFUs, and computed each year over the period 2002–2007.
22. Indeed, given that we control for the relative stock of establishments in ZFU municipalities, lagged 1 year, if the policy does attract establishments in targeted zones, we might underestimate its effect. However, we prefer controlling for this ratio for several reasons. First, if the policy generates by itself a positive dynamic on business entry (due to agglomeration externalities), this is a way to capture it. Second, not controlling at all for the change in the relative stock between the two parts of the municipality would be much more problematic, since our results would be subject to an omitted variable bias. Finally, if controlling for this relative stock can bias our results, it should be a downward bias. As shown in Column (1) of Table 5, the estimated impact of the policy is stronger when we do not control for the relative stock of establishments in the two parts of the municipality. In this sense, the coefficient we obtain on the policy variable is a lower bound of the overall impact, net of agglomeration effects of the policy.

Table 5. Effect of the ZFU policy on the probability to locate in a (future) ZFU

Dependent variable Logit model (marginal effects)	Probability to locate in the ZFU part of a municipality			
	(1)	(2)	(3)	(4)
ZFU policy	0.0275***	0.0221***	0.0241***	0.0233***
	(0.00351)	(0.00319)	(0.00309)	(0.00307)
$\log \frac{\#\text{ of establishments (all ind.) in ZFU}_{t-1}}{\#\text{ of establishments (all ind.) in non-ZFU}_{t-1}}$		0.0747***		0.0116
		(0.0160)		(0.0131)
$\log \frac{\#\text{ of establishments (same ind.) in ZFU}_{t-1}}{\#\text{ of establishments (same ind.) in non-ZFU}_{t-1}}$			0.0470***	0.0469***
			(0.00301)	(0.00302)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	172,443	172,443	172,443	172,443
Pseudo-R^2	0.1596	0.1601	0.1908	0.1908

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities with second generation ZFUs are included in the analysis. All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

same industry as the entrant is the only one to be significant. Column (3) is thus our benchmark specification.

Overall, these results show that the ZFU policy has a significant and sizable positive impact on establishment location decisions.[23] The probability to locate in the ZFU part rather than in the non-ZFU part of the municipality increases by 2.4 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 equal to 8.9% in 2002–2003, this marginal impact corresponds to an increase of the average probability to locate in ZFUs by 27%. In terms of the number of establishments, the policy is responsible for the creation of around 12 additional establishments per year and per ZFU area (715 establishments per year in total in second generation ZFU zones).[24]

23. It would have also been interesting to investigate the effect of the policy on establishment destructions, like in Bondonio and Greenbaum (2007) for example. However, while our data on establishment creations are perfectly reliable, there might be measurement issues in stock data (entering firms and exiting firms being sometimes registered with delay). We thus cannot directly investigate the effect of the policy on firm survival. Still, our analysis of the effect of the policy on the stock of establishments in Table 4 showed that potential competition effects are not strong enough to completely offset the positive impact of the policy on the attractiveness of ZFU zones.
24. Since the policy does not affect plant creations at the municipality level, and since the number of establishments locating each year in municipalities with a ZFU is equal to 505 on average from 2004 onwards, the policy induced $0.024 \times 505 = 12.12$ new establishments per ZFU zone and per year. Since there are 59 municipalities with a second generation ZFU, the number of plant creations in targeted zones that can be attributed to the ZFU policy is equal to 715 per year.

This is not negligible, equal to 6% of the initial stock of establishments in ZFU areas.[25]

Since the policy does not affect the number of establishment creations at the municipality level, this positive effect is entirely due to displacement effects. This is actually verified in Table 6, where we alternatively use as control groups the rest of the municipality, the rest of the urban area and the rest of the urban area excluding the non-ZFU part of the municipality itself. The effect is much smaller with the two latter control groups. Actually, when the non-ZFU part of the municipality is not included in the control group, it is impossible to detect any significant effect of the policy. This means that the elasticity of 27% we measure in our preferred specification is really capturing a pure displacement effect: the positive effect of the policy for targeted zones is entirely obtained at the expense of the non-targeted part of the same municipality. Hanson and Rohlin (2013) show that such displacement effects are also at play in the case of US enterprise zone programs. They use a different methodology from ours, and find that the negative spillover effects of the policy on surrounding areas might be stronger than the positive effect of the policy on targeted areas. Our results are different: the ZFU policy does not affect the number of establishment creations at the municipality level, the negative spillover effects of the policy for neighboring districts exactly compensating the gains for targeted zones. The coefficient we estimate should consequently be interpreted as the effect of the policy on the relative attractiveness of ZFU zones when compared with the non-ZFU part of the municipalities.

5. Tackling simultaneity issues: difference-in-differences and falsification tests

One might worry that policy-makers chose the beneficiaries of the policy based on specific information about the evolution of economic conditions in the targeted zones, or that unobserved shocks, other than the ZFU policy, affect the relative attractiveness of ZFUs. In this case, our benchmark estimation strategy would suffer from endogeneity issues. We propose different strategies to check for the robustness of our results.

5.1. Third generation ZFUs as a control group

We first verify that we do not observe a change in the probability to locate in the ZFU part of municipalities hosting second generation ZFUs before 2004. In this purpose, we replace the treatment variable by a set of year dummies. Results are presented in Table 7. The year of reference is 2002. For ZFUs designated in 2004, in line with the graphical analysis, Columns (1) and (2) show that the probability to locate in the ZFU part rather than in the non-ZFU part of a municipality really starts increasing in 2004 only. The coefficient remains positive and very significant, and even increases after this date. No pre-treatment trend is thus detected in the probability to locate in ZFUs.

However, it might still be the case that the implementation of the ZFU policy 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 propose a difference-in-difference

25. Indeed, before the implementation of the policy, the number of plants located in ZFU zones was equal to 199 (cf. Table 1).

Table 6. Effect of the ZFU policy on the probability to locate in a (future) ZFU—alt

Dependent variable Logit model (marginal effects)	Probability to locate in the ZFU part of a municipality		
Control group	Non-ZFU part same municipality	Non-ZFU part same urban area	Non-ZFU part other municipalities same urban area
	(1)	(2)	(3)
ZFU policy	0.0241***	0.00459**	0.00257
	(0.00309)	(0.00211)	(0.00279)
$\log \frac{\#\text{ of establishments (same ind.) in ZFU}_{t-1}}{\#\text{ of establishments (same ind.) in non-ZFU}_{t-1}}$	0.0470***	0.00679***	0.00623***
	(0.00301)	(0.00113)	(0.00134)
Municipality fixed effects	Yes	No	No
Urban area fixed effects	No	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes
Observations	172,443	646,598	494,436
Pseudo-R^2	0.1908	0.0934	0.1498

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. Column (1) corresponds to our benchmark analysis and reproduces the results of our preferred specification (Column (3) in Table 5). In Column (2), the dependent variable is equal to 1 if an establishment locates in the (future) ZFU part of the municipality and equal to 0 if an establishment locates in the zones of the same urban area that will never be a ZFU (including the rest of the municipality the ZFU belongs to). Finally in Column (3), the dependent variable is equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the other municipalities of the urban area (excluding the non-ZFU part of the municipality the ZFU belongs to). All these estimations rely on a logit model with municipality or urban area fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

approach, using as a control group municipalities benefitting from the ZFU policy in 2007 only. Such an estimation controls for potential trends common to second and third generation ZFUs. The rationale for this test is that the third generation ZFUs are not very different from the second generation ZFUs, because these areas were very close to obtain the label in 2004. Actually, the reason why the ZFUs designated in 2007 have not been designated in 2004 is likely to be exogenous, since the designation criterion regarding the size of areas decreased from 10,000 inhabitants in 2004 to 8500 in 2007. Except the policy shock itself, second and third generation ZFUs should thus be subject to the same economic conditions. In line with this prior, results in Table 7 show that before 2004, no significant difference is detected between second and third generation ZFUs in the evolution of the probability to locate in the ZFU part rather than in the non-ZFU part of the municipality.

A proper difference-in-difference estimation, using municipalities with third generation ZFUs as a control group, confirms our benchmark results. As shown in Table 8,[26]

26. While the benchmark analysis is run on the period 2002–2007, we ignore year 2007 in these regressions since municipalities with third generation ZFUs, used as a control group, fully benefit from the policy at this date.

Table 7. Probability to locate in a (future) ZFU over time

Dependent variable Logit model (marginal effects)	Probability to locate in the ZFU part of a municipality			
	ZFU in 2004		ZFU in 2007	
	(1)	(2)	(3)	(4)
Year 2003	0.00108	−0.00195	0.000534	−0.00190
	(0.00282)	(0.00279)	(0.00371)	(0.00373)
Year 2004	0.0160***	0.0155***	−0.00381	−0.00496
	(0.00327)	(0.00340)	(0.00551)	(0.00591)
Year 2005	0.0251***	0.0240***	0.000218	0.000773
	(0.00401)	(0.00394)	(0.00646)	(0.00458)
Year 2006	0.0306***	0.0269***	0.0126*	0.0130
	(0.00463)	(0.00413)	(0.00716)	(0.00838)
Year 2007	0.0384***	0.0251***	0.0366***	0.0341***
	(0.00430)	(0.00362)	(0.00494)	(0.00866)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}}$		0.0468***		0.0426***
		(0.00305)		(0.00350)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	172,443	172,443	48,364	48,364
Pseudo-R^2	0.1604	0.1911	0.1280	0.1554

Notes: Each column reports the estimate of the evolution over time of the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. Reference year is 2002. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of the municipality and equal to 0 if an establishment locates in the part of the municipality that will never be a ZFU. In Columns (1) and (2), only municipalities hosting a second generation ZFU (hosting a ZFU in 2004) are included in the analysis. In Columns (3) and (4), only municipalities hosting a third generation ZFU (hosting a ZFU in 2007) are included in the analysis. All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

the probability to locate in the ZFU part of a municipality increases after 2004 in the municipalities with second generation ZFUs when compared with municipalities with third generation ZFUs. The coefficient obtained is slightly smaller than our benchmark estimate, equal to 1.8 percentage point.

5.2. Falsification tests

Our difference-in-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. However, one could still argue that the acquisition of the ZFU label is correlated with shocks that affect the ZFUs designated in 2004 specifically.[27]

27. Even though this is not very plausible given the balanced distribution of the ZFUs on the whole French territory (see the map of ZFUs areas in France in Appendix A).

Table 8. Effect of the ZFU policy on the probability to locate in a (future) ZFU—difference in difference

Dependent variable Logit model (marginal effects)	Probability to locate in the ZFU part of a municipality	
	(1)	(2)
Post-2004	0.00275	0.00421
	(0.00322)	(0.00364)
Post-2004 × Municipality ZFU in 2004	0.0200***	0.0183***
	(0.00459)	(0.00479)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}}$		0.0492***
		(0.00253)
Municipality fixed effects	Yes	Yes
Cluster (municipality level)	Yes	Yes
Observations	181,349	181,349
Pseudo-R^2	0.1530	0.1881

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2006. Year 2007 is excluded. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of the municipality and equal to 0 if an establishment locates in the part of the municipality that will never be a ZFU. The control group is composed of municipalities hosting third generation ZFUs (ZFU in 2007). All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

This is why we propose an alternative estimation strategy, which exploits two discontinuities in the eligibility criteria to benefit from the tax and social contributions exemptions provided by the ZFU policy. Most exemptions are limited to establishments belonging to first, firms with less than 50 employees, and second, firms which turnover does not exceed 10 million Euros. These restrictions being completely exogenous to the definition of targeted zones, we can safely assume that the unobserved time-varying characteristics of the zones are the same for eligible and non-eligible firms. We thus run falsification tests based on these discontinuities. The advantage of this stratification framework is that both time-invariant and time-varying unobserved characteristics of the zones are controlled for since they are common to the two groups of firms. If there were an idiosyncratic shock other than the policy, this should affect identically all the 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. On the opposite, if 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.

To carry out these tests, we focus on establishments locating in municipalities with second generation ZFUs over the period 2002–2007, and we create two samples: the sample of eligible establishments (belonging to firms with less than 50 employees and a turnover that does not exceed 10 million Euros) and the sample of non-eligible establishments (belonging to firms with more than 50 employees or a turnover above 10 million Euros). 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 firm characteristics). We

decide to use the employment of the firm the first time it appears in the BIC-BRN database over the period 2002–2007.[28]

Columns (1) and (2) of Table 9 present the results for these two samples of firms. The impact of the policy on the probability to locate in the ZFU part of a municipality is positive and significant for eligible firms only. However, one could worry that the firms around the threshold manipulate their size so as to benefit from the policy. This could be particularly a concern in France, where some specific regulations (in particular in terms of unionization) exist for firms bigger than 50 employees. As shown by Garicano et al. (2013), these regulations generate a discontinuity in the firm size distribution precisely around 50 employees.

To avoid any bias due to the manipulation of firm size, we run the same regressions eliminating firms between 40 and 60 employees, and with a turnover between 8 and 12 million Euros.[29] Results are presented in Columns (3) and (4) and confirm that there is an increase in the probability to locate in ZFUs after the implementation of the policy for eligible firms only.

These falsification tests confirm that our estimation strategy does not suffer from a simultaneity bias. Our previous estimates, based on samples mixing eligible and non-eligible establishments, actually underestimated the real impact of the policy. Depending on the sample retained for the estimation, the policy increases the probability that a plant locates in the ZFU part rather than in the non-ZFU part of a municipality by 2.3–3.3 percentage points.

6. Heterogeneous impact of the ZFU policy

The average effect of the policy we measure might hide important variations in the efficiency of the policy along several dimensions: characteristics of the entrants, characteristics of the zones and characteristics of the industries. Measuring and quantifying such an heterogeneity is crucial to understand the mechanisms underlying the effects of enterprise zone policies, and to adequately design them. This is the purpose of this section.

6.1. Impact of the ZFU policy and firm size

In this subsection, we are interested in the potential heterogeneous impact of the policy depending on firm size. Indeed, from a theoretical point of view, beyond the threshold in eligibility rules we have already emphasized, Baldwin and Okubo (2006) show that the opportunity cost of relocating in peripheral regions is lower for smaller firms. If enterprise zone policies attract small firms only, this could suggest that the effect of these policies on local employment might be low.

28. Doing so, we match more observations than we do when using the employment of the firm the exact year it appears in the SIRENE dataset. We prefer this measure to the average employment of the firm over the period, since firm employment might be impacted by the policy.
29. We also only eliminated firms between 45 and 55 employees and with turnover between 9 and 11 million Euros. Results are similar. Note that we do not carry out a proper regression discontinuity design for two reasons. First, as explained above, we are concerned by the fact that firms could manipulate their size to benefit from exemptions. Focusing on firms just around the threshold would exacerbate the issue. Second, since the distribution of firms is highly concentrated toward small firms, we do not have enough observations around the two thresholds used for our falsification tests.

Table 9. Falsification test: Effect of the ZFU policy for eligible and non-eligible firms

Dependent variable Logit model (marginal effects)	Probability to locate in a ZFU part of a municipality			
	<50 Employees and turnover $< 10M$ € (1)	>50 Employees or turnover $> 10M$ € (2)	<40 Employees and turnover $< 8M$ € (3)	>60 Employees or turnover $> 12M$ € (4)
ZFU policy	0.0332***	−0.000623	0.0331***	−0.00130
	(0.00349)	(0.00600)	(0.00346)	(0.00646)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0456***	0.0154***	0.0459***	0.0155***
	(0.00319)	(0.00197)	(0.00322)	(0.00207)
Eligible	Yes	No	Yes	No
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	82,548	8509	81,957	7942
Pseudo-R^2	0.2037	0.2289	0.2041	0.2288

Notes: Each column reports the estimate of the effect of second generation ZFU (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities of the second generation (i.e., hosting a ZFU in 2004) are included in the analysis. All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

To investigate the heterogeneous impact of French ZFUs depending on entrant size, we introduce an interaction term between the treatment variable and establishment size. In this part, we proxy establishment size by firm size (due to data limitations). We measure firm size by the number of employees declared the first year it appears in the BIC-BRN database over the period 2002–2007.[30]

Here again, we focus on establishments locating in municipalities with second generation ZFUs over the period 2002–2007. One difficulty with a logit estimation is that the interpretation of the interaction term is not direct (see Ai and Norton, 2003). Therefore, we use a linear probability model (Table A3 in the Appendix shows that all our main results are qualitatively and quantitatively similar when using a linear probability model instead of a logit model). Results are presented in Table 10. The first column reports the benchmark results for the whole sample of firms using a linear probability model. The number of observations is smaller than in our benchmark estimations since information on firm size is missing for some establishments. We find a

30. The exercise here might be subject to measurement errors for two reasons. First, information on firm size is missing for 27% of our observations. Second, some firms are multi-establishment firms, so that firm size does not properly measure plant size. However, we carried out some robustness checks. We compared our benchmark analysis with similar estimations based on the sample of firms for which we have information on firm size (these results are reported in Column (1) of Table 10). We also restricted the sample to mono-establishment firms. The results, presented in Column (3) of Table A4 in the Appendix, are quantitatively and qualitatively similar.

Table 10. Effect of the ZFU policy according to firm size

Dependent variable Linear probability model	Probability to locate in a ZFU				
	Whole sample		≤50 Employees		>50 Employees
	(1)	(2)	(3)	(4)	(5)
ZFU policy	0.0270***	0.0273***	0.0246***	0.0326***	−0.00510
	(0.00400)	(0.00419)	(0.00412)	(0.00582)	(0.0145)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0374***	0.0382***	0.0394***	0.0424***	0.0125***
	(0.00662)	(0.00649)	(0.00686)	(0.00667)	(0.00307)
Firm size		−0.00938***	−0.0119***	−0.0148***	−0.00121
		(0.00160)	(0.00295)	(0.00289)	(0.00152)
Firm size × ZFU policy		−0.00182**	0.00294	−0.00140	0.000971
		(0.000898)	(0.00355)	(0.00246)	(0.00199)
Firms with 0 employees	Inc.	Inc.	Inc.	Exc.	n/a
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes	Yes
Observations	124,638	124,638	117,767	54,848	6871
R^2	0.0201	0.0229	0.0207	0.0271	0.0072

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities of the second generation ZFUs (i.e., hosting a ZFU in 2004) are included in the analysis. All these estimations rely on a linear probability model and include municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

positive and significant impact of the ZFU policy, and the coefficient we obtain is equal to 2.7 percentage points, very close to the effect measured with our logit estimation (2.41 percentage points). However, as shown in Column (2), 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 on 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 eligible firms with different size respond differently to the policy. In Columns (3) and (4), we thus repeat the analysis for firms with less than 50 employees, Column (3) including firms with 0 employee (companies with non-salaried employees) and Column (4) excluding them. As shown by the number of observations, the number of establishments with zero-employee is very high. However, since they can benefit from all exemptions except those on employer social contributions, we kept those firms in the benchmark analysis. Whatever the subsample, the coefficient associated with the implementation of the policy is positive and significant, and the coefficient associated with firm size is negative. This means that while the policy has a positive effect on the probability that an establishment locates in targeted areas, firms locating in these areas are small, independently from the policy. Regarding the interaction term between the ZFU policy and firm size, it is not significant: no heterogeneity in the impact of the policy depending

on firm size emerges once we limit the sample to eligible firms. Finally, in Column (5), 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 since they are not eligible to the tax exemptions provided by the ZFU policy.

To sum up, these results show that on average, ZFU zones structurally attract smaller firms. When the whole sample of firms is considered, smaller firms respond more to the ZFU policy, due to the fact that firms smaller than 50 employees are the only ones to be eligible. However, when focusing on eligible firms only, no significant heterogeneity in the impact of the policy emerges across firms.

6.2. Impact of the policy, relative attractiveness of the ZFUs and establishment mobility

A study by Devereux et al. (2007) on the evaluation of the Regional Selective 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. This result points at the difficulty for (re)location subsidies to counteract the attractiveness deficit of lagging places. We investigate this issue in the context of French ZFUs by introducing an interaction term between the treatment dummy and the relative stock of plants in the operating industry of the entrants.

Table 11 reports the results obtained with the same sample as the one used for our benchmark analysis. Column (1) reproduces our benchmark regression, estimated thanks to a linear probability model. We find again a positive and very significant marginal impact of the ZFU policy on establishment location decisions; moreover, the coefficient we obtain is equal to 2.31 percentage points, i.e., reassuringly very close to the effect measured with our logit estimation. The same applies for the relative stock of establishments in the ZFU area. In Column (2), we interact the treatment dummy with our proxy for the relative attractiveness of the ZFU. Results indicate that the effect of the policy is positive and significant, and that establishments are more likely to locate in the ZFU part of a municipality when the attractiveness differential between the two zones of the municipality is low (i.e., when the ratio of the number of establishments in the ZFU part relatively to the non-ZFU part of the municipality is high). Regarding the interaction term, it is positive and significant, meaning that the effect of the ZFU policy is magnified when the attractiveness differential between the two parts of the municipality is low. This result suggests that the ZFU policy is less efficient when targeted areas face a very high degree of economic difficulties when compared with the rest of the municipality. Note that the results are very similar when we use the ratio of the total number of establishments as a measure of relative attractiveness.[31]

The impact of the policy might also vary with industry-level characteristics. Identifying the sectors that are mostly affected by the ZFU policy can help policy-makers to redefine targeted policies by taking into account specific responses at the industry level.

In particular, sectors are likely to vary in terms of fixed relocation costs. In sectors where fixed relocation costs are low, the share of relocations in overall plant creations

31. Results available upon request.

Table 11. Heterogeneous effect of the ZFU policy—zone and industry characteristics

Dependent variable Linear probability model	Probability to locate in a ZFU		
	(1)	(2)	(3)
ZFU policy	0.0231***	0.0483***	0.00731**
	(0.00358)	(0.00993)	(0.00311)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0414***	0.0354***	0.0419***
	(0.00706)	(0.00705)	(0.00708)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}} \times \text{ZFU}$		0.00868***	
		(0.00260)	
Mobile industries			−0.0143***
			(0.00387)
Mobile industries × ZFU			0.0336***
			(0.00670)
Municipality fixed effects	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes
Observations	172,443	172,443	172,443
R^2	0.0201	0.0205	0.0211

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities with second generation ZFUs (i.e., hosting a ZFU in 2004) are included in the analysis. All these estimations rely on a linear probability model and include municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

should be high $\left(\frac{\text{relocations}}{\text{relocations}+\text{'pure'creations}}\right)$.[32] We can expect that such sectors are more responsive to location subsidies, since it is relatively easier for establishments to change location. For each establishment creation, we know in our dataset whether the new plant corresponds to a 'pure' creation or to the relocation of an existing plant. For a given three-digit sector, we thus use the share of relocations among establishment creations over the period 1995–2007 in all municipalities in France as a proxy for mobility at the industry level. In order to avoid any bias in our measure due to the implementation of the ZFU policy, we exclude municipalities obtaining a ZFU over the period. An industry is said to be mobile if the share of relocations in total plants creations is higher than 25%, the median in the sample.[33]

Column (3) in Table 11 shows that the impact of the policy is clearly stronger for establishments active in mobile industries. Indeed, while the implementation of the policy increases the probability that a plant locates in a ZFU by 2.3 percentage point on average, Column (3) shows that this increase is equal to 0.73 percentage point in sectors with high (re)location costs, and to 4.09 percentage point $(0.73 + 3.36)$ in mobile industries.

32. The total number of plant creations depending on fixed (re)location costs, but also on several other factors such as the overall demand addressed to establishments in this sector, etc.
33. For example, wholesalers, medical professions, business services are mobile industries according to our measure. The full list of mobile sectors is available upon request.

In Table A5 in the Appendix, we present the results for each sector separately. They show 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. Consistent with the results presented in Table 11, the Health and the Business services sectors, which exhibit on average high shares of relocations in plants' creations, are sectors for which the impact of the policy is the strongest.

In Table 12, we go further in this direction by estimating the marginal impact of the policy separately for 'pure' creations and for 'relocations', without distinguishing however between sectors.[34] The results show that the impact of the ZFU policy differs for creations and relocations (Columns (1) and (2)). While the marginal impact is positive for both types of establishment location decisions, it is almost five times higher for relocations of existing plants than for 'pure' creations. Columns (3) and (4) further show that the marginal impact of the policy is not significantly different for relocations within the municipality and for inter-municipal relocations (the municipality of origin being also available in the SIRENE dataset in case of relocation).[35]

Together with the heterogeneous impact of the policy depending on establishment mobility within sectors, these results are worrying for the long-run impact of enterprise zones policies. Indeed, plants that can easily relocate to benefit from the subsidies could also easily leave toward a more attractive place once subsidies are not provided anymore.

7. Impact of the ZFU policy on labor market outcomes

In this section, we turn to the evaluation of the effect of the ZFU policy on labor market outcomes. Two dimensions are taken into account: employment and wages. All else equal, in a standard model of labor supply and labor demand, the decrease in labor costs due to the ZFU policy should generate an increased labor demand in targeted zones. This in turns will increase local employment and/or wages depending on the elasticity of the labor supply (partly determined by the geographical mobility of workers). If workers are perfectly mobile and if labor supply is perfectly elastic, at equilibrium, employment should increase in targeted zones without any changes in wages. If labor supply is imperfectly elastic, we might observe an increase in local wages.

7.1. Data and methodology

The analysis relies on administrative data from the 'Déclarations Annuelles de Données Sociales' (DADS)[36] for the period 2002–2007. All firms hiring employees must fill in these declarations related to the social security of their workers. We have data at the

34. Our sample of analysis still includes all establishment locations in municipalities hosting a second generation ZFU over the period 2002–2007. However, we separate creations from relocations of existing establishments. Due to missing information, in some cases, on whether the plant location corresponds to a pure creation or to a relocation, the sum of observations in Columns (1) and (2) is slightly smaller than the number of observations in our benchmark regression.
35. Due to missing observations, the sum of observations in Columns (3) and (4) is slightly smaller than the number of observations in Column (2) of Table 12.
36. Social data managed by the INSEE.

Table 12. Effect of the ZFU policy for creations and relocations

Dependent variable Logit model, marginal effects	Probability to locate in the ZFU			
	Creations	Relocation of existing plants		
		All	Same municipality	Other municipalities
	(1)	(2)	(3)	(4)
ZFU policy	0.0135***	0.0655***	0.0641***	0.0703***
	(0.00282)	(0.00589)	(0.00550)	(0.00859)
$\log \frac{\#\text{ of estab. (same ind.) in ZFU}_{t-1}}{\#\text{ of estab. (same ind.) in non-ZFU}_{t-1}}$	0.0501***	0.0362***	0.0396***	0.0322***
	(0.00354)	(0.00291)	(0.00241)	(0.00497)
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	133,277	38,457	20,650	16,963
Pseudo-R^2	0.1894	0.2101	0.1871	0.2265

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities with second generation ZFUs (i.e., hosting a ZFU in 2004) are included in the analysis. Creations refer to establishments which entered the market. Relocations refer to establishments which already existed but which were located somewhere else. All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

employee level. For each employee, we have information on net wages, as well as on the number of hours worked, which enables us to compute worker-level hourly wages. We also have information on employee characteristics: age, gender, socio-professional category (SPC), nature of the contract (full-time or part-time worker) and whether she is a foreigner or not. We also have information on the SIRET identifier of the establishment employing the worker. This enables us to match worker-level information with plant-level data. We can thus determine which employees belong to the establishments located in targeted areas, and assess the impact of the ZFU policy on both employment and wages.

In the same vein as the analysis on establishment location decisions, our benchmark estimation strategy will rely on spatial and time differencing: we will compare the evolution of employment and wages in the ZFU part and in the non-ZFU part of municipalities hosting second generation ZFUs, before and after 2004. Descriptive statistics on the evolution of employment and wages in the ZFU part and in the non-ZFU part of municipalities hosting second generation ZFUs are presented in Table 13. Regarding employment, differences between the two parts of the municipalities hosting a ZFU are striking. On average, yearly employment is much lower in the ZFU part than in the non-ZFU part of municipalities. This reflects the small size of ZFU areas when compared with the rest of the municipalities, but also the likely higher unemployment rate in targeted areas. More importantly, after 2004, it seems that employment increases much faster in the ZFU part than in the non-ZFU part. Regarding wages, the yearly average net wage in the ZFU part is about 10.52 Euros over the period 2002–2007. It is

Table 13. Evolution of employment and wages in municipalities hosting second generation ZFUs

	ZFU part			Non-ZFU part		
	Over 2002–2007	Before 2004	After 2004	Over 2002–2007	Before 2004	After 2004
Yearly average total employment	1434	1290	1577	53,346	52,683	54,009
Yearly average hourly net wage (in Euros)	10.52	10.15	10.89	10.98	10.58	11.38

Notes: This table presents descriptive statistics on the evolution of employment and wages (before and after 2004) in municipalities hosting a second generation ZFU (hosting a ZFU in 2004).
Source: DADS.

lower than the one observed in the non-ZFU part, which amounts to 10.98 Euros. Moreover, after 2004, it seems to increase at the same pace in both the ZFU part and the non-ZFU part. Therefore, these simple descriptive statistics suggest a positive impact of the ZFU policy on employment, but a limited impact of this policy on wages.

Before turning to the econometric analysis, we have to make it clear that for the wage analysis, we will work on individual wages net of composition effects. Indeed, several factors can explain differences in wages between the ZFU and the non-ZFU parts of municipalities: employees might differ in terms of age, in terms of skills or in terms of jobs. In the same way, the evolution of wages following the implementation of the ZFU policy could be explained by a change in the sectoral composition of the activities in the zone, as suggested by our previous results. In order to assess the impact of the ZFU policy, net of these composition effects, we first estimate a Mincer equation. We can thus recompute individual wages net of individual characteristics. This residual wage is then used in a second step as a dependent variable to evaluate the impact of the ZFU policy on individual wages.

In a Mincer equation, individual wages are assumed to depend on several worker-level characteristics. Regarding the level of education and experience, the DADS data do not provide information on diplomas nor on the year workers entered the labor market. Nevertheless, we have information on the socio-professional category (spc) as well as on the age of individuals, which indirectly enable us to capture education and experience. We therefore estimate the following equation:

$$\ln \text{hourly_net_wage}_{it} = \alpha \ln\ \text{age}_{it} + \beta \ln\ \text{age}_{it}^2 + \sum_j \text{spc}_{ijt} + \gamma \text{imm_EU}_i + \eta \text{imm_nonEU}_i + \mu_{st} + \epsilon_{it}, \tag{3}$$

where the hourly net wage of a worker i at time t depends non-linearly on her age (to capture non-linear returns to experience). We also control for the SPC the worker belongs to: spc_{ijt} is a dummy equal to 1 if the worker i belongs to the category j at time t. We also include dummies for immigrant workers from the European Union and for non-EU immigrant workers, imm_EU_{it} and imm_nonEU_{it}. Finally we also include sector-year fixed effects to capture wage shocks specific to a given sector and a given year. In this framework, ϵ_{it} can be considered as the hourly wage of employee i at time t 'net' of individual characteristics and of time-varying sectoral shocks.

This Mincer equation is estimated separately for men and women at the national level. Given the huge amount of observations, the sample used for this first step is actually a random selection of 1/12 of the observations in each region. The estimated parameters are then used to compute the residual wage of employees located in municipalities hosting second generation ZFUs.[37]

7.2. Impact of the ZFU policy on local employment

In order to assess the impact of the ZFU policy on local employment, we follow our previous empirical strategy. We compare the evolution of employment in city blocks that pertain to ZFUs to the evolution of employment in non-ZFU city blocks.

The estimated equation for the difference-in-difference is the following:

$$\ln \text{ employment}_{bt} = \beta(\text{zfu2004} \times \text{post2004})_{bt} + \mu_b + \delta_t + \epsilon_{bt}, \tag{4}$$

where employment_{bt} is the level of employment in city block b at time t. City block fixed effects μ_b capture differences across city blocks that are constant over time, including the fact that some of them belong to the part of the municipalities that will become a ZFU area. δ_t takes into account macroeconomic shocks which could affect the evolution of employment in these municipalities, whatever the ZFU status of the city blocks. Finally, $(\text{zfu2004} \times \text{post2004})_{bt}$ is a dummy variable equal to 1 after 2004 for city blocks belonging to ZFU areas. This is our variable of interest. β is obtained by comparing the evolution of employment before and after 2004 in ZFU city blocks and in non-ZFU city blocks.

The impact of the ZFU policy on employment is positive and significant, as shown in Column (1) of Table 14. The policy increases employment in targeted zones by 24% on average. In Columns (2) and (3) we repeat the analysis separately for 'low-wage' and 'high-wage' jobs. Indeed, social contribution exemptions only apply to the portion of wages below 1.4 the legal minimum wage. Since it decreases the cost of 'low-wage' workers relative to 'high-wage' workers, the ZFU policy might have a different impact on the demand for both types of workers. We thus distinguish workers whose hourly net wage is below and above 10 Euros per hour.[38] Results confirm our expectations: the impact of the ZFU policy on employment is stronger for low-wage than for high-wage jobs (Columns (2) and (3)).

We also carry out a margin decomposition of employment growth and analyze the effect of the ZFU policy on employment depending on the status of the plants: stayers, entrants and exiters in a given year over the period 2003–2007. As evidenced in Table 15, the ZFU policy has a positive impact on employment in incumbent plants (stayers). It also triggers job creations thanks to newly located plants (entrants). However, results also suggest that job destructions are more important in ZFU areas than in non-ZFU areas after 2004 (exiters). Still, the effect on job destructions is less important than the effect on job creations. In the end, employment increases in ZFU areas when compared with the non-ZFU part of municipalities thanks to both incumbent plants (intensive margin) and net entry of new plants (extensive margin).

37. In all these datasets, we keep the employees who are between 15 and 65 years old and who work in the private sector (except financial intermediation, insurance, post and telecommunications and agricultural sectors). We also clean up the data and eliminate the top 3% and bottom 3% in terms of hourly wages, as in Combes et al. (2008).
38. About 1.4 times the minimum wage representing around 9 Euros over the period.

Table 14. Impact of the ZFU policy on local employment

	Total employment (1)	Low-wage workers (2)	High-wage workers (3)
ZFU 2004 × Post-2004	0.237***	0.251***	0.109***
	(0.0236)	(0.0238)	(0.0175)
City block fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	101,094	101,094	101,094
R^2	0.0069	0.0114	0.0342

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the annual employment of city blocks over the period 2002–2007. The dependent variable is the annual log of employment at the city block level. Only second generation ZFUs are included in the analysis. Low-wage workers refer to employees with a net wage lower than 10 Euros, and high-wage workers refer to employees with a net wage higher than 10 Euros. All regressions include year and city block fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

Table 15. Margin decomposition of the impact of the ZFU policy on local employment

	Total employment (1)	Employment of stayers (2)	Employment of entrants (3)	Employment of exiters (4)
ZFU 2004 × Post-2004	0.224***	0.179***	0.301***	0.187***
	(0.0236)	(0.0265)	(0.0305)	(0.0281)
City block fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	84,245	76,560	63,255	67,480
R^2	0.0063	0.0316	0.0445	0.1652

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the annual employment of city blocks over the period 2002–2007. The dependent variable is the annual log of employment at the city block level. For a given year t, 'stayers' refers to employment in establishments active in t and in t–1, 'entrants' refers to employment in establishments active in t but not in t–1 and 'exiters' refers to employment in plants active in t–1 but not in t. Only second generation ZFUs are included in the analysis. All regressions include year and city block fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

7.3. Impact of the ZFU policy on wages

In order to assess the impact of the ZFU policy on individual wages, we implement a difference-in-difference approach, using workers in the non-ZFU part of the municipality as a control group.[39]

39. We consider the workers who are working in plants that were already present in the municipalities before the implementation of the policy only. Indeed, we want to avoid composition effects due to different wage settings in newly created plants.

The estimated equation for the difference-in-difference is the following:

$$\ln \text{wage}_{izct} = \alpha(\text{zfu2004})_{iz} + \beta(\text{zfu2004} \times \text{post2004})_{izt} + \mu_c + \delta_t + \epsilon_{izct}, \tag{5}$$

where wage_{izct} is the individual hourly net wage 'corrected' for individual characteristics. zfu2004_{iz} is a dichotomic variable identifying, whatever the year, employees working in plants located in ZFU areas; α enables us to measure structural differences in residual wages between ZFU and non-ZFU areas. Municipality fixed effects μ_c capture differences in wages between municipalities hosting second generation ZFUs. Year dummies δ_t take into account macroeconomic shocks which could affect the evolution of wages in all these municipalities. Finally, $(\text{zfu2004} \times \text{post2004})_{izt}$ is a dummy variable equal to 1 after 2004 for employees working in ZFU areas only. This is our variable of interest, β being estimated by comparing the evolution of wages before and after 2004, in the ZFU part and in the non-ZFU part of a given municipality.

Results in Table 16 show that overall, the ZFU policy has no significant impact on wages, with a coefficient very close to 0 (Column (1)). However, the effect is heterogeneous across workers. Insignificant for low-wage workers, it is negative and significant for high-wage workers. Before the implementation of the policy, these workers were actually benefiting from a residual-wage premium when compared with similar workers in the non-ZFU part of the municipality, maybe due to tougher working conditions and to a less attractive working environment in these deprived areas. However, this premium tends to decrease following the implementation of the ZFU policy. This is consistent with the results on local employment. We have shown that the ZFU policy positively affects local employment, especially low-wage employment. Hence, the relative demand for high-wage workers decreases in ZFU areas after the implementation of the policy, which induces a relative decrease of their wage. The absence of any effect on the wages of low-wage workers suggests that the labor supply of these workers has been elastic enough to satisfy the increased demand.

8. Conclusion

In this article, we evaluate the impact of a French enterprise zone program, the 'ZFU' policy, on establishment location decisions and on labor market outcomes.

Our results show that the French ZFU policy has a positive and sizable impact on the probability that establishments locate in targeted urban districts: the marginal impact of the policy corresponds to an increase in this probability by 27% when compared with its pre-treatment level. This effect is robust to different estimation strategies, both in terms of significance and in terms of magnitude of the coefficients. However, the 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 enterprise zones may be less efficient for the most distressed urban neighborhoods. Second, the effect is stronger for industries where plants are highly mobile. This suggests that the long-run benefits of such programs might be low. Finally, the results reveal that the policy does not create economic activities *per se* at the municipality level; it leads to a diversion of economic activities toward the targeted zones within municipalities. As for labor market outcomes, our results indicate that the ZFU policy has a positive impact on local employment, especially for 'low-wage' jobs. The wages of low-wage workers are not

Table 16. Impact of the ZFU policy on wages

	Dependent variable: Wage		
	All workers (1)	Low-wage workers (2)	High-wage workers (3)
ZFU 2004	0.00964	−0.00805	0.0550**
	(0.0102)	(0.0100)	(0.0224)
ZFU 2004 × Post-2004	−0.00819	−0.00327	−0.0224**
	(0.00615)	(0.00482)	(0.0109)
Municipality fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	2,924,914	1,571,701	1,353,213
R^2	0.0145	0.0106	0.0330

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the annual wage of individual workers over the period 2002–2007. The dependent variable is the log hourly net wage (net of individual characteristics). High-wage refers to wages superior to 10 Euros. Low-wage refers to wages inferior to 10 Euros. Only second generation ZFUs are included in the analysis. All regressions include year and municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

affected, suggesting a highly elastic labor supply. On the opposite, the wages of high-wage workers decrease in relative terms after the implementation of the policy. This is in line with the decrease in the relative demand for high-wage workers caused by the policy.

In order to have a comprehensive view of the welfare consequences of the policy, some other dimensions should be investigated. On the one hand, the positive effects of the policy might be counterbalanced by negative effects that can hardly be taken into consideration given the data that are available currently. First, the entry of establishments in targeted zones might induce a rise in real estate prices, which could be detrimental to zone residents and to firm entry in these zones in the long run. Moreover, it would be interesting to know whether establishments entering targeted zones leave and relocate in less deprived areas as soon as they do not benefit from tax exemptions anymore. It would also be useful to study the mortality rate of establishments entering targeted zones. Finally, attracting new establishments in depressed urban areas might improve the reputation and the quality of life in these zones; beyond economic outcomes, this could have a positive social impact on zone residents. Trying to quantify these various effects seems an important avenue for future research on enterprise zones.

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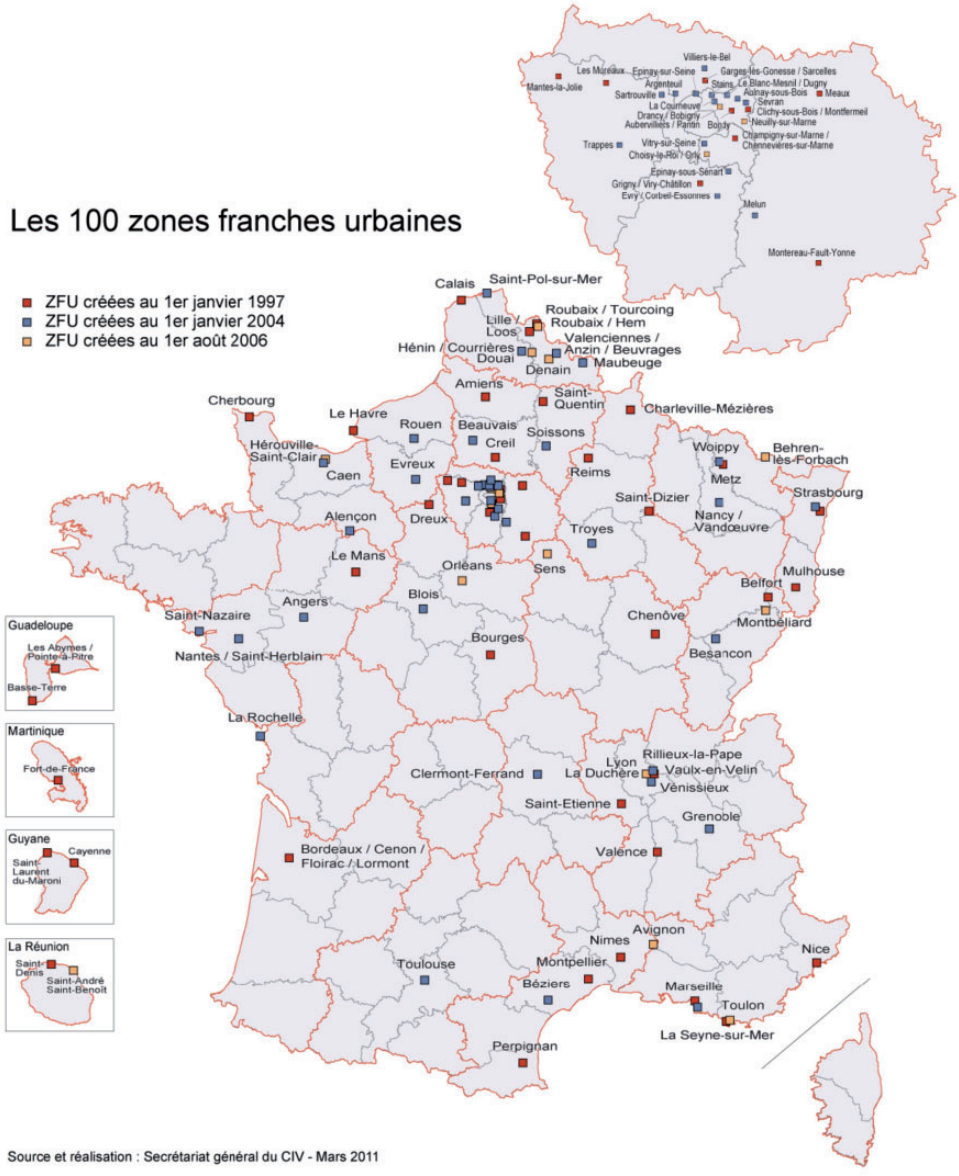

Figure A1. Maps of ZFU areas in France.
Notes: First generation ZFUs (designed in 1997) are represented in red, second generation ZFUs (designated in 2004) are represented in blue and third generations ZFUs (designated in 2007) are represented in yellow.
Source: 'Secrétariat général du comité interministériel des villes' (SGCIV).

Appendix

A. The French program: ZUS, ZRU and ZFU

In 1996, the French government launched the 'Pacte de relance de la ville' which defines three types of zones: (i) the sensitive urban zones (ZUS), (ii) the revitalisation urban

Table A1. Tax exemptions in ZUSs, ZRUs and ZFUs

Nature of exemption	Zone urbaine sensible (ZUS) Conditions	Zone de redynamisation urbaine (ZRU)		Zone franche urbaines (ZFU)	
		Length of exemption	Conditions	Length of exemption	Conditions
Tax on corporate profits	Only if local authorities have agreed on this and limited to firm creations which locate in a ZUS	Total for 2 years, at a decreasing rate for the next 3 years	Only applies to firm creations in which headquarters and plants locate in a ZRU	Total during 5 years, with possible extension during 3–9 years depending on the number of employees	Limited to establishments located in a ZFU belonging to firms with less than 50 employees and with a turnover lower than 10 million Euros
Business tax	No	Total up to 5 years, with possible extension at a decreasing rate during 3 years	Limited to establishments located in a ZRU with less than 150 employees	Total during 5 years, with possible extension during 3–9 years depending on the number of employees	Limited to establishments located in a ZFU belonging to firms with less than 50 employees and with a turnover lower than 10 million Euros
Property tax on built lands	No	Up to 5 years	For establishments located in a ZRU	Total during 5 years	All establishments located in a ZFU
Personal health contribution	No	Up to 5 years	For artisans and shopkeepers located in a ZRU	Total during 5 years	For artisans and shopkeepers located in a ZFU
Employer social contributions	No	Total during 12 months up to 1.5 the minimum wage (then degressive)	For newly created jobs only of establishments located in a ZRU	Total during 5 years (up to 1.4 the minimum wage then degressive), with possible extension	For existing and newly created jobs, subject to a local hiring conditions,[a] in establishments located in a ZFU belonging to firms with less than 50 employees and with a turnover lower than 10 million Euros

[a]Exemptions apply only if one-third of firm's employees reside in the ZUS of the urban agglomeration the ZFU is located in.

Table A2. Evolution of the number of establishments in municipalities with a ZFU

	Dependent variable: number of establishments locations Poisson model (marginal effects)			
	Control group municipalities with a ZFU in 2007			Control group municipalities from the same urban area
	Municipality (overall) (1)	ZFU part (2)	Non-ZFU part (3)	Municipality (overall) (4)
Year 2003 × Dummy ZFU 2004	−0.00192	−0.0135	−0.000662	0.0176
	(0.0170)	(0.0530)	(0.0174)	(0.0114)
Year 2004 × Dummy ZFU 2004	0.0100	0.187**	−0.00946	0.00616
	(0.0272)	(0.0786)	(0.0264)	(0.0147)
Year 2005 × Dummy ZFU 2004	0.00307	0.241***	−0.0248	0.00630
	(0.0248)	(0.0885)	(0.0253)	(0.0152)
Year 2006 × Dummy ZFU 2004	−0.0147	0.175**	−0.0385*	−0.0186
	(0.0212)	(0.0833)	(0.0208)	(0.0186)
Year 2007 × Dummy ZFU 2004				−0.0256
				(0.0261)
Year fixed effects	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	415	415	415	3500
Number of municipalities	83	83	83	600

Notes: Each column reports the estimate of the effect of second generation ZFUs (hosting a ZFU in 2004) on the annual count of establishment locations (flow) over the period 2002–2007. Reference year is 2002 and year 2007 is excluded as it corresponds to the year third generation ZFUs are designated. In Column (1), the dependent variable is the count of new establishments at the municipality level, using as a control group municipalities hosting a ZFU in 2007. In Columns (2) and (3), the dependent variable is the count of new establishments locating in the ZFU part and the non-ZFU part, respectively, using as a control group their counterparts in municipalities hosting a ZFU in 2007. In Column (4), the dependent variable is the count of new establishments at the municipality level, using as a control group municipalities from the same urban area which never benefit from the ZFU policy. All these difference-in-difference estimations rely on a Poisson model and include municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

zones (ZRU) and (iii) the urban enterprise zones (ZFU). These zones are facing an increasing degree of economic and social difficulties and benefit therefore from different packages of tax exemptions.

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

Among these ZUSs, 416 were classified as *ZRU* (*Zones de Revitalisation Urbaine*). They face stronger difficulties than the other ZUSs. These difficulties are assessed thanks to an 'index' taking into account economic characteristics and social

Table A3. Effect of the ZFU policy on the probability to locate in a (future ZFU)—linear probability model

Dependent Variable: Probability to locate in the ZFU part of a municipality								
Linear probability model								
	Benchmark		Difference in difference		Creations	Relocation of existing plants		
						All relocations	Same municipality	Other municipalities
ZFU policy	0.0260***	0.0231***			0.0132***	0.0573***	0.0560***	0.0616***
	(0.00406)	(0.00358)			(0.00293)	(0.00830)	(0.00876)	(0.0103)
$\log \frac{\text{Nb of establishments (same ind.) in ZFU}_{t-1}}{\text{Nb of establishments (same ind.) in non-ZFU}_{t-1}}$		0.0414***		0.0425***	0.0438***	0.0327***	0.0381***	0.0284***
		(0.00706)		(0.00613)	(0.00758)	(0.00608)	(0.00664)	(0.00684)
Post-2004			0.00268	0.00527				
			(0.00326)	(0.00385)				
Post-2004 × Municipality ZFU in 2004			0.0194***	0.0165***				
			(0.00495)	(0.00511)				
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	172,443	172,443	181,349	181,349	133,277	38,457	20,650	16,963

Notes: This table reproduces our benchmark estimations using a linear probability model (rather than a logit model). Each column reports the estimate of the effect of second generation ZFU (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007 for different sample, control group and type of firms. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Columns (1) and (2) correspond to Columns (1) and (3) of Table 5. Columns (3) and (4) correspond to Columns (1) and (2) of Table 8. Columns (5), (6), (7) and (8) correspond, respectively, to Columns (1), (2), (3) and (4) of Table 12. All these estimations rely on a linear probability model and include municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

Table A4. Effect of the ZFU policy on mono-establishment and zero-employee firms

Dependent variable Part (logit model, marginal effects)	Probability of location in a ZFU			
	Benchmark sample (1)	Firms for which there is information on size (2)	Mono-establishment firms (3)	Firms with zero employees (4)
ZFU policy	0.0241***	0.0270***	0.0234***	0.0227***
	(0.00309)	(0.00400)	(0.00387)	(0.00433)
$\log \frac{\text{Nb of establishments (same ind.) in ZFU}_{t-1}}{\text{Nb of establishments (same ind.) in non-ZFU}_{t-1}}$	0.0470***	0.0374***	0.0458***	0.0353***
	(0.00301)	(0.00662)	(0.00721)	(0.00717)
Municipality FE	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes
Observations	172,443	124,638	118,217	62,919
Pseudo-R^2	0.1908	0.0190	0.0215	0.0152

Notes: Each column reports the estimate of the effect of second generation ZFU (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007. Each column corresponds to a different sample (which changes according to firm characteristics). The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities of the second generation (i.e., hosting a ZFU in 2004) are included in the analysis. All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.

conditions in the zones. This index remains the main criterion for the selection of ZRUs. It is based on the number of inhabitants, the unemployment rate, the proportion of population under 25 years old, the share of population above 15 years old without any diploma and the tax base in the area. The computation of the index relied on the availability of data at that time (population census of year 1990 and tax base of year 1996).

Finally, the *ZFUs* were chosen among the biggest (more than 10,000 inhabitants) and the most deprived ZRUs and were designated in three waves. The first 44 ZFUs were created in 1996 and correspond to existing ZRUs. The second generation (41 ZFUs), created in 2004, was also selected among ZRUs, but their spatial boundaries do not necessarily match the ones of ZRUs. The same applies to the 15 ZFUs created in 2007, but for them, the population threshold was lowered to 8500 inhabitants.

Details of tax exemptions in ZUS, ZRU and ZFU are presented in Table A1. As it can be seen, ZFU areas benefit from the highest package of tax incentives.

Table A5. Effect of the policy by sector

Dependent variable Part (logit model, marginal effects)	Probability of location in a ZFU				
	Manufacturing (1)	Construction (2)	Hotel and restaurant (3)	Retail and cars (4)	Transports and communications (5)
ZFU policy	0.0285***	0.0190**	0.00470	0.0167***	0.0234***
	(0.00618)	(0.00750)	(0.00386)	(0.00406)	(0.00871)
$\log \frac{\text{Nb of estabs (same ind.) in ZFU}_{t-1}}{\text{Nb of estabs (same ind.) in non-ZFU}_{t-1}}$	0.0218***	0.0749***	0.0200***	0.0502***	0.0501***
	(0.00336)	(0.00833)	(0.00355)	(0.00205)	(0.0101)
Municipality FE	Yes	Yes	Yes	Yes	Yes
Cluster (municipality level)	Yes	Yes	Yes	Yes	Yes
Observations	11,519	27,586	16,423	57,941	9181
Pseudo-R^2	0.1780	0.1119	0.2196	0.1929	0.1442
	Business services	Education	Health	Collective services	
	(6)	(7)	(8)	(9)	
ZFU policy	0.0376***	0.0185***	0.0564***	0.0107**	
	(0.00506)	(0.00708)	(0.00755)	(0.00457)	
$\log \frac{\text{Nb of estabs (same ind.) in ZFU}_{t-1}}{\text{Nb of estabs (same ind.) in non-ZFU}_{t-1}}$	0.0267***	−0.0349***	0.0126	0.0116***	
	(0.00285)	(0.0104)	(0.0165)	(0.00381)	
Municipality FE	Yes	Yes	Yes	Yes	
Cluster (municipality level)	Yes	Yes	Yes	Yes	
Observations	61,581	3771	18,998	13,467	
Pseudo-R^2	0.1996	0.2108	0.2888	0.1803	

Notes: Each column reports the estimate of the effect of second generation ZFU (hosting a ZFU in 2004) on the probability that an establishment locates in the ZFU part of municipalities over the period 2002–2007 in a given industry. The dependent variable is a dummy equal to 1 if an establishment locates in the (future) ZFU part of municipalities and equal to 0 if an establishment locates in the part of the municipalities that will never be a ZFU. Only municipalities of the second generation (i.e., hosting a ZFU in 2004) are included in the analysis. All these estimations rely on a logit model with municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. Statistically significant * at the 0.10 level; ** at the 0.05 level and *** at the 0.01 level.