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Can Tax Breaks Beat Geography?
Lessons from the French Enterprise Zone Experience

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Abstract: This paper demonstrates that geography matters to the effectiveness of place-based policies, using the French enterprise zone program as a case study. Using a series of indicators of spatial isolation for treated and non treated neighborhoods, we show that geographical heterogeneity determines the ability of the program to impact firms' settlements, job creation and earnings. In particular, whereas a focus on the average impact of the program would lead to the conclusion that it mostly succeeded in displacing pre-existing firms, a lower level of spatial isolation was a clear determinant of the decision to create new firms from scratch.

Résumé: Les travaux d'évaluation de la politique des Zones Franches Urbaines (ZFU) montrent que celle-ci a eu un impact limité sur les implantations d'établissements et le taux de chômage local. Cet effet moyen modeste masque cependant une forte hétérogénéité d'une ZFU à l'autre. La présente étude vise à évaluer dans quelle mesure le degré d'isolement spatial des quartiers conditionne l'efficacité de la politique des ZFU, et son impact sur les créations et les transferts d'établissements, ainsi que sur l'emploi, le nombre d'heures travaillées et les salaires. Pour ce faire, des modèles rapprochant la variable de traitement (être en ZFU) d'une série d'indicateurs originaux rendant compte de l'enclavement des quartiers sont estimés par la méthode des doubles différences. Les résultats indiquent que cet isolement conditionne effectivement la performance de la politique des ZFU : les zones les moins enclavées parmi celles ciblées par cette politique en ont davantage bénéficié. En outre, si les classements en ZFU se sont traduits majoritairement par un effet de déplacement d'entreprises préexistantes, la géographie urbaine a été un déterminant très net de la décision de créer de nouvelles entreprises.

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Abstract

This paper demonstrates that geography matters to the effectiveness of place-based policies, using the French enterprise zone program as a case study. Using a series of indicators of spatial isolation for treated and non treated neighborhoods, we show that geographical heterogeneity determines the ability of the program to impact firms' settlements, job creation and earnings. In particular, whereas a focus on the average impact of the program would lead to the conclusion that it mostly succeeded in displacing pre-existing firms, a lower level of spatial isolation was a clear determinant of the decision to create new firms from scratch.

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Introduction

The evaluation of enterprise zone (hereafter, EZ) programs has generated a lot of research since the early nineties, with conflicting conclusions regarding their effectiveness. However, the reasons why some programs have worked somewhere while other apparently similar programs have failed elsewhere is seldom investigated. In this paper, we argue that one important component of this heterogeneity is urban geography: the location of targeted neighborhoods within cities, which ultimately determines the ease at which people circulate into and out of those neighborhoods, does matter to reap benefits from EZ programs. At the intra-urban scale, the location of a neighborhood may not be well proxied by a mere combination of relative distance and population. It also depends on access to transportation infrastructure as well as on physical elements which create urban severance -natural obstacles, industrial wastelands or even, paradoxically, large transportation infrastructures such as highways or airports which are often irrelevant to local residents and local firms. As emphasized by Button (2010):

> "Roads, railways, canals and other transport arteries often present major physical (and sometimes psychological) barriers to human contact. An urban motorway can cut a local community in two, inhibiting the retention of long-established social ties and, on occasion, making it difficult for people to benefit from recreational and employment opportunities on the other side of the barrier. A rail line can do the same." (op. cit., p.186)

Whereas people-based programs are increasingly believed to dominate place-based programs on a whole range of criteria (Glaeser and Gottlieb (2008)), they cannot be used to address large-scale social exclusion in the poorest neighborhoods. Therefore, if place-based programs such as EZ are also shown to be inefficient, there is room for concern. For this reason, understanding why EZ programs work in some places and not others is crucial to crafting effective place-based policies. It can help establish criteria for zone qualification and for determining what types of incentives to offer and to whom. Finally, this question also relates to the issues of transferability and scalability of this kind of programs, which may turn out to be pretty low if geography, which is not easily modified in the short run, is an important determinant of their overall effectiveness.

The first evaluations of the French "Zones Franches Urbaines" program (hereafter, ZFU) did not yield very optimistic conclusions, since they only found a small short-run positive impact, either on firm and job creation rates (Rathelot and Sillard (2008)), or on unemployment duration (Gobillon, Magnac, and Selod (2012)). In their conclusions, both studies hypothesize that such a weak effect may be partly due to the large spatial heterogeneity in the effectiveness of the program between ZFUs and advocate in favor of a better targeting of the program. We seek to recover part of this unexplained heterogeneity by comparing the geographical characteristics of the ZFUs, and in particular, their level of isolation with respect to the rest of the city. The impact of physical obstacles on the functioning of the city has long been acknowledged by urban planners and geographers. For instance, as early as 1961, Jane Jacobs started pointing out that monofunctional enclaves and large transportation infrastructures were increasingly leading to a new form of city-carving and posed a threat to urban cohesion, in particular if the neighborhoods were small and not diversified enough (Jacobs (1961)). Five decades later, however, the quantitative research on this matter is still sparse because the measure of urban severance remains an empirical challenge, compounded by the ambiguous role of transportation infrastructures and the necessity to take the mobility of residents into account. As noted by Handy (2003), "whether transportation facilities will serve as borders, barriers, or gathering spots depends in part on how residents perceive and react to these facilities". Similarly, Button (2010) explains that the best indicator of urban severance would include a measure of the number of suppressed trips induced by the obstacles, which requires the use of subjective individual surveys and is more in line with a monographic approach of the question. The same difficulties are observed in a recent French work, for which a careful case-by-case cartography of urban severance remains the endpoint of the analysis (Héran (2011)).

As far as we are concerned, we believe that there is enough good-quality information available to document urban isolation in a systematic fashion, for very different neighborhoods all across France, and to establish meaningful statistical relationships out of such indicators. For this purpose, we perform a Geographical Information System (GIS hereafter) analysis on a topographical map of France to construct a series of indicators which account for spatial isolation. For instance, we compute an index of the road severance preventing the inhabitants, the employees and the firms of a neighborhood from acceding easily to the closest Central Business Districts of the city. These indicators of spatial isolation enable us to precisely document the level of geographical heterogeneity within the set of French neighborhoods that benefit from the ZFU program. We show that geographical heterogeneity can contribute to explain why the average impact of the program is weak and may help reconcile conflicting results from previous studies.

We estimate a series of augmented Difference-in-Differences models (hereafter, DiD) in which we compare the treated ZFUs to a control group formed by similar areas that filled all the eligibility criteria but were not selected into the program. To understand the differentiating role of geography, we interact the treatment indicator with indices that aggregate our indicators of spatial isolation. Our estimates, which can be interpreted as in a triple-difference framework, indicate that spatial isolation does matter to explain spatial differentials in job and establishment creation or transfer rates across ZFUs. For instance, on average between 2004 and 2006, the establishment settlement growth rate in the areas selected to become ZFU in 2004 was 8.5% points above the establishment settlement growth rate in the unselected similar areas. However, this result was entirely driven by the least spatially isolated ZFUs: splitting the sample of neighborhoods in half according to a general index of spatial isolation, one could see that the less isolated half of the population of ZFUs witnessed a 16% increase in the establishment inflow growth rate, while the other half did not see its situation improve at all relative to similar unselected areas.

We also examine whether the effectiveness of the program differs across production sectors in the neighborhood. Previous works, such as Freedman (2013), have indeed put the emphasis on the fact that the somehow modest positive effect of EZ programs was triggered by the low and middle-paying jobs created in the goods-producing, retail, and wholesale trade industries. A sectoral analysis is called for here in order to study whether economic activities that do not really require to be operated within the zone, because they are intrinsically mobile and/or because they are labor-intensive, are sensitive to the level of spatial isolation of the neighborhoods. In the French situation, this is notably the case of the medical sector. Medical firms, which often operate outside of the zone, are both more impacted by the ZFU program on average and more sensitive to spatial isolation than, for instance, firms in the manufacturing sector.

The rest of the paper is organized as follows: Section 1 introduces the ZFU program; Section 2 describes our measures of spatial isolation at the neighborhood level; Section 3 explains our empirical strategy to evaluate the effectiveness of the ZFU program on different economic variables and the role played by spatial isolation in this respect; in Section 4, we present and discuss our results, while Section 5 concludes.

1 The ZFU program

The ZFU program has become one of the most prominent place-based policies in France. In this section, we briefly document the history of this program, describe its content in terms of tax breaks and discuss the existing evidence regarding its effectiveness and its possible relationships with urban geography.

1.1 History

In the past four decades, spatial disparities have peaked within French cities and their dramatic consequences in terms of segregation, exclusion and eventually juvenile delinquency and violence have constantly called for innovative political responses. The pioneer program of integrated community development "Développement Social des Quartiers" (Social Community Development) in 1981 had been met with little success and in 1996, an even more comprehensive set of measures entitled "Pacte de Relance de la Ville" (City Stimulus Pact), was implemented. Like other concomitant programs around the world, it was designed to generate a Big Push in favor of the most distressed areas.[1]

The enterprise zone program ZFU was the most ambitious component of this pact. It was based on the ultimate level of a three-tier zoning system of deprived neighborhoods: the first-tier level, composed of 751 Urban Sensitive Zones ("Zones Urbaines Sensibles" or ZUS) was initially formed by urban neighborhoods with a derelict housing stock and a low job-to-resident ratio. Among them, 416 Urban Revitalization Zones ("Zones de Redynamisation Urbaines" or ZRU) were more carefully targeted. The selection of these new zones was supposed to stem from their respective ranking according to a synthetic index aggregating the total population of the area, the unemployment rate, the proportion of residents with no qualification, the proportion of residents under the age of 25, and the tax potential of the hosting municipality.[2] Finally, the

[1]The most notable examples include the Social City program in Germany, the Big City program in Netherlands, the National Strategy for Neighborhood Renewal in Great-Britain and the HOPE IV program in the US.

[2]The tax potential is defined as a theoretical product of local taxes for the municipality in case the average national rate were applied to the municipality for each of the local rates. Many countries have adopted similar multi-dimensional indices to target their most distressed neighborhoods. For instance, the British government uses an *Index*

44 ZRUs that seemed to be the most underprivileged were declared ZFU (subsequently, these would be known as the first-generation of ZFUs or ZFU1Gs). Firms which entered a ZRU or a ZFU could benefit from various tax breaks and other social exemptions, yet, as detailed below, the generosity of these rebates was much higher in ZFU. Moreover, whereas these rebates were designed to be limited in time, they were postponed in practice, so that all ZFUs were still active in 2012.

A second wave of 41 ZFUs (hereafter, ZFU2Gs) was created in 2004, out of the stock of ZRUs that had not been designated ZFU1G. Whereas this second selection was officially supposed to be based on objective social and demographic criteria, it was mostly driven by the political desire to achieve a more even scattering of the ZFUs across France. Givord, Rathelot, and Sillard (2013) show that, depending on the criterion, ZFU2Gs could be depicted as better-off, worse-off or very similar to the other ZRUs. In the sense that political considerations came into play, the selection of the ZFU2Gs out of remaining ZRUs was close to random, which makes a DiD approach particularly justified. For this reason, our evaluation of the ZFU program will be focused on this second wave: we will consider ZFU2Gs as the treated group, which we will compare to the set of non-selected ZRUs.

Finally, while the program had never really been evaluated, 15 new ZFUs were added in 2006 (ZFU3Gs). By that time, the annual cost of the program reached more than half a billion euros. The cost of ZFU2Gs alone amounted to 125 million euros in 2005.[3] The final (and current) 100 ZFUs (93 in continental France: 38 ZFU1Gs, 41 ZFU2Gs and 14 ZFU3Gs) represent 1.5 million inhabitants (against 4.4 in ZUS, and 2.9 in ZRU), and they are mostly located in large cities (See Figure 10 in Appendix A for details). All ZFUs without exception are part of a metropolitan area (hereafter, MA).[4] Overall, 25 ZFUs are located within the Parisian MA, which is peculiar, and 9 more are located in the next three largest MA (4 in Lyon, 2 in Marseilles and 3 in Lille). Until now, and despite little proof of their success, French politicians across the board do not seem to get enough of ZFUs.[5] Given this political reality, one can but hope for a better targeting of the ZFU program, which happens to be the main message of this paper.

1.2 The ZFU tax package

In ZUS, local authorities are empowered to decide that firms should benefit from tax exemptions. However, these exemptions are very limited (to real estate contributions, notably) and the fiscal

of Multiple Deprivation based on the aggregation of seven dimensions.

[3] According to the first evaluation by Rathelot and Sillard (2007), this represents an average cost of 31,250 euros by job created or, equivalently, 208,000 euros by new firm.

[4] French metropolitan areas ("Aires Urbaines") are defined around a city-pole with more than 5,000 jobs and a group of surrounding municipalities polarized around this pole, in which at least 40% of the MA workforce is employed.

[5] In 2009, the government called for a systematic evaluation of the program aimed to help decide whether it should be terminated or not. Four research teams were selected to study different aspects of the program, with an expected completion date in January 2012. However, in July 2011, a political report came out, signed by one of the most vocal proponents of enterprise zones and, in October 2011, the program was officially renewed for five more years. The change of majority in May 2012 did not modify the general political credo and another report, released in May 2013, argued that the impact of the program was underestimated because the existing evaluations did not take all the relevant dimensions into account and also recommended that it be extended until December 2017.

component of the ZUS part of the program is only marginal. This is the case of the ZRUs and the ZFUs programs, which include comprehensive tax packages. However, the overall package is far more generous in ZFU in terms of exemptions from the three major taxes and contributions: social contributions, taxes on corporate profits and business tax.

- **Employer social contributions**: in ZRU, the exemption only applies to incoming workers who are hired for at least a year and lasts one year. In ZFU, while it is subject to a restriction whereby one new worker out of three must be living in the targeted neighborhood, the exemption is total for five years, and decreasing over a period that runs between three and nine additional years;[6]
- **Tax on corporate profits**: in ZRU, the exemption is total for the first two years and decreasing over the next three years whereas in ZFU, it is total for the first five years and decreasing over the next nine years;[7]
- **Business tax**: the exemption is total for the first five years and may be extended, at a decreasing rate, to three additional years in ZRU; this can be extended up to an additional 9 years in ZFU.

Firms in both types of neighborhoods may also be exempt from property tax on existing buildings and from individual social contributions that apply to self-employed craftsmen and salesmen (for up to five years). A minor addition in ZFU is that transaction costs related to the purchasing of a business or a clientele (for medical professions, for instance) are also reduced.

Compared to other similar programs, especially in the US, the ZFU program is very large, both in terms of range (the entire country) and in terms of the magnitude of the tax rebates. The total cost of State Enterprise Zones, Federal Empowerment Zones, and Federal Enterprise Community programs combined amounted to 1.21 billion dollars in 2006 (Ham, Swenson, Imrohoroglu, and Song (2011)), whereas for the same year the total cost of the ZFU program alone amounted to 472 millions euros or equivalently, 5.6 millions euros by ZFU, 1,800 euros by ZFU worker or 360 dollars by ZFU resident.This may be partly explained by the French tradition of place-based programs and of larger public interventions in general.[8] By way of comparison, in the famous Colorado EZ program, the most notable exemption was a 3% tax rebate for investment purposes, which cost 1.25 million dollars a year between 1986 and 2000; in Californian EZ, exemptions amount on average to 240 dollars per worker in 2005 and in the UK, the Local Enterprise Growth Initiative was equivalent to a 60-pound annual subvention to each working-age resident.

[6] In both cases, it applies to firms with less than 50 employees; in ZFU, the firm's turnover must also be lower than 10 millions euros.

[7] There are some sectoral restrictions, which for instance exclude the banking, finance, insurance, housing and sea-fishing sectors; however, these are minor restrictions given the sectoral mix in these neighborhoods (see section 4.3 for details).

[8] For a thorough comparison of French and US urban public policy, see Donzelot, Mével, and Wyvekens (2003).

1.3 Do enterprise zone programs work? And should they be expected to?

Several mechanisms are likely to prevent EZ programs from having net positive effects (in addition to also seriously complicating their evaluation). First and foremost, one has to bear in mind that place-based policies disrupt complex spatial equilibria and may therefore have serious general equilibrium effects such as capitalization into house prices or unexpected demographic dynamics, both leading to the capture of the subventions by untargeted populations. As shown by Kline (2010), if markets are perfect, these programs will mostly benefit to the agents in control of the real estate market if workers or firms are really willing to respond to their implementation by switching neighborhoods. Paradoxically enough, even though EZ programs are primarily employment programs, they will be less efficient if they impact local unemployment rates, rather than the level of earnings.[9]

Many other negative effects may come into play (see, for instance, Charnoz (2013)). A *spillover effect*, which is almost inherent to any place-based program, may create distortions in favor of the targeted locations, at the expense of other locations, in particular their surroundings. If these diversions are strong enough, the overall impact of the program may even end up negative. In addition, this might create an upward bias in the estimation of the impact of the program if these surroundings are targeted as a control group. Another important mechanism is the *windfall effect*, because the most distressed neighborhoods are often targeted by many competing social programs. If it is the case, one may no longer be able to isolate the net impact of the EZ, which can be close to zero, regardless of the magnitude of the program itself. The third effect, sometimes called *mailbox effect* is even more specific to this type of public intervention: since the criterion to benefit from the program is an address, firms may develop strategies whereby they only open a small office in the neighborhood, but do not really create new activity. This phenomenon could in principle be avoided by a very carefully crafted policy, although in practice, this would require too much monitoring from public authorities. The possible consequence of this effect is to observe a divergence between the impact of the program on firm creation, for example, and employment.[10]

Despite the high level of doubt cast by economic theory upon the potential efficiency of the EZ programs, is it still possible to find a positive impact of this kind of programs in the data? Over the past twenty years, a very large body of empirical research has been conducted to evaluate the impact of US EZ programs, which we will not try to summarize here.[11] These studies are almost all based on more of less sophisticated versions of DiD estimates or propensity score matching estimates. The evidence is mixed. As stated by Lynch and Zax (2011) or Ham, Swenson, Imrohoroglu, and Song (2011), a majority of these studies fail to reject that the program did not have any effect at all. For instance, among many others, Bondonio and Engberg (2000)

[9] We are grateful to a referee for helping us put this question into perspective. On the other hand, Kline and Moretti (2013) show in subsequent work that there is an efficiency rationale for local job creation if labor market imperfections, such as hiring costs, are sufficiently high.

[10] Finally, it is theoretically possible that designation into EZ will have a negative *stigma effect* on the neighborhood's residents. However, we believe this mechanism to be of second order, since most of these neighborhoods are already stigmatized, regardless of their EZ designation.

[11] Careful reviews include Lynch and Zax (2011), Ham, Swenson, Imrohoroglu, and Song (2011), or Busso, Gregory, and Kline (2013).

and Neumark and Kolko (2010) find no sizeable effects of enterprise zones on employment; on the other hand, O'Keefe (2004), or Ham, Swenson, Imrohoroglu, and Song (2011) do find a positive impact on various social and economic outcomes. The long-term impact of these programs may still be partially understudied. In addition, the relevant social outcomes may not always be the most direct economic ones. As shown by Bondonio and Greenbaum (2007), the null average impact of enterprize zone programs may also hide complex dynamics related to firms creation and destruction. A recent study by Busso, Gregory, and Kline (2013) summarizes many of the empirical difficulties that are caused by the existence of general equilibrium effects and convincingly sorts them out, to finally conclude that designation into the first round of the Empowerment Zone program had positive consequences on employment and wage for local workers, and that these effects were not counterbalanced by population inflows or increases in the local cost of living.[12]

Given the important structural differences between the US labor market and the French labor market, the external validity of these (already conflicting) results is low.[13] As already noted, the first evaluations of the ZFU program demonstrated the existence of a small, short-run effect on firm creation, job creation and unemployment duration (Rathelot and Sillard (2008); Gobillon, Magnac, and Selod (2012)). More recent work on ZFU2Gs by Mayer, Mayneris, and Py (2013) or Givord, Rathelot, and Sillard (2013) confirm these findings and stress upon the negative spillovers of the program, which led many preexisting firms to relocate in the targeted locations. Other recent studies try to tackle the more difficult initial selection problem into the first wave of ZFUs in order to assess the impact of the program on a longer time span. Givord, Quantin, and Trevien (2012) show that firms do seem to quickly react to tax cuts, but that this does not translate into better employment conditions on the longer run, which calls into question the capacity of ZFUs to improve the local economy. This conclusion is corroborated by Charnoz (2013), who uses the Labor Force Surveys and does not find any impact of the program on ZFU1G residents' unemployment probability.

1.4 Beyond average treatment effects

As reviewed by Landers (2006), the weak average impact of most EZ programs has often led evaluators to suspect that it was hiding some kind of heterogeneity, pertaining to factors related to the areas in which EZ are located, as well as how EZ are implemented and administered. In an influential policy report, Bartik (2004) makes the case for investigating in this direction, which he argues is necessary for policy-makers to be able to replicate the features of successful programs and conversely, discourage policies that lead to ineffective, or even counterproductive, enterprise zones. However, given the lack of experimental variation in program designs, going beyond average effects, which requires more statistical power than what is usually available in

[12]On the contrary, Freedman (2012) finds that some of the already modest positive impact of the New Markets Tax Credit on low-income neighborhoods are attributable to changes in the composition of residents rather than to improvements in the welfare of existing residents.

[13]Of course, EZ programs have been evaluated in other countries besides the US and France. One recent example is the study by Wang (2013), who evaluates the impact of Chinese Special Economic Zones and finds evidence of both agglomeration economies and wage increases that are not fully offset by increases in local cost of living.

this kind of evaluations, is not an easy task. Bartik (2004) advocates in favor of complementing statistical analysis with outcome impact surveys and focus groups with businessmen who use the program, to assess how the program affected their behavior.

This is the path taken by Kolko and Neumark (2010) who, in a spirit similar to this paper, seek to study how effects vary within the California EZ program. In addition to showing that the program was more effective for zones with a low share of manufacturing employment, the authors also make use of their own survey; they observe that EZ are more able to boost employment when local EZ administrators spend more time in marketing and outreach activities and less time helping firms get hiring tax credits. The authors rationalize these counter-intuitive results by claiming that they may reflect idiosyncrasies of the California EZ program. Unfortunately, although this conclusion is probably the most honest one, it does not really help policy-makers take better-informed decisions. We believe that this otherwise quite interesting study reflects the two problems faced by this line of research. First, since surveys are answered by agents who are part of the process, the information they convey is likely to be biased. As already pointed out by Bartik (2004), firms will always have incentives to claim that assistance, when it takes the form of cash transfers, had an impact on their behavior. Similar caveats are very likely to happen with local politicians or administrators, who care for the sustainability of their job or, less prosaically, for their feeling of social usefulness. Second problem, there must be some kind of theoretical background explaining the possibility of heterogeneous effects. Otherwise, looking for multiple heterogeneous impacts, over a wide range of location characteristics, can quickly turn into data mining and expose to Deaton (2010)'s critique regarding the economic interest of results that are sometimes purely statistical.

In this paper, we look at a fundamentally urban dimension of heterogeneity: the level of geographical isolation of the targeted neighborhoods, which determines the ability of people to circulate between them and the rest of the economy. There are two reasons for doing so. The first is political: spatial isolation of deprived urban neighborhoods, and its corollary regarding the low mobility of their residents, are major obstacles to the successful integration of these populations (see, among dozens of others, Coulson, Laing, and Wang (2001), Zenou (2002) or Patacchini and Zenou (2007)). Table 1 provides descriptive evidence that this lack of mobility is clearly an issue in the case of ZRU/ZFU2G residents, using data drawn from the French National Household Travel Survey (hereafter, ENTD): unemployed residents in ZRU/ZFU2G spend, on average, 0.8 more day a week without setting foot outside their home , than their counterparts who live in other parts of the same city and have the same level of qualifications. One does not see how this gap might not impact their job-searching behavior. In this respect, the purpose of the EZ policy, namely to bring employment into these areas, is as all the more justified in the more isolated neighborhoods. However, even though EZ may be most needed in these neighborhoods, the second reason to look for the impact of geography is that many arguments lead to believe that place-based policies like EZ will be less effective there. First, on firm creation, one should bear in mind that the neighborhoods that support an EZ are often too small and poor for firms to sustain if they cannot interact with larger urban markets. Spatial isolation will hinder these necessary interactions, for instance by discouraging potential customers, up to the

Table 1: Unemployed ZRU/ZFU2G residents spend more time at home

Variables	(1)	(2)	(3)
ZRU/ZFU2G resident	0.018	-0.069	-0.072
	(0.098)	(0.100)	(0.096)
Unemployed	0.641***	0.568***	0.520***
	(0.127)	(0.114)	(0.112)
Unemployed ZRU/ZFU2G resident	0.755*	0.794*	0.858***
	(0.438)	(0.418)	(0.318)
Diploma dummies	No	Yes	Yes
MA fixed effects	No	No	Yes
R-Squared	0.04	0.06	0.16

Notes: (i) Ordinary-least-square estimates of the number of days spent without leaving home in the week before the survey; Standard deviations in parentheses are clustered by MA in columns (1) and (2); ***p<0.01, **p<0.05, *p<0.1; (ii) Sample: random draw of one individual (part of the workforce) by household living in a metropolitan area which comprises a ZUS, excluding individuals living in ZFU1G; N = 4880; (iii) Regressions are weighted by sampling weights.
Source: ENTD 2007-2008.

point where tax breaks cannot get high enough for the firms to take the bait and locate in the EZ. Predictions regarding the impact of geography on employment are a little less clear: given that residents of isolated neighborhoods may not have other alternatives, firms created in the EZ could be more attractive to them than they usually are, which could impact local unemployment. However, it is difficult to imagine that, except for a few exceptions, the firms would be able to operate on the local workforce only.[14] If they need to attract people from other parts of the city, they will have all the more trouble to do so if the neighborhood is not easily accessible, which may jeopardize their global ability to function, and this latter effect is likely to dominate the impact on local residents' employment. Finally, the predictions regarding the impact of isolation on earnings are opposite: if, as we suspect, isolated neighborhoods are not able to benefit from the EZ policy to create many jobs (because, for instance, outsiders are not willing or even able to commute in), the policy will be more likely to increase earnings in the more isolated areas. However, given the compression of the earning distribution at the minimum wage in these areas in France, this theoretically possible effect may not be discernable in the data (cf. section 3.3 for details).

2 The urban geography of spatial isolation

The level of spatial isolation of an urban neighborhood is mostly determined by a combination of three features: centrality, accessibility and continuity of the urban landscape. Centrality is a measure of the relative position of the neighborhood with respect to the other locations of the city. Accessibility depends on the access to the transportation network or nodes connecting the

[14] In France, surveys indicate that finding local residents who are qualified enough is the most challenging task for many firms locating in ZFUs. According to Quantin (2012), only 27% of the new hires in ZFU2Gs between 2007 and 2010 were ZFU2G residents.

neighborhood to these locations. As for continuity, it can be characterized in reference to the number, the nature and the magnitude of the urban cut-offs which physically isolate the neighborhood from the surrounding locations and generate an urban enclave: we define as "urban severance" this corresponding lack of continuity. In this section, we explain the construction of our measures of spatial isolation, which takes place in two steps: first, we use a GIS to construct a large set of geographical indicators, which precisely describe different spatial configurations; then, we aggregate these indicators into four general indices of isolation.

2.1 The three dimensions of spatial isolation

To measure geography, we make use of the 2006 version of a topographical database called BD-TOPO, developed by the French National Geographical Institute. BD-TOPO summarizes all the landscape elements of the French territory, at a metric accuracy, in particular public infrastructures and their building footprint (such as universities, hospitals or city halls), relief, hydrography and vegetation. We focus, although not exclusively, on the transportation network, which is described very precisely and where infrastructures are ranked according to different characteristics.[15] For example, there are six different levels of roads, depending on the intensity of traffic, with a variable indicating whether each of these roads has two separate lanes, in which case it is considered impassable. The geographical referential upon which these series of maps are drawn is the same as the one used by policy-makers who design ZFUs and ZRUs (Lambert93). For this reason, the borders of the neighborhoods are perfectly identified with respect to all the information of the BD-TOPO.

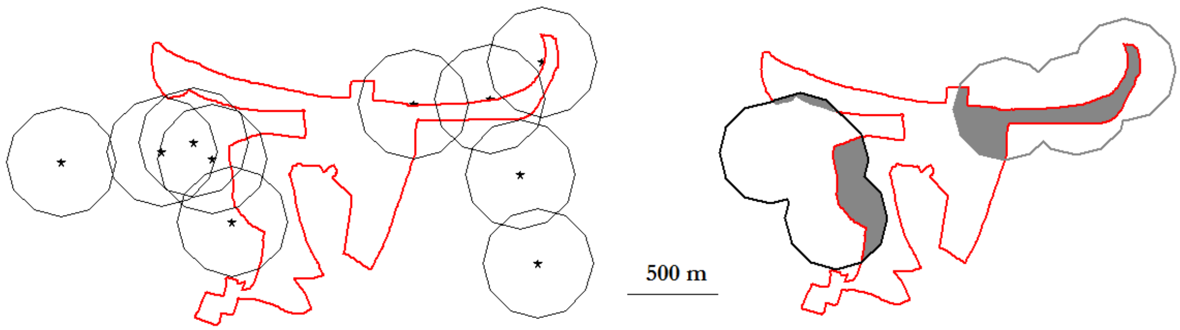
Accessibility We first compute different indicators of transportation accessibility. The most straightforward indicators are given by the smallest distance between the ZFU border and various transportation nodes, such as highways junctions or train and metro stations.[16] However, we also complement these measures in two ways. The first is to count the number of transportation nodes in the vicinity of a ZFU and the second, to measure the fraction of the ZFU which is in the vicinity of such nodes. Figure 1 provides an example extracted from our GIS analysis of a ZFU in Lille, in the north of France. In the left-hand-side map, each of the seven circles intersecting with the red line indicates one train or metro station which is less than 500 meters away from the ZFU. In the right-hand-side map, the grey area indicates the part of the ZFU which is less than 500 meters away from a metro station, which corresponds in our example to 23% of the ZFU.

Centrality Since these accessibility indicators describe very local situations, one may also want to take into account the broader location of the ZFU within the metropolitan area. ZFUs, which can be derelict portions of city centers as well as remote suburbs, vary tremendously in terms of this centrality dimension, as shown in Figure 2 for the Parisian metropolitan area. To that end,

[15] We can locate harbors, airports, bridges, highway junctions, traffic circles, cable cars and, most importantly for our purpose, train and metro stations.

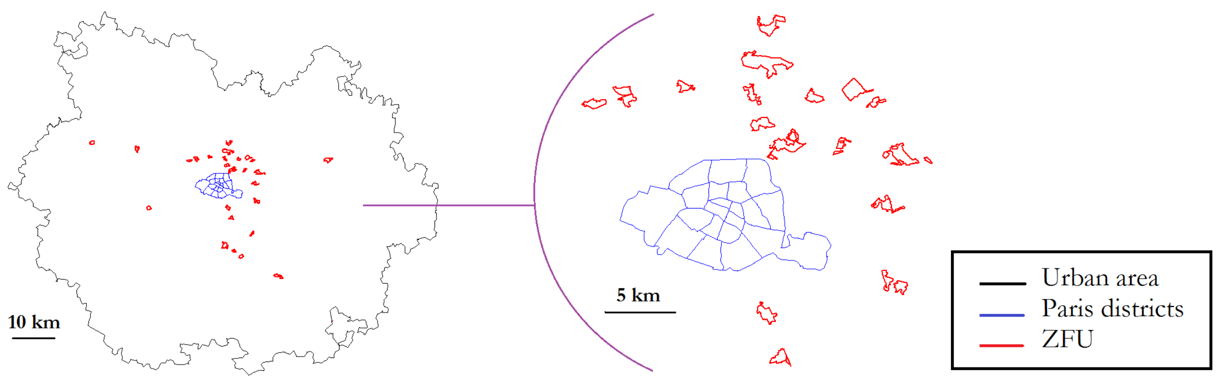
[16] Unfortunately, the BD-TOPO does not provide information on bus lines.

Figure 1: The accessibility of a ZFU to train or metro stations



Notes: (i) ZFU #31041ZF: "Faubourg de Béthune-Moulin-Lille Sud-L'Epi de Soil" in Lille; (ii) the red line is the border of the ZFU; black stars are the train or metro stations and black circles form a 500m perimeter around each station; (iii) the grey is the part of the ZFU which is less than 500m away from a train or a metro station.
Source: GIS SG-CIV and BD-TOPO.

Figure 2: The location of the 25 ZFUs in the Paris region



Source: GIS SG-CIV.

we build a series of indicators that gives a kind of "market potential" of the ZFU, based on its distance to all municipalities within the MA (Harris (1954)). For any variable x, we compute two alternative measures of market potential, depending on whether we exclude the municipality in which the ZFU is located, in order to mitigate possible endogeneity issues. For each ZFU located in municipality k in urban area "MA", the formulas are given by:

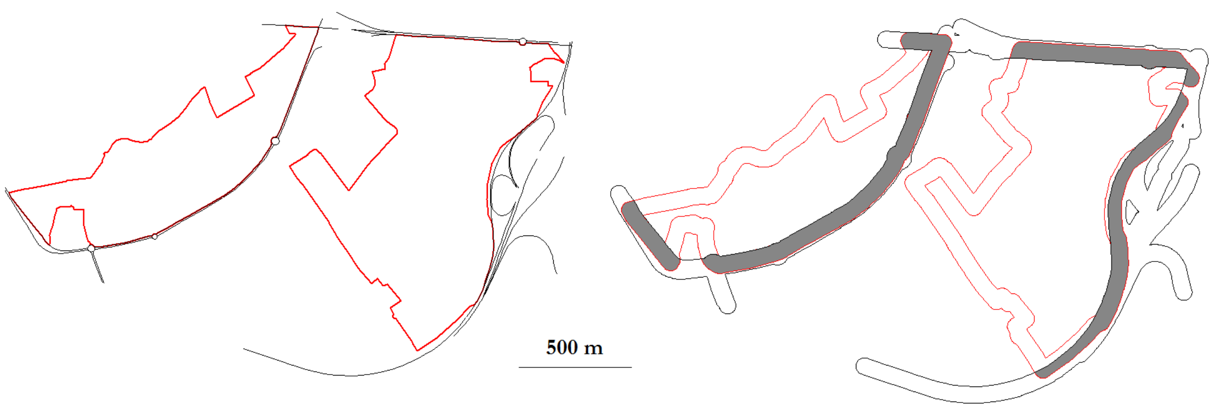
$$MP_{ZFU}(x) = \frac{\sum\limits_{k' \in MA} \frac{x_{k'}}{dist_{(ZFU;k')}}}{\sum\limits_{k' \in MA} x_{k'}} \qquad \text{or} \qquad MPs_{ZFU}(x) = \frac{\sum\limits_{k' \neq k, \in MA} \frac{x_{k'}}{dist_{(ZFU;k')}}}{\sum\limits_{k' \neq k \in MA} x_{k'}}, \qquad (1)$$

where $(k')_{k'=1,\dots,K}$ are the municipalities which belong to the MA and $dist_{(ZFU;k')}$ is the distance between the centroid of the ZFU and the centroid of municipality k'. The market potential is divided by the total sum of x in the MA in order to mitigate the impact of the largest areas, in particular the Paris region. Variable x can be alternatively the municipality population, or the number of train/metro stations, or the length of the road network, that may or may not be weighted according to the magnitude of traffic documented in BD-TOPO.[17]

Urban severance In order to measure how separated the ZFUs are from the other parts of the MA, we build two types of indicators related to urban severance. The first type is the number of cut-offs that separate the ZFU from the CBD of the MA.[18] We isolate rivers, railroads or roads and for the latter, we alternatively consider all impassable roads (i.e. roads with two separate lanes), or only roads with the highest traffic (i.e. expressways).[19] For MAs with several CBDs, we compute the average number of obstacles between the ZFU and each CBD, weighted by the share of the CBD in the total population of CBDs.

The second type of indicator aims at taking into account the fact that some ZFU borders literally follow main traffic arteries, which isolate them from the rest of the agglomeration because they cannot be crossed easily by pedestrians. To account for these "traffic barriers", we draw 100 meter-wide buffers around the railroads and roads located in the vicinity of a ZFU, and we measure the fraction of a 100 meter-wide buffer around the ZFU border which intersects with these road buffers. These indicators are built using more exclusive or inclusive definitions of roads. We consider five types of roads: highways (which correspond to the sixth class in BD-TOPO), expressways (fifth and sixth classes), big roads (fourth to sixth class), busy roads (third to sixth class) and impassable roads (any class, but with two separate lanes). The two maps in Figure 3 describe how it is done for a ZFU in Évreux (West of Paris), for expressways, which form 46% of the ZFU border, according to our analysis.

Figure 3: Severance at the border of the ZFU caused by very high-traffic roads



Notes: (i) ZFU #2315NZF: "La Madeleine" in Évreux; (ii) left: the red line is the border of the ZFU; black lines are expressways; (iii) right: the red line is the border of a 100m-wide buffer-zone centered on the ZFU border; the black line is the border of a 100m-wide buffer-zone centered on the whole set of expressways; the grey area is the fraction of the ZFU buffer which intersects with the road buffer.
Source: GIS SG-CIV and BD-TOPO.

[17]In which case, the weights go from 6 for highways and simili-highways to 1 for small country roads and paths.

[18]We use the term "CBD" to refer to a municipality hosting more than 50% of either the MA population or the population of the largest inhabited municipality in the MA. Small MAs generally have one CBD only, whereas the largest MAs may have several CBDs. For example, as depicted in Figure 2, the Paris MA has 20 CBDs which correspond to the 20 parisian well-known districts.

[19]Expressways correspond to the fifth and sixth classes of roads in BD-TOPO.

2.2 The geographical patterns of ZFUs: stylized evidence

Even though they share common characteristics, both in terms of large-scale location and landscape, the neighborhoods that became the 93 ZFUs of continental France are quite diverse with respect to their spatial relationship to their surroundings. For the whole set of indicators, Table 2 describes this diversity and also gives two polar examples of ZFUs: "les 4000", located in a notorious northern suburb of Paris called "La Courneuve", and "Bourges Nord" located in the Northern part of Bourges, a city of less than 80,000 inhabitants in the center of France. As shown on the maps of these two ZFUs, displayed in Figure 4, "Les 4000" is much more isolated from the rest of its MA than "Bourges-Nord", both in terms of simple distance to the CBD (Paris), and because of the numerous cut-offs that can be observed all around the border of the neighborhood. With this computation, 21.3% of the border of "Les 4000" follow a highway, which is the maximum value among the whole population of ZFUs, whereas the corresponding value is zero for "Bourges-Nord". On the other hand, "Les 4000" has better access to all kinds of public transportation networks than "Bourges-Nord", which belongs to a small MA with little public transportation infrastructure.

2.3 From indicators to indices: aggregation strategy

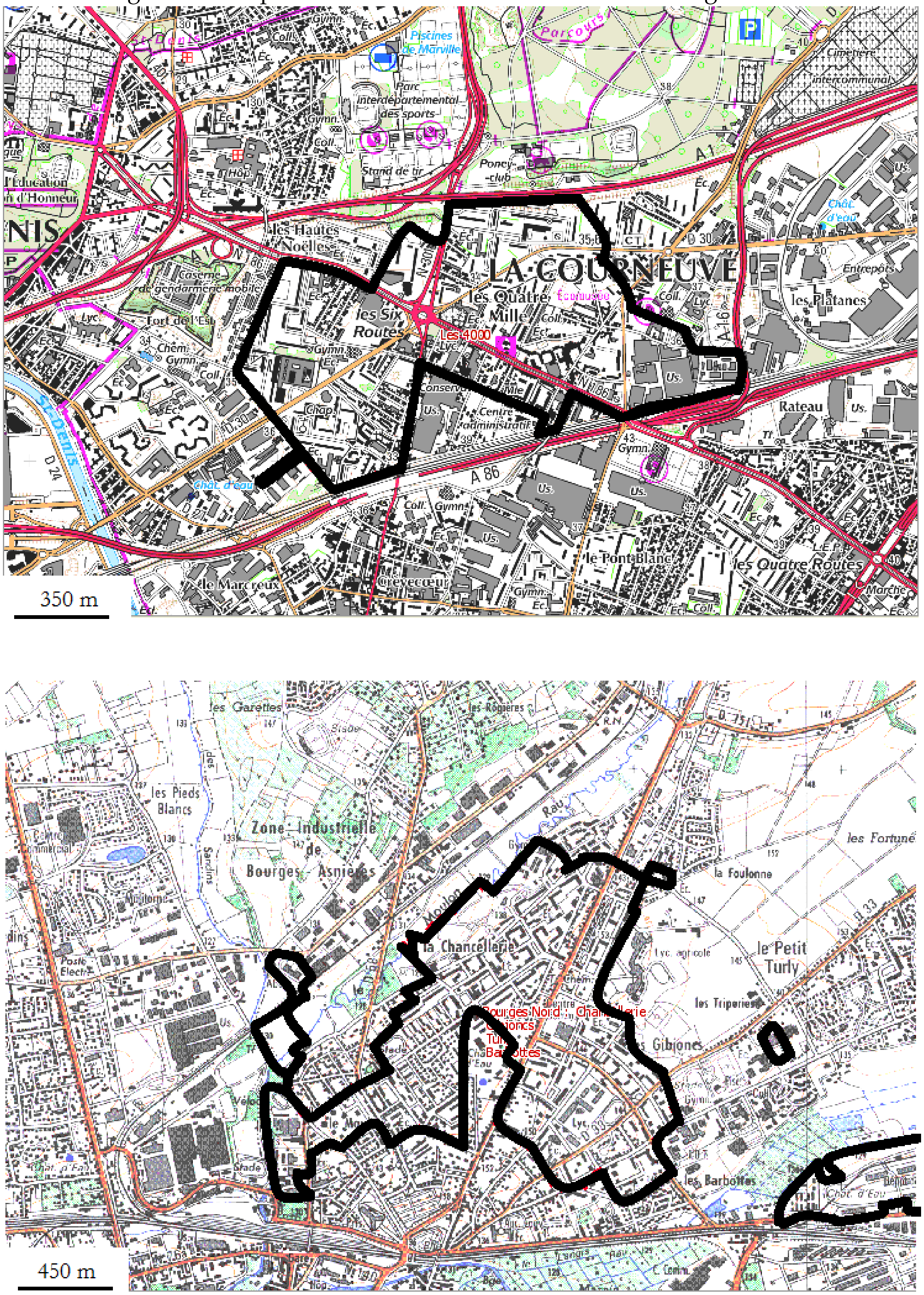
Each of our geographical indicators aims to describe one specific feature of spatial isolation. However, these indicators are correlated with each other in various ways and therefore, it is perilous to include several of them in a single regression. Moreover, we seek to have a general discussion about the three aforementioned dimensions of spatial isolation (severance, accessibility and centrality), rather than pursue a tedious case by case study. Hence, we proceed to the aggregation of our indicators into four general indices: one per dimension and one global index of isolation.[20] Our aggregation strategy is based on the rank of each neighborhood in the distribution of the various isolation indicators within the set of treated and control neighborhoods used in the econometric evaluation (see section 3.1 for details). This amounts to assuming that the relative position of each neighborhood in terms of geographical isolation matters more than the exact value of the indicator. In that sense, it is a standardization which transforms each indicator into a uniformly-distributed index.[21] Then, we simply aggregate these indices by taking their average value by dimension and sub-dimension.

We define a severance index as the average between a cutoff index and a buffer index. The cutoff index is the average between the respective inverse ranks of the four indicators in the Panel 1 of Table 2 and the buffer index is the same for the six indicators described in Panel 2. The accessibility index is defined along the same lines, as the average between a distance index (which aggregates the three indicators in Panel 3), and a catchment area index (which aggregates the two indicators in Panel 4). However, note that these two sub-dimensions (distance to infras-

[20]Since all datasets and program files are available online, the reader may construct alternative indices and test their relevance in our empirical framework.

[21]By convention, tied neighborhoods are assigned the same rank.

Figure 4: Two polar cases of ZFU: “Les 4000” and “Bourges-Nord”



Notes: (i) top: map of “Les 4000” (ZFU #1119NZF) in the Parisian suburb of “La Courneuve”; bottom: map of “Bourges-Nord” (#24010ZF) in the city of Bourges; (ii) The thick black lines are the borders of both ZFU, the purple lines in “Les 4000” are highways, whereas the orange lines in “Bourges-Nord” are busy roads; (iii) “Bourges-Nord” is made of several non-contiguous pieces.

Source: GIS SG-CIV

Table 2: The geographical features of ZFUs

	Min	Max	Average	Std Dev.	Les 4000	B. Nord
Severance						
Panel 1: Urban cut-offs between the neighborhood and the CBDs						
Average river cut-offs to all CBDs in the MA	0	481.25	34.534	81.675	56.127	2
Average railroad cut-offs to all CBDs in the MA	0	38.15	8.579	10.232	22.488	2
Average expressway cut-offs to all CBDs in the MA	0	40.85	7.464	8.693	13.982	3
Average impassable road cut-offs to all CBDs in the MA	0	41.7	8.459	9.140	12.587	3
Panel 2: Severance at the border						
Road severance at the border (busy roads)	0.197	0.913	0.500	0.155	0.609	0.324
Road severance at the border (big roads)	0	0.749	0.268	0.149	0.508	0.138
Road severance at the border (expressways)	0	0.498	0.137	0.122	0.438	0.102
Road severance at the border (highways)	0	0.213	0.025	0.051	0.213	0
Road severance at the border (impassable roads)	0	0.504	0.173	0.114	0.370	0.030
Road severance at the border (railroads)	0	0.325	0.092	0.093	0.269	0.038
Accessibility						
Panel 3: Distance to transportation						
Distance to closest rail or metro station	0	2.816	0.739	0.733	0	0.234
Distance to closest highway junction	0	71.712	11.349	14.868	11.012	45.130
Distance to closest airport	0.227	92.675	21.904	22.728	3.409	4.275
Panel 4: Catchment area						
% ZFU less than 500m away from station	0	0.874	0.123	0.216	0.651	0.022
Number of stations less than 500m away from ZFU	0	10	1.355	2.353	4	1
Centrality						
Panel 5: Market potentials						
Population access in the MA	0.027	0.848	0.219	0.167	0.088	0.257
id. without the ZFU municipality in the MA	0.022	0.242	0.091	0.046	0.085	0.055
Road access in the MA	0.026	0.517	0.129	0.091	0.046	0.121
id. without the ZFU municipality	0.024	0.215	0.082	0.038	0.044	0.078
Road access (weighted by traffic) in the MA	0.026	0.547	0.131	0.094	0.050	0.126
id. without the ZFU municipality	0.024	0.205	0.084	0.038	0.046	0.078
Passenger station access in the MA	0.025	0.995	0.188	0.170	0.097	0.206
id. without the ZFU municipality	0	0.284	0.083	0.051	0.089	0.0091

Notes: (i) The observations are the 93 ZFUs in continental France; (ii) The cut-off variables give the number of cut-offs between the ZFU and each CBD of the MA weighted by the share of the corresponding CBD in the total population of CBDs in the MA, divided by the number of CBDs; (iii) Road severance is the proportion of the border of the ZFU that is within 100m of a transportation artery; (iv) Population, road and passenger station accesses are market potential variables where the variable x in equation (1) is, respectively, population, length of roads and number of train and metro stations; (v) Distances are in km.
Source: GIS SG-CIV and BD-TOPO.

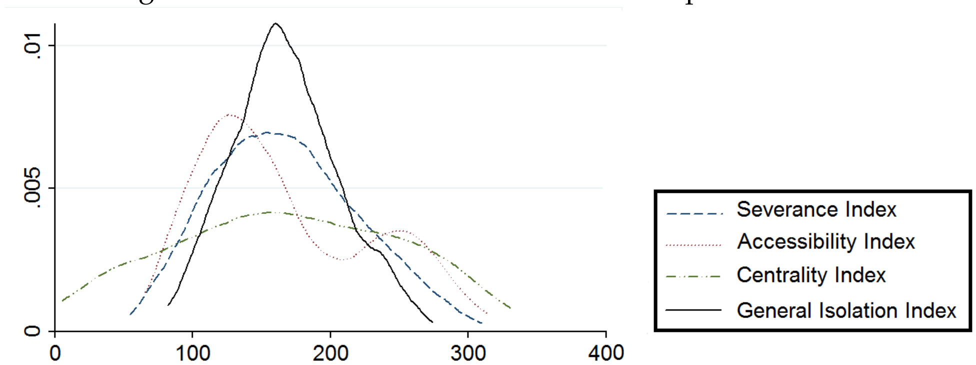
tructures and catchment area) work in opposite directions: while the former indicates more isolation, the latter indicates less isolation. Therefore, we inverse the distributions of the indicators of distance, so that the index can be straightforwardly interpreted as a positive indicator of accessibility. Finally, the centrality index is the average between the four market potentials MPs (computed by excluding the municipality that supports the neighborhood) described in Panel 5.

These three indices will be used as such in the rest of the paper. However, in order to get an even more general sense of the isolation of each neighborhood, we also aggregate them into a general isolation index. We adjust the computation of the accessibility and centrality indices so that they work in the same direction as the severance index. Consequently, this general isolation index increases with the level of spatial isolation: the higher the index, the more isolated the neighborhood.[22] The distribution of the four indices is displayed in Figure 5.

By construction, all indices have the same mean (167). The general index of isolation is

[22]It is worth noting that, whereas our geographic indicators have meaningful quantitative interpretations, the indices do not. They only aim to describe the relative isolation of each neighborhood within the sample of treated and control neighborhoods.

Figure 5: Distribution of the four indices of spatial isolation



Note: The sample is made of 292 ZRUs non support of ZFU1G/ZFU2G (control group) and 41 ZFU2Gs (treated group).
Source: GIS SG-CIV and BD-TOPO.

almost normally distributed. Its variance is reduced compared to the other three, which stems from the fact that our aggregation strategy does not take the correlation between the different dimensions into account. The centrality index is almost uniformly distributed, which means that the four market potential indicators used to construct this index are strongly positively correlated with each other. Finally, a noteworthy feature of the accessibility index is its double-humped shape, which is due to the fact that many neighborhoods do not benefit from any train or metro station in their immediate surroundings: they are therefore identical with respect to the two indicators provided in Panel 4. The respective values of these four indices for the ZFU "Les 4000" are 296 for severance, 281 for accessibility, 118 for centrality and 188 for the general index: this confirms that this ZFU is severely isolated from its immediate surroundings, but quite well-connected to the public transportation network and has a below-average position in terms of centrality within its metropolitan area. This all translates into a general isolation index slightly above average.

Even though these indices may seem abstract, they are strongly correlated with patterns of individual mobility. In section 1, we have provided evidence that ZRU/ZFU2G unemployed residents were less mobile than the rest of the unemployed population. Going one step further, we can show that among the ZRU/ZFU2G unemployed residents, those located in a more spatially-isolated neighborhood are even less mobile. This is the purpose of Table 3, which displays the results from an OLS regression of the same mobility indicator as in Table 1, on each of our four indices of isolation, employment status and the interaction of the two. Column (1) shows that a one standard-deviation increase in the general isolation index is associated with an additional half day at home for the unemployed. As shown in column (2), this result remains valid within the same metropolitan area. Columns (3) to (8) show that this correlation is also verified for the severance and the accessibility indices taken separately, but not for the centrality index.

Table 3: Spatial isolation increases the number of days spent at home by ZRU/ZFU2G residents

	General index		Severance index		Accessibility index		Centrality index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unemployed	1.14***	1.26***	1.14***	1.18***	1.39***	1.77***	1.24***	1.53***
	(0.26)	(0.29)	(0.26)	(0.34)	(0.36)	-(0.25)	(0.37)	(0.36)
Index	0.13**	0.26**	0.03	0.23	-0.12	-0.11	-0.08	-0.28
	(0.054)	(0.12)	(0.09)	(0.16)	(0.10)	(0.10)	(0.06)	(0.21)
Unemployed × Index	0.47***	0.54***	0.65***	0.68***	-0.55**	-0.74***	-0.30	-0.24
	(0.17)	(0.20)	(0.16)	(0.23)	(0.22)	(0.21)	(0.31)	(0.27)
MA fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.22	0.53	0.21	0.52	0.20	0.52	0.16	0.49

Notes: (i) Ordinary-least-square estimates of the number of days spent without leaving home in the week before the survey; (ii) Standard deviations in parentheses: ***p<0.01, **p<0.05, *p<0.1; in the specifications without MA fixed effects, standard errors are clustered at the MA level; (iii) All indices are standardized; (iv) Sample: random draw of one individual by household living in ZRUs or ZFU2Gs, N = 339; (v) Regressions are weighted by sampling weights.
Source: ENTD 2007-2008, GIS SG-CIV and BD-TOPO.

3 Descriptive statistics and empirical strategy

Our evaluation of the ZFU2G program is based on an augmented DiD framework. The outcome variables are several measures of establishment settlements, employment and wages which are all computed from exhaustive French administrative datasets. In this section, we describe the data sources that we use, the unit of observation, the sample of treatment and control groups, and our econometric specifications.

3.1 Data and sample

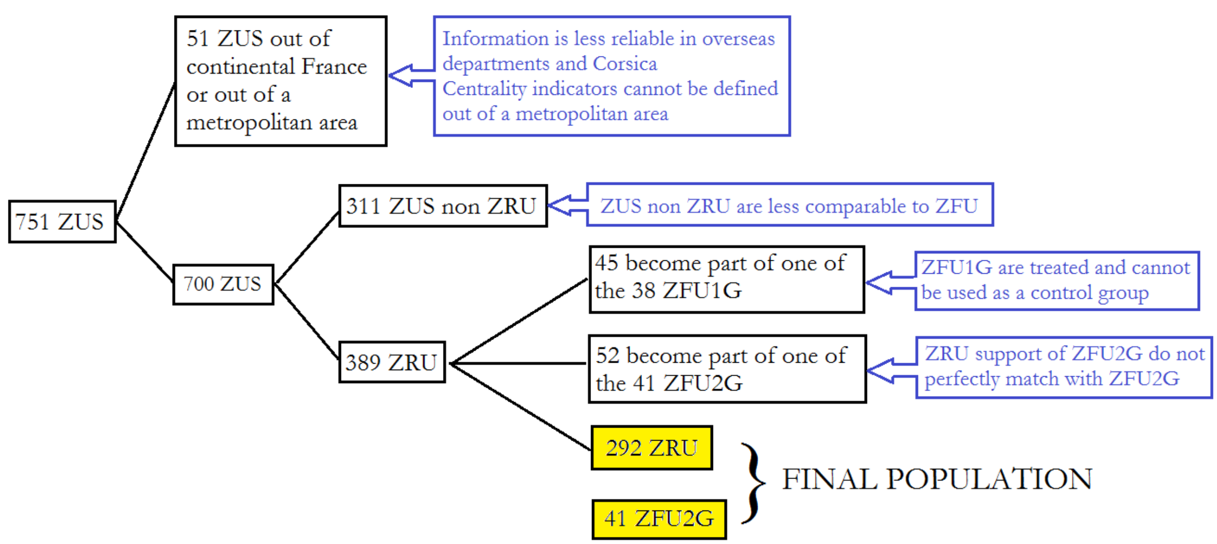
Establishment settlements, disentangled between creations and transfers, are measured with a administrative database managed by the French National Institute of Economics and Statistics (hereafter, INSEE), called SIRENE, which gives geolocalized information about the stock of establishments every first day of the year, and about the flow of new settlements during the year. In addition to a measure of total establishment inflows, it is possible to distinguish between pure "Creations" or mere geographical "Transfers" from elsewhere.[23] As for employment and wages, they are taken from another database managed by INSEE, called the "Déclarations Annuelles de Données Sociales" (hereafter, DADS). The DADS come from the exhaustive collection of mandatory employer reports of the earnings of each employee of the private sector subject to French payroll taxes. From this individual-level dataset, we distinguish between the extensive (number of jobs) and the intensive (numbers of hours worked) margins of employment. We complement this analysis by studying the impact of the program on local earnings, computed as the weighted

[23] INSEE defines a "creation" as either the implementation of new production capacities (new establishment regimental number in SIRENE), or an establishment reactivation after a year without activity, or the resumption of incumbent capacities as long as at least two out of the three following establishment's features have changed: legal corporate entity, sector or location. By way of contrast, a "transfer" indicates a displacement of a pre-existing establishment from one location to another.

average of the hourly net wage over all establishments with registered employees[24] located in the neighborhoods. We attempt to address the *mailbox effect* by selecting establishments which are described as being both administratively and economically "active" for a given year and for homogeneity purposes. We also exclude seasonal activities.

Our selection process of the population of neighborhoods is described in Figure 6: starting from the 751 neighborhoods targeted as ZUS in 1996, we consider the 700 which are located in mainland France and are part of a metropolitan area. Out of those 700 ZUS, only 389 are also designed ZRUs: we drop the 311 ZUS non-ZRU in order to keep as homogeneous a control group as possible. Among those ZRUs, we drop the 45 which become part of a ZFU1G because they are treated by a previous wave of the program and therefore do not qualify as plausible control units. We also drop the 52 that correspond to a neighborhood that will become one of the 41 ZFU2Gs and we replace this latter group with the 41 observations that correspond exactly to the ZFU2G. We need this step because ZRUs and ZFU2Gs are not perfectly nested, even though they can be ranked from the viewpoint of policy intervention: ZFUs were largely redrawn to be more inclusive than the original ZRU so as to include vacant land that could be used by new firms locating in these areas. Hence, ZFU2Gs are generally larger than the original ZRUs from which they were selected. This leaves us with a set of 333 neighborhoods: 41 treated ZFU2Gs and 292 control ZRUs. Note that this latter group includes the ZRUs which will become part of the ZFU3Gs in 2006.

Figure 6: Selection process of the population of neighborhoods



[24] i.e. between 30 and 40% of the total stock of establishments.

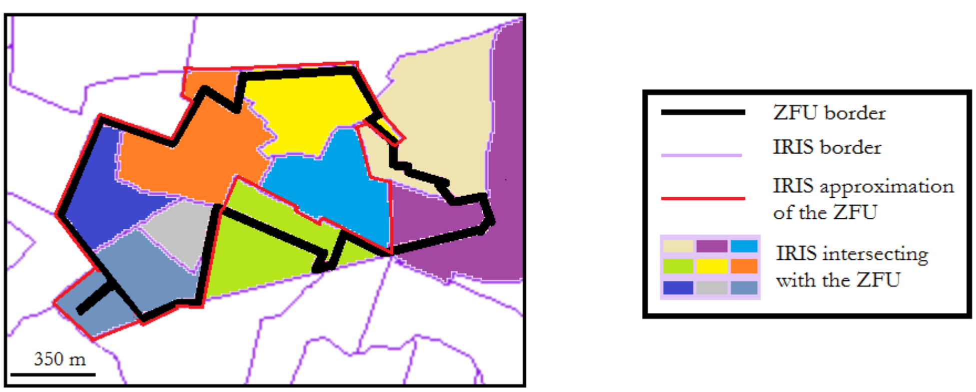
3.2 Unit of observation

In the SIRENE and DADS databases, statistical information is not directly available at the ZFU level. Therefore, to perform a consistent statistical analysis at the neighborhood level, we use a smaller seed called "Îlots Regroupés pour l'Information Statistique" (hereafter, IRIS). There are about 16,000 IRIS drawn within municipalities eligible for ZFU designation. To identify the relevant statistical information in the targeted neighborhoods and the control group, the boundaries of which do not match the IRIS partition, we choose a simple geographical allocation rule: any IRIS which intersects a targeted zone "x" on more than 50% of its area will be considered as supporting x.[25] We identify 932 IRIS which support one of the 292 ZRUs, and 231 IRIS which support one of the 41 ZFU2Gs. These 1163 IRIS would constitute our estimation sample in the absence of missing values of the outcome variables.

This choice for the unit of observation is also the one made by the pioneer study of Rathelot and Sillard (2007), who argue that it has two advantages. First, the IRIS partition is rather homogenous regarding the size of the different units, which mitigates the risk of serious Modifiable Areal Unit Problem.[26] Second, these units are both large enough (around 2,000 inhabitants, on average) to limit the number of missing values and to reduce the level of spatial autocorrelation, and small enough to allow for a precise description of the zones under study.

Figure 7 provides an example of the various spatial configurations between IRIS and ZFU on the same ZFU "Les 4000". This ZFU intersects with nine different IRIS. About half of the ZFU boundaries match with IRIS boundaries. Six IRIS are more than 50% included in the ZFU (among which, three are entirely located within the ZFU), and they define the IRIS approximation of this ZFU.

Figure 7: ZFU and IRIS: The example of the neighborhood "Les 4000"



Source: GIS SG-CIV.

Finally, let us note that several inconsistencies in the encoding process of establishments' locations and sectors jeopardize the possibility to use these data to perform a long-term evaluation. In the SIRENE database, establishments are exactly located, i.e. with their address, between 1995

[25]Section 4 will provide a sensitivity analysis of our econometric evaluation to the choice of this threshold.

[26]The Modifiable Areal Unit Problem is a potential source of statistical bias arising from aggregating data over spatial units of different sizes and shapes (see Briant, Combes, and Lafourcade (2010)).

and 2002 and after 2007, whereas they are only located at the IRIS level between 2003 and 2006. Another issue with the information on location is that a few ZFU2Gs were enlarged in 2007 but this extension was not taken into account in the 2007 wave of SIRENE. In addition, the nomenclature of the different sectors has also changed a lot in 2007. For all these reasons, we believe it is safer to restrict our empirical evaluation of the ZFU2G impact to the period 2002-2006.

3.3 Descriptive statistics

Table 4 allows for a comparison between treated and control neighborhoods before and after the implementation of the ZFU2G program. By 2005, there were about 11,000 firms in the IRIS supporting one of the ZFU2Gs. The sectoral mix showed the over-representation of the trade/retail, healthcare and construction industries, three sectors which require that a large part of the activity be conducted outside the neighborhood. With about 124,000 employees registered as working in the ZFU2G neighborhoods, this corresponds to an average establishment size of 11.4 employees -although a large fraction (around 60%) of the population of firms is, in fact, composed of self-employed individuals. Most jobs located in ZFU2Gs require a low level of qualification, as depicted by the huge share of blue-collars working in those areas (around 68%). Moreover, the wage distribution is very similar in ZRUs and ZFU2Gs, but relatively compressed around the minimum wage in comparison with all the other neighborhoods that do not benefit from The Urban Stimulus Pact.

Based on these data, we first provide here some descriptive evidence in favor of the common trend assumption in 2003 required by the DiD approach to identify the impact of the ZFU2G program for the period 2004-2006.[27] The left-hand-side Graph 1 in Figure 8 gives the evolution of the mean of our main variable of interest: the annual number of establishment inflows by neighborhood, both in the ZRU that became ZFU2G in 2004 and in the ZRU that were not treated. We take 1995, the year before the implementation of the City Stimulus Pact, as the baseline year. By 2006, the annual inflow of establishments has been multiplied by 1.8 in ZFU2Gs and by 1.4 in ZRUs. The trends of the two groups start to diverge in 2004, which corresponds to the first year of the ZFU2G treatment. We compute the 90% confidence intervals of this average value for ZFU2Gs and ZRUs. By 2004, these two confidence intervals no longer intersect. In addition, the right-hand-side Graph 2 in Figure 8 gives support to our claim that the ZFU program had a very heterogeneous impact across locations. The thick solid line represents, for any given year from 1995 (baseline year) to 2009, the value of the third quartile of establishment inflows in ZFU2Gs; conversely, the dotted line represents the corresponding first quartile. In the middle, the dashed lines represent the evolution of the median value of the variable, either for ZFU2Gs or for ZRUs. While this median has raised by 40% in ZFU2Gs, the third quartile has more than doubled over the period; conversely, the first quartile has decreased.

[27] In the next section, we analyze this assumption more precisely, by looking at pre-treatment effects.

Table 4: The economic activity in ZRU/ZFU2G

Panel 1: Establishment inflows

Year	2003		2005	
Neighborhood	ZFU2G	ZRU	ZFU2G	ZRU
Total number	2104	3375	2954	3888
Fraction of creations (%)	84,7	84,6	75,5	83,9
Sectoral mix				
Manufacturing (%)	4,3	5,0	4,3	3,8
Construction (%)	27,1	25,2	26,9	26,1
Trade and Retail (%)	30,1	30,4	26,1	32,4
Hotels and restaurants (%)	3,9	5,3	2,8	5,5
Transportation (%)	6,4	5,9	5,3	5,7
Real estate (%)	17,0	15,9	19,8	14,7
Healthcare (%)	5,8	7,2	9,9	6,1

Panel 2: Establishment stocks

Year	2003		2005	
Neighborhood	ZFU2G	ZRU	ZFU2G	ZRU
Total number	9611	17187	10879	18117
Fraction with at least one employee (%)	37,8	39,6	37,7	39
Sectoral mix				
Manufacturing (%)	6,2	7,0	5,6	6,3
Construction (%)	15,4	15,4	16,7	15,6
Trade and Retail (%)	28,0	28,7	27,1	29,3
Hotels and restaurants (%)	5,3	5,9	5,1	5,9
Transportation (%)	7,6	6,7	7,5	6,8
Real Estate (%)	13,0	12,7	14,7	13,3
Healthcare (%)	17,1	15,8	16,4	15,3

Panel 3: Employees

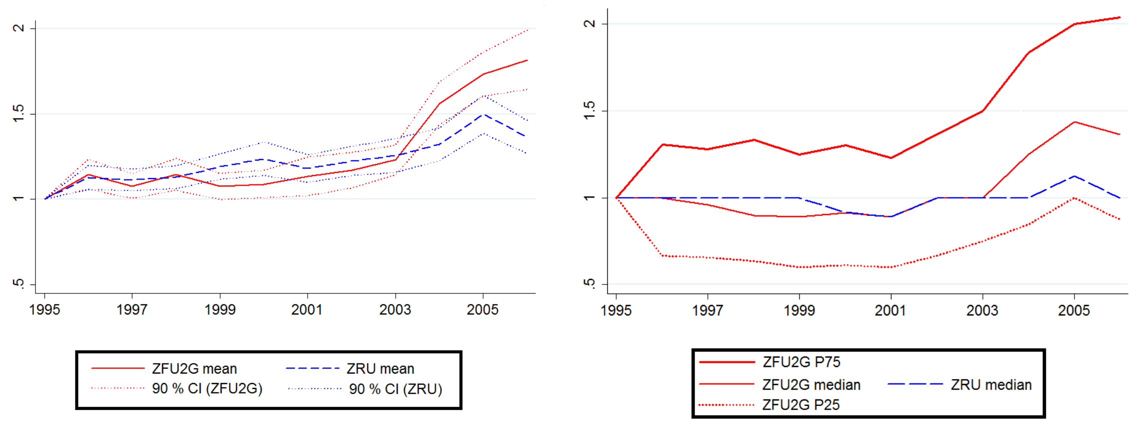
Year	2003		2005	
Neighborhood	ZFU2G	ZRU	ZFU2G	ZRU
Average number by firm	12,7	12,4	11,4	11
Skill mix				
White-collars (%)	10	11,2	9,6	11,1
Intermediate professions (%)	22,6	20,5	23,1	20,7
Blue-collars (%)	67,4	68,3	67,3	68,2
Hourly net wage				
Mean (€)	10,14	9,77	10,49	10,12
Q1 (€)	7,6	7,5	8,1	7,8
Q2 (€)	9,4	9,1	9,7	9,4
Q3 (€)	12,6	11,8	12,3	11,9

Notes: (i) ZFU2G and ZRU here stand for the IRIS approximation of ZFU2G and ZRU; (ii) stocks are computed on the first day of the year; (iii) the average number of employees by firm is computed on the population of firms with at least one employee.
Source: SIRENE and DADS.

Figure 8: Annual inflow of establishments in ZRUs and ZFU2Gs, relative to 1995

Graph 1: Mean

Graph 2: Quartiles



Note: (i) each point is the ratio of the moment described for a given year to its counterpart in 1995; (ii) ZFU2G and ZRU here stand for the IRIS approximation of ZFU2G and ZRU.
Source: SIRENE.

3.4 Econometric specifications

Like Rathelot and Sillard (2007), we assume a parsimonious econometric model where neighborhood characteristics only impact the level of the outcome variables, but not their evolution. We can at least check this assumption on observable characteristics, such as the size of the neighborhood or the initial stock of establishment. Graph 1 in Figure 9 shows that this assumption is violated regarding the level of total establishment inflows in a given year, which is positively correlated with the preexisting stock of establishments. However, Graphs 2 and 3 show that the annual growth rate of total inflows is neither correlated with stocks, nor with the annual growth rate of stocks. Given that the other five outcome variables exhibit similar patterns, we evaluate the impact of the ZFU2G program on the annual log differences of these outcomes in our econometric study.

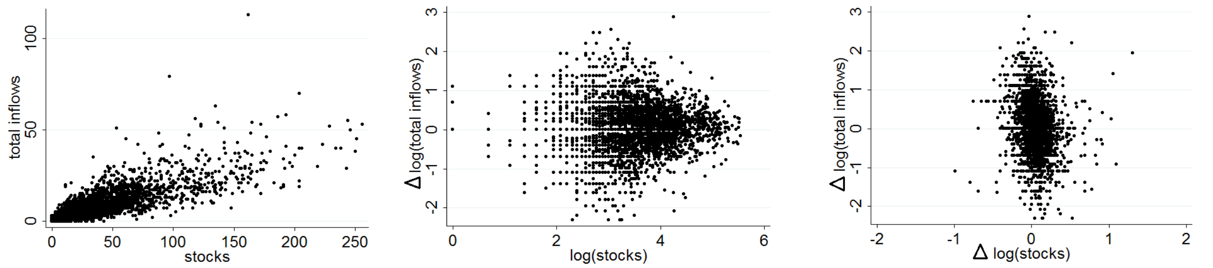
The specification we estimate is thus the following:

$$\Delta Y_{i\tau} = Y_{i\tau} - Y_{i\tau-1} = \alpha_\tau + \beta T_{i\tau} + \varepsilon_{i\tau}, \qquad (2)$$

where i is an IRIS, τ is the observation year, Y is the economic variable of interest in log, α_τ is a time dummy capturing conjuncture effects, and $\varepsilon_{i\tau}$ is the error term. The treatment variable $T_{i\tau} = \mathbf{1}_{\tau \geq t_0} \times \mathbf{1}_{i \in ZFU}$ is a dummy equal to 1 for every IRIS support of a ZFU2G observed after t_0, the implementation date of the program (2004). The coefficient β of this linear regression gives the average treatment effect under the assumption that both treated and untreated units would have followed the same trend in the absence of treatment. Alternatively, the evolution of the treatment effect is estimated with a similar specification, except β and the treatment variable

Figure 9: Establishment stocks and inflows

Graph 1: inflows/stocks | Graph 2: growth(inflows)/stocks | Graph 3: growth(inflows)/growth(stocks)



Note: Each point depicts a particular IRIS support of ZRU or ZFU2G in a given year, over the 2002-2006 period.
Source: SIRENE.

$T_{i\tau t} = \mathbf{1}_{\tau \geq t_0} \times \mathbf{1}_{i \in ZFU} \times \mathbf{1}_{\tau = t}$ are now time-varying:

$$\Delta Y_{i\tau} = \alpha_\tau + \sum_t \beta_t T_{i\tau t} + \varepsilon_{i\tau}. \tag{3}$$

In that case, the coefficient β_t identifies the incremental effect of the impact of the program in year t and the coefficient β_{t_0} identifies the immediate impact of the treatment on the evolution of the economic variable Y.

In order to study whether geography can account for part of the heterogeneity in the treatment effect, we consider an augmented framework where the previous variable T is interacted with our geographical indices of spatial isolation, in the spirit of Kolko and Neumark (2010):

$$\Delta Y_{i\tau} = \alpha_\tau + \beta T_{i\tau} + \eta G_{ZFU2G/ZRU \ni i} + \lambda T_{i\tau} \times G_{ZFU2G/ZRU \ni i} + \varepsilon_{i\tau}, \tag{4}$$

where $G_{ZFU2G/ZRU \ni i}$ is the index describing the geographical situation of the ZRU or the ZFU2G which is supported by IRIS i. The coefficient λ measures the relative effectiveness of the ZFU2G program across locations with different levels of spatial isolation. This is our main parameter of interest. It is identified because we also control for the direct impact of geography on the outcome variable.

Given the possible correlation between our indices, the analysis of the effect on one single index at a time is justified. We perform this analysis on our general isolation index. However, it may not be enough to account for the global complexity of the phenomenon under study. In particular, we seek to study simultaneously the impact of urban severance, accessibility and centrality. For this reason, we consider an augmented version of equation (4), where the treatment variable $T_{i\tau}$ is now interacted with three different indices, denoted $G_{ZFU2G/ZRU \ni i}(k)_{k=1,2,3}$:

$$\Delta Y_{i\tau} = \alpha_\tau + \beta T_{i\tau} + \sum_k \eta_k G_{ZFU2G/ZRU \ni i}(k) + \sum_k \lambda_k T_{i\tau} \times G_{ZFU2G/ZRU \ni i}(k) + \varepsilon_{i\tau}. \tag{5}$$

This idenfication strategy of the effect of spatial isolation raises two issues. The first pertains to the quality of the geographical information. Since the BD-TOPO is continuously updated without historical records for previous years, we were only able to access the 2006 version, which was the only version available at the time. Subsequently, it may be the case that some of the geographical features of neighborhoods, such as closeness to transportation infrastructures, have been partly caused by, or at least jointly determined with, the ZFU program. However, given the amount of time required to substantially modify the geography of a neighborhood, we believe this is of second order. The second caveat is likely to be more problematic. It may well be the case that some geographical characteristics are correlated with unobserved criteria of selection into the program and are therefore not perfectly orthogonal to the ZFU designation. Table 11 in Appendix B illustrates this issue. The first three columns, which display the results of an unconditional t-test of sample means between ZFU2Gs and ZRUs, sometimes exhibit substantial differences, which cast doubt over the validity of our assumption. This is particularly true in Panel 1, which displays these differences over the whole set of indicators that we use to construct our aggregate indices. However, the fourth column shows that, conditional on both neighborhoods being located in the same MA, these differences tend to disappear.[28] As shown in Panel 2, this is even truer for the four aggregate indices that we use in our evaluation: the raw differences are less important than for the initial indicators, and within-city differences are very close to zero. In order to control for the potential impact of unobserved geographical heterogeneity on the evolution (and no longer only on the level) of our outcome variables, we also finally consider a declination of equations (4) and (5) that include fixed effects ζ defined at the neighborhood (ZFU2G or ZRU) level:

$$\Delta Y_{i\tau} = \alpha_\tau + \zeta_{ZFU2G/ZRU \ni i} + \beta T_{i\tau} + \lambda T_{i\tau} \times G_{ZFU2G/ZRU \ni i} + \varepsilon_{i\tau}, \quad (6)$$

$$\Delta Y_{i\tau} = \alpha_\tau + \zeta_{ZFU2G/ZRU \ni i} + \beta T_{i\tau} + \sum_k \lambda_k T_{i\tau} \times G_{ZFU2G/ZRU \ni i}(k) + \varepsilon_{i\tau}. \quad (7)$$

These last specifications are far more demanding in terms of degrees of freedom and their explanatory power is much larger. Henceforth, they will help us test the robustness of the estimates of λ and λ_k drawn from equations (4) and (5).

4 Results

This section reports the estimation results of equations (2)-(7), for the second wave of ZFUs and for six different outcome variables, defined at the IRIS level: total establishment inflows, creations only, transfers only, jobs created, hours worked and net hourly wages. The growth rates of settlements, regardless of the establishment type, refer to the past year. For example, the outcome value for 2004 is the difference between the log of establishment inflows during 2004 and 2003. As it is computed for each year between 2003 and 2006, the impact of ZFU2Gs on settlements can be estimated for the first three years of treatment (i.e. 2004, 2005 and 2006). By way of contrast, jobs, hours and wages are measured at the beginning of each year. Their values

[28]One exception is river cut-offs, where the values for the ZFU sample are driven by a few outliers. Once these outliers are removed, the within-city differences are no longer substantial.

for 2004 are thus the difference between the logs of the related values in January 1st 2005 and January 1st 2004. For this reason, the impact of the ZFU2G program on jobs, hours and wages can only be observed with a one-year delay in comparison with establishment inflows. Due to data inconsistency after 2007, the ZFU effect on these three variables may only be estimated for the first two years of treatment (i.e. 2005 and 2006), and it is labeled as Not Applicable (NA) afterwards. By convention, the average treatment effect for these last three outcome variables is therefore computed only over 2005-2006, whereas it is computed over 2004-2006 for firms' settlements.

4.1 Average impact of the ZFU program

Table 5 reports the DiD estimates of the average impact of the program on establishment settlements, employment and wages. Panel 1 gives the average impact of the ZFU program on the whole period 2004-2006, whereas Panel 2 gives its evolution year by year. In order to account for the issue of spatial correlation, standard errors are clustered at the metropolitan area level.[29]

Table 5: Average impact of the ZFU2G program

Panel 1: average impact on all ZFU2Gs, control by all ZRUs

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.085**	0.033	0.18***	0.085**	0.050	0.0044
	(0.041)	(0.036)	(0.052)	(0.030)	(0.034)	(0.0055)
Falsification Test	0.031	0.059	0.13	-0.016	0.016	-0.012
(one year before selection)	(0.052)	(0.049)	(0.10)	(0.051)	(0.054)	(0.0097)
Observations	3,301	3,256	1,379	2,714	2,714	2,714
Number of MA	110	110	93	109	109	109
R-squared	0.013	0.006	0.023	0.022	0.021	0.004

Panel 2: annual impact on all ZFU2Gs, control by all ZRUs

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment First year	0.17**	0.059	0.45***	0.100	0.066	-0.0019
	(0.078)	(0.074)	(0.085)	(0.071)	(0.068)	(0.012)
Treatment Second year	0.024	0.023	0.035	0.070*	0.033	0.011
	(0.047)	(0.043)	(0.089)	(0.043)	(0.041)	(0.015)
Treatment Third year	0.062	0.016	0.12	NA	NA	NA
	(0.048)	(0.045)	(0.084)	NA	NA	NA
Observations	3,301	3,256	1,379	2,714	2,714	2,714
R-squared	0.014	0.006	0.028	0.023	0.021	0.004

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level; ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficient β in equation 2 (Panel 1) and to the coefficients β_t in equation 3 (Panel 2).
Source: SIRENE and DADS.

[29]The IRIS used in the estimation are located in about 100 different metropolitan areas. This number is high enough so that a bootstrap procedure is not necessary (Busso, Gregory, and Kline (2013)).

The average impact of the ZFU2G program is an additional 8.5% in the growth rate of establishment inflows on the period 2004-2006 (see Panel 1). This estimate is of the same order of magnitude as the 5 to 8 percentage point propensity-score difference found by Givord, Rathelot, and Sillard (2013). Although positive, this effect is around ten-fold lower than that found for ZFU1Gs (Givord, Quantin, and Trevien (2012)).[30] The growth rate of transfers is significantly higher in ZFU2Gs than in ZRUs (+18% points), whereas this is not the case for creations from scratch, even though they form the lion's share (around 80%) of total establishment inflows for any given year. The stronger impact on transfers is an indication that some firms have taken advantage of the program to displace preexisting establishments: the main effect of the program is therefore to foster the relocation of incumbent firms, and not to create new production capacities. This result is also perfectly in line with Givord, Rathelot, and Sillard (2013) and Mayer, Mayneris, and Py (2013), who both show that the ZFU2G program is very likely to have had negative spillovers on the economic performance of the neighboring areas.

As shown by Panel 2, the program was mostly effective in attracting firms during its first year of implementation. The impact of being targeted as ZFU2G on the growth rate of establishment inflows is an additional 17% in 2004 (45% for transfers). The effect of the program vanishes the year after the policy was enacted, which means that being targeted as a ZFU2G had no exponential impact on establishment inflows.[31] This one-shot increase in the growth regime of new settlements corroborates the linear impact found by Rathelot and Sillard (2008). Note, however, that we cannot assert with certainty that such dynamic is also to be found in terms of job creation, given the low level of precision in the year-by-year estimates in column (4).

The ZFU2G program had a stronger impact on job creation (+8.5% points) than on hours worked (no significant impact). As already mentioned, most tax breaks in ZFUs are targeted to new hires in the limits of 50 employees, but tax exemptions tend to decrease with the work task. The smaller impact found on the intensive margin of employment is therefore perfectly consistent with the design of the program.[32] The lack of impact on net earnings confirms this finding. However, as will be shown in section 4.3, this feature hides a large heterogeneity across neighborhoods with different levels of spatial isolation and across sectors with different labor-capital intensity.

The DiD approach is relevant only if the treated and control groups share a common trend before the program is implemented. In addition to the graphical evidence displayed in section 3, we perform a falsification test to see whether the ZFU2G policy had an impact during the pre-treatment year. The related coefficient, reported in the bottom line of Panel 1, is not significant

[30] This large difference may be due to the fact that, contrary to the evaluation of ZFU1Gs, both treatment and control groups have here already been treated by the ZRU program for eight years before the implementation of the ZFU2Gs, and many firms may have already seized the opportunity. Moreover, given that ZRUs keep benefiting from tax exemptions, even though far less generous than in ZFUs, after 2004, the effect of the ZFU2G program is likely to be understated in our evaluation.

[31] Indeed, one must bear in mind that the outcome studied here is the yearly growth rate of the flow of incoming establishments. Our estimates therefore suggest that the increase compared to the initial growth rate is stable over the first three years of the program's enforcement.

[32] Additional regressions on the job creation rate split between different skill levels, available upon request, show that the most-impacted category of workers, at least in terms of growth rates, is white-collars. Given the qualification mix of the worker population in firms located in these neighborhoods, this stronger impact on the more qualified workers is diluted by studying the evolution of total employment.

regardless of the outcome studied, which gives strong support to our identification assumption. Admittedly, one might also argue that the magnitude of our estimates depends on the control group. As a further robustness check, we provide the difference in outcomes between the treatment group and the subset of ZRUs lately designated ZFU3Gs, who might share common unobserved characteristics with ZFU2Gs. As shown in Panel 1 of Table 6, results remain mostly unchanged: in comparison with ZFU3G-to-be, ZFU2Gs experienced a 11% point increase in establishments settlements, that were mainly driven by transfers. With this new control group, the program had no visible effect on job creation, hours worked or net earnings.

Table 6: Average impact of the program: two robustness checks on control groups

Panel 1: average impact on all ZFU2Gs, control by ZFU3Gs

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Average Treatment	0.11*	0.031	0.17**	0.016	-0.033	0.00082
	(0.053)	(0.052)	(0.072)	(0.056)	(0.054)	(0.010)
Observations	1,393	1,380	641	1,131	1,131	1,131
R-squared	0.019	0.008	0.027	0.026	0.028	0.007

Panel 2: average impact on SW and NE ZFU2Gs, control by NW and SE ZRUs

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.083*	0.043	0.14***	0.095**	0.059	0.0069
	(0.042)	(0.040)	(0.050)	(0.042)	(0.055)	(0.0091)
Observations	1,505	1,485	598	1,228	1,228	1,228
R-squared	0.011	0.009	0.026	0.018	0.020	0.009

Panel 3: average impact on NW and SE ZFU2Gs, control by SW and NE ZRUs

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.091*	0.029	0.22***	0.081*	0.040	0.0025
	(0.046)	(0.040)	(0.066)	(0.041)	(0.040)	(0.0082)
Observations	1,796	1,771	781	1,485	1,486	1,486
R-squared	0.015	0.006	0.029	0.031	0.025	0.004

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level; ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficient β in equation 2.
Source: SIRENE and DADS.

Finally, it could be that using nearby ZRUs as controls exaggerate the positive impact of the program, because of negative spatial spillovers due to the "cannibalization" of surrounding activities. If the main effect of the ZFU2G program is to divert firms located nearby the ZFU border, our DiD estimates do not take into account the welfare reduction possibly associated to these relocations for depleted ZRUs. To tackle this issue, we run two further robustness checks. The first is to compare ZFU2Gs to distant ZRUs. To that end, we consider a partition of France in four quadrants defined by geographical coordinates and we only compare ZFU2Gs to ZRUs located in another quadrant.[33] In Panel 2 of Table 6, we report the impact estimates of ZFU2Gs located in the South-West and North-East quadrants compared to the ZRUs located in the South-East and North-West quadrants, whereas we consider the reverse population in Panel 3. The treatment estimates drawn from restricting the control group to distant ZRUs are very close to those found with a less restrictive control group.

The problem with this solution is that it forces us to compare neighborhoods that are potentially more different from each other. Because of this tradeoff between avoiding contamination due to spillovers and comparability between treatment and control groups, we perform an additional robustness check, based on the tightening or loosening of the selection criterion used to define treated and control neighborhoods, up to more than 90% of the IRIS overlapping the ZFU2Gs/ZRUs. Results are reported in Table 12 in Appendix B. Tightening the selection criterion reduces the probability to use nearby ZRUs as controls. However, as soon as the selection criterion is above 10% of intersection, the average treatment effect is virtually unaffected. All of these robustness checks comfort the conclusion that the overall impact of the ZFU2G program on our different outcomes is precisely identified and not overestimated.

4.2 Spatial isolation and the effectiveness of the ZFU program

The previous section has credibly established the presence of a positive, though modest, average treatment effect on establishment inflows and, to a lesser extent, on the extensive margin of employment. By way of contrast, the ZFU policy was less likely to affect both the intensive margin of employment and the earnings of people working in treated neighborhoods. This section seeks to understand which factors drive the limited success of the ZFU2Gs program, to recover part of the heterogeneity hidden in its modest average impact, and to show that there exist conditions under which tax and social exemptions are actually effective, due to the heterogeneous response of treated neighborhoods. A large part of this heterogeneity is fostered by differences in their spatial isolation.

To transparently demonstrate the importance of geography for the success or failure of the ZFU2G program, we split the sample related to each of our six income variables into different subgroups. The simplest split consists in dividing the sample into a more or less isolated set of neighborhoods according to the median of the general index of isolation presented in section 2.5. Table 7 reports the treatment estimated for the two sub-samples obtained.

The impact of the ZGU2G program is statistically different for the two sets of neighborhoods. Tax incentives are very effective at attracting new businesses into "well-connected" neighborhoods: the growth rate of establishment inflows is 16% points higher in ZFU2Gs than in ZRUs, an order of magnitude that is twice the average treatment effect found in section 4.1. More importantly, while the program fails to generate creations from scratch on average, it succeeds in fostering company births in the least isolated neighborhoods (+9.1% point difference in favor of treated areas). By way of contrast, only transfers contribute to the flow of incoming establishments in the most isolated neighborhoods, which clearly reduces the effectiveness of tax

[33] South encapsulates all geographic coordinates with a latitude below $48.53^o N$, whereas West is defined according to a longitude above $2.50^o W$.

Table 7: Average impact of the program in two sub-samples

Panel 1: average impact in more isolated neighborhoods

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.0071	-0.024	0.12**	0.060*	0.020	0.010*
	(0.038)	(0.039)	(0.046)	(0.030)	(0.037)	(0.0058)
Observations	1,588	1,574	664	1,286	1,286	1,286
R-squared	0.005	0.003	0.014	0.021	0.019	0.005

Panel 2: average impact in less isolated neighborhoods

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.16***	0.091***	0.24***	0.114**	0.085**	-0.00023
	(0.029)	(0.030)	(0.053)	(0.041)	(0.042)	(0.0092)
Observations	1,713	1,682	715	1,428	1,428	1,428
R-squared	0.026	0.013	0.030	0.024	0.026	0.003

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level; ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficient β in equation 2; (iii) The two sample sizes slightly differ because the IRIS associated with the median value of the general isolation index are all included in the second panel; results stay unchanged if these IRIS are assigned to the first panel instead.
Source: SIRENE and DADS, BD-TOPO and GIS SG-CIV.

exemptions there. It is also worth noting that the program increases significantly the intensive margin of employment as long as the neighborhood is not too spatially isolated: the least isolated ZFUs have benefited from an additional 9.5% points in job creations, and an additional 8.5% points in hours worked, whereas there is no marked difference between the treated and control groups in the most isolated neighborhoods.

Wages stand as a critical exception. As shown by Panel 2, the ZFU2G program has generated an increase in the earnings of isolated communities, whereas the same outcome was not significantly affected in connected neighborhoods. The important conclusion we might draw from this result is that isolated treated neighborhoods have more a response in terms of earnings than in terms of jobs.[34] As pointed out in Kline (2010), job variations are actually a measure of the distortions induced by Enterprize Zone programs. But the benefits to individuals are better grasped by changes in earnings. Because fewer outsiders are willing to commute in more isolated neighborhoods, those areas reap benefit from this inelastic labor supply through an increase in wages. This result is very enlightening from a policy point of view, as it provides a clear rationale for still targeting isolated areas, despite the ineffectiveness of the program on many other aspects. Yet, this optimistic message must be taken with a certain degree of caution. The wage premium generated by the ZFU2Gs program for people working in isolated neighborhoods is rather low in comparison with the variation of other outcomes (+1% in comparison with ZRUs). This might be due to the prominence of low-paid jobs, which generates a salary

[34] We thank a referee for pinning down this point.

compression around the guaranteed minimum wage threshold: in 2007, at least one out of four new hires in ZFU2Gs and ZRUs was paid at the minimum wage (Quantin (2012)), while one out of two did not exceed a 10% cap of this value. The lack of variance in the earnings of new hires makes it difficult to identify precisely the effect of the program on wealth.

To strengthen our previous result whereby more isolated neighborhoods would be less able to reap benefits from the program, and the respective roles played by the different dimensions of spatial isolation in that respect, we now move towards a more parametric DiD model estimated on the whole sample of ZFU2Gs/ZRUs, in which we interact the treatment with our general index of spatial isolation. The results of this somewhat "triple-difference" regression are provided in Table 8.

Table 8: The role of the general isolation index

Panel 1: without ZRU/ZFU2G fixed effects

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.091***	0.038**	0.19***	0.087***	0.053*	0.0046
	(0.015)	(0.016)	(0.042)	(0.026)	(0.027)	(0.0054)
Index	0.029***	0.020***	-0.015	0.005	0.0049	-0.0048***
	(0.0062)	(0.0071)	(0.013)	(0.008)	(0.0077)	(0.0014)
Treatment× Index	-0.10***	-0.089***	-0.030	-0.032**	-0.043***	0.0053*
	(0.010)	(0.014)	(0.019)	(0.016)	(0.016)	(0.0028)
ZRU/ZFU2G fixed effects	No	No	No	No	No	No
Observations	3,301	3,256	1,379	2,714	2,714	2,714
R-squared	0.018	0.010	0.021	0.023	0.022	0.005

Panel 2: with ZRU/ZFU2G fixed effects

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.059*	-0.010	0.020	0.059*	0.036	0.016*
	(0.033)	(0.038)	(0.091)	(0.033)	(0.035)	(0.0088)
Treatment× Index	-0.14***	-0.12***	-0.0036	-0.057***	-0.067***	0.00094
	(0.010)	(0.014)	(0.021)	(0.019)	(0.019)	(0.0034)
ZRU/ZFU2G fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,301	3,256	1,379	2,714	2,714	2,714
R-squared	0.040	0.031	0.089	0.084	0.081	0.055

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level (panels 1 and 2); ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficients β, η and λ in equation 4 (Panel 1), and to the coefficients β and λ in equation 6 (Panel 2).
Source: SIRENE, DADS, BD-TOPO and GIS SG-CIV.

As shown by Panel 1, the interaction term is highly significant and negative for most of the outcomes studied, which means that the treatment was globally less effective in the more isolated neighborhoods. As previously, wages stand as an exception: the more isolated the neighborhood, the more effective is the treatment, but the significance of the related estimate remains low. Interestingly, spatial isolation matters to new businesses, but not to relocations. This result is all the more interesting that the average impact of the ZFU2G program on creations was null, unlike transfers (see Table 5). This is no longer the case when spatial isolation is taken into account: ZFU2Gs benefit from an additional 3.8% points of new production capacities, in comparison with ZRUs (See Panel 1). If one thinks that geographical spillovers still bias the identification, the fact that geography impacts company births more than relocations makes this shortcoming less of an issue *a posteriori*. In Panel 2, we test the robustness of these results to the inclusion of ZRU/ZFU2G fixed effects, as they might help purge any unobserved spatial heterogeneity. We cannot statistically rule out that the estimates of λ stay unchanged by the inclusion of these fixed effects, despite an increase in the standard errors due to the number of constraints imposed by a fixed-effects specification. The only exception comes from the wage equation, where the interaction term fades away.

Note that the estimated coefficient η associated with the isolation index is significantly different from zero for some of our outcome variables, in particular settlements, creations and, to a lesser extent, wages. It is perilous, however, to interpret this impact as causal since geography might be correlated with many other possibly omitted variables likely to affect the development of treated and control areas. The index is included as such in the specifications for identification purposes, as explained in section 3.4. Nevertheless, we believe that this is not an issue because the inclusion of fixed effects does not dramatically affect the estimation of the coefficient on the interaction term, which is our primary parameter of interest.

Finally, in order to deepen our understanding of the factors driving the impact of spatial isolation, we conduct a separate analysis for each of the three dimensions of spatial isolation presented in section 2: severance, accessibility and centrality. Table 9 depicts the results of this multivariate estimation. Not surprisingly, severance inhibits the effectiveness of the ZFU program to attract firms in the treated neighborhoods, and to increase the earnings of its workers. The communities which are more isolated from the rest of the metropolitan area by cut-offs of any kind clearly under-perform: for instance, a one standard deviation increase in the severance index reduces by 6.1% points the growth rates of settlements in ZFU2Gs relatively to ZRUs (see Panel 2). However, it is difficult to draw from this kind of estimates a clear indication of how much penalizing are urban enclaves. As a meaningful guidance for policy makers, we find it useful to estimate the penalty associated to each indicator used to construct the synthetic severance index. In a previous version of this work, we have shown for instance that an increase by one standard deviation in the number of impassable roads separating the ZFU border from the main CBD of the metropolitan area would translate into a 6.3% point decrease in the establishment settlement growth rate.[35]

As for accessibility, ZFU2Gs which are well-connected to the transportation network benefit from a larger growth rate of establishment inflows, mainly driven by the entry of new business companies. Once again, to take a more concrete example, it might be enlightening to know that a one-standard deviation increase in the number of train or metro stations within 500 meters of a ZFU, which is equivalent to adding 2 stations in the area, would be associated with a 5.8% point rise in the growth rate of establishment inflows. Compared to the 8.5% point raise induced by the ZFU2G program on average, this increase amounts to a program over-effectiveness of 70%.

[35] See Briant, Lafourcade, and Schmutz (2012).

Table 9: The role of the three dimensions of isolation

Panel 1: without ZRU/ZFU2G fixed effects

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.092***	0.037**	0.18***	0.087***	0.056*	0.0075
	(0.016)	(0.018)	(0.034)	(0.028)	(0.029)	(0.0049)
Severance	0.0060	0.0031	0.0061	0.0007	-0.0038	-0.0028*
	(0.0073)	(0.0075)	(0.015)	(0.009)	(0.011)	(0.0016)
Treatment× Severance	-0.055***	-0.046**	-0.083***	-0.016	-0.0088	-0.0087**
	(0.015)	(0.019)	(0.026)	(0.025)	(0.029)	(0.0043)
Accessibility	-0.011	-0.012	0.0066	0.004	-0.0065	-0.0027*
	(0.0064)	(0.0083)	(0.013)	(0.007)	(0.0074)	(0.0015)
Treatment× Accessibility	0.056***	0.062***	0.040	0.0096	0.021	0.0020
	(0.013)	(0.018)	(0.032)	(0.021)	(0.022)	(0.0038)
Centrality	-0.026***	-0.017**	0.018	-0.0077	-0.0058	0.0050***
	(0.0071)	(0.0074)	(0.014)	(0.012)	(0.012)	(0.0016)
Treatment× Centrality	0.065***	0.050**	-0.043	0.024	0.038	-0.015***
	(0.016)	(0.019)	(0.032)	(0.032)	(0.033)	(0.0046)
ZRU/ZFU2G fixed effects	No	No	No	No	No	No
Observations	3,301	3,256	1,379	2,714	2,714	2,714
R-squared	0.018	0.010	0.023	0.024	0.023	0.008

Panel 2: with ZRU/ZFU2G fixed effects

	(1) Total inflows	(2) Creations	(3) Transfers	(4) Jobs	(5) Hours	(6) Wages
Treatment	0.064*	-0.012	0.021	0.067*	0.036	0.018**
	(0.036)	(0.042)	(0.062)	(0.036)	(0.037)	(0.0088)
Treatment× Severance	-0.061**	-0.040	-0.10	-0.024	-0.0057	-0.012**
	(0.027)	(0.030)	(0.063)	(0.035)	(0.033)	(0.0055)
Treatment× Accessibility	0.059***	0.065**	0.034	0.005	0.023	-0.0015
	(0.020)	(0.027)	(0.065)	(0.025)	(0.028)	(0.0050)
Treatment× Centrality	0.11***	0.091***	-0.091	0.052	0.071*	-0.0099
	(0.024)	(0.028)	(0.064)	(0.037)	(0.038)	(0.0064)
ZRU/ZFU2G fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,301	3,256	1,379	2,714	2,714	2,714
R-squared	0.040	0.031	0.090	0.084	0.081	0.056

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level (panel 1); ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficients β, η_k and λ_k in equation 5 (Panel 1), and to the coefficients β and λ_k in equation 7 (Panel 2).
Source: SIRENE, DADS, BD-TOPO and GIS SG-CIV.

Public transportation services are thus likely to explain the relative success of the ZFU program in large metropolitan areas such as Paris, which benefit from good railroad passenger networks.

Centrality also helps recover additional gains from tax breaks: the higher the market potential of a neighborhood, the more effective the ZFU program to generate new establishments from scratch, create jobs, and increase the number of hours worked. Interestingly, by disentangling the effectiveness of the ZFU program between the three dimensions of spatial isolation, we get deeper into the mechanisms underlying its positive impact on the earnings of isolated neighborhoods. As shown by Panel 1, the interaction between the treatment and the centrality index exhibits a negative and highly significant impact on wages, which is perfectly in line with the already mentioned disability of outsiders to commute to remote neighborhoods.

To sum up, the main finding so far is that urban geography affects the ZFU2G program in a less effective way regarding employment than regarding establishment settlements, just as the program is, on average, less effective on establishment settlements than on employment. However, this result hides a large heterogeneity between sectors. Section 4.3 turns the attention to this question.

4.3 The interplay between sectors and geography

We finally investigate whether the sectoral mix, in itself or combined with geography, also contributes to explain why the impact of the ZFU program varies across neighborhoods. Theory predicts that EZ programs should have less impact on more capital-intensive sectors on average, because firms in these sectors face higher sunk production costs and relocation costs. In addition, firms in more labor-intensive sectors should be more sensitive to spatial isolation. To conduct this analysis, we split our sample into different sub-groups of industries.[36] Table 10 breaks out the estimated impact of the ZFU2G program on the intensive margin of employment, by the most representative industries located in distressed neighborhoods.

Overall, the impact of the ZFU2G program on the number of hours worked is very heterogeneous across industries. We find a statistically significant positive effect of the program in two sectors only: real estate and healthcare. There is no discernible effect on the other industries. The huge impact of EZ programs on these two sectors has already been noted by policy-makers, and it is also mentioned in Freedman (2013) and Mayer, Mayneris, and Py (2013). A sector such as the healthcare industry mostly encompasses self-employed workers, such as nurses or physicians. It is neither capital-intensive, nor space-consuming, unlike the manufacturing sector, which has larger establishments. As such, we may expect the former to be more sensitive to tax incentives than the latter, and to relocate more quickly, at lower cost. Results are consistent with this conjecture: for instance, in comparison with ZRUs, ZFU2Gs have witnessed a 17% increase in the growth rate of the number of hours worked in the medical sector on average, but nothing in the manufacturing sector (see Panel 3).

In addition to its relatively high labor-intensity, other features may also explain why the medical sector is more impacted by the ZFU program: in particular, the relationship of health-

[36]We use the two-digit industrial classification NAF17 provided by the INSEE, but keep out of the analysis those industries which exhibit a too small number of observations to provide robust estimates.

Table 10: Sectoral analysis: hours

Panel 1: average impact

	(1) Manuf.	(2) Constr.	(3) Trade	(4) Hotels	(5) Transp.	(6) RE	(7) Health
Treatment	0.027	0.011	-0.014	-0.0052	0.012	0.26***	0.21***
	(0.048)	(0.053)	(0.052)	(0.054)	(0.097)	(0.061)	(0.069)
Observations	1,598	2,054	2,319	1,308	961	1,571	1,415
R-squared	0.004	0.011	0.001	0.007	0.008	0.037	0.023

Panel 2: Isolation index, no fixed-effect

	(1) Manuf.	(2) Constr.	(3) Trade	(4) Hotels	(5) Transp.	(6) RE	(7) Health
Treatment	0.027	0.015	-0.010	-0.0068	0.023	0.26***	0.21***
	(0.050)	(0.049)	(0.029)	(0.054)	(0.091)	(0.061)	(0.058)
Index	0.029**	0.010	0.026**	0.031**	-0.058	-0.0070	0.033***
	(0.012)	(0.015)	(0.012)	(0.013)	(0.038)	(0.016)	(0.0099)
Treatment× Index	-0.067	-0.072**	-0.081***	-0.018	-0.029	0.00080	-0.078*
	(0.047)	(0.035)	(0.019)	(0.031)	(0.061)	(0.038)	(0.040)
ZRU/ZFU2G fixed effects	No	No	No	No	No	No	No
Observations	1,598	2,054	2,319	1,308	961	1,571	1,415
R-squared	0.005	0.012	0.005	0.009	0.012	0.037	0.026

Panel 3: isolation index, fixed-effects

	(1) Manuf.	(2) Constr.	(3) Trade	(4) Hotels	(5) Transp.	(6) RE	(7) Health
Treatment	0.062	0.0050	-0.032	0.091	-0.082	0.14	0.17**
	(0.099)	(0.14)	(0.040)	(0.11)	(0.19)	(0.11)	(0.080)
Treatment× Index	-0.053	-0.094**	-0.072***	-0.060	-0.062	0.00043	-0.081*
	(0.048)	(0.045)	(0.021)	(0.047)	(0.091)	(0.061)	(0.048)
ZRU/ZFU2G fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,598	2,054	2,319	1,308	961	1,571	1,415
R-squared	0.118	0.087	0.090	0.105	0.216	0.126	0.120

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level (panels 1 and 2); ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficients β in equation 2 (Panel 1), to the coefficients β, η and λ in equation 4 (Panel 2), and to the coefficients β and λ in equation 6 (Panel 3); (iii) Manuf.: manufacturing; Constr.: construction; Trade: Trade, retail and car repair shops; Hotels: Hotels and restaurants; Transp.: Transportation and communication; RE: Real Estate and service to firms; Health: Healthcare and social work.
Source: DADS, BD-TOPO and GIS SG-CIV.

related firms to their surroundings and the level of mobility in the daily activity of these firms. As it is, the French private health sector is characterized by a high level of mobility: for instance, self-employed nurses mostly work at their patients' homes, which are often located outside the ZFU. On the contrary, most of the activity in the manufacturing sector is done within the borders of the ZFU. Whereas health and social workers may then need to be able to commute easily inside, to and from the ZFU, it may not be as important to the people who work at the plant. If this whole story were true, one should observe that geography matters more to the program effectiveness on the healthcare than on the manufacturing industries. This conjecture is indeed verified: in the health sector, the program effectiveness is lower in isolated neighborhoods, as testified by the negative coefficient found on the interaction term, whereas there is no such sizable effect in the manufacturing (See Panels 2 and 3). Spatial isolation also inhibits the effectiveness of the ZFU program in the construction and retail industries, which are both heavily relying on mobility: mobility of the workforce for construction, which mostly takes place out of the zone, and mobility of the customer base into the neighborhood for retail.

5 Conclusion

This paper is an attempt to give empirical support to the simple statement that local geography should matter to the success or failure of place-based programs. Using a new data set which describes the level of spatial isolation of the neighborhoods that were targeted by the French enterprise zone program, it shows that this program was, in general, more likely to be effective when the targeted neighborhoods were connected enough to the other parts of the city. Two geographical dimensions have particularly conditioned the success of the ZFU program. Transportation accessibility, and more particularly access to road and train or metro stations, enhances the program's ability to attract firms and to create jobs. By way of contrast, discontinuities generated by traffic or natural barriers between the neighborhood and the main employment centers of its urban area hinder the benefits of tax-breaks and social exemptions. Geography matters in itself but also matters in combination with other features of the local economic fabric, in particular the distribution of the population of firms between sectors.

From a policy perspective, we show that if public authorities care first and foremost about boosting employment in these areas, they ought to target the least isolated among them. However, besides the political controversies this selection would raise, this choice may not be the most efficient. On the contrary, our results also suggest that the program might be able to have a positive impact on earnings in the most segregated areas, which is a clear rationale for still targeting them, despite their apparent lack of responsiveness along many other dimensions. Given the crucial role played by spatial isolation, one can but acknowledge the necessity of combining place-based tax breaks and employment incentives with public investments in transportation infrastructure and services. The current "Grand Paris" global project, which aims at building a metro ring around the inner suburbs of Paris, as well as supporting sustainable economic and urban development, may be a right step in this direction. However, the cost of such investments - around 35 billions Euros for the "Grand Paris" metro station project - calls for a cautious cost-benefit analysis that is difficult to undertake given that transportation infrastructures have multiple other purposes than reviving depleted urban communities.

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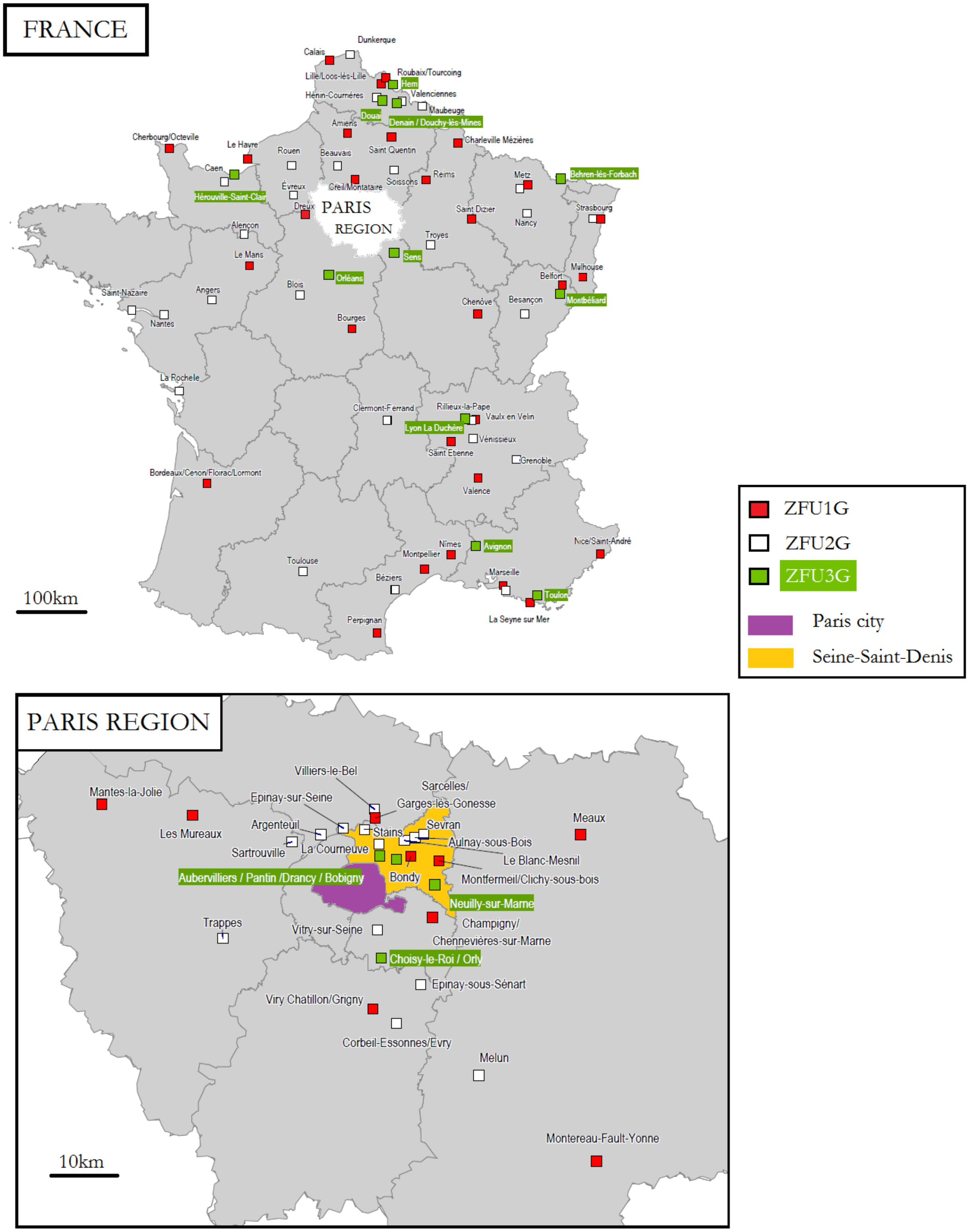
A The location of ZFUs

Figure 10: The 93 ZFUs in continental France



Source: GIS SG-CIV.

B Additional tables

Table 11: Geographical differences between ZFU2Gs and ZRUs

Panel 1: Geographical indicators

	ZFU2G	ZRU	Difference	Coeff. ZFU2G
Severance				
Urban cut-offs between the neighborhood and the CBDs				
Average river cut-offs to all CBDs in the MA	37.57	3.07	34.50***	40.85***
Average railroad cut-offs to all CBDs in the MA	10.67	5.13	5.54***	1.90**
Average expressway cut-offs to all CBDs in the MA	8.62	4.74	3.88***	0.61
Average impassable road cut-offs to all CBDs in the MA	9.40	5.72	3.68***	-0.06
Severance at the border				
Road severance at the border (busy roads)	0.55	0.53	0.01	-0.02
Road severance at the border (big roads)	0.29	0.26	0.02	0.02
Road severance at the border (expressways)	0.15	0.11	0.04*	0.04
Road severance at the border (highways)	0.02	0.02	0.007	0.002
Road severance at the border (impassable roads)	0.19	0.12	0.07***	0.06**
Road severance at the border (railroads)	0.11	0.07	0.04**	0.04**
Accessibility				
Distance to transportation				
Distance to closest passenger station	0.70	1.25	-0.54**	-0.26
Distance to closest highway junction	8.71	11.23	-2.52	-0.85
Distance to closest airport	20.08	26.00	-5.91	-2.59**
Catchment area				
% zone less than 500m away from a passenger station	0.15	0.11	0.04	-0.02
Number of passenger stations less than 500m away from zone	1.56	0.51	-1.05***	0.89***
Centrality				
Population access in the MA	0.20	0.28	-0.09*	-0.005
id. without the ZFU municipality	0.10	0.10	-0.003	0.005
Road access in the MA	0.11	0.18	-0.07**	0.000
id. without the ZFU municipality	0.08	0.10	-0.02***	0.002
Road (weighted) access in the MA	0.11	0.18	-0.07**	-0.000
id. without the ZFU municipality	0.08	0.10	-0.02**	0.002
Passenger station access in the MA	0.18	0.27	-0.09	-0.01
id. without the ZFU municipality	0.09	0.09	-0.002	0.007

Panel 2: Geographical indices

	ZFU2G	ZRU	Difference	Coeff. ZFU2G
Severance Index	196	163	33***	13*
Accessibility Index	187	164	23**	7
Centrality Index	170	145	25*	7
General Isolation Index	177	165	12*	-0.17

Notes: (i) These statistics are based on the comparison between the 41 ZFU2Gs and the 292 control ZRUs that do not support a ZFU2G or a ZFU1G; (ii) Column "Difference" gives the significance of the difference between the first two columns; column "Coeff. ZFU2G" gives the coefficient associated with the dummy variable"ZFU2G" in an ordinary-least-square regression of the geographical indicator described in line, on this dummy variable and MA fixed effects; (iii) significance: ***p<0.01, **p<0.05, *p<0.1.
Source: GIS SG-CIV and BD-TOPO.

Table 12: Robustness check: average impact by fraction of IRIS in ZFU2G/ZRU

Panel 1: Total inflows

$\%IRIS \subset Zone$	> 0	$> 10\%$	$> 20\%$	$> 30\%$	$> 40\%$	$> 50\%$	$> 60\%$	$> 70\%$	$> 80\%$	$> 90\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.0413	0.0774**	0.0759**	0.0921**	0.0896**	0.0846**	0.0790**	0.0859**	0.0806**	0.0748*
	(0.0252)	(0.0307)	(0.0355)	(0.0422)	(0.0414)	(0.0407)	(0.0364)	(0.0368)	(0.0353)	(0.0381)
Observations	9,037	5,303	4,628	4,071	3,644	3,301	3,020	2,618	2,305	1,998
R-squared	0.011	0.016	0.017	0.017	0.013	0.013	0.014	0.012	0.014	0.017

Panel 2: Creations

$\%IRIS \subset Zone$	> 0	$> 10\%$	$> 20\%$	$> 30\%$	$> 40\%$	$> 50\%$	$> 60\%$	$> 70\%$	$> 80\%$	$> 90\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.0119	0.0356	0.0343	0.0433	0.0404	0.0326	0.0289	0.0344	0.0260	0.0168
	(0.0226)	(0.0287)	(0.0315)	(0.0371)	(0.0363)	(0.0358)	(0.0331)	(0.0341)	(0.0345)	(0.0379)
Observations	8,920	5,223	4,557	4,015	3,596	3,256	2,976	2,578	2,269	1,965
R-squared	0.008	0.011	0.010	0.010	0.007	0.006	0.007	0.006	0.008	0.011

Panel 3: Transfers

$\%IRIS \subset Zone$	> 0	$> 10\%$	$> 20\%$	$> 30\%$	$> 40\%$	$> 50\%$	$> 60\%$	$> 70\%$	$> 80\%$	$> 90\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.0542**	0.114***	0.114***	0.151***	0.160***	0.184***	0.180***	0.187***	0.176***	0.173***
	(0.0218)	(0.0316)	(0.0422)	(0.0447)	(0.0467)	(0.0519)	(0.0495)	(0.0612)	(0.0494)	(0.0560)
Observations	5,237	2,559	2,146	1,806	1,562	1,379	1,242	1,044	902	774
R-squared	0.006	0.017	0.020	0.021	0.017	0.020	0.019	0.022	0.021	0.021

Panel 4: Jobs

$\%IRIS \subset Zone$	> 0	$> 10\%$	$> 20\%$	$> 30\%$	$> 40\%$	$> 50\%$	$> 60\%$	$> 70\%$	$> 80\%$	$> 90\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.0448***	0.0585***	0.0651***	0.0680***	0.0750***	0.0848***	0.0872***	0.0946***	0.0902**	0.0992***
	(0.0142)	(0.0205)	(0.0216)	(0.0228)	(0.0283)	(0.0302)	(0.0314)	(0.0331)	(0.0345)	(0.0359)
Observations	7,400	4,348	3,804	3,348	2,992	2,714	2,482	2,150	1,899	1,640
R-squared	0.017	0.021	0.023	0.022	0.023	0.023	0.022	0.023	0.022	0.021

Panel 5: Hours

$\%IRIS \subset Zone$	> 0	$> 10\%$	$> 20\%$	$> 30\%$	$> 40\%$	$> 50\%$	$> 60\%$	$> 70\%$	$> 80\%$	$> 90\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.0243*	0.0337	0.0371	0.0405	0.0447	0.0498	0.0516	0.0589	0.0477	0.0612
	(0.0147)	(0.0207)	(0.0232)	(0.0250)	(0.0317)	(0.0343)	(0.0354)	(0.0394)	(0.0394)	(0.0410)
Observations	7,400	4,348	3,804	3,348	2,992	2,714	2,482	2,150	1,899	1,640
R-squared	0.019	0.021	0.024	0.022	0.021	0.021	0.020	0.021	0.020	0.020

Panel 6: Wages

$\%IRIS \subset Zone$	> 0	$> 10\%$	$> 20\%$	$> 30\%$	$> 40\%$	$> 50\%$	$> 60\%$	$> 70\%$	$> 80\%$	$> 90\%$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treatment	0.0022	0.0043	0.0042	0.0040	0.0038	0.0044	0.0058	0.0110	0.0121	0.0111
	(0.0030)	(0.0043)	(0.0047)	(0.0056)	(0.0059)	(0.0055)	(0.0060)	(0.0068)	(0.0078)	(0.0084)
Observations	7,400	4,348	3,804	3,348	2,992	2,714	2,482	2,150	1,899	1,640
R-squared	0.001	0.003	0.002	0.003	0.003	0.004	0.005	0.004	0.006	0.004

Notes: (i) In parentheses: standard errors clustered at the metropolitan area level; ***p<0.01, **p<0.05, *p<0.1; (ii) Treatment stands for "average treatment"; The estimates correspond to the coefficient β in equation 2.
Source: SIRENE and DADS.