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Implications of homeownership policies on land prices: the case of a French experiment

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Abstract

We propose to estimate the price effects of a positive housing demand shock on French real estate markets. The "Interest Free Loan" system is expected to support housing demand by first-time buyers. From 2009 to mid-2010, the amount of subsidies paid to first-time buyers was increased. We evaluate the effect of this new housing policy on land parcel prices using a new methodological approach of a hybrid of difference-in-difference and matching techniques, and exploiting geographical differences in the policy design to identify possible inflationary effects. We identify significant but transitory inflationary effects suggesting that land supply elasticity is low in France.

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1 Introduction

The question of the price effects of housing stimulus policies is crucial for understanding price dynamics and support for housing affordability. In areas where housing supply is highly regulated and rather inelastic, positive demand shocks (such as an exogenous rise in income or a new policy to support housing demand) should lead to large housing price appreciations compared to high-elasticity areas where housing prices are prevented from increasing much above construction costs. As such, these positive demand shocks in inelastic areas may have both short and long run negative, real economic consequences, with a lower than expected increase or even a decrease in housing affordability for instance (Quigley and Raphael, 2004).

In line with the US literature on the question of housing affordability (see Glaeser and Gyourko, 2003), we intend to estimate the effect of a positive housing demand shock (i.e., a new housing affordability policy) on real estate price dynamics. We explore these effects with French data. While the urban expansion pattern and housing markets in France are sometimes considered as highly regulated, there is a lack of information and academic research on the impact of demand-supporting policies on prices: no localized measure of housing supply elasticities, comparable to the US estimates of Saiz (2010) exists; and nor is there any measure of the impact of homeownership policies as Hembre (2018) has provided for the US. In spite of this lack of academic work, homeownership policies have been an important issue for French governments since World War II. In particular, a system called the Interest Free Loan (IFL) was introduced in 1995 and supports housing demand for first-time buyers. This loan with a zero interest rate finances a fraction of the property purchase of first-time buyers and enhances housing affordability, as it is considered as a down payment by credit institutions.

At the end of 2008, as in many other countries, the housing sector in France went through a profound crisis, as transaction volumes and new construction fell. The government therefore decided to "double" the IFL from 2009 to mid-2010, increasing the subsidies paid to households wishing to purchase their first home. We propose to test the effects of this new housing policy on the French land parcel prices. For this, we use a new methodological setup exploiting geographical differences in the policy design to identify possible price effects. This setup is a hybrid of difference-in-difference and matching techniques. We exploit a geographical gap in the implementation of the doubling of the IFL between two zones as an identification strategy. In 2009, the maximum amount of IFLs was increased by 50% in the zone "treated", but by only 25% in the control zone, while both zones had been receiving exactly the same amount of subsidies before 2009. We control for the potential endogenous selection effect of the "treated" and "control" groups and match land parcels in both zones, that were geographically close and had similar characteristics before and after 2009. Our estimation procedure reveals important housing price effects over a one-year horizon: the price change in the "treated" zone between 2008 and 2009 was seven percentage points higher than in the "control" zone. This price effect was still significant – though slightly smaller – using a longer time span [2007-2010]. These results are robust to the chosen specification and confirm the hypothesis of the low supply elasticity in the French land market and important negative price effects of housing policies supporting demand to make housing more affordable.

The rest of the paper is organized as follows. Section 2 describes the IFL policy and its doubling in 2009. Section 3 presents the data and the preliminary regressions. Section 4 presents the methodology and Section 5 sets out our results and conclusion.

2 Context

2.1 Principle of the Interest Free Loan

Homeownership policies have been an important policy concern for French governments since World War II. In 1995, the government decided to loosen the borrowing constraints faced by low and middle-income households. Consequently, a new system called Interest Free Loan (IFL, or Prêt à Taux Zéro in French) was introduced. The IFL is a complementary loan, funding only a part of the total home purchase, limited to 20% of the dwelling price before 2009, and carries a zero percent interest rate. This loan is provided to households by banks, which also distribute the principal loan that will finance the main share part of the purchase. The French Government pays the difference in interest payments between the IFL and the normal interest rate. From the bank's point of view, the IFL acts as a down payment and so considerably eases the borrowing constraints for households. The IFL is specifically devoted to first-time buyers with low or middle-incomes. More precisely, eligibility to the IFL is subject to a maximum annual income threshold as detailed in Table 1.

Table 1: maximum annual income per household, [2007-2010]

Family Size	Zone A	Zone B	Zone C
1 person	€31,250	€23,688	€23,688
2 persons	€43,750	€31,588	€31,588
3 persons	€50,000	€36,538	€36,538
4 persons	€56,875	€40,488	€40,488
>4 persons	€64,875	€44,425	€44,425

Zone A is the most expensive and includes the Paris area, the coastline of the French Riviera and the French Genevois (the area in France surrounding Geneva). Zone B is less expensive and is usually split in two subzones: zone B1 includes metropolitan areas (MAs) of more than 250,000 inhabitants, the outer suburbs around Paris, the periphery of the French Riviera and a few other cities. Zone B2 includes (other) MAs of over 50,000 residents, some coastal areas, and the fringes of the Paris Region. Zone C includes all other towns located in MAs of less than 50,000 inhabitants.

2.2 The 2009 experiment

At the end of 2008 as the global financial crisis unfolded, the housing sector in France went through a profound crisis: transaction volumes in the second-hand sector, as well as new construction decreased suddenly. The government then implemented several policies to support housing markets, and notably the "doubling" of the IFL.[1] This "doubling" of the IFL involved three changes: firstly, the maximum share of the IFL in the transaction which had been 20% was raised to 30% for the whole of mainland France (i.e., for zones A, B and C). The second change concerned the postponement of the repayment of the interest free loans. Until 2009, a household could benefit from an 18-year deferred repayment period when it only had to repay its main on loan, but not the IFL. Repayment of the IFL occurred after these 18 years, over a further period of 8 years. As of 2009, the deferred repayment period was extended to 30 years, for the whole country.

The third and last change was the one we are most interested in because it was not geographically uniform and serves as the basis for our statistical identification: the increase in the maximum amount of the IFL. The maximum amount of IFL available for potential first-time buyers was increased by approximately 33% in zone A, 50% in zone B (both B1 and B2) but only 25% in zone C, as shown in Table 2.

Table 2: Maximum Amount of IFL per operation in 2009

Family Size	Zone A		Zone B		Zone C	
	Before 2009	After 2009	Before 2009	After 2009	Before 2009	After 2009
1 person	€24,135	€32,100	€17,600	€26,400	€17,600	€20,700
2 persons	€33,835	€45,000	€25,300	€37,950	€25,300	€30,900
3 persons	€38,000	€50,100	€28,600	€42,900	€28,600	€35,700
4 persons	€41,500	€55,050	€32,280	€47,700	€32,280	€40,350
5 persons	€45,250	€60,150	€35,100	€52,650	€35,100	€45,000
>5 persons	€49,000	€65,100	€38,300	€57,450	€38,300	€49,650

Before 2009, the maximum amount of IFL was exactly the same in zones B and C. For instance, in 2009, a household with 4 persons could benefit from an IFL of €47,700 if the purchased dwelling was located in zone B, compared to only €40,350 in zone C, whereas before the reform the maximum limit was €32,280 in both zones B and C.

Hence, as can be seen in Tables 1 and 2, the IFL scheme was exactly the same in zones B and C before 2009, but from 2009 onwards, zone B benefited from a greater increase in subsidies than zone C. We will use this difference in treatment between Zones B and C for the statistical identification of the price effects of the IFL. More precisely, for the difference-in-difference and matching analysis that will be explained further, we need to compare areas whose housing markets are as close as possible to each other. As metropolitan areas are larger in zone B (mostly composed of MAs with more than 50,000 inhabitants) than in zone C (mostly MAs below 50,000), we will select the smallest MAs in zone B2 (those with less than 100,000 inhabitants) and compare them to the largest MAs in zone C (those with more than 20,000).

[1] It should be noted that no other housing policy response to the crisis was implemented for zones A, B and C. As this zoning is the very basis of our strategy to identify the effects of the IFL, we are certain that the results presented in this paper are only related to the effects of the IFL and not to other housing policies.

3 Data and preliminary estimations

3.1 Datasets

We use French land price data from the Survey of Developable Land Prices. This survey has been conducted on a yearly basis since 2006 by the French Ministry of Ecology and records a large sample of transactions on land parcels for which the buyer has been granted building permission for a single-family home (no multi-family buildings). The survey covers all years from 2006 to 2012. The total number of observations is 662,060 (with important changes over time due to the evolving market: 118,632 permits were granted in 2006, 48,991 in 2009 and 127,479 in 2012.

The survey provides information on the land parcels, as well as the future houses. For each land parcel, we have the transaction price, the area in square meters (SQMs), the location (municipality), whether the parcel is serviced or not, whether it has been bought through an intermediary (realtor, a builder, another intermediary such as a notary) or without any intermediary. Regarding the future home, we know the expected cost, floor area and information about the heating system, the building's completion, as well as the type of builder responsible for construction. Regarding the project manager (i.e., the household), we also know the age and professional category of the household head. As explained in the previous section, we will use the difference in treatment between Zone B and Zone C to identify the effects of IFL, and to focus on transactions that took place in MAs with more than 20,000 and less than 100,000 inhabitants in the [2007-2010] time period. This reduces the number of available observations to 7,910, but is essential for our identification strategy: we take into account the transactions in the zones that received the same amount of subsidies before 2009 but different amounts after 2009 and which took place in MAs close to the 50,000 threshold in zones B and C.

The survey is merged with other sources. Another dataset records the number of facilities (from the French National Statistics Institute, INSEE). It provides the number of public or private facilities in each municipality. As we expect these facilities to affect the property market, we will include them in our benchmark econometric model. The facilities can be of different types: Type A facilities concern services to individuals (police stations, courts, other public services, etc.); Type B facilities refer to shops; Type C facilities refer to education (schools, universities, etc.); Type D facilities are health institutions; Type E facilities are train, bus or metro stations and airports; Type F facilities relate to sports, leisure and culture, etc.; and Type G facilities are for tourist places. Finally, we use the CORINE Land Cover dataset produced by the visual interpretation of satellite images which details the land use of each parcel as: urban, semi-urban, forest, lakes, work, amenities, retail, and agricultural. Each municipality will be broken down according to its share of urban, industrial, agricultural or natural areas, as this may also impact the housing market.

3.2 Selection equation

In the IFL zoning scheme, we expect most of the municipalities located in urban areas with more than 50,000 and less 100,000 inhabitants to be in zone B2, while most municipalities in urban areas with less than 50,000 (and more than 20,000) should be in zone C. However, some municipalities in MAs with less than 50,000 inhabitants benefited from exemptions and were classified as B2 instead of C. Hence, the MA size is not the only criterion, and other factors may impact the zone selection probabilities. If these factors also affect our price equation, this may lead to biased estimates. Indeed we must control for variables which may have an impact on both price dynamics (our main equation, see below) and the B2/C selection process to avoid endogeneity issues. Consequently, in a first step, we estimate a simple binary logit model at the municipality level where the endogenous variable is I ($= 1$ for zone B2 and $= 0$ for zone C). We test several independent variables: the MA size, the municipality size, median income and price level (in 2006, so before the IFL doubling), the number of facilities per municipality (in each category) and the municipality land use (urban/industrial/agricultural/natural/mixed). The results are summarized in Table 3.

As expected, the size of the urban area is a decisive covariate in explaining zoning choices for the IFL. The probability of being in zone B2 for municipalities in urban areas is positively and significantly related to the metropolitan area (MA) size (modeled here with a simple dummy variable which is equal to 1 if the MA size is above the official 50,000 inhabitant threshold, and 0 otherwise). However, other factors do have an impact on the zoning process. Among them, the most important one is the (log of) municipality average price level in 2006. A rise in the initial price level significantly increases the probability of being in zone B2. Hence, it means that the probability of being selected in zone B2 may be higher for some municipalities located in small urban areas (below the 50,000 inhabitant threshold), with high home price levels than for some municipalities located in large MAs, but with low home price levels. Finally, it should be noted that the municipality size and median income also positively and significantly impact the zoning process. Overall, we have an endogeneity concerns with several variables: the median income, the number of municipality inhabitants and the municipality initial price in 2006. These variables impact the zone section process, but may also impact the price dynamics. Hence, they should be taken into account in our benchmark price estimation equation. Note that variables related to the number of facilities or land use are not significant.

Table 3: Logit for zone selection (B2 vs C). $n = 972$.** = signif at 5% level, * = 10%

Variable	Parameter Estimates with se in ()
Intercept	-23.6130^{**} (7.3614)
Log(nb inh in 2005)	0.3896^{**} (0.0014)
Log (median income per capita in 2005)	1.7669^{**} (0.7653)
MA Size (1= more than 50,000 inh., 0 if less)	2.9051^{**} (0.1924)
nb facilities A in the city per capita	-7.3131 (20.0446)
nb facilities B in the city per capita	0.6672 (28.2219)
nb facilities C in the city per capita	-559.2 (372.741)
nb facilities D in the city per capita	-32.0340 (33.6157)
nb facilities E in the city per capita	-1.1023 (160.6)
nb facilities F in the city per capita	-1280.1 (955.5)
nb facilities G in the city per capita	376.6^{**} (92.5256)
Share of urban areas (%)	1.9962^{**} (0.8183)
Share of industrial areas (%)	-0.4047 (1.5278)
Share of agricultural areas (%)	0.0543 (0.4264)
Share of natural areas (%)	0.5648 (3.3694)
average log of city land price in 2006	0.8044^{**} (0.1388)

Note: Log(nb inh in 2005) is the log of the number of inhabitants in the municipality in 2005. Log (median income per capita in 2005) is the log of the median income per capita in 2005 in the municipality. MA Size is a dummy variable related to the size of the Metropolitan Area (50,000 in threshold). Type A = services to individuals. Type B facilities = shops. Type C = education facilities. Type D = health facilities. Type E = transport facilities. Type F = sport or leisure facilities. Type G = tourist places. Each municipality is broken down according to its shares of urban surface area, industrial, agricultural or natural areas. The missing category corresponds to mixed-use areas... Average log of city land price in 2006 is the average log of price in the municipality in 2006 (i.e., prior to our estimation period).

4 Methodology

In our benchmark pricing model, $p_{i,j,t}$ is the log price of land parcel i per SQM, in municipality j and year t. N is the total number of observations in our sample, $i = 1, ..., N$. T is the set of treated municipalities, i.e., $j \in T$ if the municipality is in zone B2 and $j \notin T$ if it is in zone C. We propose the following linear heterogenous hedonic model to explain land prices:

$$p_{i,j,t} = \alpha_j + X'_{i,j}\beta_j + \delta_{j,t} + \varepsilon_{i,j,t} \quad (1)$$

α_j is a municipality-level fixed effect. $\varepsilon_{i,j,t}$ is the error term. $X_{i,j}$ is a $(k \times 1)$ vector containing information on the land parcel attributes and the municipality and metropolitan area characteristics. We allow for heterogeneity in hedonic parameters β_j which may differ across municipalities, $\beta_j \neq \beta$. More precisely, let us decompose $X_{i,j}$ and β_j in two components, $X_{i,j} = [W_{i,j} \ ; \ Z_{i,j}]$ and $\beta_j = \left[\beta_{W,j} \ ; \ \beta_{Z,j}\right]$, where $W_{i,j}$ is the subvector associated with heterogeneity, $\beta_{W,j} \neq \beta_W$. We conduct preliminary Chow tests and determine that $W_{i,j}$ should include the location of the land parcel (i.e., the municipality) as well as the land area in SQMs. This raises the challenge of identification, as it will not be possible to estimate a $\beta_{W,j}$ coefficient for each municipality. We will then propose an original procedure to overcome this difficulty. Other explanatory variables $Z_{i,j}$ are not associated with heterogeneity, $\beta_{Z,j} = \beta_Z$. $\delta_{j,t}$ is a municipality time-trend. Importantly, the unobserved fixed effects α_j may be correlated with both $X_{i,j}$ and $\delta_{j,t}$. A crucial assumption here for identification is that $X_{i,j}\beta_j$ and $\delta_{j,t}$ are supposed to be additively separable: we assume there is no specific time trends at the intra-municipality level. Two land parcels located in the same municipality are assumed to share the dynamics in land prices over the time period considered. Moreover, some important local characteristics may be unobserved but are captured by our fixed effect term, α_j. Notice also that all significant variables in the selection equation (see Table 3) are included in $Z_{i,j}$ (income, zoning B2/C, size of the municipality and initial 2006 price level) as they may impact both the zoning variable I and the target variable $p_{i,j,t}$. If these variables were not included, the estimate of the impact of I would be biased.

We propose an original approach combining difference-in-difference and matching methods to evaluate the effects of the IFL doubling in 2009. The difference-in-difference dimension comes from the fact that we compare the evolution of prices before and after 2009, between zone B2 and zone C. This method has already been widely used on real estate data (see, for instance, Engberg and Greenbaum, 1999, Landers, 2006, Busso and Kline, 2007 or Krupka and Noonan, 2009). However, by applying a simple difference-in-difference, we compare sales that are potentially very dissimilar in terms of characteristics: we compute an average of land parcels in zones B2 and C with different attributes, some of which have a heterogeneous impact on prices ($W_{i,j}$). We therefore combine this approach with a matching procedure inspired by Black (1999) or Fack and Grenet (2010). Their strategy consists in focusing only on sales that takes place in the vicinity of a boundary (regression discontinuity design). We adapt this approach and carry out the matching procedure on the basis of the (W_{i,j}) variables associated with heterogeneity (location, land parcel area). This will allow us to eliminate these variables in our difference-in-difference equation. More specifically, we collect all pre-reform land sales $p_{i,j,t}$ (with $t \leq$ 2008) and match each of them with a set $\overline{n}$ of counterfactual post-reform land sales $\overline{p}_{s,i,j,t'}$ located in the same municipality j ($s = 1, ..., \overline{n}$ and $t' = 2009$). $\overline{X}_{s,i,j} = \left[\overline{W}_{s,i,j} \ ; \ \overline{Z}_{s,i,j}\right]$ is the attributes vector of these counterfactual sales. This matching procedure is done on a spatial basis – the reference and counterfactual are in the same municipality j – but also on the basis on the elements of vector $W_{i,j}$, those associated with significant parameter heterogeneity. Consequently, the reference land parcel will be matched with the post-reforms parcel with comparable land areas, since we evidenced a great deal of heterogeneity with the impact of land area on the transaction price per SQM. Overall, counterfactual sales are selected such that $\overline{W}_{s,i,j}$ is close to $W_{i,j}$ for each s. We select the counterfactual sales with kernel methods.[2] We compute the land price difference between *reference* transaction i and counterfactual transactions s, i.e., $\Delta p_{i,s,j,t,t'} = \overline{p}_{s,i,j,t'} - p_{i,j,t}$. All price differences are pooled and weighted according to the kernel distance between the focal and counterfactual sales. Let $w_{i,s}$ denote the weight between sales i and s. $\overline{n}^{-1}\sum_{s=1,\dots,\overline{n}} w_{i,s} = 1$, $\forall i = 1, ..., n$. Using equation (1), we obtain:

$$\Delta p_{i,s,j,t,t'} = \left(\overline{Z}_{s,i,j} - Z_{i,j}\right)\beta_Z + (\delta_{j,t'} - \delta_{j,t}) + (\varepsilon_{s,i,j,t'} - \varepsilon_{i,j,t}) \tag{2}$$

where we use the matching hypotheses to drop $W_{i,j}$ terms and fixed effects α_j out. As an additional identifying assumption, we separate the set of municipalities in two groups: the

[2] In the benchmark equation, we select counterfactual transactions in a range of +/- 10% compared to the reference pre-reform transaction land parcel area. We ran several models with other kernel specifications: results are available upon request.

treatment group (cities located in zone B2), $j \in T$, and the control group (cities located in zone C), $j \notin T$. So we replace $(\delta_{j,t'} - \delta_{j,t})$ with the "selection equation" dummy variable $I_{j\in T}$ which is equal to one if the municipality j has been treated ($j \in T$, zone B2) and zero otherwise (zone C).

5 Results and conclusion

We test several versions of the model. Models 1 and 2 include only the initial municipality price level in 2006 among the "selection equation" significant variables, while Models 3 and 4 include all of them (municipality size and median income). We also consider two estimation periods : [2008,2009] (Models 1 and 3) and [2007,2010] (Models 2 and 4). In the first case, each pre-reform land parcel sale (in 2008) is matched with a set of post-reform sales (in 2009, in the same municipality with similar parcel areas in SQM). In the second case, each pre-reform sale (in 2007 or 2008) is indifferently matched with a set of 2009 or 2010 post-reform sales in the same municipality (with similar parcel areas in SQM). Estimation results for all versions of the model are summarized in Table 4.

Table 4. Estimation results. $B2$ = treated, C = non treated. se in (). ** = signif at 5% level, * = 10%

Variables	Model 1 [2008, 2009]	Model 2 [2007, 2010]	Model 3 [2008, 2009]	Model 4 [2007, 2010]
Intercept	0.8819** (0.0036)	0.8113** (0.0031)	0.8965** (0.0033)	0.8453** (0.0032)
$I_{j=B2}$	0.0701** (0.0233)	0.0563** (0.0202)	0.0780** (0.0215)	0.0578** (0.0208)
Pre-reform year 2007 (ref=2008)	–	−0.0229** (0.0046)	–	−0.0185** (0.0045)
Post-reform year 2010 (ref=2009)	–	−0.0117** (0.0048)	–	−0.0105** (0.0042)
$\log(p_{2006})$	−0.2288** (0.0506)	−0.2122** (0.0503)	−0.2103** (0.0500)	−0.2166** (0.0527)
$\log(\text{size}_{2005})$	–	–	−0.0582 (0.0926)	−0.0411 (0.0847)
$\log(\text{income}_{2005})$	–	–	0.0422 (0.0305)	0.0404 (0.0293)
Regional Dummies	yes	yes	yes	yes
$(\overline{Z} - Z)$ factors	yes	yes	yes	yes
Quarterly. Dum.	yes	yes	yes	yes
n	3,743	7,910	3,743	7,910
$\overline{R}^2$	0.2256	0.2310	0.3257	0.3311

All specifications reveal a significant effect on prices, whatever the time period considered. In Model 1 on [2008,2009], our estimates suggest a 7.01% increase in land prices per SQM, for the treated group T (zone B2) compared to the control group T (zone C). The price effect is also present and significant, though slightly smaller on the [2007-2010] time period (only 5.63%). The chosen set of control variables extracted from the selection equation does not seem to have much impact on the results (results of Models 3 and 4 are very close to those of Models 1 and 2 respectively). Finally, it should be noted that the average log of initial price level per municipality p_{2006} negatively and significantly impacts the subsequent price dynamics (either for the [2008-2009] or the [2007-2010] period): the higher the initial price, the lower their future growth rates. The initial size ($size_{2005}$) or median income ($income_{2005}$) of the municipality does not significantly impact the land price dynamics.

All these results are limited to a part of the territory (part of zone B2 vs. part of zone C). This limit is essential for our estimation strategy, but it naturally reduces the geographical scope of our results (as is usual when using "matching" or regression discontinuity design techniques). We have therefore re-estimated the estimates in Table 4 over a wider area: all MAs between 10,000 and 200,000 inhabitants (instead of 20,000 to 100,000). This is likely to bias our estimates (we are comparing less similar areas and therefore potentially very different property markets). But it also allows us to increase significantly the number of observations: 12,356 in [2008-2009] instead of 3,743, and 26,909 in [2007-2010], instead of 7,910. Our main results are preserved. The price effect is 6.42% with Model; 1, 4.98% with Model; 2, 6.66% with Model 3; and 5.02% with Model 4.

Hence, according to our estimate, prices per SQM of land parcels in zone B2 were 6% or 7% higher in 2009 than they would have been if they had followed the counterfactual trend observed in zone C. This inflationary effect suggests a low elasticity of the land supply in France, at least in the short term (a maximum time horizon of 2 years). In a period of falling demand, the overall number of land parcels put on the market fell, but the price did not decrease as much as expected because the IFL was doubled. This demand shock contributed to preserve, at least partially, the bargaining power of the sellers and allowed them to obtain some of the IFL subsidies indirectly.

In order to estimate the size of the share of subsidies indirectly captured by the seller, we simulated the potential gain in purchasing power for buyers. We proceeded as follows: we used the sample of potential first-time buyers (public or private tenants) from the 2006 Housing Survey (available year closest to 2009). We knew the location, characteristics (age, size) and income of about 16,000 households, representative of the population of first-time buyers. We simulated the maximum land purchasing power of each of these households according to their composition and income: we assumed that the main loan duration was 20 years and supposed that credit repayments (principal and interest) would not exceed one third of household income (the usual borrowing constraint in France). We used the housing credit rates published by the French Central Bank. In addition, we calculated the maximum amount of the IFL for each household based on its characteristics and added it to the principal loan amount. We assumed no down payment (as the IFL is considered a down payment by the bank). We simulated the maximum amount of the total operation for each household both in zone C and in zone B2 in 2009. In zone C, the maximum loan/house price was €157,234 on average. In zone B2, it was equal to €176,037 (+11.96%). This gap was solely due to the difference in IFL design between the two zones. On average, a household gained nearly €20,000 in purchasing capacity thanks to the IFL if it decided to buy in zone B2 rather than zone C. However, we know (Table 4) that price increase in zone B2 was 7.01 percentage points higher than in zone C, due to the IFL price effect. In other words, an asset that would have cost €157,234 in zone B2 without the B2/C difference in the IFL scheme, actually cost €168,260 because of this difference, etc. This means that the price effect of +7.01% canceled out almost 59% of the expected benefits of the IFL for buyers. A majority share of the IFL was thus captured by sellers via the inflationary effect on land prices.

This study deserves of course further analysis. In particular, it would be interesting to examine the effects of a variation in the IFL in a period of price growth, instead of during a crisis. Moreover, the study could be extended to the whole of mainland France, and not only to certain parts of zones B2 and C. We leave this open for further research.

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