Socio-economic Inequalities in Accession to Real Estate Market

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Abstract

We study socio-economic drivers of accession to property in Real Estate Market, based on the Greater Paris case. Our contribution is twofold : (*some empirical/theoretical results*), and methodological by introducing an heuristic to reconstruct missing data by using kernel mixture extrapolation.

Keywords

Real Estate Market, Data Extrapolation

Introduction

In most capitalist advanced countries, housing prices increases faster than households incomes. In some of them, more exposed with toxic financial assets, 2007's subprimes crisis lead to a momentary burst, but in others the bubble stayed "robust" **?**.Starting from the bubble explanation and haunted by the notion of equilibrium, hortodox eonomists see in inflation an existing unbalanced stock between housing supply and households demand. In that terms macro-prices dynamics can not be understood by their models and finally put the emphasises on the unresponsability of individuals households, adopting a speculative behaviour similar to financial stakeholders. As if housing was an asset like the others and we would buy one only for the exchange value. More recently, litterature on political economy of housing give us the tends of the public policy of housing. In that terms it is became common to accept housing "as a pillar of the capitalist economy" (**?**, page 10)

-comparative studies : dette et prix -critique des modles comparatifs : une vision parfois romantique qui ommet les tendances gnrales : privatisation du stock + libralisation des politiques de rgulation du financement –¿ Le rle du logement dans l'conomie -Critique de la logique de la formation des prix par des "acteurs de la promotion" + le remplacement social (vision cologiste) Often, marxist literature investigating on housing rising prices put the emphasises on the role of real estate developers. One of the most famous theory has been developed by Neil Smith through the concept of rent-gap model. We do not assume that this model is unefficient but it seems that it can not explain the contemporain prices formation in entire metropolitan urban regions for one major reason. The housing market is not feed by new constructions but by the circulation of used housing. Moreover, research on real estate developpers have shown their spatial diversification after the inflation. In that sense they are attentive to the "markets signals" more than market markers. However we do accept the analytical concept of devaluation. But in our perspective until nowadays, massive devaluation of real estate stock has been avoid thanks to the More generally the logic

PB : Dans quelle mesure la hausse du prix immobilier est le rsulat de l'volution des conditions d'octroie du crdit immobilier? les ratio LTV dans les espaces socio correpond t-ils au capital empruntable selon les conditions d'octroie? Quels sont les "rgimes" immobiliers des espaces urbains? (un rgime patrimonial , un rgime par le crdit...)?

–¿ Politiques de scoring : quantification du risque

Since Halbwachs seminal study **?**, urban rese archers have tended to explain socio-economic inequality as a function of housing affordability (i.e. the price to income ratio). Few have explicitly attempted to link socio spatial inequality to the financial dynamics of residential housing

Data

Data Extrapolation

When using aggregated statistical data, one often observe an aggregated distribution over a classification. We propose a desaggregation method under the assumption of a kernel mixture.

When studying geographical data, aggregation is generally done on different aspects. Spatial and temporal aggregations have been widely studied (MAUP, etc.). The aggregation over classes of a population may be problematic : for example, one can have the distribution of incomes for a population of a geographical area, but not the distributions conditioned to socio-economic classes (CSP) that are crucial for some statistical analyses. We describe here a method to reconstruct these, under the knowledge of population composition and simplifying assumptions on the shape of the conditional distributions. This problem is close to inverse problems in various fields of applied statistics, and using

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Gaussian mixtures is a well-known method **?**. It can also be understood as mode finding with a fixed number of modes **?**.

Formalization

General case We assume a random variable W describing a population, for which we know the empirical distribution with density $f(w)$. The population is stratified into a finite number of categories $c \in C$. We assume that the shape of the distribution is known for each category and that it can be expressed with a kernel $k_c(w)$. With categories yielding a partition of the population, we have directly by independence, where w_c is the proportion of category c in the population such that $\sum_{c \in C} w_c = 1$,

$$f(w) = \sum_{c \in C} w_c \cdot k_c(w)$$

Parametrization Kernels are the unknown to be determined from the empirical distribution. In the general case, we want to minimize a cost function between the two distribution, i.e. solving

$$\min_{k_c} K(f, \sum_{c \in C} w_c k_c)$$

Let simplify the problem and take similar distributions for each category, such that $k_c = g(\vec{\alpha}_c)$. With a simple mean-square error cost function, our optimization problem becomes

$$\min_{\vec{\alpha}_c} \int_w \left(f(w) - \sum_c w_c \cdot \left[g(\vec{\alpha}_c) \right](w) \right)^2 dw$$

Implementation

Implement the optimization problem in R

In practice, we will have an histogram $(f(x_j))_j$ of the empirical distribution, yielding a discrete mean-square integration. The implemented function will be of the form

```
extrapolate(distrib,weights,kernel,bounds)
```

with `distrib` the histogram, `weights` composition of the population,`kernel` the kernel function (taking parameters and variable as arguments), `bounds` boundary for parameters (should be tunable for each category or general).

Remarks :

- kernel type can be left generic
- in what case do we have a convex problem (yielding unicity and speed of resolution) ?

Validation

Sensitivity Analysis

External Validation zero rate mortgages : for a subpopulation, data we extrapolate is given (beware of selection bias) $\rightarrow$ validate on it.

Typology of Local Markets

Context Theoretical considerations and literature review suggest that housing market is segmented into at least three distinct categories, that should furthermore correspond to clearly identified spatial entities. The so-called Market Regimes are :

- Periurban
- Saturated markets for middle-income classes (usage market)
- Capitalisation markets

Methodology The aim is to identify spatial regimes. These should answer differently to perturbations as the 2008 crisis, what is a mean of external validation.

The classification can be done at the first, but also second order (correlations). Indeed, if households have a large range of choices that are effectively realized, the correlation between socio-economic and transaction variables should vanish.

The type of dwelling (independently from surface) should be crucial for the question of choice.

The geographical provenance of buyers should also contain some signal, as capitalisation can occur far from the residence, whereas modest household will tend to stay in local range.

Using GWR to extract an optimal spatial scale is also a possibility.

Conclusion