# Buying In:
# Putting a Price on Urbanity in the Digital City

**SNSF Early Postdoc.Mobility Research Project Involving:**

**EPFL - École Polytechnique Fédérale de Lausanne**
Dr. Luc Guillemot
**UC Berkeley, Departement of Geography (Host Institution)**
Prof. Dr. David O'Sullivan


**Proposed by:**
Dr. Luc Guillemot, EPFL

## Abstract

Housing prices tend to be higher in city centers than elsewhere. This phenomenon is known as the *urban rent*. The cause of this observed difference kindled a yet unsettled scientific dispute between two opposing models: Does urban rent stem from **global economic speculation** based on a location advantage, or is urban rent the result of an **actors-driven valuation** of *central* neighborhoods that leads to the augmentation of housing prices?

This controversy is epitomized by the debate surrounding *gentrification*, i.e. the replacement of lower income inhabitants by higher income ones in poor neighborhoods. Two main models of gentrification have been proposed: the economic exogenous approach integrates gentrification in **macro-scale speculation** and the geographic microscale approach considers the **neighborhood effect** of high valued houses. These models describe *how* gentrification might happen, but fail to explain *why* neighborhoods suddenly become attractive although their locations did not change.

I propose in this project to test the **role of urbanity in the gentrification process** so as to address this shortcoming. Three methodological steps will be performed: First, I will create **indicators** of housing prices, housing upgrading, urbanity levels and urbanity preferences in order to build a historical atlas to give a cartographic insight into the relation between urbanity levels and housing prices. Second, I will build a **hedonic model** of housing prices in San Francisco neighborhoods since 2000 in order to measure the urbanity component of housing price variations. By examining movements in actual housing prices and the urbanity component of these prices, I will estimate the degree of correspondence between the inflection points in housing prices and in the urbanity component. If urbanity is a determinant of housing prices, I expect to find a high degree of correspondence between these turning-points. Third, I will perform a **qualitative analysis** of inhabitants categorized as *gentrifiers* to understand **if and how urbanity intervenes in the valuing of the neighborhood** they live in. This last phase will serve both as an evaluation of the statistical model's relevance and as a method to test the correspondence between urbanity preferences and voting behaviors.

This question is important because it adds an often omitted dimension to the **long lasting scientific debate** surrounding gentrification. It is also important because it could impact the way **public authorities** manage cities: if the augmentation of housing prices depends on urbanity levels, urbanity will prove to be a relevant lever to pursue urban policies and keep control over the housing market.

Furthermore, this project equally builds **innovative tools and methods**. I will build an unprecedented dataset of urban indicators and urbanity preferences using never previously brought together data. I will use and contribute to state-of-the-art data gathering and **geospatial visualization techniques** (*d3.js* foremost) to ease the exploration and perform statistical analysis of such a dataset.

This project falls within the scope of a long-term interest I have in phenomena where local and global scales interact—*glocal* phenomena—, in innovative cartographical tools that depict such complex phenomena as *gentrification*, and to the definition of universal comparable indicators between cities.

Since **San Francisco** has become the model of **super-gentrification**, usually attributed to the return of rich elite in central San Francisco, this city will be my field study. Prof. David O'Sullivan and I have been in close contact in order to develop this project and he has offered me to join his research team at **Berkeley Geography**, where fellow geographers and cartographers will allow an **anticipated fruitful collaboration** that will hopefully continue on my return to Switzerland.

# Contents

## 1 Research project

### 1.1 State of general research

#### 1.1.1 The urban pattern of votes

The level of urbanity seems to be the main explanatory dimension of spatial patterns of electoral geography. Most democratic countries demonstrate a **dichotomy in voting behavior between city centers on the one side and less urban areas on the other side**. This dichotomy is for instance patent in the 2012 Obama election where city centers tended to lean more democratic than their outskirts (Guillemot and Lévy, 2012). Most federal ballots in Switzerland follow the same pattern (Chavinier and Lévy, 2009). The French 2012 presidential election also exhibits such an urban/suburban pattern. This pattern was especially salient regarding the far-right party *Front National* whose best results occurred in the suburbs of cities (Donzelot and Mongin, 2013). More than social and demographics characteristics, the distance to the center seems therefore to be a valuable predictor of election outcomes.

#### 1.1.2 Homogenization of neighborhoods

Along this center/suburbs spatial dichotomy, the political spatial pattern in the United States is also characterized, since the 1970's, by the political homogenization of

communities. The increasing number of **landslide uncompetitive elections reveals the polarization of neighborhoods** (Bishop, 2009, §174). Abrams and Fiorina (2012) have criticized the relevance of this empirical observation for explanatory purposes, and especially the hypothesis of the "big sort" (cf. Figure 1.1.4). Their main criticism is that this approach only relies on federal elections, whereas local politics do not necessarily exhibit so clear a pattern. Nevertheless, this homogenization bolsters the idea that the place an individual choose to live in and his voting behavior are related:

> "As americans have moved over the past three decades, they have clustered in communities of sameness, among people with similar ways of life, beliefs, and, in the end, politics." (Bishop, 2009, §95)

These empirical observations do not identify clearly the causal relation between residential choice and political views, but they demonstrate a relation between them.

#### 1.1.3 The political significance of residential choice

Van Diepen and Musterd (2009), as well as Lévy (2013) have measured "ways of living" in the city as *levels of urbanity*. Urbanity can be measured considering three component of places: density, social diversity and functional variety.

The *level of urbanity* of a place is a proposed synthetic indicator comprising these three components and characterizes places from *urban* to *infra-urban* (Lévy, 1994). They can also be thought of as different ways of relating to the other: whereas city centers are characterized by density, social diversity and functional variety and tend to house "allophillic" individuals; suburbs, less dense and less diverse, tend to house "allophobic" individuals (Ourednik, 2010). Places also differ on their access to mobility. City centers are served by public transportation, while suburbs rely more on private motorized transportation. Thus, "dwelling" somewhere is not anecdotal of one's way of thinking its place in society.

Urbanity "is a concept that cannot be restricted to what happens in cities. It is a mode of social relations" (Boudreau, 2010, 55). Louis Wirth also recognized urbanity as a set of sociological characteristics more than just a spatial arrangement of realities. The comprehension of the city and **urbanity as a "way of life"** (Wirth, 1938) is followed by the work of many scholars in the field of geography and urban sociology who deem the city as an innovative place (Jacobs et al., 1970) that attracts talent and human capital, what Florida calls the "creative class" (Florida, 2006). The mode of social relations included in *urbanity* could explain the spatial polarity between political parties in the United States.

### 1.1.4 Residential choice, political choice: which comes first?

Two competing models have been devised to explain urban pattern and homogenization of votes: the "big sort" or "friends-and-neighbors influence". Either people move to places where people are already like them, or they are influenced by their neighbors once they are settled.
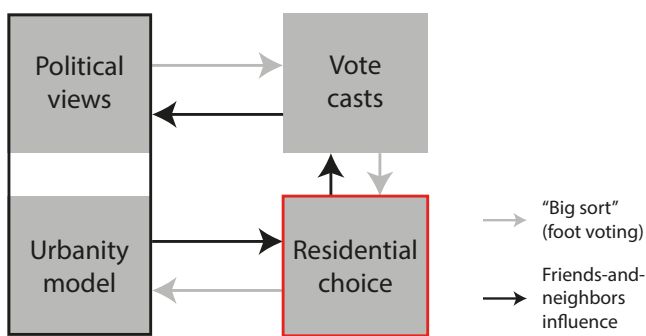


Figure 1: systemic urbanity models and political views intertwinements

**The big sort** The *big sort* model states that people move to live with their own kind (Bishop, 2009). Individuals have different preferences and don't share the same expectations in term of local public goods, therefore they will move to the place where local public goods services meet their expectations (Tiebout, 1956). Individuals who

deem their local government does not align with their preferences favor moving to another community that fits best their political views over trying to influence local policies. This is what Tiebout (1956) calls "voting with one's feet": instead of casting a ballot, people move. For him, this is a spatial solution to the "free rider problem", people benefiting from public goods without sharing the costs (Olson and Olson, 2009). Individuals might want to have a greatest impact on politics and choose therefore a community where their opinion will be more predictably taken into account, where their chosen policies will be actually delivered.

**Friends-and-neighbors influence** The "friends-and-neighbors" hypothesis states that people tend to imitate the political behaviors of their neighbors. Once they settle somewhere, they tend to slowly adjust their view of society and political preferences towards the ones of their neighbors. Over time, the community homogenizes its political preferences, exhibiting a "community effect". If an individual feels good in the place he lives in, he shall credit local politics for it and therefore the dominating political party in the community (Zuckerman, 2005) or simply be "directly influenced by what [his] neighbors are saying at the moment" (MacKuen and Brown, 1987).

### 1.1.5 Is residential choice a free choice?

"Big sort" and "influence" are not necessarily mutually exclusive but go together in an evolving circle process. These two hypothesizes both posit residential free choice. Under this postulate, people are not assigned a place to live by external condition but can make free and informed choice of a residential place. The expansion of commuting, in particular, frees people from having to live close to their workplace. However, this choice is not totally free. Dieleman (2001) identifies external constraints limiting the number of residential opportunities available to households (housing prices, local housing policies, etc.), as well as constraints based on their own trajectories (mobility rate, stage in the life circle, size of the dwelling unit, life events, etc.) (Clark and Dieleman, 1996).

The validity of the hypothesis of a causal relation between political views and residential choice is therefore heavily contingent to housing freedom of choice.

### 1.1.6 The urban fabric of ground value

Housing affordability is constrained by housing market prices. Factors influencing these prices are manifold and differ on two main dimensions: economic and geographical. Following Alonso's seminal article extending the agricultural theory of rent to the urban case (Alonso et al., 1964), *urban rent* can be defined as the advantage of places that are spatially close to city centers (CBD[1], urban amenities...).

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[1]Central Business District.

**Economic models** In neoclassical models of urban rent, the real-estate market is driven by offer rather than demand. William Alonso states that urban land market depends on the ability of the owner to allocate land to its most profitable use (Alonso et al., 1964). By contrast, marxist theorists contend that urban ground rent is not related to demand but to speculation of investors (Rose, 2013). The **economic debate surrounding the "urban rent" is a yet unsettled dispute** between neoclassical and marxist economists (Ball, 1985), but neither the neoclassical nor the marxist approach have included space in their explanatory models. Therefore, specifically geographical models have been developed to incorporate a spatial dimension in the explanation of housing market behaviors.

**Geographical models** O'Sullivan (O'Sullivan, 2002) points the lack of a micro-scale geographical approach to urban rent. He argues that land valuation can not be considered as if land parcels were isolated the ones from the others (cf. housing "upgrading") because potential ground rent is a "neighborhood scale phenomenon" (O'Sullivan, 2002, 255). **Housing market value of a neighborhood cannot be reduced to a global economic phenomenon** in order to explain *why* reinvestment becomes profitable.

### 1.1.7 Gentrification

The lack of space in economic models is peculiarly salient when considering the phenomenon of **gentrification**. Gentrification refers to the phenomenon by which higher income residents replace the lower income residents of a neighborhood, following renovation and "upgrading" of dwellings. Furthermore, the informal term *super-gentrification* has been coined in connection to New York and London where high incomes of finance people have changed neighborhoods dramatically (Butler and Lees, 2006). The recent return of Silicon Valley rich elites in the city of San Francisco is usually credited for the dramatic changes in the housing market, accelerating gentrification, and thus making **San Francisco the model of super-gentrification**[2].

Gentrification is more a descriptive term than an operative analytical tool. The causes and potential effects on public policies are subject to controversies. Gentrification thus makes a good case to explore rent value because it makes easier to decide the answer to the question: What do high housing prices indicate? Speculation? Neighborhood effect? Or something else?

Marxist theorists contend that the speculation that lead to gentrification then creates spatial injustice in the city (Harvey, 2010). The *rent gap* is the difference between the devaluing of capitalized ground rent and the potential ground rent the owner could achieve by upgrading housing accommodations (Smith, 1996). Gentrification thus corresponds to the filling of the *rent gap*.

Both neoclassical and marxist economic models of ground value have lead to the exclusive understanding of *gentrification* as an exogenous creation of value building on the location rent (distance to city center). Gentrification, according to Smith (2002), is enshrined in a global neoliberal strategy to valuing urban "command centers" (Sassen, 1991), an idea also at stake in Beckmann (1969) statistical model determining rent, density and income as power functions of distance to the CBD:

> "[T]he mobilization of urban real-estate markets as vehicles of capital accumulation is ubiquitous." (Smith, 2002, 446)

The geographical approach to gentrification and the critics to the *rent gap* theory consists in an opposition between the economic macro-scale approach to housing market analysis and the micro-scale geographical approach. Furthermore, the geographical approach can be related to the two hypothesis explaining the homogenization of political communities (cf. Figure 1). Sorting and neighbors' influence provide hypothesizes to include local, actor-based spatial variables in housing market models, and expand them beyond the sole economic scope. Space cannot be left out of the equation for land valuation models.

### 1.1.8 Behind gentrification

Economic and geographical micro-scale approaches to gentrification describe the phenomenon but fail to examine *why* housing prices suddenly rise. The location of newly revalued neighborhoods remains at the same distance to downtown: "they have always been there" as phrased by O'Sullivan (2002, 255). Moreover, housing prices augmentation does not always follows reinvestment. On the contrary, Freeman (2011) points out that gentrification might occur in the reverse order than usually depicted: high income people move to low income neighborhoods, which changes its reputation and the housing market, which *in fine* attracts speculation. Empirical observations in cities like New York, London (Atkinson, 2000) or Paris ( (Clerval, 2008); (Préteceille, 2007)) tend to demonstrate that gentrification relies on actor-based logics of action rather than on economic-driven rehabilitation phenomenons (Sabri et al., 2012). **People's move and housing prices augmentation follows the search by individuals for a quality of life that may be *urbanity.***

## 1.2 State of applicant research

I defended successfully in November 2014 my **PhD thesis realized at EPFL doctoral Program for Architecture and Sciences of the City** (EDAR). During my PhD, I was also lecturer at EPFL College of Humanities (CdH). My doctoral work addresses the topic of globalization and the emergence of a World-society, i.e a worldwide political society. Through an empirical analysis of Net neutrality related international laws and Internet related

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[2]See for instance *My Imperiled City* by Rebecca Solnit: `http://boom.lareviewofbooks.org/boom-interview-imperiled-city/`

international jurisprudence, I investigate how Internet fosters the harmonization of norms all around the World and how it leads to the globalization of values.

I am specifically interested in the **local/global relation** that is at the heart of my doctoral work and that is also at the core of gentrification: is it a global economic phenomenon that is implemented in cities (New York, London, Berlin, San Francisco, etc.) or is it on the contrary the result of a locally produced added value to neighborhoods? This postdoc project thus takes place in a long lasting interest I have in questions relating to globalization and its local indicators (see also section 6).

I have been actively involved in several scientific projects dealing with the city. I was an active coproducer of the scientific exhibition *Little Big City*[3], performed during the Architecture, urbanism and design Biennale in Bordeaux, *Agora*, May 2010 where a theoretical approach to the city centered on the notion of *urbanity* was presented and illustrated. I also created an animated map of the world overall and urban population growth since the beginning of human settlements. This animated map[4] is featured in the scientific film by Jacques Lévy *Urbanity/ies*[5].

Since my Master specialization in cartography, GIS[6] and computer sciences, I have been involved in several projects seeking innovative ways to depict spatial phenomenons that will nourish the cartographic part of this postdoc research. I was cartographer in several books (cf. publication list). The project *Commuting Scales*[7] lead me to combine euclidean and time metrics to depict commuting journeys in the Lemanic region. I will leverage during this postdoc project the strong data processing skills I developed during these projects.

## 1.3   Aims

The goal of this research is to test if **existing urbanity levels** and **individual preferences for urbanity** are driving the evolution of housing prices in neighborhoods. The main hypothesis of this research is then that there is an **interaction between urbanity levels and individual preferences for urbanity in a neighborhood wether speculation is swaying the housing market or not.** To achieve this goal, I will perform a statistical analysis of housing prices to unravel the weight of urbanity in their evolution and a qualitative analysis of *gentrifiers* housing choices. A second aim of this research is to test the relevance of inferring urbanity preference of individuals from their voting behavior. As residential choice in San Francisco is heavily constrained and political geography in California is changing, I will focus on San Francisco for the purpose of this research.

Based on data from real estate transactions, I will devise and assemble a **dataset on housing uneven distribution** in San Francisco since 2000, including the yearly evolution of house sales and the 5 year evolution rental prices evolution in San Francisco's 37 neighborhoods. I am working with Patrick Carlisle, market analyst at the real estate group Parangon[8], to guarantee the reliability of the data I will use.

I will create an **index of urbanity** based on the definition of urbanity as the combination of diversity—social and functional—and density, and an index of the *upgrading* level of a neighborhood based on the newness of housing units. United States census data will be completed by local data aggregated by the City and County of San Francisco to produce these indicators.

I will build a statistical hedonic model of gentrification to relate these indicators together. It will help understand the extent to which **housing market change is related to urbanity** and if **urbanity individuals' preferences drive local housing changes**.

I will create a **geographical dataset of voting behaviors** measured with different metrics, both partisan (democratic vs. republican) and non partisan (thanks to the liveliness of direct democracy and people initiatives in California) **to qualify demand for urbanity**. This indicator will be used in addition to **interviews that will determine how city dwellers relate their urbanity preferences and their housing choices**.

## 1.4   Questions to be answered

**1)** Given a neighborhood where housing prices have increased between $t$ and $t+1$, the **interaction with urbanity** can be summarized by the four fictive situations depicted in the next figure.
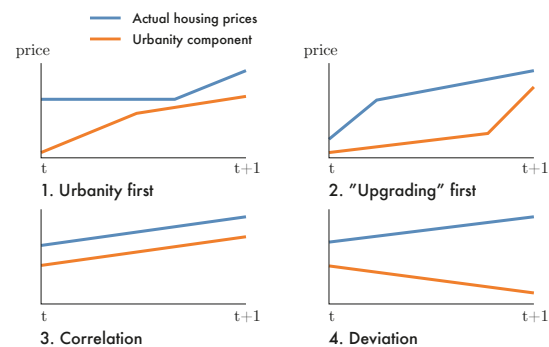


Figure 2: How are urbanity levels and housing prices related?

The debate surrounding *gentrification* concerns mainly scenarios 1 and 2. The debate is about the cause to gentrification: is it due to the *upgrading* of poor neighborhoods

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[3]Exhibition panels can be consulted on this webpage: `http://choros.epfl.ch/page-35462-fr.html`.

[4]`http://lucguillemot.net/uwh.php`

[5]*Urbanity/ies* can be seen on *Vimeo*: `http://vimeo.com/84537407`.

[6]Geographic Information System.

[7]`http://lucguillemot.net/cs.php`

[8]`http://www.paragon-re.com/`

(the construction of more luxurious housing opportunities that attracts higher income residents) or, on the contrary, the upgrading follows the settlement in poor neighborhoods of higher income residents who can afford to *upgrade* their housing conditions. This relation can therefore be divided in two subquestions:

**1.1** Do increases in housing prices and urbanity levels happen together?

**1.2** Do urbanity levels change before or after the augmentation of housing prices?

These questions relate to Hypothesis 1: housing prices augmentation is a consequence of the growth in urbanity, and will be answered during Phase 1 and 3 (cf. subsection 1.7).

**2)** Besides the empiric relation between urbanity and the housing market, I also want to address the **motivation of settlers** in newly gentrified neighborhoods (where lower housing prices are increasing dramatically). Considering urbanity and housing choices, individuals can create these four typical situations in a neighborhood:

| | **High** urbanity preference | **Low** urbanity preference |
|---|---|---|
| **High** housing market prices | 1. urbanity valuing | 2. self-enclavement |
| **Low** housing market prices | 3. gentrification creating | 4. ghettoization |

Figure 3: Housing prices and urbanity levels: four logics of action

    **Situation 1, "urbanity valuing"**: Following William Whyte's eulogy of city centers and their social diversity (Whyte, 1989), some scholars have argued that social mixing and the augmentation of housing prices are correlated because of the promotion by city dwellers of the social diversity and amenities that can be found in city centers. This situation where "gentrification is cool" as depicted by Gabe Friedman (Friedman, 2012) lean to the conception of high housing market prices as an actor-produced reality following people's search for urbanity. – **Situation 2, "self-enclavement"**: Housing prices can increase in neighborhoods where individuals look for sameness or/and absence of density. If individuals can choose their community of residence and prefer to live in a place that reflects their view on society, their residential choice may lead to the homogenization of the neighborhoods where only people with high affordability capacity can live. – **Situation 3, "gentrification premise"**: Lévy recognizes the role of *Bobos* (Lévy, 2013) as bringers of diversity (high income persons) in poor neighborhoods. They add therefore a social value to the neighborhood, this situation can be characterized as the beginning of gentrification. The reputation of the neighborhood changes along with the creation of urban amenities and engenders housing prices increasing. – **Situation 4, "ghettoiza-**

**tion"**: Cheap housing and low urbanity levels go together in abandoned and relegated neighborhoods.

    Given that high income city *gentrifiers* wield a large leeway regarding their housing choices, the questions to be answered considering the relation between urbanity preference and housing choices can be formulated as follows:

**2.1** Is urbanity an uttered motivation to settle in a neighborhood?

**2.2** How much low prices intervene in *gentrifiers* housing choice?

**2.3** Do high income settlers think that they increase the level of urbanity in a former poor neighborhood?

**2.4** Do *gentrifiers* adapt their political behavior to increase the level of urbanity of their neighborhood?

**2.5** Do *gentrifiers* relate urbanity to an idea of society of individuals (as opposed to a communitarian idea of society)?

## 1.5 Hypotheses

**Hypothesis 1**: The augmentation of housing prices is due to the augmentation of the level of urbanity in a neighborhood. This hypothesis leads to two incidental hypothesis: the settlement of higher income inhabitants in a poor neighborhood increases the level of urbanity, which contributes in return to the increasing of housing prices; and *Gentrification* prevents poor neighborhoods from ghettoization.

**Hypothesis 2**: High income residents in poor neighborhoods value more a high urbanity level than low housing prices. This hypothesis relies on the ancillary methodological hypothesis that urbanity preferences are revealed by voting behaviors.

## 1.6 Importance of the project

**Scientific debate**: This project is important because it adds an often omitted dimension to the **long lasting scientific debate surrounding gentrification**. Gentrification and housing studies are often associated with macroscale economic phenomenons. Their impact is undeniable and the housing crisis of 2008 in the United States is for instance a direct consequence of the subprime's crisis. Levin and Wright (1997) have also shown the role of speculation in the evolution of the housing market in the UK. Nevertheless, I am convinced that the transformation of neighborhoods can not be reduced to such sole economic phenomenons. I intend to prove that the evolution of housing prices can be used as a proxy to understand the **actors-driven logics of housing prices volatility**. That is why I will implement both a quantitative and a qualitative analysis of the gentrification process (see subsection 1.7) which is otherwise unfathomable.

    **Public policies**: Is housing prices augmentation good news or bad news? and what can public policies do? This project is also important because it could impact the way public authorities manage cities: if the augmentation of housing prices depends on urbanity levels, urbanity will

prove to be a relevant lever to pursue urban policies and keep control over the housing market. The augmentation in housing prices is often deemed as a bad news for city dwellers because it reduces their spending power, and as a rocky problem for public authorities because they are accountable for the universal affordability of the city. Urban management is often described as the search for equality among citizens or the "right to the city" describes by Henri Lefebvre (Lefebvre, 1968), that could be also formulated as a *right to urbanity*. Urbanity and housing prices are even more decisive and intertwined as local policies modify urban forms, housing affordability and therefore the political behavior of the concerned inhabitants in a "geographically-induced policy feedback" (Nall, 2013). Therefore, knowing precisely the levels of action of urban policies is of foremost importance for public authorities to decide which policy to praise.

## 1.7  Methods

This early PostDoc.Mobility project takes place in 4 major phases: *Phase 1 - indicators creation and cartographic analysis*: Quantization of concepts to build **measurable indicators** that will be mapped in a **historical atlas** of San Francisco. These indicators include chronological data at the neighborhood level[9] on urbanity, demand for urbanity, housing market prices and housing "upgrading" between 2000 and today. This time span is appropriate for this research as housing conditions have changed a lot following the *tech boom*, which also makes San Francisco a particularly suitable place to scrutinize. *Phase 2 - Pilot interviews*: Before realizing the quantitative analysis, I will conduct four interviews to test the relevance of indicators. *Phase 3 - quantitative analysis*: Based on these indicators, I will test how urbanity preferences modulate housing prices using a **hedonic model of housing prices**. *Phase 4 - qualitative analysis*: Based on the maps created during *phase 1*, I will identify relevant communities and individuals that will be **interviewed** to test the relation between urbanity models of individuals (urbanity preference) and their housing choices. The answers to interviews will be compared to the mapped preference for urbanity derived from political behaviors. These interviews will also be useful to test the relevance of the statistical model. An additional *phase 5 - Comparative validation* will be necessary to estimate if findings in San Francisco can be replicated elsewhere. The same methodology could be applied to the Lemanic metropole in Switzerland as it shares with San Francisco the same housing pressure. This last comparative part will not be realized during this early PostDoc.mobility project but would be necessary to further test the validity of urbanity as the most significant proxy to understand housing market dynamics.

**Phase 1: Creation of empirical indicators and cartographic analysis.**

| Indicator | Source | Geography | Time span |
|---|---|---|---|
| Housing market | US Census/ACS + Parangon Real Estate | Planning neighborhoods | 2000 to today |
| Urbanity | US Census/ACS + data.sfgov.org | Block/Census tract | |
| "Upgrading" | SF Planning Dept. + SF Dept. of Building Inspection | Address | |
| Urbanity preference | Cal. statewise database (UC Berkeley Law) + SF Dept. of elections | Precinct | |

Figure 4: Data sources used to build indicators

*Housing market*: Housing rental prices are more relevant than sell prices for my research as I focus on housing choices rather than ownership as an asset. Housing rental prices are available at the neighborhood level on a 5 year interval thanks to the data gathered by the decennial US census of 2000 and 2010 and the *American Community Survey* for 2006. Nevertheless, houses and condos sell prices at the neighborhood level are available yearly and made public by several real estate groups (see for instance Figure 7). Patrick Carlisle, market analyst at the Paragon Real Estate Group, showed interest in my research and offered to help me during my stay in the Bay Area to get the most from these data.

Some scholars offset the lack of yearly data about rental prices with incidental evidence such as eviction or household incomes (Kennedy and Leonard, 2001), or even define gentrification by social indicators (Freeman, 2005) but I will not use this artifact to avoid redundancy with the indicator of urbanity.

*Upgrading*: Residential buildings construction and rehabilitation are very well documented by the City and County of San Francisco. Data are available on its website[10] offering snapshots of San Francisco "Development Pipeline" processed quarterly. Construction and entitlement activity are tracked based on data from the Department of Building Inspection's Permit Tracking and the Planning Department's Case Tracking enterprise databases. Figure 5 features 2012 4th quarter data. For each year in each neighborhood, the average sell price of new housing units will be compared to the average sell price of all housing units in the neighborhood:

$$Upg = \frac{\sum_{i=1}^{n} p_i}{P}$$

where $Upg$ is the upgrading indicator, $i$ is a new housing unit, $p$ is the sell price of a housing unit and $P$ is the average sell price of all housing units in the neighborhood. Following the results of the analysis, the relevance of measuring the scale of the phenomenon by weighting this indicator with the total number of new housing units (as compared to other neighborhoods) will be considered.

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[9]Census data and other data will be aggregated at the neighborhood level using geoprocessing tools.
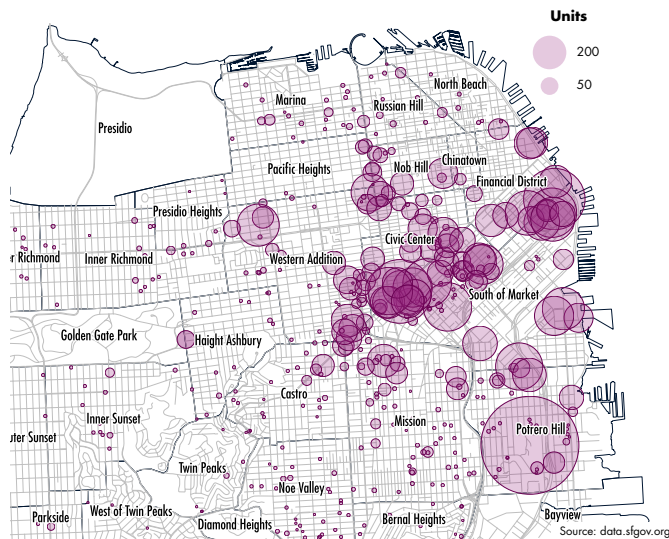
[10]https://data.sfgov.org/

Figure 5: Residential building construction
(4th Quarter 2012)
*Source: Planning Department, City of San Francisco,
data.sfgov.org*

*Levels of urbanity*: The density of the built-up environment is a typical but not sufficient manifestation of urbanity. Urbanity comes into being thanks to city dwellers' practices such as going to the restaurants, shopping or loitering in the streets. In other words, "without activity, there can be no urbanity" (Montgomery, 1998, 96). But urbanity also refers to "city sites where urban values such as solidarity, tolerance and the enjoyment of difference can exist" (Van Diepen and Musterd, 2009, 335). Furthermore, urban forms are not limited to cities anymore (Dumont, 2008), and cities do not know the same levels of urbanity everywhere. It is therefore possible to define **levels of urbanity** from "urban" to "infra-urban" (Lévy, 1994). They will be measured through a variety of indicators based on Lévy's simple definition of urbanity as the combination of diversity and density (Lévy, 1994). "Diversity" will be constructed with a range of indicators of heterogeneity among people living in a neighborhood, and to the functional mix of activities. The indexes of diversity will be calculated as the likelihood that two individuals from the same neighborhood belong to different groups[11]. "Density" will weight the indicators of diversity according to the relative concentration of these realities as compared to other neighborhoods. All the data are easily available and usable thanks to the data provided by the US Census Bureau[12] (decennial census and *American Community Survey* for yearly data) and the Government of the City and County of San Francisco[13].

The urbanity indicator will be based on three sets of diversity indicators and an indicator of the urban way of life, as summarized in the following list:

1. Economic diversity
   - Median household income (USD, as compared to highest median income in San Francisco)
   - Poverty (% of population)
   - Unemployment rate (% of population)

2. Social diversity
   - Non-family households (% of households)
   - Ethnicity (6 categories, % of population)
   - Age (5 categories, % of population)
   - Educational attainment (4 categories, % of population)
   - Language spoken at home (5 categories, % of population)

3. Functional diversity
   - Open businesses (13 main categories, 569 in total)[14]

4. Urban "way of life"
   - Households with no vehicles (% of population)
   - Journey to work transportation mean (6 categories, % of workers, 16 years and over)

*(Political) preference for urbanity*: The political index will be inspired by the California Political Precinct Index (CPPI), created by David Latterman from the University of San Francisco (Latterman, 2012)—with whom I am already in contact—but will be modified in order to infer some precision in the index. The index will use the results of **ballot propositions in California at the precinct level**[15] to create and assign to each precinct a value on a 0–1 scale from the most urbanity-friendly to the least. The value each precinct gets is not thought to be predictive of election results and does not reflect the democratic/republican opposition. I will modify the index thematically in order to be able to analyse **specific facets of politics that can be related to urbanity models**. For instance ballot propositions related to mobility means or land use, which reflect individuals' way of thinking their place in the urban space. Figure 6 depicts the outcome of the November 2014 proposition L *"Restore Transportation Balance", Parking Meter and Traffic Laws Initiative*, which would have prohibited the city, if accepted, to implement parking and car transportation limitations. The acceptance spatial distribution of such an initiative shows the contrast between the supposed most urbanity-friendly neighborhoods (Noe Valley or Mission) with the least ones (Sunset or Parkside). Direct democracy in California allows the multiplication of political metrics combination. The statewide electoral database[16]

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[11]See an implementation of such a methodology with the ethnic diversity index proposed by the SCI, `http://www.sustainablecommunitiesindex.org/indicators/view/137`

[12]`http://www.census.gov/`

[13]See for instance (SFP, 2011) and the available data on `https://data.sfgov.org/`

[14]I created a map of today open business locations in San Francisco based on this data, available at `http://bl.ocks.org/lucguillemot/8f54e173859d0feab402`.

[15]See the exhaustive list of all ballot propositions in San Francisco on `http://ballotpedia.org/San_Francisco_City_and_County,_California_ballot_measures`.

[16]`http://statewidedatabase.org/data.html`

of California maintained by UC Berkeley School of Law inventories a comprehensive list of election results since 1992 and therefore gives a **time depth to political analysis** possibility.
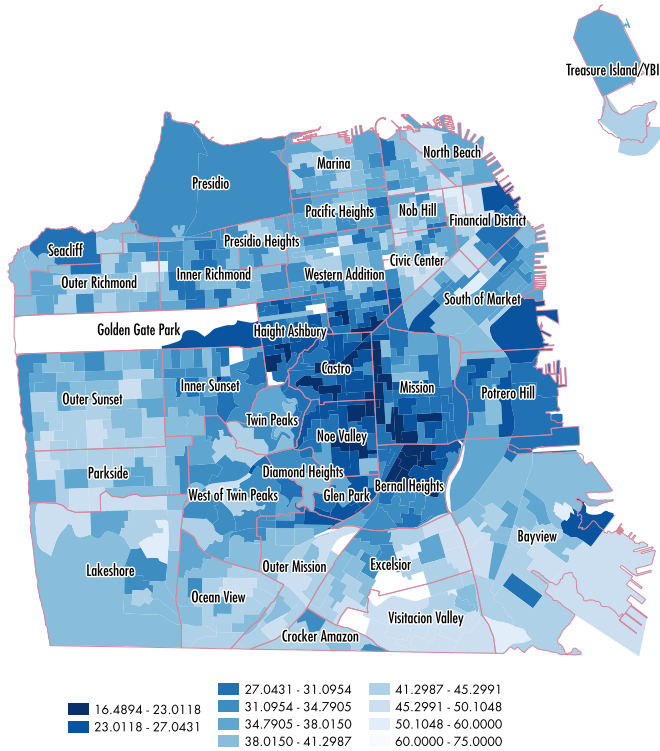


Figure 6: Proposition L
*Source: UC Berkeley Law, Statewide Database*

*Mapping urban change*: The atlas will assemble a **comprehensive picture of previously depicted indicators** at the block, precinct or neighborhood level depending on the availability of data. The atlas will firstly be used as an empirical investigation tool aiming at identifying key neighborhoods in San Francisco and basic spatial correlations between urbanity levels and housing prices respective transformations (cf. graphs in subsection 1.4). The first basic maps I created for the purpose of this proposal lead to think that the most expensive neighborhoods of Russian Hill or South of Market are not necessarily those where *upgrading* is the most pregnant (Figure 5). On the contrary, the neighborhood of the Mission, which epitomizes gentrification, is also very urbanity-friendly according to Figure 6. The maps will also be used as a transitional artifact during the interviews (see *Phase 4*). Eventually, maps will be used to communicate the results of the research project. I will use highly innovative and adaptable tools, mainly the Javascript library d3.js[17].

**Phase 2: Pilot interviews**.

The pilot interviews are designed to test the relevance of the construction of the indicators. I will conduct four interviews focused on the Mission neighborhood, typically

categorized as *gentrified* (Maciag, 2015) where housing prices are soaring (Figure 7) although household incomes are relatively low. The interview subjects will be:

– Betty A. Taisch, President of the *San Francisco Association of Realtors*,

– Sonja Trauss, President of the *San Francisco Bay Area Renters Federation*, a pro-development activist group aiming at promoting the construction of housing.

– David Campos, Supervisor of District 9 (which includes the Mission),

– Peter Lewis, President of the *Mission Dolores Neighborhood Association*, a preservation organization aiming at maintaining the quality of life in the Mission.

The interviewees have been selected to represent opposing points of view: Taisch and Trauss lean to the development of housing to bolster the development of neighborhoods whereas Campos and Lewis tend to slow down any construction projects in order to keep the neighborhood as it is. Unlike *Phase 4* interviews focused on inhabitants logics of action, these interviews will be guided and used as a feedback on each of the indicators that may be modified in accordance.
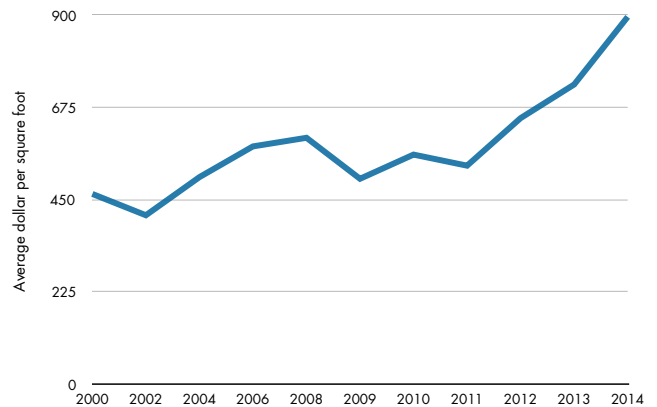


Figure 7: Mission Condo Sales.
*Source: Parangon Real Estate Group*

**Phase 3: Statistical hedonic model of the impact of urbanity on housing prices change**. I will use a hedonic model to measure the surrogate value of urbanity in housing prices. Hedonic modeling allows to set a price on a standard unit of housing (a one-bedroom apartment) to make sensible comparisons between neighborhoods and over time. Hedonic regression decomposes the analyzed object into several constituent elements and give **respective estimation of the contributory value of each of the constituent elements**, including non-market goods such as urbanity.

The following equation summarizes how the urbanity contributory value can be defined considering $P$ as the

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[17]*d3.js* is an opensource Javascript library developed at Stanford University providing high quality tools to create graphics and maps on the Web http://d3js.org/. Some of the maps I created with *d3.js* are publicly available at http://bl.ocks.org/lucguillemot and on my personal website http://lucguillemot.net/.

housing price value, $Urb$ as the urbanity indicator and $Upg$ as the "upgrading" indicator.

$$P = f(Urb, Upg)$$

Reproducing the same model each year between 2000 and today will allow to answer the first hypothesis (subsection 1.5): Given a neighborhood where housing prices are increasing, if the urbanity component of housing prices the following year $P(Urb)_{t+1}$ is higher than the reference year $P(Urb)_t$, we can deduce that the settling of higher income residents increases the level of urbanity, which is the reason of the housing prices augmentation.

By examining covariant movements in actual rental prices and the urbanity component of rental prices, I will be able to assess the degree of correspondence between the inflection points in house prices and in the urbanity component. If urbanity is a determinant of rental prices, I expect to find a high degree of correspondence between these turning-points over time, following Goodman (1978) finding that "the relative valuation of physical improvements in housing is smaller in the central city than in the suburbs".

Nevertheless, one must not forget that regression analysis may lead to controversial interpretation as it challenges the way to handle *interaction effects* among variables (O'Sullivan and Perry, 2013b, 9). This empirical model will show empirical relationships without explaining *why* these relationships can be observed. That is why *Phase 4* has been designed.

**Phase 4: Interviews**.

The analysis of *gentrification* in urban neighborhoods can not rely on sole quantitative data. To verify my hypothesis that *gentrification* is not the result of housing opportunities creation by speculators, but the result of a conscious yearning for urbanity from settlers, I need to have access to *gentrifiers* "logics of action" (Thomas, 2011). I will therefore conduct interviews to determinate **if urbanity valuing is their key motivation, regardless of housing prices** (cf. Hypothesis 1, subsection 1.5). The interviews will also aim at validating the hypothesis that **voting behavior is a valid proxy to access preferences for urbanity, and conversely**.

Following the data created by the hedonic model, I will select four neighborhoods corresponding to the four situations I described earlier (see *Questions to be answered*, Figure 3). I will scrutinize individuals to determinate if the four corresponding described logics of action (urbanity valuing, self-enclavement, *gentrification* premise, ghettoization) are relevant. Following Beaud (1996) methodological advice, I am planning to perform between 20 and 30 interviews. Interviewees will be selected through the analysis of participants to public meetings centered on development projects. Such meetings are very common in San Francisco[18] and I expect my engagement in communities to outreach to interview potential participants.

The interviews will be conducted based on the "grounded theory" (Glaser and Strauss, 2009) following a "semi-structured" guide, as described by Kaufmann (2011), i.e. the first questions are very general in order to let interviewees stray to the subject, the following questions are more focused on the subject matter and can be oriented by the interviewer during the discussion. Interviews are designed following these four "how questions" incentives (Kaufmann, 2011): **1)** How did you decide to move in this neighborhood? (to test the housing choice leeway of the interviewee and his motivations) **2)** How do you feel with the city dwellers in your neighborhood? (to test the urbanity preference) **3)** How did the neighborhood change since you moved in? (the maps created during *Phase 1* will be used here as a "transitional artifact" to usher the discussion) **4)** How do you consider the impact of urban policies on your neighborhood? (to test the consistency between voting behavior and urbanity preference).

**Phase 5: Qualitative validation of the results**. This last phase is a comparative phase aiming at validating San Francisco results by their confrontation to other local configurations. The Lemanic Region is of interest because of its similarities with the Bay area (high income residents, demographic vigor, direct democracy). This phase could be conducted during an advanced Postdoc.Mobility period.

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[18]All public meetings and hearings are notified on `http://www.sfdpw.org/index.aspx?page=31`.

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# 3    Schedule of the project



Figure 8: Schedule of the project: September, 2015 > February, 2017.

# 4    Reason for the choice of research institution

**Prof. David O'Sullivan** from UC Berkeley Geography Department has a longstanding interest in urban change and in mapping methodologies. The research he already carried out on gentrification (O'Sullivan, 2002), mapping techniques (O'Sullivan and Perry, 2013a) and statistical spatial methods (O'Sullivan and Unwin, 2003) were a great input for me to elaborate this project. We have been in contact since the beginning of 2014 and he helped me unfold the lack of a specific spatial approach to gentrification, and the fact that San Francisco Bay Area was an epitomizing situation to test my hypothesis. We have been in close contact since and he has offered prodigal review and advice in the development of my research proposal. He will serve as an advisor during my stay at UC Berkeley.

Prof. Nathan Sayre, Head of **UC Berkeley Geography Department**, offered me a workplace in the Department offices and invited me to join the prolific research team. Berkeley Geography is renown for its cartographic competence. Darin Jensen, Department cartographer, has a longstanding proficiency in mapping and I am sure that being able to have daily interactions with fellow researchers with abilities in cartography and statistical analysis will be of great help for the success of my project. **Prof. David Latterman from the University of San Francisco** also helped me in elaborating the political indicators and to understand how urbanity demand can be induced from political votes. He also offered me his advice when I am in Berkeley.

Furthermore, **San Francisco Bay Area** is a place of innovation in many fields including information and communication technologies, but also in the field of geography and data analysis. Pioneering companies such as *Stamen*[19] have specialized in the use of geographic information systems, *Openstreetmap* for instance, to help understand social phenomenons. I hope for this proximity to reveal useful.

The **tech boom** has also engendered a heavily tight housing market which make San Francisco a peculiarly **relevant place to scrutinize**. I was in San Francisco in March 2014 and I witnessed there a protest march against *Google* and other tech companies private buses that foster the settlement of their high wage employees in San Francisco (and not in the southern Silicon Valley), which lead to an augmentation of housing prices. This experience convinced me of the relevance of San Francisco to conduct my field work on the seek for urbanity by individuals.

## 5  Relevance for personal career development

Urban change is an increasingly important field in the social sciences. Along with MIT[20] and NUS[21], EPFL is an emerging leading institution in this field comprising among others the *Urban Sociology Laboratory* (LASUr), *Chôros Laboratory*, the *Economics and Environmental Management Laboratory* (REME), the *Digital Humanities Laboratory* (DHLAB) and the Institute of Architecture and the City in general. This project will contribute to strengthen this strong cluster of competences on the city as a research object by building a bridge between Berkeley Geography and EPFL laboratories. *Chôros Lab.* is carrying out a research project dedicated to the creation of an urbanity indicator using data from social networks, I anticipate therefore fruitful future collaboration, including co-authoring scientific articles.

My career development will further benefit from this experience at UC Berkeley by expanding the scope of my academic experience in one of the worldwide most prestigious University.

As stated in the *methods* section, I intend to validate the model I will test during this early Postdoc.mobility project by reproducing empirical results in the Lemanic region, which shares a lot of similarities with the San Francisco Bay area.

## 6  Planned publications

**Conference participation**: Before the beginning of my postdoc, I will participate to three conferences that will give me opportunities to have academic feedback on the hypothesis of this project. **1)** I have been selected at the *Urban Affairs Association* annual meeting taking place in Miami, April 8–11, 2015 for a scientific poster session to present the maps and spatial correlations I already created. **2)** I have also been accepted at the *American Association of Geographers* annual meeting taking place in Chicago, April 21–25, 2015 to present this project as a *work in progress*. **3)** I will participate to June 2015 PhD colloquium *Agents/Agency of Urbanity* taking place at EPFL.
During my postdoc at UC Berkeley, I intend to participate to several other conferences: **4)** The *American Political Science Association* annual meeting in San Francisco, September 3–6, 2015, **5)** The *Urban Affairs Association* 46th conference, San Diego CA, March 2016 and **6)** AAG annual meeting, April 2016 will be opportunities to present more advanced phases of the project.

**Articles**: I intend to publish articles following three milestones of this research: **1)** The **atlas of urban change** in San Francisco Bay Area (Phase 1 and 2) could lead to the publication of an article in the journal *Cartographica*. **2)** The role of urbanity and demand for urbanity in urban housing prices, as the **main result of this research**, will lead to an article in the targeted *Progress in Human Geography* journal. I also intend to publish these results in the journal *Geographica Helvetica* to have a visibility both in english and french. **3)** The "hypergentrification" of San Francisco could lead to the publication of a case study article in *Urban Studies*. The relevance of relating urbanity preference to voting behaviors should be of interest to *Political Geography*, a journal specialized in such spatial-political phenomenons.

**Book project**: As stated in my *Career plan*, I have a long term project of writing a book combining both my doctoral and my postdoctoral findings. The common aspect of these two projects is the relation between local and global phenomenons, as some scholars call "glocal" in the management and urban fields[22]. Please refer to the accompanying *Career plan* for more details.

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[19]http://stamen.com/
[20]*Massachusetts Institute of Technology.*
[21]*National University of Singapore.*
[22]See for instance (Svensson, 2001); or (Ghorra-Gobin, 2012).