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Gated Communities and House Prices:
Suburban Change in Southern California, 1980–2008.

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Abstract

Housing prices being one factor thought to contribute to segregation patterns, this paper aims at differentiating gated communities from non-gated communities in terms of change in property values. To what extent do gated communities contribute to price filtering of residents, accentuated by patterns of price differentiation favoring gated communities in the long run?

The paper provides an analysis of the territorial nature of gated communities and how the private urban governance realm theoretically sustains the hypothesis of better protection of property values in gated communities. In order to identify price patterns across time, we elaborate a spatial analysis of values (*Price Distance Index*), identifying gated communities with real-estate listings in 2008, matched with historical data at the normalized census tract level from Census 1980, 1990 and 2000, in the greater Los Angeles region.

We conclude that gated communities are very diverse in kind. The wealthier the area, the more they contribute to fuel price growth, especially in the most desired locations in the region. Furthermore, a dual behavior emerges in areas with an over-representation of gated communities. On the one hand, GCs are located in local contexts that introduce greater heterogeneity and instability in price patterns, and by doing so contribute to a local increase of price inequality that destabilizes the price patterns at neighborhood level. On the other hand, GCs spread in contexts that show a very strong stability, in terms of producing price homogeneity at the local level.

Key words: private urban governance, suburbs, gated communities, spatial analysis, property prices, segregation

Résumé

La sélection des résidents d'un quartier par le prix constituant un facteur fondamental de la ségrégation, cet article vise à analyser la manière dont les gated communities se différencient des autres lotissements non enclos, en termes d'évolution des valeurs immobilières. Les gated communities constituant avant tout des lotissements comme les autres, à la différence près que leur accès est fermé et contrôlé, notre étude porte sur la manière dont ces lotissements fermés se différencient des autres lotissements en termes d'appréciation ou de dépréciation relative des biens immobiliers ; et ce faisant dans quelle mesure elle contribuent à une sélection sociale des résidents accentuée par des logiques différentielles de production des prix immobiliers sur le temps long.

Dans une perspective expérimentale à l'échelon local dans la région de Los Angeles, cet article vise donc, d'une part, à explorer la nature territoriale des gated communities, en particulier la manière dont leur appartenance au genre plus général des lotissements en copropriété (*Common Interest Development*) permet de structurer la réflexion sur la manière dont elles peuvent générer une plus-value immobilière par rapport aux lotissements non-enclos. L'analyse porte d'autre part - avec les outils de l'analyse spatiale (indice de discontinuité des prix immobiliers) dans les zones où les lotissements planifiés (fermés ou non) sont surreprésentés (entre 1980 et 2008). A partir de données immobilières, nous identifions les gated communities et les comparons aux données fournies au niveau des Census Tract du recensement en 1980, 1990 et 2000, afin d'analyser les types de trajectoires temporelles des prix immobiliers.

Les résultats montrent que les gated communities sont d'une part très hétérogènes, et contribuent globalement à soutenir la hausse des marchés immobiliers, en particulier dans les zones les plus attractives. De plus, les gated communities introduisent localement une plus grande hétérogénéité et instabilité dans les types de trajectoires temporelles des prix immobiliers à l'échelon du quartier.

Keywords: gouvernance urbaine privée, suburbs, gated communities, analyse spatiale, prix immobiliers, ségrégation

1. Introduction

For almost two decades, gated communities have been under the scrutiny of scholars, including those addressing the question of whether or not they produce a housing price premium and thus contributing to residential segregation. Earlier studies on housing prices in gated communities have focused either on the price premium produced by gating a neighborhood, by the means of hedonic modeling in the U.S. (Lacour-Little and Malpezzi, 2001, Bible and Hsieh, 2001) or other empirical methods in South Africa (Altini and Akindele, 2005). All studies yield comparable results about the price premium in favor of gated communities, compared to non-gated subdivisions in the same area. Our line of inquiry seeks to analyze how this price premium structures price differentiation patterns between the gated and non-gated areas in the long run.

This paper studies the sprawling suburban areas of Southern California (Santa Barbara, Ventura, Los Angeles, Orange, Riverside, San Bernardino and Riverside counties) by means of a quantitative approach to price change between communities in the same vicinity. Thus, the paper focuses on gated communities in Southern California, and differentiates gated communities from non-gated communities in terms of property values. We further study the patterns of change in property values between 1980 and 2008.

Two overlapping understandings of “gated communities” (hereafter “GCs”) have emerged in academic literature. One group of scholars consider them to be a family member of a more general class that includes master-planned communities (horizontal version) and condominiums (vertical version) governed by collective tenure and incorporated organizational arrangements (McKenzie, 1994, McKenzie, 2003, McKenzie, 2006a, Kennedy, 1995, Gordon, 2004, Webster, 2001, Webster and Le Goix, 2005, Kirby et al., 2006, Le Goix and Webster, 2008). Important considerations from this perspective include the nature of ownership, governance, and management. Such neighborhoods will, for example, have some kind of Property Owners Associations employed by a governing body formed from among residents tied to a common set of interests by contract.

A second group of scholars contends that it is the existence of fences, walls, and security features that

distinguishes GCs as a residential form that is significantly different from non-gated places (Blakely and Snyder, 1997, Low, 2003, Vesselinov et al., 2007, Le Goix, 2006, Vesselinov and Le Goix, 2009). This discourse tends to stress the impact of gated communities on crime, segregation, property values, citizenship, and related behavior.

This paper adjudicates between these two understandings and elaborates on whether gating a neighborhood matters over the private governance effort in shielding property values and producing a price premium across time. Gated developments in the U.S. are residential communities among others, and they are private Common Interest Developments run under the provision of private contractual regulations, with the major difference being that they are gated. Two overlapping lines of inquiry need to be addressed here: (1) Are gated communities different from other non-gated suburban neighborhoods with regard to price increase or depreciative trends? (2) By doing so, to what extent does the enclosure of a neighborhood significantly contribute to price change-patterns in favor of gated communities?

We argue that housing prices describe not only intrinsic characteristics of housing but also the characteristics of places, assessed and perceived at different geographical levels (location in a city, social characteristics of the neighborhood, and those of the street). Price changes also induce a powerful social filter in metropolitan suburban areas. In an experimental perspective at the lower local scale, we analyze property values in areas where planned communities are preeminent features for the period between 1980 and 2008. We identify GCs and non-gated communities using a primary source based on properties on sale in 2008 in real-estate agents' listings. Matched with data at the tract level from Census of 1980, 1990, and 2000, we identify price patterns across time.

The next section of the paper reviews the relationships between GCs and private residential governance in proprietary neighborhoods, in order to better understand how gating a neighborhood might generate more price premium than the overall legal and contractual structuring of a private neighborhood designed to avoid negative externalities. We then review the issues of GCs and prices in a context of growing prices since the 1980s interrupted by two major crisis (in the mid-1990s and the emergence of the 2008

foreclosure crisis), and we also put in perspective the specificity of a case study based upon empirical data from Southern California. In the subsequent section, we analyze the main trends of price changes, so that we might identify underlying local depreciation and valuation dynamics applied to gated communities. We finally propose a spatial analysis that discriminates patterns of prices change between neighborhoods over the 1980 and 2008 time-frame, with a special focus on how price change introduces similarity or dissimilarity between communities and how these changes correlate with the gated or non-gated status of neighborhoods.

2. Protecting property values in gated and non-gated private communities : theoretical perspectives

In this section, we analyze how the definition of GCs requires addressing on the one hand the structuring of private urban governance, dedicated to the protection of property values (McKenzie, 1994); and on the other hand how gating a planned subdivision also impacts property values and theoretically sustain the hypothesis of a price premium in GCs, compared to non-gated private residential communities.

Gated communities: Providing security and community services

Blakely and Snyder's (1997) book focused academic debate and helped shape the discourse. They took a predominantly morphological view in which gated communities were simply walled and gated residential neighborhoods. After almost two decades of academic debate on GCs, one major difficulty in addressing the phenomenon is when comparing the different versions of gated communities that elaborate the same language that describes privatized neighborhoods, but does not cover the same societal impact (Claessens, 2009). Commentators have recorded the phenomenon across national contexts, under a diversity of denominations (Atkinson and Blandy, 2005, Glasze et al., 1999), all with contextual references and an emphasis on historical patterns of enclosures (Low, 2006, Bagaeen and Uduku, 2010). There is nevertheless a noticeable consensus among authors who describe the security logic as a non-negotiable requirement in contemporary urbanism and architecture, and all agree that "both the privatization of public space and the fortification of urban realm, in response to the fear of crime, has contributed significantly to

the rise of the contemporary gated community phenomena” (Bagaee, Uduku, 2010, 3) in Western Europe (Le Goix and Callen, 2010, Blandy, 2006, Raposo, 2006), in post-communist Europe (Stoyanov and Frantz, 2006, Blinnikov et al., 2006, Cséfalvay, 2009a), in the Arabian peninsula (Glasze, 2006); in Israël (Rosen and Razin, 2009), in China (Webster et al., 2006, Low, 2006, Wu, 2005), etc. On the one hand, a strong thesis is the link between security and fear of others—sometimes distinguished from the desire for security of person and property (Low, 2003, Low, 2001). In Argentina and in Brazil (Caldeira, 2000), in the U.S. or in Europe (Billard et al., 2005), and in Mexico (Low, 2001), gating has been associated with a lack of confidence in the public security enforcement. On the other hand, residential preferences and economic rationale prevail, and gated communities are understood as an exit-option from the public realm, from the over-regulated and overcrowded cities, inefficient in providing community services (Cséfalvay, 2009b).

Regardless of local traditions and national legal contexts, there are different organizational types of private residential neighborhoods, differentiated by the way property rights are assigned, over shared spaces, facilities and exclusively-used housing units: condominiums, stock co-operatives, corporations and homeowner associations (McKenzie, 1994, Glasze, 2005). In the homeowner associations, all common spaces and facilities are the property of an incorporated body set up specifically for that purpose. A covenant is attached to the deed of a residential lot making the owner a shareholder in the corporation with voting rights according to the amount of the share (Glasze, 2005). McKenzie has termed these neighborhoods Common Interest Developments and we will use this term as well (CIDs).

By the year 2000 over 15% of the U.S. housing stock was in common interest developments—and the number of units in these privately-governed residential schemes rose from 701,000 in 1970 to 16.3 million in 1998 (McKenzie, 2006b, McKenzie, 2005, McKenzie, 2003). The Community Association of America estimated in 2002 that 47 million Americans were living in 231,000 community associations and that 50% of all new homes in major cities belonged to community associations (Sanchez and Lang, 2005). Only a proportion—varying from 12 to 30% in the region of Los Angeles (Le Goix, 2003)—of these private local government areas are gated.

Gated communities and CIDs in the US: Social homogeneity and the preservation of property values

Across history, red-lining, neighborhood associations and land-use regulations have been instrumental in protecting property values (Massey and Denton, 1993). Research on the homeowners movements in Los Angeles (Purcell, 1997) and another recent study in Santa Clara (California) suggest that, “to the degree that local zoning responds to land-market forces, exclusion in residential settings is more a product of racial than land-use composition” (Cervero and Duncan, 2004). There is thus a long history in the U.S. of exclusive regulations being implemented both in planning and land-use documents (Ihlanfeldt, 2004, Kato, 2006), but more significantly in the legal structuring of residential associations by means of restrictive covenants (Kennedy, 1995, Fox-Gotham, 2000, Kirby et al., 2006). As a consequence, the implementation of CC&Rs (Conditions, Covenants and Restrictions), and the overall private urban governance effort in private neighborhoods are not tangential in protecting or shielding property values. For instance, based on a New York gated communities and condominiums case study, Low (2009) considers that private governance structures (condominium and residential associations) designed to exclude others and organize social homogeneity are as important as the securitization strategies in shaping the social project in gated communities and exclusive housing schemes.

Both CIDs and GCs belong to the same kin by law, but differ in morphology because of the gates and security features. Gated communities are territories of exclusiveness; building up social homogeneity on security, snob values, fear of crimes and symbolic and physical distance from others (through gates and walls). But all these attributes are not truly independent, as they result from the contractual agreement binding all property owners (Brower, 1992, Kennedy, 1995). Generally speaking, CIDs and condominium ownership encourage a kind of speculation around real-estate prices. But gating a CID reinforces the proactive private governance effort toward property values preservation. The liberal hypothesis assumes that operating costs of private governance are paid for by the increase in property values.

First, the quasi-governmental regime has a preeminent role in shielding property values: GCs and non-

gated developments, as local quasi-governments in terms of provision of public services (McKenzie, 1994, McKenzie, 2006c), act as local consumption clubs of urban services (Webster, 2002). The short-term apparent cost/benefits market efficiency in providing collective services (Foldvary, 1994) must be matched up to the risks of long-term spill-over effects, inefficiency of the decision-making process, residents' lack of involvement (discussed by Blakely & Snyder, 1997; McKenzie, 1998; Low, 2003), and the risks of obsolescence and inflating maintenance costs undermining the tidiness and reputation of a neighborhood and ultimately its property values (Berding, 1999, Miller, 1989). Second, according to Brower (1992) and Kennedy (1995), many court cases and legal restrictions apply only to gated communities and make a special case of their governmental regime, that cannot be extended to non-gated private communities. At last, as public dedication cannot be obviously applied to gated streets, GCs need to live up to their promise and to be founded on a financial model that takes account of the rising costs due to the obsolescence of infrastructure and amenities managed behind the gates by the property owners associations. Gating a CID ultimately stresses the private realm, thus reinforces the selection of residents. This effort toward social control and homogeneity contributes to the overall effort of shielding property values and creating a price premium.

Gated communities, a tool to protect prices and to avoid urban decay

Hence, both private urban governance and gated morphology are not independent in explaining the social structure of the community (Low, 2009) or the price premium in gated communities (Lacour-Little and Malpezzi, 2001). An early theorization of gated streets as defensible spaces has been developed by Newman (1974) as a preemptive effort against urban decay and depreciation of a neighborhood. Newman makes an apology for gating as a device that prevents urban decay by giving social control over the environment to residents. This includes the erection of street barriers in retro-fitted residential neighborhoods as a way of reintroducing public safety, and controlling gang activities. Furthermore the gate, the CCTV, private police, and amenities have to be paid for; gated communities residents bet on property value gains to offset the cost of gating and private urban governance; this consent to pay seems

paramount in sorting out residents attracted by a scheme promoting security, exclusiveness, and a gated lifestyle (Newman, 1996). Recent research also show that GCs enjoy a premium of house prices compared to private neighborhoods in surrounding areas. Hedonic modeling demonstrated the measurable effect of the location of the property within a gated community (Bible and Hsieh, 2001). In Saint Louis, Missouri, it has been demonstrated that the premium is decomposed in part due to the privacy-security effects of gating; and the other part due to private subdivision and the homeowner association, and its proactive regulations and governance efforts to protect the neighborhood from negative externalities. By the means of hedonic analysis, the author demonstrate a 26% price premium where gates had been erected between 1979 and 1998; by way of comparison, a regular non-gated private neighborhood produced only an estimated 9% price premium over a regular neighborhood (Lacour-Little and Malpezzi, 2001). All these results bring concurring evidences that gated street and residential association are together instrumental in avoiding decay and other externalities in a neighborhood. This is confirmed in some places, for instance in South Africa, where gated community property values are usually higher than in regular neighborhoods, and this perception is shared by both prospective buyers and real-estate agents (Altini and Akindele, 2005).

But there are also some evidences that the price premium is sometimes detrimental to properties in non-gated developments near a gated community. In the Los Angeles area between 1980 and 1990, gated prices showed better strength to real-estate market fluctuations than did prices for regular residential neighborhoods and non-gated CIDs, especially between 1990 and 1995 (Le Goix, 2007). This study shows that failure of property owners associations occur when costs rise above a sustainable level compared to rapidly decreasing property values. A majority of average middle class gated enclaves, located within more diverse neighborhoods did not succeed in creating a significant price premium and/or did not maintain significant price growth during the last decade (Le Goix, 2007)¹.

¹ Elaborating on Le Goix, 2007, the present paper seeks to analyze price change and gated communities from a different perspective. Antecedent work focused on analyzing the impact of legal structuring of gated communities on property values, with a special focus on the relationships between gating, decreasing property values and obsolescence of a neighborhood. The latter issue is to be seen as very significant in private neighborhoods where all infrastructures are paid for and maintained by residents' homeowners fees. This paper encompasses a different perspective, on the one hand by comparing price patterns both in gated and non-gated CIDs, which are identified by

3. A case study in Southern California : context matters.

Southern California makes a good case study for three main reasons: the level of diffusion of GCs in the area; the legacy of gated and private communities in the area, starting in the early 1930s (Le Goix and Callen, 2010); and the specific fiscal context that has favored the diffusion of private residential neighborhoods.

The impact of taxation in California

The diffusion of homogeneous residential suburban communities in this region is related to suburban growth; to the anti-fiscal posture; and to the municipal fragmentation dynamics that have affected the Los Angeles area since the 1950s. This level of analysis yields intricate interactions between private governance and public authorities, which also impacts property values, mostly because of taxation issues in the U.S. and especially in California. These are processes that have progressively lowered the fiscal resources available to local governments, while the urban sprawl has produced an increased need for revenue to finance public infrastructure (roads, freeways) in low-density suburban settlement patterns. In Los Angeles, the anti-fiscal posture has been associated with the incorporation² of numerous cities—the first of which was Lakewood (1954). These new municipal governments were designed to avoid paying costly county property taxes—which after incorporation were replaced by lower city assessments and better local control over local development and other municipal affairs (Miller, 1981). A second step was the 1978 “taxpayers’ revolt”—a homeowner-driven property tax roll-back known as Proposition 13 (Purcell, 1997). Passed in 1978, this tax limitation increased the need for public governments to attract new residential subdivisions, especially those that would bring wealthy taxpayers into their jurisdiction. A third influence on the spatial diffusion of gated enclaves was the rapid growth of the Los Angeles area,

an *ad hoc* database ; on the other hand by analyzing trends, by the means of a multivariate analysis, in order to better characterize price change in neighborhoods.

² Incorporation is the legal process by which unincorporated land (under county’s jurisdiction) becomes a city, once approved by the State (in California, the LAFCO, Local Agency Formation Commissions are in charge of supervising the process) and by 2/3 of the voters. A new municipality can either be granted a charter by the State as large cities are, or be incorporated under the general law, which is the common case.

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sustained by massive population inflow during the 1980s. Common Interest Developments (CIDs) are fiscal “cash-cows” for local public governments enlarging the tax-base at barely no cost, and are efficient in privately funding urban sprawl in the fastest growing areas (McKenzie, 1994, Dilger, 1992). Access control, private security and other infrastructure and services represent a substantial capital and recurrent cost for the homeowners that would otherwise have been subsidized by the general tax-paying public. As compensation, homeowners are granted private and exclusive access to their neighborhoods. This ultimately impacts property values in both CIDs and gated communities, as the exclusiveness is theoretically capitalized in land rent, but there is so far no empirical data showing how this capitalization fluctuates irrespective of whether the neighborhood is gated or not.

Main trends: Boom and burst of the bubbles

Two main trends affected property values between 1980 and 2008 (Figure 1). After a continuous increase during the first decade that continuously affected the five counties, the trend reversed between 1990 and 1995: the average transaction lost half of its value, in a drop which was consistent with the real market crisis in Los Angeles, mainly resulting from the burst of a speculative bubble (Jaffee and Kroll, 2001), as well as the 1992 riots, the 1993 earthquake, and the floods and fires between 1994 and 1995. More importantly, after 1995 and during a decade of geometrical growth of property values, metropolitan areas followed diverging trends. While Santa Barbara and San Diego areas grew well above the average trend of Los Angeles, Oxnard and Santa Ana-Irvine, the fast growing area of Riverside experienced a slower growth of property values. After 2007 and the sudden foreclosure crisis, the Santa Barbara, Santa Ana and Oxnard metropolitan areas were affected first and harder than Los Angeles and Riverside counties.

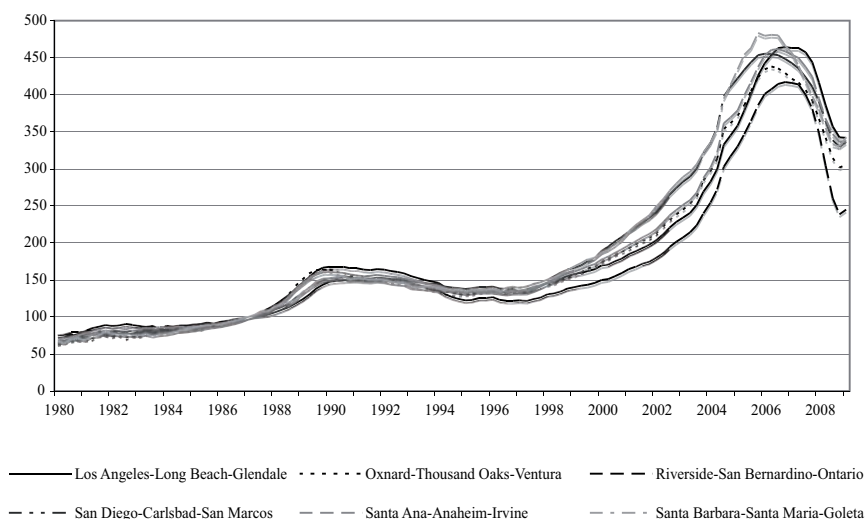


Figure 1. Home Price Index in Southern California's Metropolitan Areas
(Index 100 in 1987, first quarter. Source: Freddie Mac, 2009)

How GCs behave, compared to other suburban communities being our main line of inquiry, we rely upon a 1980–2008 sample of property values at a disaggregated level. We seek to analyze how GCs differentiate from other non-gated suburban communities in terms of price increase or depreciative trends.

A long-term comparison of price patterns between gated and non-gated private neighborhoods is an empirical question that needs further investigation, especially in the context of the 2008 foreclosure crisis. Rising prices would normally have positive knock-on effects on substitute properties. A high-end GC in a low-income area of a developing city, for example, will boost local land values. If there are other middle-income housing areas nearby, a GC of sufficient prominence might have an enhancing effect. On the other hand, if GCs are of sufficient size that they effectively introduce a layer of superior housing above the existing housing stock—then, the existing housing might be marked down. This is more likely to happen in times of excess supply. The mortgage crisis thus offers an opportunity to observe the behavior of property prices over time while affluent housing (including gated housing) will be in excess supply in a depressed market, and GCs may ultimately fail to protect property values, and data available in 2008 offers a opportunity to monitor the first effects of the crisis on property prices in GCs.

4. A spatial analysis of price change

In the area defined by 7 counties of the larger Los Angeles area in Southern California, a sample of 9694 properties has been established, using real-estate on-line listings in 2008 (see Methodological Appendix). In such a fast growing metropolitan region, the sample of properties in residential subdivisions is quite homogeneous in terms of square footage (mean=2,522 square feet) and year of construction (average date is 1993). Property prices, indeed introduce a lot of variance in the sample (\$873,000 in average; SD=1,386,744).

After the selection of valid data and aggregation by Census tract, the analysis unfolds on a set of 581 census tracts (Figure 2)³. The overall quality of data has been verified by the means of a control variable, an assessment of the ratio of streets in gated communities by Census tract (independent variable *% gated streets*), based on proprietary data⁴. As a matter of fact, we do not record the 2008 actual transaction prices, as the dataset is based on advertised prices. This choice has been made with regard for the different variables also collected for each of the advertised properties (gated status of the neighborhood, age of the house, sq. footage), all those variables being collected at a disaggregated level. We understand the bias this might introduce, as during price booms, advertised prices may understate transaction prices. The reverse is true during market slowdowns. The net effect may be to understate the range of variation in house prices. This is not a major concern as we only seek to estimate the trend in median property price changes (ups and downs), these trends being unlikely to be inverted because of marginal under- or over-estimate of advertised prices over long periods of time.

³ Our dataset underestimates the number of properties in gated communities: recent field surveys (April and July 2010, 618 subdivisions surveyed) have shown that 10% of subdivisions in the database are qualified as non-gated, whereas they are indeed gated; and only 3% of visited subdivisions are characterized as gated by mistake in the database.

⁴ The data comes from Thomas Bros. Maps®. The company publishes interactive maps that identify private streets. Access to vector maps allows spatial queries of gated streets, in order to identify gated neighborhoods. The files also contain information related to military bases, airfields, airports, prisons, amusement parks and colleges, some of which may also contain private streets with restricted access. Aerial photographs (e.g. Google Earth, MapQuest) are further used to help identify GCs and dismiss non residential gated areas (Vesselinov and Le Goix, 2009).

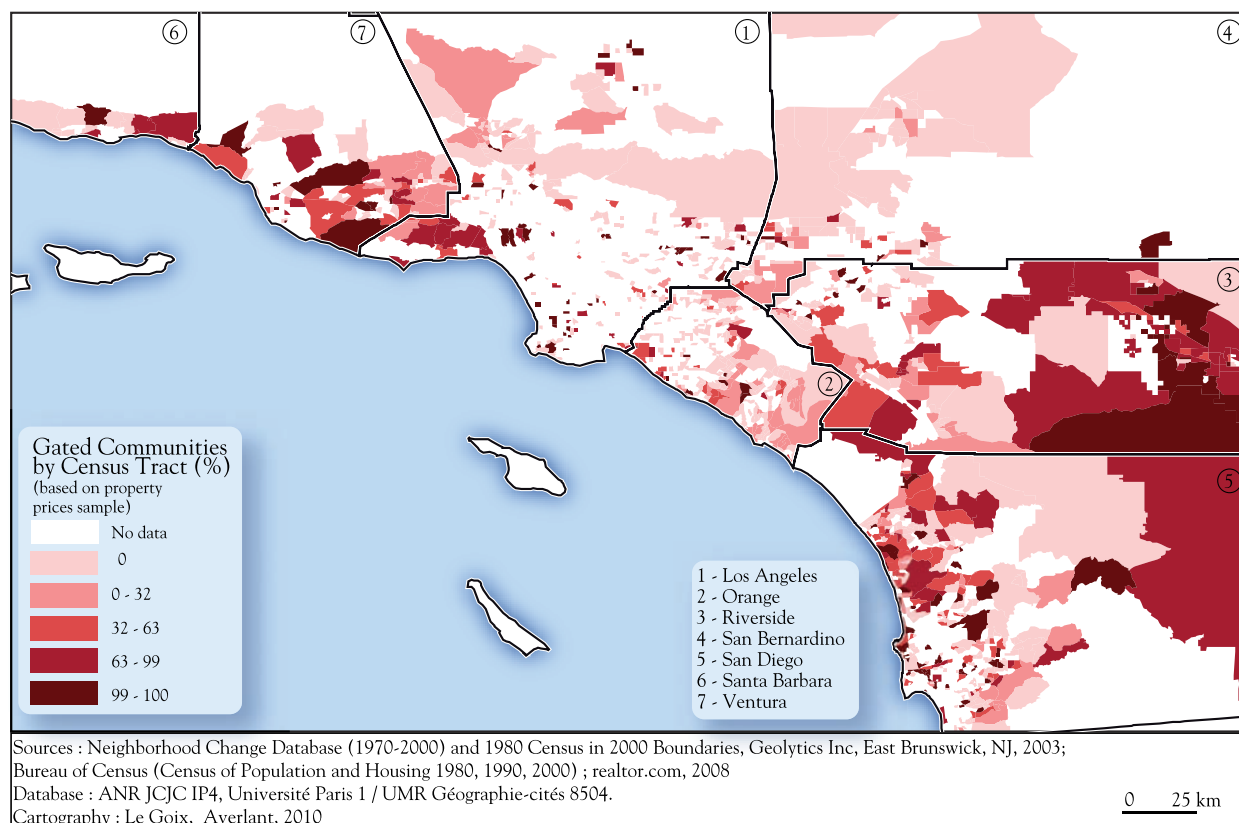


Figure 2. Properties in gated communities, percent of sample population, by Census tracts

“Location, location, location”: Price data at the normalized Census tract level.

As we seek to analyze price change on the urban edge between 1980 and 2000, a larger geographical scale than the neighborhood or the metropolitan statistical area is required. Property values must be observed not only locally (comparing peer-to-peer a gated community with a nearby non-gated community) but also globally—at the metropolitan region level—given that gated communities, according to their location, express different lifestyle preferences and serves as a subset of the range of market segments (Le Goix, 2006, Vesselinov and Le Goix, 2007). Nevertheless, several communities in the same area or neighborhood often reflect the same socio-economic patterns and the same market segment (Figure 3). As a consequence, at the very local level, the question is whether a price premium benefiting to one GC, might derive from its gates and walls, or from the general effect of location rent in the metropolitan area (location advantages and municipal amenities). Such contextual effects are well described by hedonic

modeling and multilevel analysis of prices that takes into account the distances from amenities and local externalities in the valuation of a residential property (Orford, 2002). It must be ensured that a positive price change identified for a specific gated enclave is consistent with global patterns of price change in a metropolitan area, in order to determine whether a gated enclave is more efficient in generating property value than non-gated master planned community, everything being equal at the metropolitan level.

These changes in property value have been analyzed during 3 decades between 1980, 1990, and 2000. Data are available at the normalized Census tract geographical level, in which historical data are fitted into 2000 Census tracts boundaries⁵. Historical data are matched to the subset of Census tracts for which we have a profile for 2008 property values, based on our own sample. Inflation effects are corrected according to the U.S. Government standard price index, and prices are expressed in equivalence with 2008 U.S. dollars (constant prices)⁶.

Local trends

Figure 3 shows that price changes follow diverging trends. On the one hand, some areas experience a continuous increase of property values, especially in coastal tracts with a higher site rental, such as in Santa Barbara/Montecito, Newport Beach area and the southern part of Orange county, and the north of San Diego urbanized area (Encinatas, Rancho Santa Fe and Del Mar). The residential tracts located north of Malibu, west of Los Angeles County, and East of Ventura county in the Calabasas/Agoura Hills/Thousand Oaks and Camarillo area, have also experienced this trend. In other areas, data show a

⁵ GeoLytics is a commercial organization providing a normalized database in which data for decennial census are matched to the 2000 Census tracts boundaries. Variables selected: Median Value All Owner Occupied Housing Units (2000); Median Value Owner Occupied (1990); Median Value Non-Condo Housing Units (1980). Neighborhood Change Database (1970–2000) and 1980 Census in 2000 Boundaries, GeoLytics Inc, East Brunswick, NJ 2003. As census tract boundaries have considerably changed over time, a remapping of former census boundaries to 2000 definitions is required in order to accurately compare variables across time for a given location. The incomplete coverage by census tract in 1970 and 1980 census, only available in urban areas is an additional difficulty. The normalization of historic tract data to 2000 tract boundaries starts with the an estimate based on block-level weighted geographic data. 1970 and 1980 boundary files are related to 1990 boundary files using correspondance files produced by the Census Bureau, given a computed tract weight. Detailed methodology is published online: <http://www2.urban.org/nnip/ncua/ncdb/AppendixJ.pdf> [accessed: june 2010].

⁶ Source: Consumer Price Index, 2009 (U.S. Bureau of Labor Statistics, <http://www.bls.gov>). 1\$ in 2008 is equivalent of 0,38\$ in 1980 ; 0,61\$ in 1990 and 0,8\$ in 2000.

relative decline of values between 1990 and 2000, followed by an increase of value between 2000 and 2008, especially in the south-west side of Riverside county. At last, in some areas such as the resort desert city of Palm Springs and its vicinity, where gated communities are a preeminent form in the urban landscape, property values have been relatively stable until 2000, followed by a significant increase of values during the last decade

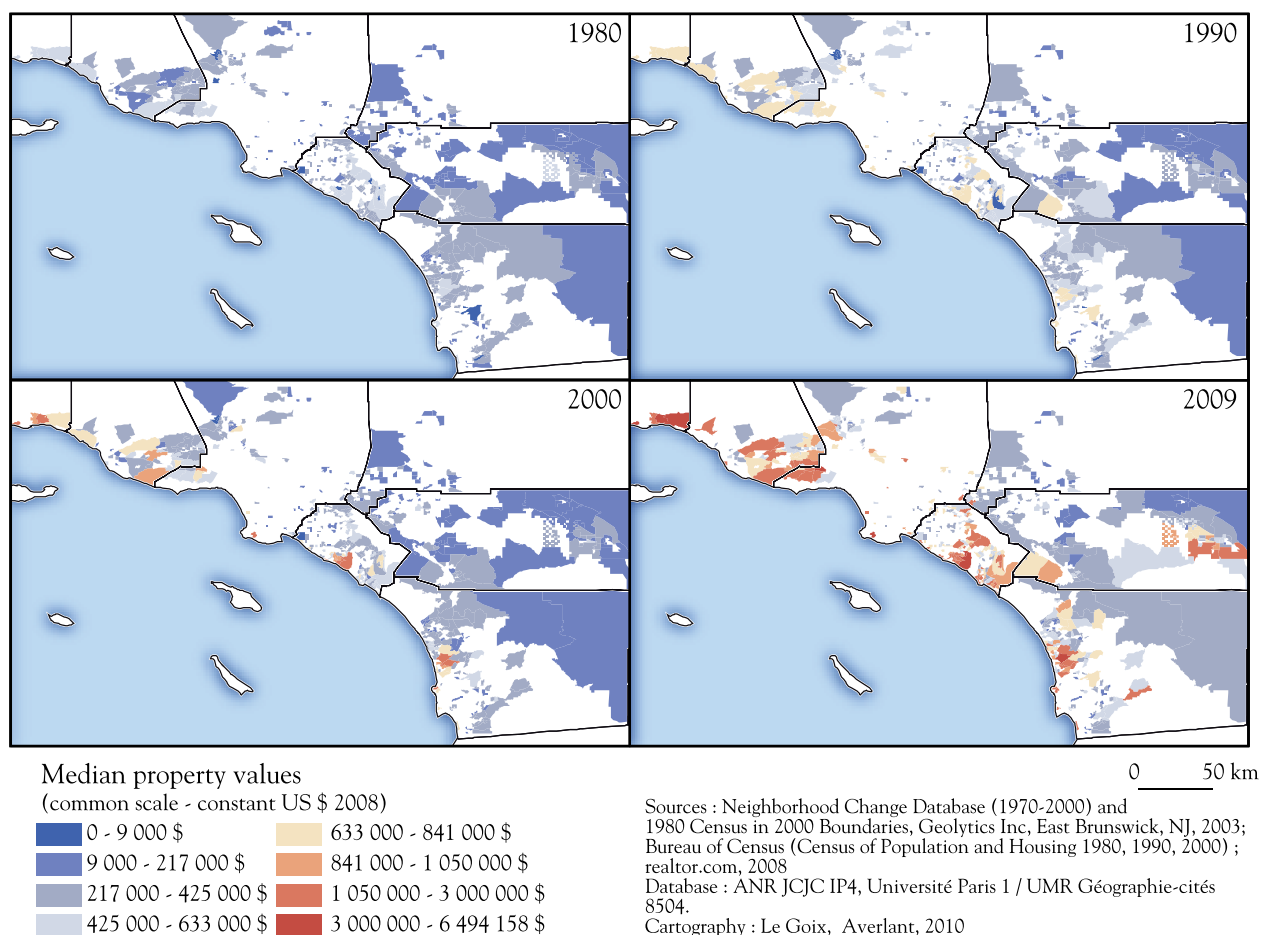


Figure 3. Median property values 1980, 1990, 2000 and 2008 compared on a common scale, in Census tracts with gated communities

Gated communities protect property values

In this section, we clarify the trends of price change at the tract level, and comparing them with the percentage of properties in gated communities and non-gated subdivisions by tract. To achieve that, we apply a cluster analysis based on median property prices: Cluster profiles are reported in Figure 4. The

typology shows four significant patterns of price change. In addition to trends at the metropolitan level reported in Figure 1, the results sort out the different phases of accelerating growth of prices over time.

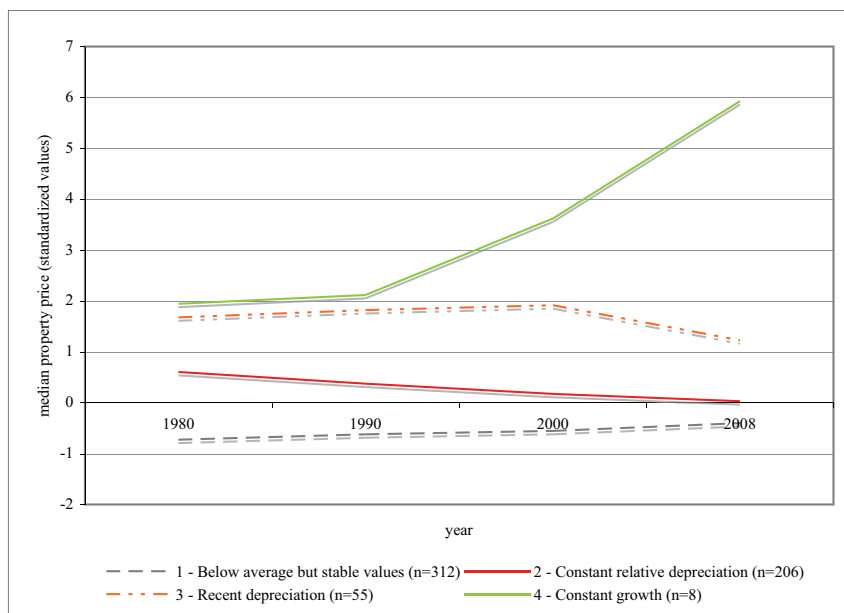
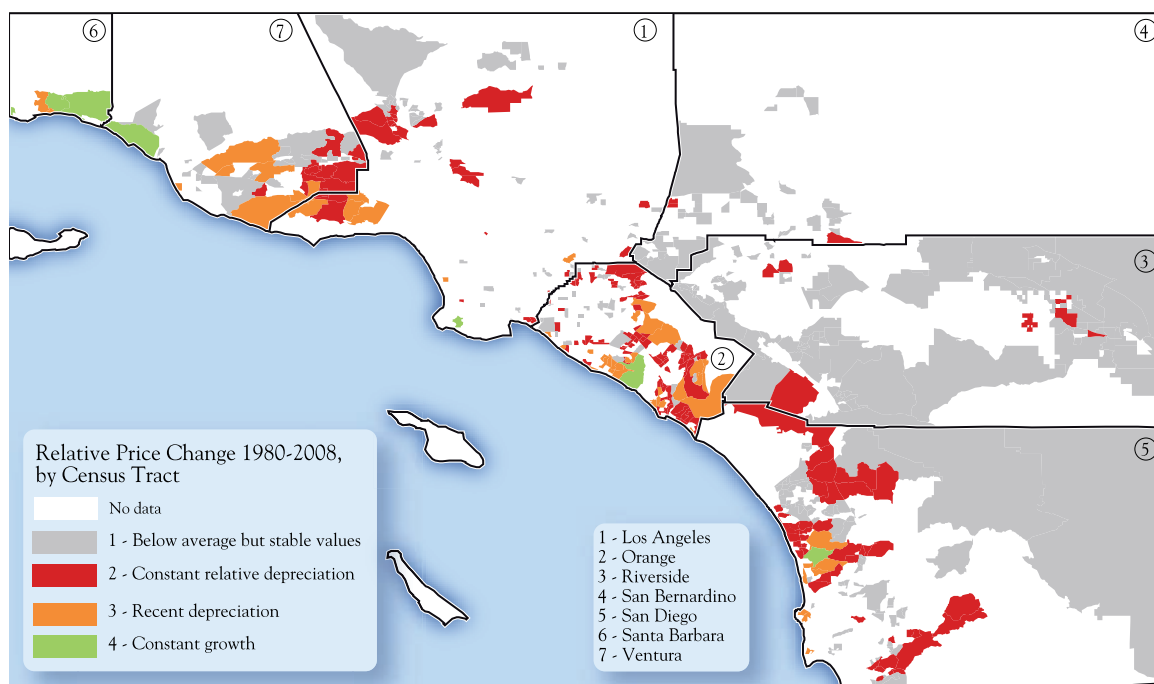


Figure 4. Clusters profiles - A typology of price change patterns by Census tracts (1980–2008) (Cluster analysis, ward method, Euclidian distance, r.sq.=0.72, standardized values)



Sources : Neighborhood Change Database (1970-2000) and 1980 Census in 2000 Boundaries, Geolytics Inc, East Brunswick, NJ, 2003; Bureau of Census (Census of Population and Housing 1980, 1990, 2000) ; realtor.com, 2008
 Database : ANR JCJC IP4, Université Paris 1 / UMR Géographie-cités 8504.
 Cartography : Le Goix, Averlant, 2010

0 25 km

Figure 5. A typology of price change patterns by Census tracts (1980–2008)

The standardized profiles show spatial patterns of relative price change:

- Cluster 1 records below-average but stable property values in constant U.S. dollars, and this trend specifically applies to the desert-side of the suburban areas, north of Los Angeles county (Santa Clarita valley and Palmdale area), west San Bernardino, most of Riverside county, and the east-side of San Diego counties (although these tracts are only partially built up).
- Cluster 2 describes a trend of relative depreciation in constant dollars throughout a period of time, especially on the north and the western side of Los Angeles (Agoura Hills, Santa Clarita for instance), and also in the affluent south of Orange county.
- Tracts described in cluster 3 show higher property values during the first 3 decades, and a recent loss of relative value (2008), all things being equal compared to the average profile of the cluster analysis. This cluster describes places in Ventura county (Camarillo), Thousand Oaks, Calabasas area, but also larger gated developments areas such as Dove Canyon and Coto de Caza, south of Orange county.
- At last, cluster 4 describes a profile of continuous and sustained growth, in areas like Montecito and Santa Barbara, Oxnard in Ventura county, the south of Irvine and Newport Beach in Orange county, and the Rancho Santa Fe area (San Diego county).

This analysis yields first insights on how tracts with a majority of properties in gated communities compare with properties in non-gated developments, in terms of price change profiles. We compare tracts with more than 50% properties in gated communities, and tracts below that threshold. On the one hand, a large majority of tracts show below-average but stable values (cluster 1) or constant relative depreciation (cluster 2), and the gated status is not discriminating in both cases. In a majority of cases, there is no significant contrast between most gated communities and most non-gated communities: 54 percent of both gated and non-gated communities experienced “below average but stable values.” This being said, it is on the other hand significant that a higher share of census tracts with more than 50% of properties in GCs are found in clusters 3 (higher values between 1980 and 2000 but experiencing recent depreciation) and 4

(constant growth), with respectively 36.4% and 87.5% of all tracts in the clusters. Although fewer tracts are described by clusters 3 and 4, both trends being confined to untypical areas, it is nevertheless significant that in these specific cases, gated communities are more likely to experience “recent depreciation” or “constant growth” than non-gated communities. The statistical relationship is significant, both when considering the percentage of properties in GCs, and the control data set describing the share of gated streets in a CT (Table 1 and Table 2). These trends are confirmed by a Chi-square test, which proves the correlation between gating and favorable trends in price patterns; we also control the effect produced by the date of construction on price trends, and the relationship proves to be weak (Table 2), as a more recent date of construction might also yield higher property values (fashionable architecture, obsolescence of the house, etc.).

Blakely and Snyder’s work (1997) was among the first to establish that there are different types of gated communities in the U.S.. A vast majority of GCs are average standardized product for the middle- and upper-middle class, and a minority of high-end, exclusive, expensive hideaways for the wealthier share of the owners (Sanchez and Lang, 2005), and this is especially true in Southern California (Le Goix, 2006). Indeed, the analysis shows that price trends are on average undifferentiated whether the communities are gated or not. As shown in maps (Figure 3 and Figure 4), a majority of the average middle class gated enclaves, located within the continuum of low to average median property values, do not contribute to measurable price premium between 1980 and 2008. Nevertheless, results show that in some very significant cases, GCs do contribute to fuelling price growth (clusters 3 and 4). This is especially true in the most desired location in the metropolitan areas, such as in the south of Orange county, and in Santa Barbara, Calabasas (West Los Angeles) or Thousand Oaks (Ventura county) areas.

Table 1. Contingency table for percent gated communities and 1980–2008 price profiles by census tracts

Table 2. Statistical relations at the census tract level (N=581 spatial units)

From this analysis of price patterns between 1980 and 2008 in gated communities versus non-gated CIDs, some trends clearly emerge. First, GCs are very heterogeneous and diverse in kind, between the average standardized product for the middle class and the high-end coastal community. It is significant that gated communities are more likely to experience either “recent depreciation” in the wake of the foreclosure crisis, or “constant growth”, than non-gated communities. But on average, the wealthier the area, the more GCs contribute to fuel price growth, targeting tracts with better rent-gap opportunities and tracts on the more desired location in the metropolitan areas. There is a significant correlation between gating and securing a neighborhood and appreciative trends of price growth at the census tract level.

5. Gated communities stress price inequalities at the local level

In a second step of the analysis, we measure the level of price discontinuity between two adjacent tracts using the *price distance index* (PDI : the absolute value of median price difference between adjacent tracts). Where PDIs are significantly high, there is a statistically significant level of dissimilarity between two contiguous tracts that can then be mapped as a line segment materializing the level of discontinuity. The spatial analysis in this part aims at measuring the contribution of topological distance (Census tract boundaries) on price differentiation patterns.

Methodology : a price distance index

The analysis of price change aims at comparing census tracts with an over-representation of properties in GCs (above a threshold of 50%) and Census tracts with an over-representation of non-gated subdivisions. We implement a *price distance index*, following a methodology developed for price change patterns analysis in downtown Paris (Guérois and Le Goix, 2009).

The analysis at the neighborhood level primarily measures the distance between prices in one Census tract and adjacent (gated or non-gated) tracts. Segregation, concentration and dissimilarity indices are known to

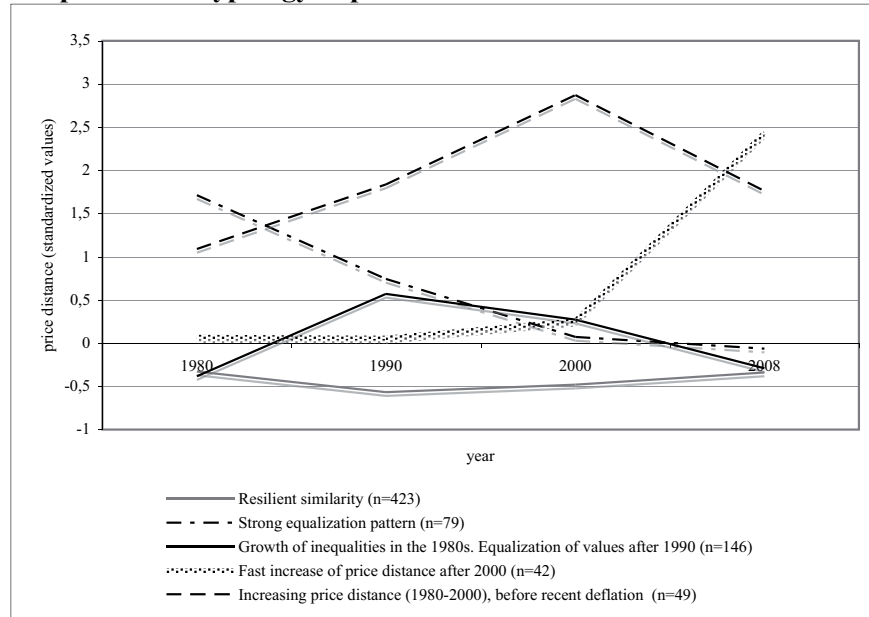
be sensitive to spatial auto-correlation (Apparicio, 2000, Grasland et al., 2000, Nelson et al., 2004). It is also well established that these indices usually ignore spatial patterns, depending on the level of spatial auto-correlation (White, 1983, Massey and Denton, 1988, Nelson et al., 2004). To study differentiation and segregation patterns at a local level, we therefore need to implement a function of topological distance (adjacency) in the measure to account for the gradient and the proximity effects. The proposed local *price distance index* (PDI) circumscribes usual spatial auto-correlation bias, as it measures the level of price discontinuity between two adjacent tracts⁷. Then we compare the PDIs and the spatial distribution of gated areas and non-gated areas.

Results: a typology of price distance indices

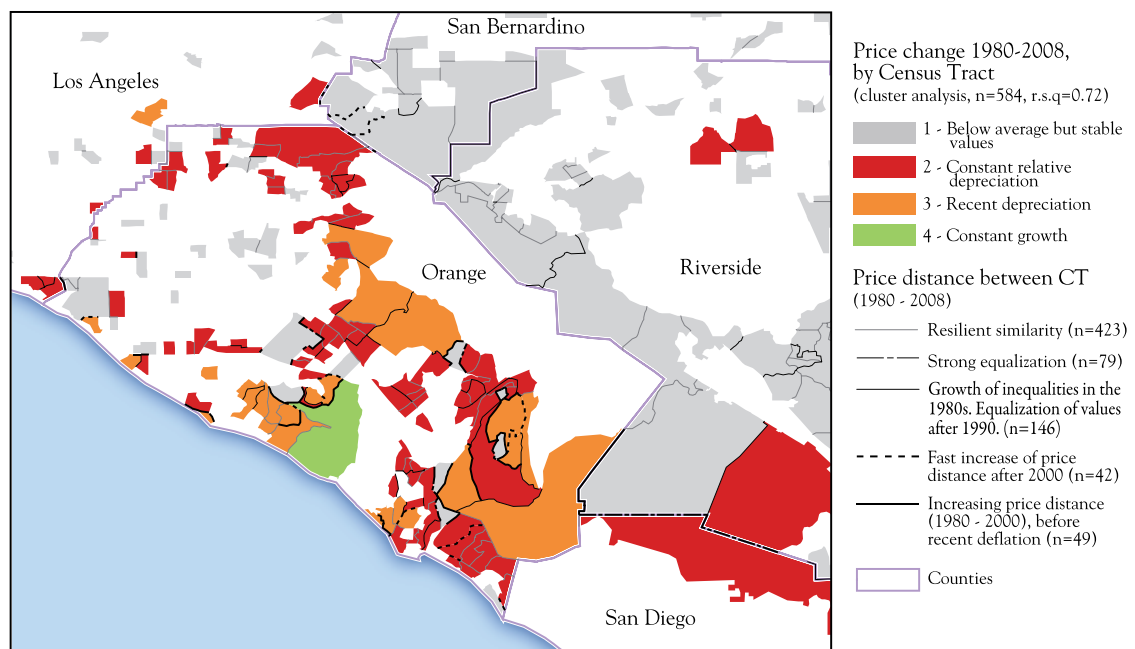
In order to compare values over time between census tracts with gated communities and non-gated areas, price distance index (PDI) between tracts in 1980, 1990, 2000 and 2008 (Figure 6 and Figure 7) are classified by the means of a cluster analysis. The interest of the method is such that each cluster summarizes a trend, describing how census tracts in the same vicinity have diverging or converging property values (relative differentiation between median property values between two adjacent tracts).

⁷ The *price distance index*, in fact the absolute value of median price difference between tracts, will be our main indicator in this comparison between Census tracts with gated communities and CTs with non-gated subdivisions. It has been computed at the normalized 2000 Census tract level. For each year (1980, 1990, 2000 and 2008), the index is constructed by subtracting median property values in a given tract and median property values in an adjacent tract and is the absolute value of the difference for each spatial unit (the line segment, or boundary, between two adjacent tracts).

Figure 6. Clusters profiles - A typology of price distance index



(Cluster analysis, ward method, Euclidian distance, r.sq.=0.58, standardized values)



Sources : Neighborhood Change Database (1970-2000) and 1980 Census in 2000 Boundaries, Geolytics Inc, East Brunswick, NJ, 2003;
 Bureau of Census (Census of Population and Housing 1980, 1990, 2000) ; realtor.com, 2008
 Database : ANR JJC IP4, Université Paris 1 / UMR Géographie-cités 8504.
 Cartography : Le Goix, Averlant, 2010

0 10 km

Figure 7. Map of price change patterns and price distance index, south of Los Angeles

(Orange, San Diego and Riverside counties, 1980–2008)

- A first cluster results from the classical patterns of positive spatial auto-correlation : a majority of tracts experience the same property prices trends as their adjacent neighbors. Indeed, everything being equal, the vast majority of segments between tracts (57.2%) belong to a pattern called *resilient similarity*, meaning that median prices remain more or less equivalent on both sides of the tract boundary: Values in adjacent tracts experience a parallel increase during the period of booming prices, and decrease in sync during crisis.
- Cluster 2 describes *strong equalization patterns*. A constant trend of decreasing inequalities in price occurs during the entire period of time between two adjacent tracts (10.7% of all segments).
- Cluster 3 describes a dynamic close to the average profile, showing a *growth of inequalities in the 1980s, then an equalization of values (1990–2008)* (freq.=19.8% of all segments). This cluster is very specific of newer subdivisions on the urban edge. After the development of pioneer subdivisions in rural and desert areas (thus favoring higher differentiation of prices), the tract by tract contagion of suburban subdivisions has produced a diffusion pattern of prices (similar houses, similar subdivisions, similar property owners, similar developers on the urban edge), thus favoring an homogenization of prices between adjacent neighborhoods. This pattern seems quite common on the outskirts of the urban edge, which is consistent with the spatial diffusion of planned subdivision, both gated and non-gated.
- Cluster 4 describes neighborhoods where price dissimilarities have boomed after 2000, succeeding to a stable system of price homogeneity during the first two decades (*Fast increase of price distance after 2000*, freq.=5.7%). On average, the price distance index has increased from 0 to almost 2.5 standard deviation, thus corresponding either to urban renewal areas with new subdivision in a previously built-up homogeneous environment; or new pioneer subdivisions in rural locations.
- Cluster 5 describes boundaries between tracts where local price dynamics fuel the spatial differentiation patterns during the first 20 years, followed by a relative equalization of prices between 2000 and 2008 (*Increasing price distance (1980–2000), before recent deflation*, Freq.=6.6%).

Are gated communities more likely to generate price inequalities ?

Elaborating on this typology, we analyze how GCs and non-gated subdivisions are correlated with prices dissimilarities (PDIs) over time. In order to offset the risk of ecological fallacy, the typology of price distance index only accounts for the local context of price patterns in which GCs and other subdivisions are located. We consider the percentage of properties located in gated communities (Table 3). The statistical relation shows itself to be very strong (Table 4) for both percentage properties in GCs and percentage gated streets (control variable).

Table 3. Contingency table of properties in GCs and price differentiation patterns. Contingency table of price distance index and percent properties in gated communities on both sides of census tracts boundaries (N=747 line segments); overrepresentation highlighted in bold.

Table 4. Chi-square test on boundaries between CT level

The main line of inquiry has been to analyze to what extent GCs are different from other non-gated suburban subdivision, and by doing so how does the enclosure significantly contribute to price-change patterns in favor of GCs. A three fold answer can therefore be provided, which is illustrated with Orange county examples (Figure 7) :

On the one hand, data show strong evidences that *GCs correlate with stronger price differentiation patterns*, compared to abutting non-gated subdivisions. Above the threshold of 50% properties in gated communities by Census tract, there is a higher probability of increased price dissimilarities as described in cluster 4 (*fast increase of price distance after 2000*). GCs are more likely to be found in local contexts that introduce greater heterogeneity and instability in price patterns, and by doing so contribute to a local increase of price inequality that destabilizes the price patterns at neighborhood levels, compared to the

non-gated communities. This is for instance the case between the affluent communities of Dove Canyon and Coto de Caza, which differentiates from the rest of the Rancho Santa Margarita area. This trend is spatially associated with cluster 5 (*increased price distance in 1980–2000 before deflation of the PDI*). Furthermore, cluster 5 is more likely to be found where there are only GCs on one side of the Census tract boundaries. For instance, the newly developed Newport Coast - Pelican Hills Master Planned Community (Newport Beach) differentiates strongly from the rest of the Newport and Irvine area, with a constant growth of price and increased PDI.

On the other hand, cluster 2 shows *that strong equalization patterns also occur between 1980 and 2008*. Everything being equal, segments in cluster 2 are more likely to separate either census tracts with GCs on both sides or census tracts with GCs on one side only. As in Figure 7, they relate to areas - for instance in the central area of Orange county (Santa Ana, Tustin, Orange and Irvine) - where gated communities are preeminent morphologies in denser, clustered or in-fill developments, producing a spatial diffusion of gated communities (contagion effect) and by doing so a homogenization of price patterns. This may be explained by a convergence of factors at different geographical levels. The attractiveness of GCs to prospective buyers, the risk of negative spillovers for those living nearby a GC (Helsley and Strange, 1999), as well as the price premium generated by the gated neighborhood, both fuelled a powerful contagion effect (Vesselinov and Le Goix, 2009). Regarding crime for instance, the deterrent effect of gates for residents (Atlas and Leblanc, 1994) yields a diversion of crime to other adjacent non-gated communities (Helsley and Strange, 1999). This is a massive spillover for non-residents, and communities nearby might react by building their own gates. At a metropolitan level with already strongly-endured segregation patterns, newer developments adopt a model that has been successful in the vicinity, and by doing so, target niche markets of prospective buyers with rent-seeking strategies. To a certain extent, some older neighborhoods nearby retrofit with gates and walls in order to anticipate and avoid the negative spillover effects over crime and property values. Among other reasons fueling the contagion effect, fiscal reasons seem paramount and GCs are a result of planning strategies by suburban local body of

governments (counties and municipalities). By providing their own security, infrastructure and services, these developments reduce public financial responsibility while generating new fiscal revenues. As compensation, homeowners are granted exclusive access to their neighborhoods; a condition that enhances location rent and positively affects property values.

At last, GCs are less likely to be found in local contexts of price homogenization. Indeed, everything being equal, segments between tracts with below-the-threshold of 50% properties in GCs, are in relative terms more likely to belong to cluster 1 (*resilient similarity*) and cluster 3 (*Growth of inequalities in the 1990s, then equalization of values (1990–2008)*) : this is the case in the areas of lower property values (West of Riverside and San Bernardino counties), but also along the North boundaries of Orange counties, in a depreciative context affecting mostly non-gated subdivisions.

The price distance index analysis highlights how price trends may diverge in different areas with an over-representation of gated communities. On the one hand, GCs are located in local contexts that introduce greater heterogeneity and instability in price patterns, and by doing so contribute to a local increase of price inequality that destabilizes the price patterns at neighborhood level. On the other hand, GCs are also frequently found in contexts that show a very strong stability, in terms of producing price homogeneity at the local level.

6. Conclusion

Gated and non-gated private neighborhoods (non-gated CIDs) share the overall legal and contractual structuring of a private neighborhood designed to avoid negative externalities, but discriminate because gating a private neighborhood might generate more price premium and more price stability over time. Deriving from this background hypothesis, we analyzed how to differentiate gated communities from non-gated communities in terms of patterns of change in property values.

The results yield two series of conclusion. First, along the axis of price differentiation, gated communities are more likely to generate inequalities than non-gated CIDs, and are indeed more likely to produce a filtering of residents that have a profound impact on segregation patterns. The dynamics of prices in gated communities show that they are more likely to profit from the price bubble periods, and more likely to better resist a sudden drop in values during the foreclosure crisis for instance, while contributing not only a status and a “snob-value,” to residents but also a better means to economically differentiate themselves from others.

Second, there is a dualism induced by the kind of contexts in which gated communities are located in. On the one hand, data show new empirical evidences of the highly theoretical contagion-effect produced by gating. The strong positive spatial auto-correlation patterns of property values is especially true in denser suburban areas, with more infill redevelopments and proximity between subdivisions. But on the other hand, GCs also correlate with stronger price differentiation patterns, especially in recently developed areas by the means of large master-planned communities, compared to nearby non-gated subdivisions. This yields evidences that the price premium for GCs is detrimental to properties in non-gated developments nearby a GC. This demonstrates a long-running hypothesis about the deterrent effects of gated communities on property values located outside of the walls, and this is especially true in lower density suburbs, in communities on the urban edges or along the coastline.

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Methodological Appendix.

Identifying properties in gated and non-gated suburban planned communities

In order to identify in a dataset properties in gated and in non-gated suburban planned communities, the main information has been extracted from Realtor.com online listings, operated by a US federation of real-estate agents. The listings of properties for sale throughout the United States are publicly available online. These public listings have been queried for single-family homes in order to get a sample of properties in targeted subdivisions. According to the common definition of CIDs, we have extracted properties in neighborhoods sharing a privately operated “community amenity” (as referenced in listings) , such amenities being good proxies to identify CIDs. Properties have been geo-coded at the address level. By doing so, we get general data describing the property, community information (gating, private streets, leisure amenities), and also data on the date of construction, the square footage of a house, and estimated property prices (advertised price in November 2008) — thus taking into account the first phases of the mortgage crisis. According to the available information, we characterize each property with a dummy variable (independent variable *property in GC*) :

- either as properties in a gated subdivision, where the words “guarded,” “gated,” “patrol,” “security features,” and “private street/lane” are explicit in the property description (3 947 properties, 40.7%)
- or as properties in a non-gated subdivision in all other cases (5 747 properties, 59.3%)

Data have initially been aggregated and matched to 992 Census tracts. This geographical level has been chosen for sampling reasons so as to avoid having too many geographical units with a small number of properties. Nevertheless, we disregard Census tracts containing less than 3 properties, and we aggregate property values on the basis of median value in order to avoid obvious bias introduced by a single exceptional property in a census tract : the final data set contains 581 Census tracts (Figure 2).

Table 1. Contingency table for percent gated communities and 1980–2008 price profiles by census tracts

<i>Cluster*GC</i>	<i>N</i>	<i>CT with less than 50% of properties in GCs</i>	<i>CT with more than 50% of properties in GCs</i>	<i>Total</i>
1 - Below average but stable values	209	66.9%	103 33.03%	312 100%
2 - Constant relative depreciation	145	70.4 %	61 29.6%	206 100%
3 - Recent depreciation	35	63.6%	20 36.4%	55 100%
4 - Constant growth (n=8)	1	12.5%	7 87.5%	8 100%
Total	390	67.1%	191 32.9%	581 100%

Table 2. Statistical relations at the census tract level (N=581 spatial units)

	<i>Price patterns x % gated streets</i>	<i>Price patterns x % properties in GCs</i>	<i>% properties in GCs x Median building date</i>	<i>Price patterns x Median building date</i>
Clusters X	1-2-3-4	1-2-3-4	+50 % -50 %	1-2-3-4
Clusters Y	+25 % -25 %	+50 % -50 %	Min = 1947 Q1=1980 Q2=1989 Q3=2001 Max=2008	Min = 1947 Q1=1980 Q2=1989 Q3=2001 Max=2008
Chi ² (observed value)	21.40	12.12	30.36	21.8
DF	3	3	3	9
p-value	<0.0001 ***	0.007 **	< 0,0001 ***	0.0093 N/S

Table 3. Contingency table of properties in GCs and price differentiation patterns.

Contingency table of price distance index and percent properties in gated communities on both sides of census tracts boundaries (N=747 line segments); overrepresentation highlighted in bold. Results are analyzed at the segment level (line segment between adjacent tracts) : more than 50% of properties in GCs on both sides of the segment; more than 50% on one side only; less than 50% of properties in GCs on both sides

<i>Price distance index (clusters)</i> <i>x % of properties in GCs</i> N % in line	<i>More than 50 % GCs on both sides</i>	<i>More than 50% GCs on one side</i>	<i>few GCs on both sides</i>	<i>Total</i>
1. Resilient similarity	69 <i>16.3%</i>	84 <i>19.9%</i>	270 63.8%	423 100 %
2. Strong equalization pattern	22 27.9%	23 29.1%	34 43.0%	79 100 %
3. Growth of inequalities in the 1980s ; equalization of values after 1990	21 <i>14.4%</i>	35 <i>24.0%</i>	90 61.6%	146 100 %
4. Fast increase of price distance after 2000	10 23.8%	19 45.2%	13 30.9%	42 100 %
5. Increasing price distance (1980-2000), before recent deflation	6 <i>12.2%</i>	19 38.8%	24 49.0%	49 100 %
Total	128 <i>17.32 %</i>	180 <i>24.36 %</i>	431 <i>58.32 %</i>	739 100 %

Table 4. Chi-square test on boundaries between CT level

<i>Price distance (clusters)</i> <i>x</i> <i>Gated communities</i> N	<i>% gated streets</i> 739	<i>% properties in GCs*</i> 739
Clusters X	1-2-3-4-5	1-2-3-4-5
Clusters Y	≥ 50 % GCs on both sides ≥ 50% GCs on one side few GCs on both sides	≥ 25 % GCs on both sides ≥ 25 % GCs on one side few GCs on both sides
Chi-square (Observed value)	35.5	32.46
DF	8	8
p-value	< 0.0001 ***	< 0.0001 ***

*The same categorization to the control variable describing the percentage of gated streets on both sides of census tracts boundaries, with a 25% threshold only, as a 50% threshold does not yield significant results.