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**“Juntos Pero no Revueltos.” The Influence of the Social Stratification  
System on Urban Densification Patterns in Bogotá, Colombia**

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System on Urban Densification Patterns in Bogotá, Colombia**

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## **Dedication**

I would like to dedicate this work to my mother, Amanda Lozano, who devoted her life to the academia. She taught for more than thirty years soil chemistry at the National University in Bogotá. Thanks to her commitment and hard work over the years, my brothers and I had access to a higher education while enjoyed her love and council for all the important decisions of our life. *¡Gracias Mamá!*

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# **“Juntos Pero no Revueltos.” The Influence of the Social Stratification System on Urban Densification Patterns in Bogotá, Colombia**

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The University of Texas at Austin, 2017

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From the 1950s to the 1970s, Bogotá, Colombia was one of the fastest growing cities in the world. During this period, the city became characterized by extreme social and geographic polarization between rural migrants and urban elites. This polarization was caused by a lack of development control as well as planning policies that encouraged social and spatial segregation. Social elites primarily lived in suburban neighborhoods in the north of Bogotá, which were well served by municipal infrastructure and enjoying easy access to services and employment opportunities. Low-skilled rural migrants settled in informal neighborhoods in the south that had poor municipal services and were close to environmentally polluted areas and far from the central business districts. Faced with the prospect of continuing, ungovernable urban sprawl led by both the formal and informal sector, in 1979 the city implemented a set of growth control and densification policies.

However, thirty-five years later these policies have failed to halt or reverse the uneven development of the city. I argue that the unintended outcomes of the growth management policies are largely due to private sector interests and actions, which in turn

are influenced by social equity policies. To demonstrate this, I correlated the recent densification projects with the so-called Stratification system. This system separates the city into six levels based on built form characteristics to identify groups with different income levels, providing a proxy for the analysis of socio-spatial segregation patterns. In addition, I explored the behaviors and attitudes of urban development agents through interviews and analysis of planning documents.

I found that there is a statistically significant correlation between the Stratification zones and the densification patterns shaped, in part, by the influence of the private sector over local land-use and density regulations. This influence of developers has led to a transformation of the built form that is distinguished by uneven density levels, access to services and employment, and concentrations of poverty. Because of this complex articulation of planning and social policies with private sector interests and actions, Bogotá's low income residents are experiencing unpredictable patterns of disinvestment, overcrowding, revitalization or dislocation in their neighborhoods.

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## List of Acronyms

### BRT

Bus Rapid Transit, *14, 59, 142, 143, 152, 157, 162, 167, 169, 170, 172, 175, 179, 180, 191, 193*

### CIAM

Congrès Internationaux d'Architecture Moderne, *8, 43, 44, 94, 95*

### DANE

Departamento Administrativo Nacional de Estadística, *3, 7, 17, 72, 79, 82, 89, 185, 186, 189, 201, 219*

### DNP

Departamento Nacional de Planeación, *101, 130, 132*

### FAR

Floor to Area Ratio, *120, 145, 208*

### GIS

Geographic Information System, *23, 79, 120, 125, 151*

### GWR

Geographically Weighted Regression, *177, 178, 180, 183*

### IDECA

Infraestructura de Datos Espaciales para el Distrito Capital, *3, 7, 79, 125*

### ISI

Import Substitution Industrialization, *57*

### POT

Plan de Ordenamiento Territorial, *61, 81, 92, 113, 114, 116, 117, 118, 119, 120, 128, 141, 142, 196, 208*

### PPRUs

Planes Parciales de Renovación Urbana, *116, 117, 223*

### PPs

Planes Parciales, *114, 152, 223*

### SDP

Secretaría Distrital de Planeación, *17, 23, 33, 34, 35, 40, 72, 79, 80, 81, 89, 119, 120, 125, 136, 138, 141, 142, 151, 189, 208, 211*

### UPAC

Unidad de Poder Adquisitivo Constante, *5, 103, 105, 202*

### UPZs

Unidades de Planeación Zonal, *81, 83, 113, 117, 118, 119, 120, 141, 147, 208, 209*

USB

Urban Services Boundary, *9, 107, 116*

VIP

Vivienda de Interés Prioritario, *201, 206*

VIS

Vivienda de Interés Social, *206, 219*

## **Chapter 1: Introduction**

*Juntos pero no revueltos* is a phrase widely used in Latin America. It means together but not scrambled, and clearly describes the everyday landscape in Bogotá. As a first time foreign visitor to the city, a person may be overwhelmed by its density and congestion, but also surprised by its diversity. People with different income levels, different ethnicities, races, ages, and genders appear to live closely in harmony. However, a closer look reveals countless inequalities. Notwithstanding the density levels, there are differences in how these individuals, with different education levels, income and ethnicities move, where they live, the places they visit, and how they look at each other, and these differences eventually influence the opportunities they have in their lives.

In this dissertation, I explore the historical role urban planning has had in reinforcing such social differences by fostering uneven urban development in the city. I argue that over time, approaches to urban planning have been shaped by social, political, and economic conditions, complex international discourses about planning, and the interests of powerful developers and landowners. Despite the best intentions of planners, these factors have perpetuated spatial disparity in the distribution of jobs, services, and affordable housing, in turn perpetuating a system of socio-spatial segregation. However, this case also illustrates how the same private sector forces that complicated planners' urban growth strategies may also constitute an opportunity to overcome the social challenges stemming from such spatial disparities.

### **INTRODUCTION TO BOGOTÁ AND ITS SOCIAL AND SPATIAL DIVISIONS**

Bogotá is located close to the geographical center of Colombia, more than 800 kilometers away from both the Pacific Ocean and the Caribbean Sea. The city occupies

about a quarter of a high altitude plateau at 2,600 meters above sea level, on the eastern most branch of the Andes mountains, that split in three as they traverse Colombia from south to north. The polluted Bogotá River halves this plateau, known as *Sabana de Bogotá* [Bogotá's savanna], which is bordered also by steep mountain ranges on the south and east. Locals refer to the steep range along the east as the *Cerros Orientales* [Eastern Hills]; they are a natural reserve since 1973 and constitute the main geographical feature of the city. To the west, the Bogotá River constitutes the administrative limit of the city, and to the north, it opens to the rural green plains of the savanna. I provide in Figure 1 a map with the detailed location of Bogotá and its surrounding area.

The Spanish founded Bogotá in 1538 and later made it the capital of the Viceroyalty of New Granada. In 1810, the descendants of Spanish, or *criollos* [creoles] declared their independence from Spain and founded the Republic of Colombia. Independence, however, did not end the nearly three hundred years of social divisions that had developed under colonial rule. The extensive uncontrolled urban growth of the city soon combined the colonial social differences with the geographically heterogeneous environment of the savanna, shaping an enduring pattern of socio-spatial division. As a result, the city is now divided into three socially and geographically differentiated regions: the North, the South, and the West. Different social groups living in different structures occupy each zone, where each group enjoys different amenities and services and has little interaction with other groups.

The North, along the piedmont protected from seasonal floods and close to the green and fertile lands of the savanna, became the site where the affluent traditionally live.

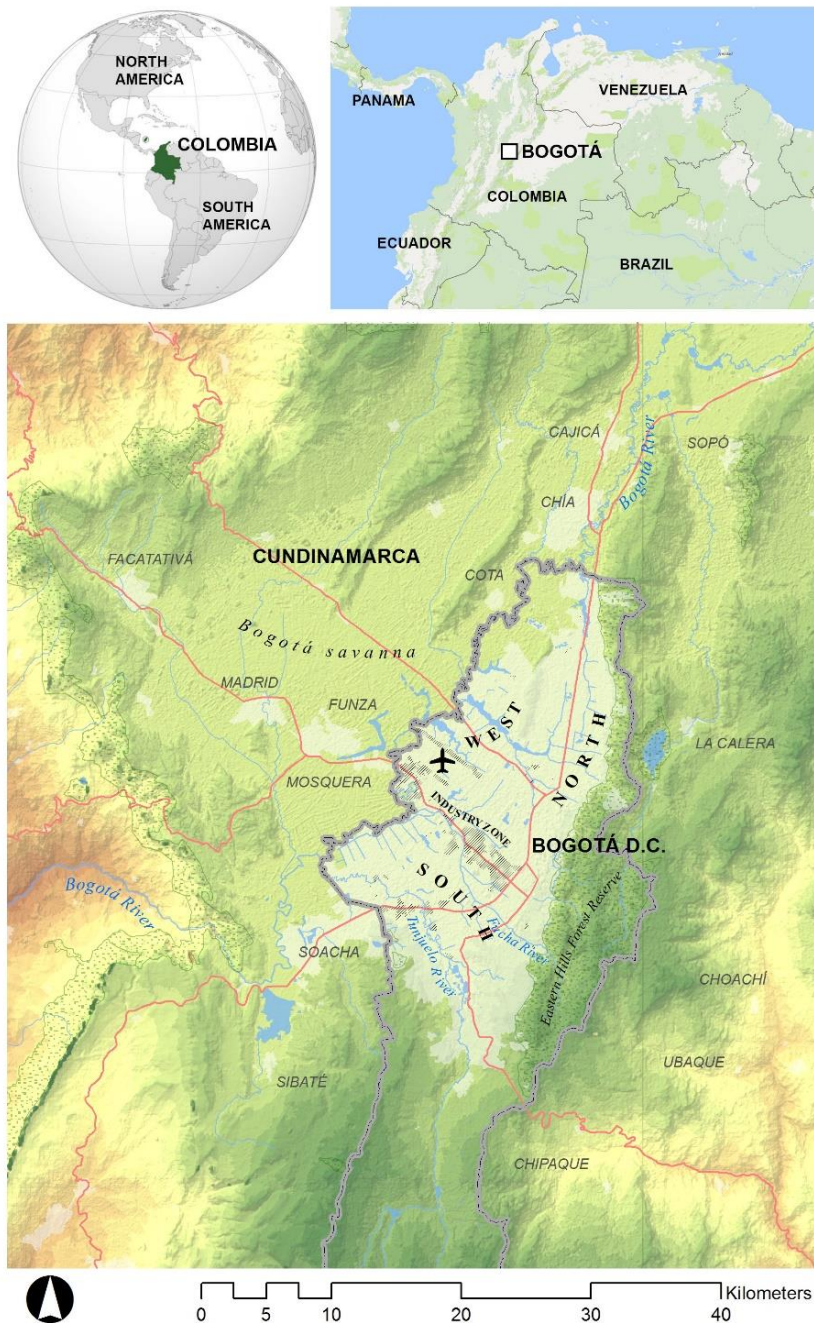


Figure 1: Map of Bogotá and the savanna region.

Illustration by the author. Sources: IDECA, CAR, DANE; Background Images: Google Maps and ASTER GDEM, a product of METI and NASA.

The higher classes in Bogotá have their roots among the white descendants of the creoles and other groups of European or Middle-Eastern migrants that came to the country during the twentieth century. These groups originally settled in the main core of the colonial city, close to the main plaza and market. Nonetheless, from the 1910s onwards, they migrated north along the piedmont of the Eastern Hills, first into the streetcar suburbs in the area that became known as Chapinero, and then further into the northern town of Usaquén. The cable car suburbs where they first settled were fashioned as British garden cities, with townhouses of Tudor Revival style and streets lined with trees. Later they began moving northward into areas resembling a scaled-down version of sprawling suburbia of postwar North America. Highways, shopping malls, universities, clinics, and parks are located in the wealthy northern areas, where the affluent can move around conveniently by driving short distances.

An industrial area separates the South, home of the lower classes, from the North, home of the wealthier. This elongated industrial area constitutes a physical barrier, following an axis that starts in the colonial center and goes towards the west following the main road that connects Bogotá with Facatativá, and further on with the seaports. Beyond this barrier, the South is scattered with industrial sites and reaches its limits in the barren and drier steep terrain at the southern tip of the savanna. The polluted Fucha and Tunjuelo rivers traverse the South as they flow into the Bogotá River and until recently, they seasonally flooded several neighborhoods. In contrast with the North, communities living in the South have their roots among the “Muiscas,” a native tribe that lived in the savanna before the arrival of the Spanish, and in the descendants of the colonial artisan class—called *mestizos*—who are descendants of whites and natives, and are the predominant ethnic group in Colombia. The descendants of the Muiscas were the first group to inhabit

the South. The municipal authorities relocated them from the fringes of the colonial center during the first “slum removal” program during the 1930s. Soon after, the South also became the entry-point for various waves of impoverished migrants from the countryside, mostly mestizo peasants displaced by the long enduring armed conflicts of Colombia. As a result, the South became consolidated as a low-income class enclave, by residents with strong social identities associated with both the Muisca and with mestizo groups from neighboring regions of the savanna, and were thus still very much attached to Colombian rural culture.

Development in the West, which was once a system of marshlands in the watershed of the Bogotá River, is more recent. The area was urbanized through the development of large-scale multifamily apartment towers and compounds of row houses starting in the late 1970s. These developments were made possible by the introduction of the *Unidad de Poder Adquisitivo Constante* (UPAC). This mortgage system made equity available for the emerging middle classes of Bogotá to purchase their first houses. These large housing compounds share the West with other large-scale public urban interventions. Examples of these include the *Ciudad Salitre*, an infill mixed-use planned development; the affordable housing projects in the corridor of *Calle 80* developed by the *Instituto de Crédito Territorial*—the disbanded public entity in charge of the construction of affordable housing in Colombia—the *Centro Administrativo Nacional*, seat of most of the ministries; and the international airport, *Eldorado*. These large housing complexes and large public infrastructures have made the West currently the most economically dynamic and socially mixed area of the city.

As the city has grown and densified, these social and geographic divisions have become more acute. The traditional affluent lands in the North have become more

expensive and socially segregated as they densify and improve their infrastructures and urban services. Conversely, the poorer areas in the South have not developed at the same pace, and currently are suffering from pollution, a clogged transit system, poor infrastructure, and high crime levels. The southern localities have become more violent and socially unstable, signaling concentrated poverty and ghettoization. These spatial imbalances have been rooted and aggravated in different ways by the land-use and growth management policies applied in the city since the early twentieth century.

#### **A HISTORY OF URBAN GROWTH SHAPED BY SOCIAL AND SPATIAL SEGREGATION**

Before the 1970s, successive zoning ordinances with exclusionary characteristics governed urban growth in Bogotá. These ordinances set differing built form standards for each of the socio-geographic zones of the city. As a result, they indirectly determined land prices and the quality of services for each of these zones. Examples of these differing standards of built form across the city include the differing maximum limits on building footprints and dwelling densities, and differing minimums on road widths, setbacks and parking spaces in the North, the South, and the West.

Originally, city authorities introduced these zoning ordinances as urgent attempts to control the unruly development that was happening in the city. As a result, the ordinances were not comprehensive: they neither integrated the urban ecological, social, and mobility systems, nor encouraged sustainable city growth. Instead, in practice these ordinances mostly legalized and facilitated development as dictated by the private sector, land markets, and the traditional social segregation patterns in Bogotá (Salazar-Ferro 2007). Figure 2 provides a detailed map of Bogotá's localities, and patterns of growth throughout the history. Additionally the map indicates the areas of informal settlement, later legalized by the authorities.





The municipality introduced the first system of social segregation through density and land-use norms during the 1940s. Before then, planners were debating whether the city should follow “City Beautiful” standards or other norms based on the precepts established by the *Congrès Internationaux d'Architecture Moderne* (CIAM).<sup>1</sup> Some years before, the Austrian planner Karl Brunner became the first chair of the city’s urban planning office, originally known as the *Departamento Administrativo de Planeación Distrital* (DAPD) and later as the *Secretaría Distrital de Planeación* (SDP). Brunner introduced the first European models of “urbanism” during the 1930s. They were based on the public sector having a leading role in designing the city, mostly following the normative ideals of good city form. However, the increasing migration of impoverished peasants from the countryside into the city soon challenged Brunner’s urbanist approach. Outpaced by the growth of the city, the city phased out the normative approaches and adopted a planning model based on urban development led by the private sector, modeled on North American approaches to zoning and road plans.

Although local planners and architects mostly advocated for urbanist approaches, politicians considered that the rapid growth and socio-economic realities of the country required more liberal and *laissez-faire* policies. Into this debate, local architects brought international planning celebrity Le Corbusier to draft an ambitious comprehensive plan for the city, a master plan that later was deemed impossible to enforce. As a result, in 1944, the mayor passed the first zoning and road plan of the city in the statute known as *Plan Soto-Bateman*. This ordinance separated the city into different land-use zones: in the North,

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<sup>1</sup> CIAM was an organization responsible for a series of events and congresses arranged across Europe by the most prominent architects of the time, with the objective of spreading the principles of the Modern Movement, and focusing on all the main domains of architecture (such as landscape architecture, urbanism, industrial design, and many others).

it delineated a zone of exclusive residential land use, and in the South, a working class area. Zoning in the North encouraged larger plots, lower densities, and exclusive residential land uses. In the working class zones, on the other hand, the ordinance dictated smaller plots, with little or no setbacks, and it allowed commercial and light industrial activities in addition to residential use.

At the same time, the city authorities tolerated the informal subdivision of rural properties in the urban fringes that, in the absence of adequate public housing programs, became the only housing options for the very poor. Landowners and developers, operating at the margins of legality, systematically sold very small un-serviced plots to impoverished migrants from the countryside. These neighborhoods quickly turned into slums. Developers vanished, leaving these communities, mostly comprised of persons with low levels of literacy, to deal on their own with infrastructure problems and conflicts over legal ownership. This pattern of residential segregation and uncontrolled informal urbanization of the fringes continued well into the 1970s.

By 1979 the city authorities aimed to regain control of urban development following consultation with international firms that conducted a study called *Fase 2* [Phase 2] (Llewelyn-Davies Weeks Forestier-Walker & Bor et al. 1972). This study was the basis for the ordinance known as *Acuerdo 7*. *Acuerdo 7* introduced a set of tools to control urban growth. The first of them was an Urban Services Boundary (USB), which was to act as a growth control limit, known as *Perímetro de Servicios*. The intention was to preserve the natural environments of the northern Savanna, but also to impede informal development on the steep slopes of the South and on the Eastern Hills where roads, running water, and sewage services were difficult to provide. Inside the USB, areas were set aside for future growth. These areas were proposed for both the development of multi-family housing

compounds for the working classes and for projects of serviced-plots and self-help housing for the poorest families.

Inside the city, Acuerdo 7 introduced a system known locally as *densificación lote a lote* [lot-by-lot densification, hereafter referred to as incremental densification]. This process was meant to accommodate urban growth in the already serviced inner-city areas, aiming to house a growing middle and elite classes without expanding into the savanna. *Densificación lote a lote* is the process of redeveloping a property, such as a two-story townhouse, by building a multiple story residential building on the same site, following upgrades in the dwelling density zoning limitations. For that purpose, Acuerdo 7 provided a planning framework to facilitate incremental densification by separating the city in different zones called *tratamientos* [treatments]. Planners delineated these *tratamientos* according to the different ages and conditions of existing developments and buildings in different neighborhoods, and then established different guidelines for each based on a market rationale. For instance, they set higher height limits and less land-use restrictions in the older areas of the central city in order to encourage redevelopment by densification conducted by the private sector. Although Acuerdo 7 was a short-term plan—meant originally only to define the growth of the city up to the mid-1980s—the main proposals of the ordinance continued in use, under different circumstances, in subsequent plans up to the 2010s. Today, thirty-five years after the 1979 ordinance, the USB and the *tratamientos* continue in effect with few changes.

As a result, in recent years, as the city exhausts the expansion areas defined by Acuerdo 7, the inflexibility of the *tratamientos* system and traditional segregation patterns have fostered speculation and higher land prices inside the city. Neoliberal land markets have led to conflicts over prime areas that are located close to services and sources of

employment, and the competition over these properties has led to rising land and housing prices, which in turn, perpetuate social and spatial inequalities and harm the very poor. Today, for instance, it is hard for a working class family to afford rents within the city core—even in highly densified neighborhoods of informal origin—and it is almost impossible for them to find housing affordable enough to purchase inside the city.

#### **THE CURRENT URBAN CRISIS AND PERSISTENT IMBALANCES**

Each of the planning studies conducted in the city since the 1970s has diagnosed similar problems related to an unequal distribution of urban services and employment sources across the city (Llewelyn-Davies Weeks Forestier-Walker & Bor et al. 1972; DAPD 1981, 2000a). In Bogotá, economic activities and services are concentrated only in the North where the most affluent residents live, and thereby the lower classes are condemned to living the South and in parts of the West, which requires them to endure tortuous daily commutes in a clogged transit system. At the same time, hazardous industrial and commercial use of land for things such as bars, car mechanic workshops, waste deposits, and artisan industries, invades the few centrally located areas that are inhabited by the poor, thereby servicing the affluent while simultaneously lowering the quality of life for the lower-class people who inhabit them.

The patterns of location of new constructions in the city show this imbalance. In 2015, the northern localities of Usaquén, Chapinero, and Suba together total more than half of the new residential and commercial construction projects in the city. Conversely, the production of affordable housing continues to decline and is now located almost exclusively in the localities of Ciudad Bolívar and Usme, and in the municipality of Soacha, all on the southern fringes of Bogotá (Bustamante-Palma 2015). This disparity has

caused the provision of urban services such as public space, education, security, and transportation to continue to be very uneven across the city.

For instance, data from Bogotá's environmental protection agency (SDA 2016) shows that each inhabitant of the northern localities of Teusaquillo, Chapinero and Usaquén enjoy more than 20 square meters of public space—including parks, plazas, roads and bike paths—while in the southern localities of Ciudad Bolívar and Bosa, each person have less than 13 square meters available. The last urban development report published by city authorities (2015) shows that while daycare for children under three years of age is available to half of the children living in Chapinero and Barrios Unidos, it is only available for a fifth of the children in the southern localities of Kennedy, Bosa, and Ciudad Bolívar. Residents of the South also have less access to basic education, as it is available to only 70–80 percent of the school-age population in Ciudad Bolívar and Usme. At the same time, placement of children in schools is high in the North. Public schools in the South are also under-performing compared to those in the North. In Ciudad Bolívar, San Cristóbal, and Usme, on average less than half of the schools make high scores on the national standardized exams, while the public schools in Suba and Usaquén in the North score in the 90<sup>th</sup> percentile.

Crime levels are also very uneven across the city. Localities in the North such as Usaquén, Suba, Teusaquillo, and Barrios Unidos have murder rates below 20 per 100,000 persons—close to the murder rates of cities such as Philadelphia, Miami, or Atlanta. Localities in the South have higher murder rates of 30 to 50 per 100,000 persons—comparable to the most violent cities in the United States, such as Saint Louis, Baltimore, Detroit, and New Orleans. Pollution levels are also very uneven. Specifically, the levels of airborne particulate matter are very different in the North and South. In the wealthy

northern localities of Usaquén and Chapinero, the average daily level of particles less than ten microns in diameter (PM10) is between 22 and 27 micrograms per cubic meter, which is mostly within the recommended limit of 25 micrograms per cubic meter set by the World Health Organization (WHO 2005). However, in the southern localities of Kennedy and Bosa the average daily level of particulate matter smaller than ten microns in diameter reaches 75 to 80 micrograms per cubic meter.

The patterns of mobility in these areas also reflect the social and geographical disparities of the city and particularly affect the lower classes. The northern localities of Usaquén, Chapinero, Suba, and Teusaquillo have the highest levels of car ownership, reaching more than 250 cars per 1,000 persons, while in the southern localities of Usme, Ciudad Bolívar, and Bosa there are fewer than 100 cars per 1,000 persons. This makes modal transportation share distribution different across the city: the affluent use private vehicles for more than half of their trips, while the lower classes predominantly use public transportation and walk to their destinations. The number of people who walk to their daily destinations, however, has been decreasing in recent years, demonstrating that the lower classes are now more mobile, and increasingly require vehicular transportation to access distant jobs and leisure destinations. Paradoxically, the number of people walking and biking has increased among the higher-income group, indicating how they now have easier access to jobs and services (Alcaldía Mayor de Bogotá, Transconsult, and Infométrica 2015). As a result, the deficiencies of the transit systems disproportionately affect lower income groups. Trips in public mass transportation take longer than in any other transportation mode, more than 70 minutes on average in increasingly overcrowded Bus

Rapid Transit (BRT)<sup>2</sup> buses. As many as eight passengers are fitted per square meter on each bus, and they have to transfer through congested stations (Sierra et al. 2014). Consequently, almost every week in Bogotá, angry passengers initiate spontaneous blockades and bring the BRT system to a standstill.

These inequalities are not new. Since the 1970s, consultants have proposed that the city be decentralized through the consolidation of sub-centers for services and employment, which would be scattered across the urban area to reduce the daily movement of the population and the concentration of both employment and poverty. However, only a few of the proposed sub-centers have been consolidated, and those rarely break the patterns of social segregation. In the best cases, these sub-centers have become commercial hubs for local communities, but they fail to draw the educated higher-class groups into living in areas outside the North. This pattern has been the result of a continuous misalignment of the urban development objectives of the public and the private sectors. While the public sector has set goals for city structure and introduced planning tools to desegregate the city, the private sector often acts as a loose wheel, and goes against the planning objectives set by the municipal authorities.

This research seeks to use both quantitative and qualitative evidence to demonstrate this misalignment between the public and the private sector in urban planning policy. I will triangulate geographical information data with historical documents, behaviors and perspectives from interviews with agents of city development, using as proxy the so-called *Estratificación* [Stratification] system.

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<sup>2</sup> Bogotá's BRT system moves the largest number of passengers of any bus system in the world. The system, called "Transmilenio," opened in 1999, and currently uses 113 kilometers of exclusive lanes on Bogotá's main roads.



## THE ROLE OF PUBLIC POLICY AND THE PRIVATE SECTOR IN THE INEQUALITIES

Stratification is a national policy that was initiated as a social equity tool for distributing cross-subsidies among people in different income groups. By the 1970s, infrastructure was still meager within informal settlements, which accounted for more than a third of the area of the city. Unpaved roads, no sewage, and unstable sources of water and electricity condemned inhabitants of those settlements to live in conditions of extreme poverty. At the time, budget constraints made it difficult for the public sector to bear the costs of the infrastructure upgrades that were necessary to bring utilities to informal settlements. Policy-makers then proposed that members of the higher classes should contribute to the necessary improvements through their monthly utilities charges. However, at the time, the required data regarding the income levels of the population, such as property appraisals and tax assessments, were not entirely reliable. As a consequence, policy makers decided to rely on the differing built form across the city to determine residents' income levels. As a result, during the 1980s, Bogotá was divided into six income areas, called *Estratos* [strata]. Strata 1 and 2 were delineated in the neighborhoods of informal origin where the very poor lived. Stratum 3 was defined in the areas where the state or non-profits had developed affordable housing projects where they believed were living people of emerging middle classes. Finally, strata 4, 5 and 6 were the areas developed by the private sector. These were mostly areas of suburban single housing or high-rise condominiums, where the most affluent and the upper-middle classes lived. These areas were located almost exclusively in the North.

After some years, the Stratification system proved to be a success as a social equity policy. Through it, the public sector raised the revenue necessary to subsidize the infrastructure needed in informal neighborhoods. This greatly improved the quality of life

of the poorest residents of Bogotá. However, the Stratification system's more negative effects outside the utilities realm eclipsed its successes. Sociological research suggests that Stratification has perpetuated social segregation, which is rooted in colonial social hierarchies and aggravated by the twentieth century's system of social segregation through density and land-use norms. Sociologists point out how Stratification has been adopted into the local culture, exacerbating the perception of wealth differentiation between different urban areas with severe social, political, and economic implications that include generational social immobility and concentration of poverty (Uribe-Mallarino 2008).

In this research, I will use the Stratification zones as a lens to observe the recent urban development patterns of the city. My argument is that the Stratification zones provide a useful tool to discover the social injustices of the planning system at different levels. These zones are based on the differences of the built form at the block level in the existing developments. Each stratum has different architectural typologies, street layouts, and supply of parks, plazas and pedestrian infrastructure. As a result, the strata system is the outcome of more than 70 years of social segregation based on land-use and density regulations. In other words, I am not suggesting that social differences and differences in built form have emerged from the Stratification system *per-se*. Instead, the Stratification system is the *outcome* of historical planning processes, behaviors and perspectives of city development agents, and the actions of the private sector. Consequently, I use Stratification as a means to measure and bring to light the inherent, structural inequalities of the planning system in Bogotá.

This research points out that the built form differences reinforce the perceived social differences between strata, and hence shape perceptions of appropriate, future development. These perceptions are, in part, the result of a lack of consideration for socio-

spatial differences in public planning policies. These policies, in turn, have facilitated private sector influence over the drafting of local density and land-use regulations, often in contradiction with broader policy objectives. The consequences of these processes have been mixed. On the one hand, the city has seen increasing segregation in some areas, and gentrification and dislocation in other areas. On the other hand, uneven built form patterns have been perpetuated in some parts of the city; other areas have seen aggressive transformations in the built form. These contradictory processes have led to a great deal of uncertainty, making it difficult for planners to address the deficit in transit and roads infrastructure and to forecast future development, thus perpetuating the uneven distribution of employment opportunities, services, and housing supply.

In order to discover these patterns, I used a pragmatic mixed-method approach. Firstly, I gathered data from the new spatial database of building permits, which the SDP has digitally catalogued since 2010, and socio-demographic data from the latest multipurpose surveys conducted in the city by the *Departamento Administrativo Nacional de Estadística* (DANE). Secondly, I interviewed private sector developers, urban policy makers, and local academics. By triangulating this quantitative and qualitative data, I found that there is a statistically significant relationship between the incremental densification patterns and the Stratification policy. Two interconnected strategies moderate this relationship. First, social perceptions and attitudes among planners and developers inform discourse about real estate as well as investment decisions. Second, developers influence the drafting and passage of planning ordinances at the local scale both through participatory planning processes and by directly informing policy decisions. Nonetheless, I also found that there is an emerging class of young or grassroots developers, which are modifying the

environment of the neighborhoods of informal origin and disrupting traditional segregation patterns.

## **DENSIFICATION AND PRIVATE SECTOR IN GROWTH MANAGEMENT POLICIES**

I used three different bodies of theory to situate this research within an overarching planning debate and to inform my understanding of the intertwined relationships among the densification discourses, the patterns of social segregation, and the role of the private sector within a Latin American planning framework. First, in order to trace the roots of the growth management and densification policies introduced to Bogotá by Fase 2 study (which was the basis for Acuerdo 7), I reviewed the literature that emerged in the 1960s that engaged with the relationships among built form, urban design, and urban planning. This work often took a normative stance, calling for greater urban density and a compact urban form to mitigate environmental and social concerns wrought by urban sprawl and modernist, large-scale planning interventions. Since the 1970s, urban design and urban planning practitioners have transformed these densification discourses into growth management policies throughout the world.

Initially, ideas favoring compact cities were triggered by the writings of Jane Jacobs (1961), who advocated that urban design return to a traditional pre-modern city form, an approach that privileged dense small-scale piecemeal development, the mixing of social classes, and pedestrian circulation. Over time, influential authors within the urban design and architecture fields, such as Krier (1984) and Alexander (1966; 1977; 1987) initially, and later others within the New Urbanism movement (CNU and Talen 1999; Calthorpe 2009; Talen and Duany 2013), operationalized and disseminated these discourses through planning strategies premised on the densification of the central city. Another examples of the push toward compact cities is the incorporation into urban planning of the “Smart

Growth” discourse, created as response to the challenges of the environmental sustainability of cities (M. Newman 2005); and the commodification of housing in accordance with the global shift in urban policy to encourage development led by the private sector (Chapin 2012).

However, the implementation of densification policies also had unintended consequences. Paradoxically, some of the policies aggravated social segregation and increased the displacement of vulnerable communities from the central cities, even though Jacobs aimed for them to do the opposite. A group of scholars has exposed these unintended effects in recent decades by evaluating the theory and practice of densification that uses form-based codes. For instance, they questioned the assumption that density in cities enables social mixture and the peaceful interaction of people with different backgrounds (Fainstein 2005; Harvey 1997; Day 2003; Brain 2005). They also have pointed out the problematic theoretical underpinning of form-based planning approaches that emerge from disciplines such as architecture and urban design, and are coopted by the private sector (Gunder 2011; Tafuri 1976; Cuthbert 2008). On the other hand, empirical research has proven the weak association between urban form and the social sustainability performance of cities (Burton 2000; Talen 2006; Bramley et al. 2009; Pendall and Carruthers 2003). I am using this scholarly debate to argue how the growth control and incremental densification policies established in Bogotá in 1979 by Acuerdo 7 responded initially to an international densification discourse that was imported into Bogotá. As in other places, the case of Bogotá may be an example of the unintended effects of densification and growth control that were caused by the influence of the private sector in city development.

Second, I identified an absence of in-depth, critical reviews of urban planning in the literature on Latin American urban morphology (Almandoz 2006). Because of this, I

reviewed literature that analyzes urban growth and social segregation in Latin America from a sociological perspective. I am using this literature as a way to approach the urban growth in Bogotá, while also contributing to it with a perspective that considers historical zoning regulations. Sociologists in the region have coined the terms “polarization” and “fragmentation” to describe two different phases of urbanization in the region during the second part of the twentieth century. Griffin and Ford (1980) coined the term “polarization” to describe the unique urban growth patterns that responded to the deep social and ethnic divisions in the region. Scholars identify the poles of social divisions with the educated elites of European ancestry who most frequently have held power on one extreme, and the mostly illiterate population migrating from the countryside on the other extreme. According to sociologists, these divisions were made manifest in the built environment of cities during the twentieth century as the region was urbanized. Contemporary scholars, however, argue that the neoliberal reforms that have been implemented in the region since the late 1980s have disrupted this traditional pattern of polarization. The new growth pattern became known as “fragmentation,” a form of urban sprawl distinguished by the appearance of fragments, or urban islands populated by different social groups that live in proximity to one another, but each enclosed by man-made security borders, such as fences or gates (Borsdorf and Hidalgo 2010; Thibert and Osorio 2014; Janoschka 2002). Numerous scholars are analyzing the social patterns of exchange between social groups that formerly were living on opposite sides of cities and are now living in close proximity. Some experience these new exchanges as positive (Sabatini and Brain 2008; Sabatini and Salcedo 2007; Salcedo 2010; Rasse 2015) and others experience them as negative (Janoschka and Sequera 2016; Ruiz-Tagle 2015).

Finally, I draw on research in urban governance in Latin America, in particular the work of Koch (2015). He introduced the term “Arranged Urbanism” to describe the private sector influence over the public sector, arguing that imbalance of power between the two shapes the cities in the region. Koch points to the role of neoliberal mechanisms of governance in causing increasing segregation inside urban areas, and for ultimately undermining democratic control over the process of city construction. I am using his discourse to understand the historical planning regulations, and the arguments of local developers I interviewed and those in local real estate discourse. Based on my findings, I argue that to moderate city development, instead of following public planning rules, the private sector follows the rules of social segregation that are embedded in the Stratification policy.

#### **SUMMARY REVIEW OF CHAPTERS**

I will present the methods, theory and results of this investigation in nine chapters. In Chapter 2, which follows this one, I will narrate my motivations for this research through my personal experiences in two different Bogotá neighborhoods. They provide examples of the effects on local communities of conflicts over densification and social segregation and illustrate the complexity of the intersections between local planning ordinances, the private sector, and the Stratification system. In Chapter 3, I will discuss the theoretical framework that grounds this research. I will explain the origins and theoretical basis of the international discourse on densification and, recent critiques to it based on evidence found through scholarly research. In addition, I will explain the traditional and new patterns of residential segregation in Latin America, and how those relate to city growth in the region. Finally, I will address the power of the private sector in urban development in Latin America and its different mechanisms of influence over the development of public policy.

In Chapter 4, I will present my research questions and explain the mixed-methods approach that I am using, and discuss the pitfalls of using only either quantitative or qualitative methods. I am also presenting the advantages and disadvantages of my positionality with regard to my research, writing both as a “Bogotano” and about Bogotá. I will explain how I have lived most of my life in Bogotá, while also extensively studying abroad, and I will discuss the contradictions in the fact that I am both a practitioner of architecture and urban design and a scholar of urban planning. In Chapter 5, I review the planning history of Bogotá, arguing that the city has seen four planning phases. A first foundational phase lasted up to the 1940s in which planners focused on normative aesthetic interventions that were brought by European practitioners of urban design such as Karl Brunner and Le Corbusier. Although these men contributed to the professionalization of local planning practice, they overlooked the complex problem of social segregation between the elites and illiterate migrants from the countryside. A second phase followed when, in the 1960s, these social conflicts erupted into a planning crisis that led to the enactment of procedural policies that made development rules more flexible, and aimed to solve housing deficits through the action of the private formal and informal construction sector. I propose that a third planning phase started in the early 1970s with the Fase 2 study and was enacted with Acuerdo 7 in 1979, when uncontrolled sprawl again motivated the introduction of normative rules based on foreign theories for controlling city growth. I argue that the planning framework introduced during this phase continues in force today. However, I recognize a fourth phase of planning history beginning in the 2000s, when planning ordinances started to regulate processes of urban development rather than city form in order to address social equity challenges. Nevertheless, I argue that the turn to this



progressive framework has failed due to pressure from the private sector construction industry.

In Chapter 6, I explain in detail the Stratification system, the policy that embodies the patterns of socio-spatial segregation. I will discuss its methodology and the various scholarly critiques of it and its social consequences, while explaining the recent local debate about its elimination. In Chapter 7, I will use quantitative methods, specifically Geographical Information System (GIS) data from 2010 to 2015, to statistically assess the relationship between incremental densification and the Stratification system. Specifically, I will use a simplified regression model to relate the size of incremental densification projects with the strata, controlling for location and physical characteristics of the parcels. In addition, I will relate incremental densification patterns with the changes in social segregation in the city during the period 2007–2014.

In Chapter 8, I will explain the mechanisms that facilitate private sector influence over urban planning and their relationship with the Stratification policy. I will develop this argument through analysis of thirteen in-depth interviews that I conducted with local construction firms of different sizes and policy-makers at the SDP. In addition, I will compare the interviews with an analysis of the real estate discourse in the literature written in Colombia. Finally, in Chapter 9, I will discuss my findings and their contribution to broader theoretical debates in planning and the current planning practice in Bogotá.

## **Chapter 2: Two illustrative cases of densification from Bogotá**

In Bogotá, although planning ordinances have encouraged the densification of the central city since 1979, it was not until the 2000s, in the face of a scarcity of empty lots for development, that communities began feeling pressures from developers in the land markets. These market pressures are increasingly dislocating neighborhoods with families of both middle and lower income located in prime central areas. As a result, local planners, activists, communities, and non-governmental organizations are concerned about these struggles over land for redevelopment. During my life and work as a planner in Bogotá, I witnessed many of these processes. However, it was only through the investigation discussed here that I was able to establish links between the observed struggles, broader planning theory, and local urban planning policy.

This chapter emerges as a result of my own retrospect of different events of my life in Bogotá that I now relate to urban planning policy. I will recount stories of two different neighborhoods in the city where residents experienced conflicts brought by incremental densification policies. These examples illustrate in detail the complex role of private sector developers in influencing local land development policy and land markets. The result of these patterns, as the cases suggest, has been uneven and unplanned densification at the expense of the quality of life of existing communities. In addition, the case studies exemplify how developers' decisions are not solely influenced by planning ordinances, but also by the Stratification policy, which reflects and reproduces the social divisions in the city.

### **DENSIFICATION IN CEDRITOS: SUCCESS OR UNPLANNED URBANIZATION?**

One of the earliest memories of my childhood was growing up playing in the large green fields of the northern savanna. I remember very well getting dirty in its deep green

grass and muddy soils, a result of the almost daily rainfalls that distinguish Bogotá's weather. I ran with my friends across the fields, along with farmers wandering with milking cows, playing with street dogs and trespassing the barbed wired fences. When we got tired, we returned to our houses located in a small subdivision in the middle of this sea of green pastures. We named the subdivision *cuadra* [block], and the *cuadra* was at that time the entire world we knew at our young age. My father moved from the city to the *cuadra* in search of clean air and empty space where his children could grow and play. He joined a handful of pioneers, acquiring a small plot of land to build a house with a front and back yard for the family. People called the larger area where our *cuadra* was located *Cedritos*, which was inspired by the name of a fancy gated subdivision that sprung up nearby. The name came from the cedar trees, meaning "little cedars," and was associated with green space, trees, and nature, assets that were scarce in central Bogotá.

As I was growing up, many families joined the first pioneers of the *cuadra* and bought many more plots in the subdivision to build single-family houses. Figure 3 shows a picture of how the *cuadra* looked back in the 1980s. Each neighbor built their home with a different design; however, most of them were inspired by Spanish colonial architecture with red tile roofs, white walls, and wooden window frames. At the same time, though, they tried to resemble the houses with garages and green front lawns that we saw in the TV shows from the United States. Other families with less money built their homes in an austere style with basic paint on the façade, cement roof tiles, and metallic framed windows. However, while in the United States plots were wide and houses were detached from one another, in our *cuadra* the developer had illegally subdivided each plot into two, and our homes were built one right next to the other, similar to townhouses. During this time, I remember that we left the green fields to play in the many construction sites that

sprung up everywhere. We broke into the sites during the night, climbed the wooden fences, and then played for hours with sand, cement, wheelbarrows, tools, and everything we could find as we ran around through the unfinished structures.

I do not remember exactly when our *cuadra* stopped being a border area between the city and the savanna's countryside, and started being a part of Bogotá, but I do remember several changes that came with this transition. As most of the plots in our subdivision were built out, we got our first bus route, which was served by small trucks called *busetas* that were adapted to carry passengers. They ran through the main street every fifteen minutes or so. Because this happened when I was becoming a teenager, the *busetas* allowed me to become more independent from my parents. Because I could ride the *busetas*, I did not require them to drive me everywhere and control my mobility. I used the *busetas* to go alone or with my brothers to the shopping mall or to visit the homes of school friends' who lived in other neighborhoods.

Unfortunately, with the city's growth and the *buse*ta routes, *cuadra* neighbors began to mistrust one another. One night someone broke into a house and stole something; another day, someone stole a radio from a car parked on our little street. Soon after, it was my family who was the victim of the crime wave. The night of December 23, 1989, my parents, my brothers and I went to see the Christmas lights downtown. When we got back, the TV and other appliances were missing, as well as some of my mom's jewelry. Someone had broken into our home. This was a big shock for my father and it caused him to become very cautious. He built a fence in the front and the back of our house, and he restricted us from being outside at night. Our self-protective attitude may also have been fueled by the horrors we saw on Colombian television news. At the time, in the early 1990s, everyday there were news of kidnappings, murders, and bombs in the country. By the beginning of

the 2000s, the violence involved not only the usual drug barons, but also average Colombians, people like us.

Paradoxically, my father also saw opportunity with the unexpected growth of the neighborhood. With the help of my aunts and uncles, he bought one of the last remaining plots in the cuadra to build a midrise multi-family condominium. While Cedritos had been since its origins a place of single-family houses, multi-family condominium buildings eventually became very popular. This type of buildings, with five floors, parking in the basement, and four to six apartments, were a good alternative to make a profit from booming housing markets and the safety concerns that became ubiquitous all around the city. They offered a second layer of security for their occupants. Families could control the entrance with a concierge or with electronic devices, while windows in condominiums were set higher and therefore the risks for someone breaking in were lower. My father's building had very few architectural qualities as it was mostly designed by the construction chief, or *maestro*, who had much empirical knowledge of construction but had never gone to a training school. My father also complained that workers were constantly stealing materials and building poor quality constructions. Nevertheless, in a few years he had built not just one but two small condominium buildings in our cuadra. After all this work, he was able to keep one of the apartments, and with the money he earned, he bought a car. The car was later stolen while it was parked in front of the church, but the rent from the apartment helped our family for many years.

Many other neighbors and other small developers had ventures in the incremental densification of Cedritos. When I turned twenty-three years old and graduated with my bachelor's degree in architecture, I left a neighborhood that was very different from the one in which I was born and raised. Only twenty years after the first families moved to

these green savanna fields, Cedritos became a fully serviced urban middle class enclave. The plains with milking cows and scattered suburban subdivisions were transformed into a mix of gated complexes of townhouses and five-story residential condominiums, with buseta routes everywhere that led to small commercial strips and shopping malls.

When I graduated from college, I moved out of this middle class enclave to a shared apartment in the center of the city. This apartment was located very close to where my parents first lived after they got married; it felt as I was restarting a cycle. This area, called Teusaquillo, was more convenient to me as it was only a short buseta or taxi drive to my office. In addition, the apartment was closer to the bohemian central entertainment districts I was starting to frequent at that time.

Some months after I moved out, I found an unusual article about my old neighborhood:

[A modern and constantly developing sector. Cedritos is not just one more place on the map of Bogotá anymore. It is a necessary reference for urban development in the north of the city, because it possesses a combination of features that project it as a real estate investment point. At present, there are between fifteen and twenty housing projects, of which 80 percent have been sold over blueprints. People like the sector because it is recursive, modern and it is in constant development; to which must be added the plentiful access routes, which have now received more attention from the authorities.] (Redacción El Tiempo 2007b)

*Un sector moderno y en constante desarrollo. Cedritos no es una zona más en el mapa de Bogotá. Es referencia obligada del desarrollo urbano del norte de la ciudad y una combinación de factores que la proyectan como punto de inversión inmobiliaria. Actualmente, allí se encuentran entre 15 y 20 proyectos de vivienda, de los cuales 80 por ciento se ha vendido sobre planos. Y es que a la gente le gusta el sector porque es recursivo, moderno y está en desarrollo constante, a lo que se les deben sumar las vías de acceso, que ahora han tenido más atención por parte de las autoridades.*

I was surprised at reading this article after living in Cedritos for more than two decades. I thought the image the article was portraying of my neighborhood was far from

reality. As I believed back then, Cedritos was a middle class suburban enclave, an affordable area with many parks but disconnected from central Bogotá, and it was therefore a good place for children to grow up, far from noise, pollution, and drug addicts. I never had considered Cedritos to be a modern new center and a pole of development of the city. However, to my surprise, other articles published soon after also contradicted my view of Cedritos:

[It is estimated that 60 percent of the sector is urbanized with homes in Stratum 4, making it a good choice for newly married couples and college students or professionals entering the labor market. It is a traditional sector, and above all, a very residential site, which for twenty years the professionals have opted for. Because of features that are recurrent: the location and the stratum that allows them to live at a very high level in a more affordable way.] (Redacción El Tiempo 2007a)

*Se calcula que el 60 por ciento del sector esta urbanizado con viviendas de Estrato 4, lo que lo convierte en una buena opción para parejas recién casadas y los universitarios o profesionales que están ingresando al mercado laboral. Es un sector tradicional y sobre todo un sitio muy residencial al que, desde hace veinte años le ha apostado la población profesional por factores que son recurrentes: la ubicación y el estrato que les permite vivir a un nivel muy alto de manera más económica.*

I knew construction firms probably paid to publish all of these articles in order to sell more condominiums in the area, but I was shocked by the arguments they were using, especially the one about Cedritos being a very well connected area. Cedritos grew in an unplanned way from a set of suburban subdivisions, which meant that there were few roads connecting the area to the center of the city. In fact, its first settlers, such as my father, moved to Cedritos in the first place precisely because of this disconnection. For five years when I was growing up, I had to suffer because of Cedritos' isolation. Attending college downtown, I had to spend two hours daily in a buseta full of people in the middle of a

kilometer-long traffic jam. I felt sorry for those who read the article and moved to Cedritos confident that it is a “well connected area.”

Nonetheless, I had to accept that the other terms they were using were more accurate. Cedritos was indeed a quiet residential area with few commercial land uses and no industries at all. The neighborhood was largely classified as Stratum 4, which meant middle class, or that people living in Cedritos were educated professionals, such as my parents, my brothers and I are. This seems to be very attractive in the real estate market of Bogotá as the neighborhoods classified as higher strata 4, 5, and 6 were very few, and most of the areas in strata 5 and 6 were very expensive. Therefore, if a family with a low income wanted to live in an area where their neighbors have a high level of education, Cedritos was the best option.

As I was going to Cedritos weekly to visit my parents looking through the buseta window in the usual traffic jam, I started to see how old houses were being demolished to make way for new condominiums. However, this time they were not the usual midrise buildings, such as those my father had built some years before. This time the new buildings were high-rises occupying several plots in the old subdivisions and going up ten to twenty stories. Figure 4 shows how Cedritos looked in 2016. These towers sprung up everywhere, built after demolishing entire gated compounds that contained five to fifteen townhouses, or by joining a couple of lots in front of small streets. I was hearing unprecedented stories in the neighborhood, such as “Ms. X had a small house in the cuadra. She was offered a thousand million<sup>3</sup> by the construction companies. She sold it and moved to a big mansion in the savanna.”

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<sup>3</sup> One thousand million pesos sum roughly USD \$350,000 or 1,350 minimum monthly wages in Colombia in 2016.





Figure 3: Cedritos in the 1980s

Source: Familia Yunda-Lozano



Figure 4: Cedritos in 2016

Source: Photo taken by the author

More people kept moving in and the prices on condominiums, which used to be more affordable than in downtown, continued to increase. Soon they were as expensive as condominiums in more central areas, such as Chapinero. Newspaper articles were increasingly talking about the neighborhood. In 2009 there was one titled, “The multiple advantages of living in Cedritos;” in 2010 there was another titled, “Cedritos: integration between housing and commerce;” and in 2011 there was an article titled, “Cedritos, an area of great valorization.”

As I would return every week to my parents’ home, the traffic became every day more chaotic. During my childhood, there were no traffic jams in Cedritos. Later, during my teenage years, the first traffic lights were installed, and with them, there formed small lines of four or five cars in the crossings. However, now I was spending fifteen minutes in the buseta at every single traffic light in the neighborhood. The densification of Cedritos seemed to be very illogical: roads were narrow, there was no mass transit to connect it with downtown, and the whole area was planned for two-story houses. The implications of this poor planning eventually became evident in the utility infrastructure. On September 24, 2012, the city’s water and sewers utility sent a letter to all the *Curadorías Urbanas*, the private agencies in charge of granting the building permits in the city. The unprecedented letter said that the population increase in Cedritos was affecting the utility’s service to the neighborhood, which could potentially create a sanitary crisis in the area. Because of this, the letter asked the water and sewers utility to stop the granting of any more construction permits in the neighborhood, as the company did “not have the capacity to treat the sewage of the future population of Cedritos.”

The image of Cedritos with its new fancy residential towers and new luxury shops flooded in its own sewage immediately shocked the neighbors. The community quickly

organized and went to the SDP to protest against the new construction. In 2012, the newspaper articles about the neighborhood suddenly changed tone: “In Cedritos, the utility network cannot cope with growth”; “There is no capacity for more users”; “Neighbors claim to not approve more construction permits.” The scandal about the sewers revealed the crisis about other infrastructure in the neighborhood. An article from 2013 was titled “The roads in Cedritos reached the limit” (Cante 2013):

[According to mobility expert Eduardo Behrentz, Cedritos is the sector of the city that best reflects the consequences of what happens when the number of residents in a neighborhood increases without increasing the supply of roads, to withstand this load. ‘In Bogotá we have a concentration of very high density, 20,000 inhabitants per square kilometer, when you have so many people living in such a small space the roads cannot cope with the demand,’ explained Behrentz].

*El norte de la ciudad no ha sido ajeno a estos problemas, según el experto en movilidad Eduardo Behrentz, Cedritos es el sector de la ciudad que mejor refleja las consecuencias de lo que sucede cuando se incrementa la cantidad de residentes en un barrio sin que aumente la oferta de malla vial para soportar esta carga. “En Bogotá tenemos una concentración de densidad muy alta, 20,000 habitantes por kilómetro cuadrado, cuando tienes tanta gente viviendo en un espacio tan pequeño las vías no dan abasto,” explicó Behrentz.*

Finally, by the end of 2012, the SDP prohibited the construction of buildings higher than six stories in Cedritos. However, at that point, more than 100 permits for high-rises had already been issued and remained valid. Negotiations ensued between the SDP, the water and sewer utility, and the construction firms. Eventually they announced: “Green light is given to 105 construction projects in the north of Bogotá” (Redacción Bogotá 2012). However, they did not disclose details of how they were going to solve the problem of the sewer’s capacity or who was going to pay for the necessary infrastructure improvements. This episode related only to the sewers, but the population of Cedritos will have to deal in the future with the additional traffic, noise, and unwanted land uses that come from unplanned densification. Probably all residents will have to pay through public

funds for the improvement to the infrastructure in an area that hosts primarily an affluent population, thereby taking resources away from the poorest neighborhoods of the city. In 2014, the chair of the SDP finally declared, “Densification in Cedritos was done in a disorderly way” (Aguilera-Jiménez 2014):

[Gerardo Ardila, Secretary of Planning, said that the densification in these types of sectors, such as Cedritos, ‘is inconvenient because it was done in a disorderly and disjointed way. Little by little areas were created where there was no public space, and the one that was there was not respected.’ In addition, he explained that nobody thought about who should be responsible for the correct provision of public services.]

*Gerardo Ardila, secretario de Planeación, afirmó que la densificación en este tipo de sectores, como Cedritos, “es inconveniente porque se hizo de manera desordenada y desarticulada. Poco a poco se fueron creando zonas donde no había espacio público y el que había, no se respetó”. Además, explicó que nadie pensó en quién se debía responsabilizar por la correcta prestación de servicios públicos.*

This case of Cedritos illustrates how the private sector used the Stratification discourse to advertise and profit from the densification of a neighborhood, while conducting incremental densification processes without regard of planning policy at the larger level. This is exemplified by the words of the chair of the SDP, which show how policy makers and property owners are powerless in face of the power of the private development sector to determine the growth patterns of the city.

### **DENSIFICATION IN LOS OLIVOS: DISLOCATION OR SOCIAL IMPROVEMENT?**

While the case of Cedritos is the case of unplanned densification that I felt most personally, there are many more in other parts of the city. Sometimes incremental densification has disrupted populations more vulnerable than the middle classes of the north of Bogotá. In 2011, I took my first planning job when I joined the SDP team in charge of zoning. We were in charge of updating the local land development codes in specific

neighborhoods of the city. This job took me to visit a set of neighborhoods of informal origin located in the steep cliffs of the Eastern Hills, in an area known as Chapinero Alto. These informal settlements are sandwiched in between the forest reserve and one of the most expensive areas of the city where luxury residential towers overlook the whole savanna. Figure 5 provides a view of Chapinero Alto, showing the mix of high-rises and informal settlements in the piedmont.

One day, as I was conducting my fieldwork, taking notes and pictures, some of the residents in one of the settlements of informal origin, called “Los Olivos,” approached me. This was a small settlement, long and narrow, of about a hundred houses located along a small street that runs parallel to a ravine. The first residents of Los Olivos settled there illegally in the 1980s, and since then, they had acquired the provision of utilities, the titling of the lands, and the full legalization of the neighborhood. Los Olivos residents were concerned about a group of unknown agents that were buying up several properties in the area. I talked with members of the community, and at the beginning, it was very hard to tell what they were concerned about and what they wanted from the SDP and the local development code. Some complained about the massive buyouts and wanted to keep their neighborhood as it was, with the small self-built houses. Others who were aware of the small size of their properties seemed to want more development rights so that they could increase their property values and sell them off to developers.

At the same time at the SDP offices, we received frequent visits from lawyers and realtors who seemed very interested in the revision of the land development code, specifically as it related to the Los Olivos neighborhood. They were telling us to keep some rights of way in the area, and asking that we include some odd references to older regulations in the new local land development code. After speaking with other more

experienced colleagues, the situation became clearer. There was a division in the community between those who wanted to sell their lots and move somewhere else, and those who wanted to stay and keep the neighborhood as it was. Driving this conflict was a group of professionals that represented an investment firm. They wanted to buy the whole settlement and build luxury residential high-rise condominiums. The city regulations that promoted densification allowed very high densities in areas that were urbanized but not built, such as these border areas between the city and the Eastern Hills forest reserve. In fact, surrounding Los Olivos there were already many construction sites where towers were rising with more than fifteen stories. The loophole for redeveloping Los Olivos was an old regulation from the 1990s which considered areas that were informal settlements as unbuilt urbanized areas if someone acquired all the properties, demolished the structures, and relocated the population somewhere else.

According to some residents, during the late 2000s the investment firm made an alliance with the leaders of the neighborhood association, the *Junta de Acción Comunal* [community action board], to convince the community members to sell their properties. Patricia Melo, a community activist, claimed in a meeting I attended: “They negotiated with the Junta de Acción Comunal, and their leaders received one million pesos<sup>4</sup> for each family that sold their house.” In addition, she claimed the investment firm was also using the system of Stratification as a way to pressure the original settlers to leave.

Los Olivos, as other areas of informal origin on the borders with the Eastern Hills, is classified as the lowest strata, stratum 1 or 2, and because of that, they receive the largest subsidies for utility payments. However, most of these areas of informal origin are small

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<sup>4</sup> One million pesos sum roughly USD \$350 or 1.3 minimum monthly wages in Colombia in 2016. Accordingly, one thousand million pesos are roughly USD \$350,000 in 2016

and they are surrounded by larger areas classified into the highest strata, 5 and 6. John Martínez, a resident, commented to the newspaper *El Tiempo*, “They say that the stratum will change, that we will have to pay property taxes that we cannot afford.” Other residents were more concerned with the prices the investors were offering for their properties, which they viewed as unfair, in comparison with the sky-high prices for luxury properties nearby. In the same news article, Hector Martínez was cited as saying, “Our opinion is not worth anything. Next to us there are condos that are worth more than 500 million, and to us, who are located where they need to grow upwards, they do not give us the right [to set the price]”... “[We claim] that they buy us at the right price. My property I do not sell it by the appraisal price, I sell the house. That's why my property is worth 1,500 million pesos” (Redacción Mi Zona 2013).

Although some residents resisted the pressures, many others finally sold their properties. By 2014, most of the families living in the lowest part of the settlement had sold their properties, and the new owners were demolishing the houses and leaving piles of debris that gave a very grim image to the whole settlement, and according to members of the community, increased their sense of insecurity and the presence of rodents. Figure 6 shows these demolitions as they were denounced in local newspaper articles. However, the representatives of the investment firm, on the contrary, argued that this real estate deal was actually done for the benefit of the community. Piedad Gómez, representing the investment firm, commented to the newspaper *El Espectador* that she had been working in the neighborhoods in the Eastern Hills for many years. At first she was advocating for the improvement of the infrastructure and living conditions. However, she realized that actually many families wanted to sell their plots and move somewhere else. She then started working with her husband, an economist, to find the investors and design the real estate

operation, which allowed the Stratum 1 communities from the Hills to improve by moving to neighborhoods of Stratum 3 in the West (Téllez-Oliveros 2015):

[Then came Edmundo, who is an economist and banker, and he got an investor who paid very well to the inhabitants, sums that neither I, nor the owners dreamed of receiving for their properties. With that money, they were able to acquire houses in neighborhoods like the *Minuto de Dios* and they improve to Stratum 3. Almost all bought houses of two or three stories. We followed them up in their change of lives.]

*Después llegó Edmundo, que es economista y banquero, quien consiguió a un inversionista, que les pagó muy bien a los habitantes, sumas que ni yo ni los poseedores soñaron con recibir por su predio. Con ese dinero pudieron adquirir casas en barrios como el Minuto de Dios y pasaron a estrato tres. Casi todos compraron casas de dos o tres pisos. Nosotros hicimos ese seguimiento de su cambio de vida.*

In a response to the risk of displacement facing residents in Los Olivos, in 2015 the left-leaning mayoral administration of Gustavo Petro (2012-2015) declared Los Olivos an area of urban renewal under the Colombian Law of Urban Planning of 1997 (Ley 388). Under this law, assuming an agreement is reached with at least 51 percent of landowners; such a designation provides the local government with the first option to purchase houses to implement an urban renewal plan—called *Plan Parcial de Renovación Urbana* (PPRU). A PPRU bestows the municipality with the power of eminent domain to take the properties of those who refuse to sell. Following the designation of Los Olivos as a PPRU, the city of Bogotá used eminent domain to expropriate the parcels that the investment firm had already acquired and made offers to the remaining residents to acquire their houses. The city's intention was to encourage current residents to remain in the community, using the PPRU to provide them with new apartments in exchange for their houses in a new, socially mixed housing development classified as strata 3 and 4.





Figure 5: Panorama of Chapinero Alto

Source: Photo taken by the author



Figure 6: Demolitions in Los Olivos

Source: El Espectador (Hernández-Osorio 2015)

However, residents for the most part responded negatively to the city's purchase offers, since the threat of expropriation meant that they could still be displaced, albeit by the state instead of developers. As a current resident of Los Olivos complained in an interview with the newspaper *El Tiempo*:

[A developer with a land trust was going to pay us four and five million per square meter, and now Metrovivienda (Public land bank) is paying us 350.000 pesos and less for the same area ... You can't imagine how abused and powerless we feel. Even with my land title, now my house is not mine anymore. That a state institution (Metrovivienda) is going to expropriate our houses, is astonishing.]

*Un señor privado con una fiduciaria nos estaba pagando cuatro y cinco millones de pesos el metro cuadrado y ahora apareció Metrovivienda y el alcalde y nos están pagando 350.000 pesos y menos el metro [...] No se imagina el abuso y la impotencia de saber que la casa ya con escrituras no es mía sino de un ente que abusivamente va a expropiarnos nuestras casas, es impresionante*

The expropriations that took place in Los Olivos eventually led to a series of lawsuits that put a freeze on land transactions in the neighborhood. Developers sued the city government, arguing that Los Olivos was in fact located outside the area targeted for urban renewal by the SDP. The area could therefore not legally be set aside for a PPRU, rendering the expropriation of properties illegal. In response, the city filed suit against the developers, arguing that they had used threats and violence to facilitate their property buyouts in the 2000s and 2010s. By the end of 2015, however, Petro finished his term and it is still not known what approach the centrist mayor of Bogotá, Enrique Peñalosa (2016-2019) who comes back after a first term between 1998 and 2000, will take on this issue.

The stories of Cedritos and Los Olivos illustrate the different social and spatial conflicts brought by densification in Bogotá. They also show how the Stratification policy becomes a principal driver behind the discourse of densification used by the private sector. In Cedritos, developers used the Stratum 4 discourse to consolidate the image of the

neighborhood as a middle class enclave, where the population has a high level of education and land uses were primarily residential, while still the area preserves some degree of affordability. This social discourse was developed by the private sector at the margins of any public sector process of planning, and thus did not foresee or prevent the burdens that densification puts on the existing urban infrastructure, which is very precarious. At the end of the day, the private agents captured most of the profits from the densification operation, while both the communities and the public sector had to bear the costs.

On the other hand, the process in Los Olivos shows how the private sector also deploys densification as a mechanism of social cleansing mandated by the forces of the real estate market. Instead of focusing on the privileges brought by the potential complementarity of different strata areas, the evidence from the discussion in the media suggests that members of the public view Stratification as a way to legitimize social and spatial segregation. In this way, the general view is that the location of a lower strata neighborhood within a higher strata area is an anomaly, instead of a social opportunity. In this case, densification is used as a tool to “get things back to normal” as it allows the Eastern Hills to become homogeneously high strata and the lower income population to move to areas suited for their income levels, while still reaping some benefits from upgrading from Stratum 2 to Stratum 3. In this case, the private sector, including developers and property owners, reaps the most benefits from the real estate operation, while the city has to bear the costs of increasing social segregation and infrastructure needs.

## **Chapter 3: Growth management, densification, and private sector**

### **DENSIFICATION AND GROWTH MANAGEMENT IN URBAN PLANNING AND DESIGN**

Densification and other theories to shape urban form, such as the garden city or the city beautiful, are part of what scholars in planning identify as normative discourses of good city form. Planning scholars and practitioners have been developing these theories since the early days of planning to face different urban challenges throughout history, such as to preserve rural peripheries, eliminate disease, increase efficiency in transit or reduce pollution. In this section, I will provide a brief history of the evolution of the normative theories of good city form to situate densification among them, explaining the arguments that sustained the re-emergence of this approach, first in the urban design field during the 1970s and then moving on into urban planning.

Since the early days of urban planning in the late nineteenth century, planners have been modeling how cities “ought to be.” The work and proposals of Camillo Sitte (1889) in Austria, and Raymond Unwin (1909) in England are examples of these initial approaches to study the urban form. Sitte and Unwin introduced to urban planning different techniques of field research to sustain their theories. They used criteria such as aesthetics, cultural values, or visual comfort to draft a series of humanistic principles or codes for good urban environments to face the challenges of overcrowd and disease in the core of the industrial metropolises. Collectively these proposals were assimilated into a body of theory known as the normative theories of good city form (Lynch 1981).

Normative ideas of good city form have been always popular among architects, landscape architects and urban designers, however not for urban planning scholars, who currently use other more humanistic schools of theory and practice. Planning theorists often criticize “formalist” approaches to the city, arguing that a reductionist study of form and

aesthetics ignore the complex social, political and economic processes involved in cities, and consequently overlook the outcomes of spatial proposals in terms of social justice. The root of this criticism comes from the revolutionary times of the 1960s. By then, the public had realized that the large-scale urban redevelopment projects led by the CIAM prescriptive urbanism with the objective of “improving” the urban form of cities were displacing minorities and vulnerable communities and promoting social segregation. Because of these contradictions, planning theorists and practitioners moved away from the physical side of cities to find solutions by exploring theories of politics, economy, and sociology (Hall 1988, 334).

Urban planning entered a period of theoretical disciplinary diversity leading to the development of sub-fields such as advocacy, radical and communicative planning. This detachment of planning from the formal considerations to address social challenges in cities led to the introduction of new non-physical planning solutions to social problems, which addressed, among other issues, the enduring problems of concentrated poverty (Wilson 1990) and spatial mismatch<sup>5</sup> (Kain 1968). Examples of these are inclusionary zoning ordinances and the shifting housing policies across the world from direct provision by the state in large-scale housing projects, to rental vouchers or demand-side subsidies for purchasing affordable housing units.

However, the physical side of cities during the 1970s and 1980s continued to follow a sprawled model shaped by highways, gated communities and suburban shopping malls. The persistent problems of concentration of poverty and mismatch, together with the environmental discourse against urban sprawl, revived the inquiries on a normative

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<sup>5</sup> The Spatial Mismatch Theory addressed the challenges to access job opportunities facing impoverished minorities in the inner cities of the United States, leading in part to the movement to suburban areas starting in the 1960s.

approach to a more equitable physical side of urban development. These approaches were proposed from beyond the planning discipline, including from architecture and urban design (Gunder 2011).

By the 1970s, densification became the preferred answer from design practitioners to solve both environmental and social justice problems at the same time. Important architecture and urban design thinkers such as Robert Venturi (born 1925), Aldo Rossi (1931-1997), Christopher Alexander (born 1936) and Leon Krier (born 1946), grounded these approaches within a body of theory in architecture that opposed the Modernist Movement, a theory that had dominated planning practice during the mid-century. They formed a new discourse, epitomized as Postmodernist Architecture by Venturi in his book “Complexity and Contradiction in Architecture” (1966). This started as a re-examination of traditional European city morphologies and architecture from before the twentieth century. They proposed that elements of the pre-industrial city, such as buildings with medium heights, continuous facades in the block fronts, pedestrian friendly environments, street vitality and cultural landmarks were key to improving the community life in cities, destroyed during the twentieth century by CIAM urbanism and the increasing suburban sprawl in form of auto-centric development.

Their propositions echoed a renewed interest in Jane Jacobs’s influential book, “The death and life of great American cities,” (1961) which advocated for increasing street vitality in neighborhoods using urban design strategies such as improving sidewalks, incentivizing the mixed-use of buildings, and bringing more transparency to facades. An example of the current revitalized concern with these propositions is an emerging branch of empirical research that aims to prove the efficiency of these ideas (Sharifi and Murayama 2013; Sung, Lee, and Cheon 2015; King 2013).

Ultimately, the combination of the normative theories of Jacobs about street vitality and the proposals of dense urban forms coming from postmodernist architects became the theoretical basis of influential urban planning and design movements emerging in the 1980s (Smyth 1996, 88). One of the best known of these movements, which called for dense and compact urban design with neo-traditionalist characteristics, is the New Urbanism movement, formed in the United States around the 1990s. New urbanists argue that a dense city performs better environmentally than the sprawling suburbs and therefore is more sustainable: “the ecological footprint and environmental impacts of cities are larger than suburban sprawl per acre, but smaller per capita; and the benefits of cities with a grid/network are even greater than non-gridded, fragmented ones” (Talen and Duany 2013, 59).

Densification policies also have also the support of a branch of economists and environmentalists. The economic rationale of densification policies is that they will discourage the use of cars (P. Newman and Kenworthy 1989), save rural land, and use land and resources more efficiently, issues working towards a sustainable urban growth. It is assumed that the negative outcomes that come from densification in the local context are outweighed by the positive impacts at the global environmental scale (Evans 2004, 41). Further, on the housing market side, limiting densification with height restrictions may also mandate more expensive forms of housing. For instance, Mangin (2014) claims that the introduction of height restrictions are often results of “not in my backyard” attitudes in consolidated neighborhoods. This restrictions in practice turn cities into preserves for the wealthy, a phenomena that he refers to as a New Exclusionary Zoning.

As a result, since the 1980s, the density and compactness of the urban form discourse conjoined rapidly in architecture and urban design, supported in turn by both

economists and environmentalists. These joining of forces eventually ended in an international consensus regarding a new normative ideal of a city, one that should be dense to manage growth efficiently and become sustainable. An example of this new consensus is the main urban design policy recommendation from the current United Nations Habitat's International Guidelines for Urban and Territorial Planning:

Equally important is clarity in the layout of the buildable blocks and plots, including appropriate compactness and mixed economic use of the built area, in order to reduce mobility needs and service delivery costs per capita. Finally, the design should facilitate the strengthening of the social mix and interaction and the cultural aspects of the city. (UN-Habitat 2015, 3)

According to Chapin (2012), this consensus about the benefits of dense cities saw its early expression in planning through the growth management measures emerging in the United States in the 1960s, including growth control and USB responses to urban sprawl. He argues that the densification discourse was adapted to these growth control policies responding to the idea that planning should encourage a smarter way of urban growth, or "Smart Growth." This movement advocated for growth control policies to transcend regulations concerned only to the urban fringes to encourage also redevelopment and place making using incentives to promote specific urban design features in the city core. Chapin (2012, 10) however, claims that behind these approaches was a change in mentality towards the public sector. Before the 1980s, the power of the public sector to delineate comprehensive plans was supported by the need to protect quality of life's standards in cities, threatened by booming population growths. Nevertheless, in the early 1980s, facing unemployment, economic stagnation, and a fiscal crisis, the public opinion shifted to reject the large public urban planning interventions. The people and the politicians started to perceive the government policies as problems or obstacles for economic development and therefore policy approaches shifted to facilitate the intervention of the private sector. This



led to the rise of “public-private partnerships,” under the idea that these were more efficient to develop infrastructure, housing and redevelopment in cities.

On the other hand, M. Newman (2005) claims that dense development was also introduced to urban planning as a result of its association with the concept of “sustainable growth.” He argues that studies backed by influential institutions such as the American Planning Association, the European Environmental Agency, and the Urban Land Institute promoted the association between sustainability and density. However, he criticizes the theoretical linkages used by these studies, arguing that planning scholarly research have inadequately defined the term “sustainability,” and thus, its association with the physical forms of the city constitutes a fallacy. He argues, by reviewing empirical data, that conceiving the city solely in terms of form is not sufficient to achieve the elusive goals of a sustainable city.

As an alternative, M. Newman claims that an overarching review of the literature suggest sustainability is a concept closer to the terms capacity, fitness, resiliency, diversity and balance. He explains how the performance of these indicators in cities are more dependent in the “processes” to construct cities instead than on the forms. Hereby, he coincides with alternative views of the normative theories of good city form that incorporate values such as culture and site to promote that there are several different views of the “good city form” (Lynch 1981). These theoretical underpinnings have become the basis for a numerous criticism to density and compact city ideas within the practice of urban planning. In the next section, I will summarize some of these ideas.

#### **CRITICISM OF DENSIFICATION POLICIES WITHIN GROWTH MANAGEMENT**

Several planning scholars have criticized the premise that densification in urban growth management will increase social mixing; strengthen a sense of “community;” and

foster interaction between different people. Critics have deployed sociological and economic arguments to demonstrate that densification and compactness policies instead of improving the levels of social equity in cities, mostly produce gentrification, displacement, racism, and increase social segregation. Some of the criticism uses empirical evidence from field research, and some others use theory to both condemn the idea of density as an avenue to social mixing in neighborhoods, and its origins rooted in the architecture and urban design fields.

Specifically regarding the empirical research, scholars challenge the theoretical association between the physical forms of the city and the characteristics of the communities that inhabit them, which grounds the purported social benefits of densification policies. Urban designers argue that through the means of controlling the urban form, planners can incentivize the proximity between different social groups and thus indirectly nurture local economies, tolerance, innovation and equity in the access to services and affordable housing (Calthorpe 2009; Florida 2002; CNU and Talen 1999; Krier 1984). Planning scholars, on the other hand, have proven that the relationship between urban form and social equity is more complex than one-size-fits-all, and density may often paradoxically not contribute to the social side of sustainability.

For instance, Pendall and Carruthers (2003) found that the relationships between income diversity and density levels in the metropolitan areas of the United States are not linear and equal across all the cases. According to the authors, income diversity may depend more on local market forces and political landscapes than on density levels. Talen (2006), King (2013) and Dong & Zhu (2015) found strong relationships between social diversity with neighborhood's age and location, independent of the built form characteristics. Burton (2000) found that in the United Kingdom increasing density

encourages the use of transit and improves the access to services, but it also limits the availability of affordable housing. Researchers in the United States and western Europe argue that the proliferation of New Urbanism ideas of compact city urban form that promote densification processes are encouraging gentrification, and racial or inter-age segregation (Day 2003; González and Lejano 2009; Lees 2003; Skovbro 2002; Venerandi et al. 2014).

Scholars in the global south have also found contradictory relationships between density and social diversity. Studies in Mumbai (Dave 2011) and Santiago (Aquino and Gainza 2014) show that the potential relationship between density and social integration is overshadowed by traditional spatial separation among high and lower class neighborhoods. In the same way, Aguilar and Mateos (2011) proved that in Mexico City each social class occupies separated areas with different densities and urban forms. Therefore, evidence suggests that in the global south incentivizing densification will not necessarily affect the levels of social integration. Further, more recent studies have pointed out how densification in the central areas of Latin American cities have produced gentrification for the cases of Santiago (López-Morales 2016) and Mexico City (Delgadillo 2016).

Other scholars have been undermining the consensus about the benefits of social mixture in neighborhoods brought by density. Fainstein, for instance, argues that diversity is one of the principles of the Just City, however is one that is constrained by scale.

On the metropolitan scale it is appropriate to have places where different social groups can cluster, however, the intermixture of social conditions at the neighborhood scale may, in opposition, create environments of conflict, brought by gentrification, ethnic violence, or intergenerational incompatible lifestyles. (2010, 67)

Other researchers have challenged the simplistic way the concepts of “diversity” and “community” may be used by urban design practitioners to justify densification

policies, often overlooking deeper social and political conflicts within cities (Bell and Hartmann 2007; Brain 2005; Harvey 1997; Talen 1999; Vanderbeek and Irazabal 2007).

Some critics have grounded the conflicts of densification ideologies in their philosophical roots in the disciplines of architecture and urban design. During the second half of the twentieth century, the communicative branches of planning theory, procedural in nature, removed from the planning field the concerns about the urban form. As a result, architecture and urban design, disciplines with different systems of value than planning, started to monopolize the ways in which space was being developed (Gunder 2011; Talen and Ellis 2002). Gunder argues that urban design, for instance, is a field in which practitioners only focus on the economic factors, and have no regard for concepts of both social and environmental equity. He claims that urban designers have legitimate private goals that include economic gain, artistic expression, and professional fame, which are avaricious goals that are not appropriate for professional planning practice or beneficial for the public good (Gunder 2011, 184–85). On the other hand, in his book “Architecture and Utopia” (1976) Tafuri argues that architects as urban designers are functionally integrated into the ideological structure of capitalist enterprise, and therefore, is for them impossible to work against it. As such, the agents of urban development have largely rejected or adapted all of their utopian propositions to other purposes, and as a result, the urban design of the contemporary city is currently going through a “creative” crisis (Koolhaas 1994; Palermo 2014).

The criticism presented in this section addresses how the current connections of both the architecture and urban design fields with the private sector interests may have induced the failure of the present physical planning approaches to cope with the challenges of social justice in cities. This point is of special importance when evaluating planning

policies in Latin America. The next section describes how the characteristics of the region's social segregation patterns have a key role in determining urban growth. As I will explain, these patterns become more important to shape urban growth under the neoliberal urban governance that emerged in the Latin American region since the 1980s.

#### **THE STUDY OF GROWTH PATTERNS IN LATIN AMERICAN CITIES**

According to Almandoz (2006), ideas and practitioners from Western Europe and North America provided the foundation of Latin American urban planning in the early twentieth century, including practitioners of *Urbanisme* in France and *Staedtebau* in the German speaking area (such as Jean-Claude Nicolas Forestier (1861-1930) working in Argentina and Cuba; and Karl Brunner (1887-1960) in Chile and Colombia). The practice that became known as *Urbanismo* is closer to what in the Anglo-American world is called “urban design,” than to planning. However, Almandoz explains that later, from the 1960s onwards, *Urbanismo* changed into a practice closer to the ideas of comprehensive planning and zoning rooted in North American urban planning. As the field changed under the influence of foreign consultants brought from the United States by different international cooperation agencies, it became known as *Planificación*.

Almandoz suggests that this adaptation of foreign models in the practice of planning prevented it from addressing the concerns of the region, such as informal urbanization and socio-spatial inequalities. Consequently, research of local planning practices that critically analyzes the political and economic motivations behind the urban growth patterns is very scarce. Nevertheless, while the Latin American literature has traditionally focused on physical planning issues, scholars from sociology have intensively analyzed the urban growth in relation to the social segregation patterns and provided important lessons for the case of Bogotá.

Paradoxically, most urban sociology scholars studying growth patterns in Latin America write from a perspective that is also rooted in a foreign model, in this case the Chicago school of urban sociology. During the 1920s and 1930s, this school used ethnographic research to understand the patterns of interaction between social and physical structures producing neighborhood change and urban growth. The best known examples of growth theories emerging from this school are the “concentric zone model” proposed by Park, Burgess and McKenzie (1925) and the “sector model” later proposed by Hoyt (1939). For instance, according to Hoyt’s sector model, growth in American cities took form of wedges growing from the center to the periphery following the different transit corridors. The social groups that occupied these wedges were dependent on the valuation or devaluation of land based fundamentally on the land uses. For instance, industries settled along railway corridors or water canals to facilitate trade. However, in the process, the pollution from these industries led to the devaluation of the surrounding areas. Consequently, the working classes moved into these areas finding not only attractive prices, but also proximity to their sources of employment. On the other hand, the middle and higher classes settled farther away, often along transit corridors, to avoid living in polluted industrial areas and in the proximity of the lower-income classes.

The study of Latin American metropolises using the Chicago school perspective started with a seminal paper by Griffin and Ford (1980). Instead of the sector model, they identified the pattern of urban growth in Latin American cities as “polarization,” defined as the spatial separation between the educated elite classes and the majority of low-skilled class groups, both spatially and based on their housing structures. According to Griffin and Ford, these differentiations shaped urban growth in the region. As Figure 7 suggest, cities grew following a spine that grew outwards from the Central Business District (CBD)

located in the old colonial core towards the suburban fringes. This spine contained the major commercial and institutional services of the city. The elites settled close-by and stayed there over generations, enjoying easy access to services and employment. The rest of the city, by contrast, grew concentrically from the CBD, mainly through informal urbanization and unregulated housing construction. Griffin and Ford argued that this unique pattern responded mainly to the absence of professional builders and large-scale financing for housing production aimed for the lower classes. As a result, Latin American rural migrants expanded the city as they needed without state oversight.

The result of this process was that the lower class areas became homogeneous in terms of physical shape, typically following a repetitive pattern of small parcels and self-help houses. Over time, an observer could only differentiate between neighborhoods by the different rate of consolidation of their constructions. For instance, newer houses were made mostly of reclaimed materials, wood, fabrics and zinc, whereas older residents often would have introduced walls made of brick, mortar and cement. Given this, an observer could identify the first inner-ring areas by their better materials and greater heights. Griffin and Ford identified the same pattern in the neighborhood's infrastructural conditions: in the inner areas, all the streets had pavement, sewers, and access to services and urban amenities. By contrast, farther out, neighborhoods were in the midst of some form of consolidation process. Buildings were under constructions, some roads remained unpaved, and often construction materials sat exposed in public space. Finally, the fringes were the least consolidated areas, mainly occupied by squatter settlements built by recent migrants. In these zones, houses were made of waste materials, and the neighborhoods lacked all infrastructure.

Griffin and Ford used the case study of Bogotá as an example of their proposed geographical pattern (Figure 8). They explained how the commercial spine developed in Bogotá along the trolley lines expanding to the suburb of Chapinero. According to their study, elites had been progressively moving northwards along this axis, as the traditional center became an area of social unrest. In addition, the introduction of foreign architectural styles from abroad, such as townhouses of Tudor-revival style during the 1930s, required much larger properties, rare in a city core made up by traditional Spanish colonial courtyard houses. By contrast, people of modest means occupied the outlying areas to the south and west in small single-story self-made houses. In the traditional core, people lived in neighborhoods made up of old colonial houses intertwined with retail and small artisan industries. Griffin and Ford highlighted how these areas have reached stability and experienced little change overtime—particularly when juxtaposed with the outer informal fringes in Bogotá, which during the 1980s were undergoing substantial change.

Explaining this process, Griffin and Ford argued that because of lack of private capital investment, the central areas did not densify. People then responded to this lack of suitable housing offer in the formal market by moving and squatting on the urban fringes. The authors describe how people occupied steep cliffs and swamps, areas otherwise deemed unsuitable for urbanization. Nevertheless, people showed their optimism despite the precariousness of these settlements. They were eager to improve their communities, in the hope of one day becoming fully integrated into the formal city and fulfilling the middle class dream of owning a house in the suburbs.



A GENERALIZED MODEL OF LATIN AMERICAN CITY STRUCTURE

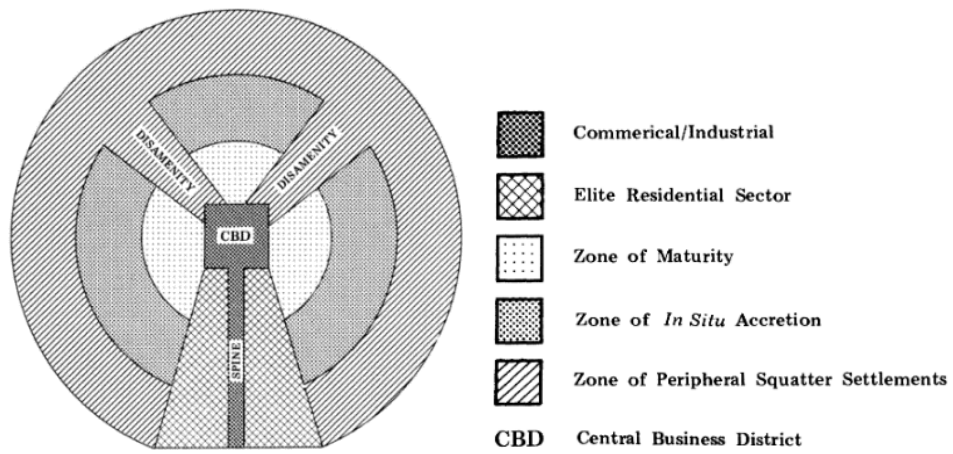


Figure 7: Latin American City Structure diagram

Source: *A Model of Latin American City Structure* (Griffin and Ford 1980)

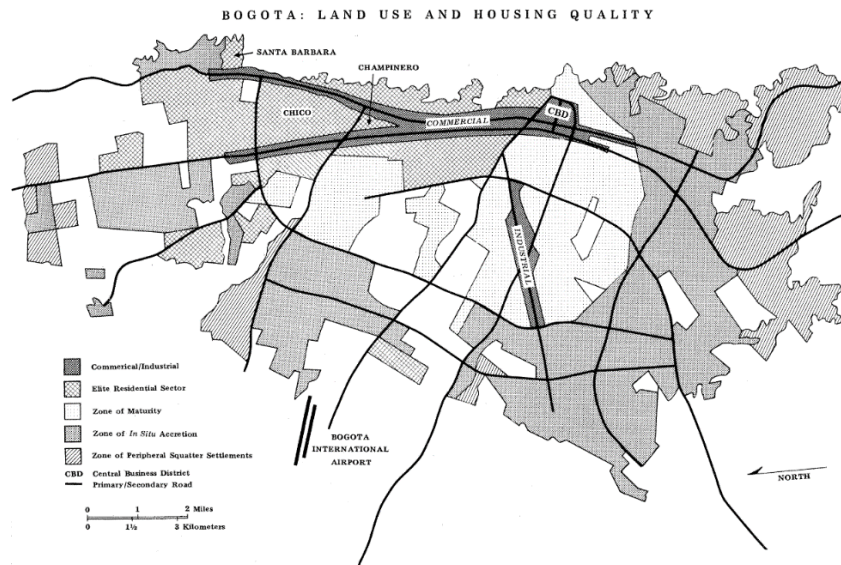


Figure 8: Structure of the city applied to Bogotá

Source: *A Model of Latin American City Structure* (Griffin and Ford 1980)

More recently, however, scholars suggest that polarized urban growth has changed into a pattern called “Fragmentation.” Janoschka (2002) explains that fragmentation define the unique pattern of urban sprawl that Latin American cities experienced since the 1990s, distinguished by the consolidation of urban islands connected by highways in the former mostly rural peripheries. This model resembled the North American sprawl but with a structural difference: while urban islands in the United States are mainly car-oriented middle class enclaves, in Latin America, social groups with different income levels settle isolated from one another *within* these islands. As a result, in the fringes, different urban forms and social groups co-habit. They could be upper-class security enclaves, mass-produced housing for the lower classes, or isolated squatter settlements. Some of them are located in close proximity to one to another, but frequently with limited morphological and functional connectivity. There are many examples of scholars that identify and analyze this same pattern across the region. Caldeira (1996) and Irazábal (2006), suggest that in Brazil examples of fragmentation are the recent sprawling gated communities in the periphery of Sao Paulo and Curitiba. Schapira and Pineda (2008) identify fragmentation in the new developments at the fringes of Buenos Aires; while Borsdorf, Hidalgo and Sánchez (2007) recognize it in the peripheries of Santiago and Valparaiso. Santana-Rivas (2013) and Otálora-Moya (2014) have also recognized this same pattern of islands of wealth and poverty in the savanna of Bogotá.

Other papers aim to offer explanations to the phenomenon of fragmentation in the region. Caldeira and Holston (2005) explain that fragmentation in Brazil was the result of the loosening of state control over land-use and urban morphology. They recount the experience of the Brazilian planning framework in its transition from a modernist to a neoliberal paradigm. In the past, top-down urban development shaped major urban areas

like Brasilia, using the centralized power and resources of an authoritarian government. Currently, however, states have retreated from direct intervention in city development, allowing private developers to control both the location and physical features of new settlements.

Thibert and Osorio (2014) (citing Roberts (2005) and Borsdorf and Hidalgo (2010)) propose a comprehensive set of explanations for the fragmentation process from a political-economic perspective. They explain that between the 1950s and 1970s, national governments in Latin America imposed the Import Substitution Industrialization system (ISI), an economic model focused on the replacement of imported goods with domestic production. According to the authors, this economic model was the main cause of the pattern of polarization in the Latin American cities, as it perpetuated the monopolistic practices of large landowners and industries or authoritarian governments controlled by elites. However, they argue that the widespread neoliberal reforms during the 1990s changed the social and spatial structure of the urban regions. During ISI, the closed economy guaranteed the social status of the elites and their physical location; but during the 1980s and 1990s, the reforms opened the door to global capital to invest in real estate and infrastructure development. As a result, these new policies triggered different changes and spatial transformations: Firstly, land markets were deregulated. During ISI, the control over the rural areas surrounding cities was tight, as government officials or powerful families—owners of large tracts of land in the peripheries—restrained any development that would put their social status in jeopardy. Neoliberalism loosened the control of both the oligarchy and state over rural lands, and consequently, unleashed massive speculation and development pressures on the urban fringes.

The second change that Thibert and Osorio mention was the increasing inequality that came with the flexibilization of labor markets. While this change allowed economic growth to become more dynamic, it also put unfamiliar pressures over the middle classes. People suddenly faced much more precarious employment stability, which further reduced their access to mortgages. As a result, rising property values displaced households from the city center. They relocated further out, often to areas still without proper urban services. Finally, the third change was the construction of highways around the core of many cities. Municipalities with more available capital invested primarily in private automobile transit infrastructure, mainly to emulate the urban policy focus and ways of life of North American cities. These investments have increased greatly the accessibility and value of former marginal areas in the urban peripheries.

Thibert and Osorio explore three spatial trends that have resulted from fragmentation. First, the suburbanization of the elites, and increasingly the middle classes, has altered the traditional division between the core and the periphery, rooted in the polarization period. Second, the increase in the physical proximity of the elites and the lower income groups, as developers build new residential projects in the center and in the periphery in close proximity to traditionally poorer areas. Third, the increase in restricted-entry areas, a byproduct of the fortification of the new high-end settlements in proximity with poorer areas.

Whether the outcomes of these fragmentation processes are beneficial or harmful to Latin American societies divide scholars. Some argue that this recent transformations have hindered the social conditions of the urban poor. For instance, researchers in the 1960s and 1970s found in the shantytowns of Latin America a community with strong social ties and solidarity advancing itself through mutual aid (Gilbert and Ward 1985; Perlman 1976;

Turner 1976). Nevertheless, when some scholars revisited the same informal settlements, forty years later, they observed ubiquitous violence, social immobility, and persistent segregation (de la Rocha 2001; Eckstein 1990; Perlman 2010; Roberts 2011). Conversely, other researchers, specifically in the Chilean case, claim that the new proximity of high-income groups to low income groups may also have brought unexpected benefits. Sabatini and Brain (2008) and Rasse (2015) claim that the colonization by the middle class of formerly impoverished ghettos in Santiago may be improving the conditions of those groups in poverty. They argue that for the urban poor, it is not enough to be property-owners: they also need to be surrounded by a safe, diverse, and inclusive urban environment, an outcome that fragmentation is able to provide. Salcedo (2010), for instance, followed the struggle of a squatter community in “La Toma de Peñalolen,” in eastern Santiago, to avoid relocation to new houses in the periphery. Middle class communities currently surround their informal settlement once located in the fringes of the city, which brings them employment opportunities and better urban services. They succeeded in modifying the relocation project to stay in place, building a case model for a new approach to low-income housing policy in Chile. This Chilean group of scholars has criticized the consolidation of poverty ghettos in the periphery, a result of the neoliberalization of low-income housing policy. Instead, they have been introducing to Latin American housing research concepts such as mixed-income areas.

These new models have empirically demonstrated that proximity between social classes may foster networks of mutual benefit. In the Bogotá case, scholars have explored the effects of improved transit systems in the patterns of fragmentation. Bocarejo et al. (2016) conducted a study to evaluate if the new infrastructure implemented for the BRT had disturbed the traditional segregation patterns of the city. They found no evidence up to

2005 that the implementation of the transit system had made the central areas of Bogotá more fragmented. However, they found some evidence that social fragmentation increased in the peripheral areas served by local feeder routes.

While the bodies of literature that deal with polarization and fragmentation explain in detail the patterns, social consequences, opportunities, and political and economic causes of these phenomena, they do little to explain how polarization and fragmentation has been operationalized through the specific urban planning policies. Therefore, I incorporated to my review a set of research from the public policy perspective. This branch of literature, discussed in the next section, studies the interaction, interests and power relations between the public and private sector in developing urban policy.

#### **THE POWERFUL ROLE OF THE PRIVATE SECTOR IN LATIN AMERICAN PLANNING**

Different scholars have studied the private sector's leading role in Latin American urban planning policy. In this section, I am highlighting the contribution of Koch (2015), who coined the term "Arranged Urbanism" defined as the "infiltration of formal institutions through informal practices and the exertion of different types of power." Koch applies this definition to the private construction companies and large owners of properties influencing urban planning policy in cities. These practices are unwritten and hence informal, but they strongly shape the behavior of public officials and are therefore very controversial. Koch quotes Mac Leod and Jones (2011) to explain these contradictions, arguing that in Latin America informality is tolerated within powerful private sector groups, but it is criminalized when it occurs within vulnerable communities such as informal settlements.

Koch's Arranged Urbanism also fits within the literature that deals with the conflicts of weak or corrupt public institutions within neoliberal governance in Latin

American cities. Nuissi et al. (2012) studying the case of public-private partnerships in Chile, argue that one of the challenges of governments in the region is the primarily weak position of both local and regional authorities in face of powerful interest coalitions. This weak position of the institutions lead to different patterns of public policy tailored by the private sector. These behavior have been identified across the interventions of the public policy in different fields and typified by Levitsky and Helmke (2006) in the Mexican case, as “dedazo,” clintelism in Brazil, legislative ghost coalitions in Ecuador, and elite power-sharing in Chile.

Using the specific case of Barranquilla, Colombia, Koch describes how the private sector’s control of public policy under neoliberal governance shapes the urban form and thus becomes a type of “Urbanism.” He used the implementation of the *Plan de Ordenamiento Territorial* (POT) [territorial ordering plan] of 2000. His research found that authorities delineated this plan through informal recommendations from construction companies, mostly because of the absence of qualified professionals in the city. The result of this has been the development of a fragmentary built form, in direct contradiction with the initial ideology and goals of the plan presented to the public. Physically, this led to the development of socially selective walled enclaves and shopping malls in unplanned areas of the city. These architectural typologies have failed to connect with the existing city and have not created space for parks and other public amenities for the public good. I found another example of Arranged Urbanism in Bogotá, studied in the master’s thesis of Lozano-Triviño (2014). She analyzed the development of gated high-rise communities during the 2000s in a large in-fill area in the northwest, and found similar tailored requirements included in the urban regulations that obliged the development of a single architectural type. This type privileged the profit of large-scale construction firms, owners

of the land, but did not contributed to the improvement of the urban public spaces in the city.

The work on fragmentation in Latin American cities Arranged Urbanism under neoliberal urban governance combine to frame my overarching argument. Starting in 1979, models of growth control and densification developed in the United States and Western Europe inspired planning approaches to control urban form in Bogotá. However, as urban sociologists suggest, unique Latin American patterns of social segregation largely shape urban growth, and thus the formal and imported approaches to planning policy fail to address the complexities of the region's urban problems. This may contribute to forms of Arranged Urbanism, as neoliberal governance facilitates the control of urban policy by the interests of the private sector. The combination of growth control and arranged urbanism has produced incremental densification in ways that reflect local patterns of social segregation.



## Chapter 4: Research methods

### DEFINITIONS, RESEARCH QUESTIONS AND METHODS PROPOSED

In my investigation, I explore the relationship between a social equity policy, Stratification, and urban development in Bogotá. More specifically, because Stratification serves to cement patterns of social segregation in Bogotá, it may help explain changes in the built form and the social composition of neighborhoods. Stratification is a national policy that divides the city in six strata zones based on the built form characteristics of neighborhoods at the city block scale. The Colombian authorities developed this system during the 1970s and 1980s to distribute cross-subsidies for infrastructure improvements among people in various income groups, by charging a subsidy on utilities payments.

Incremental densification is traditionally the most common process of redevelopment in the central areas of Bogotá (Rincón-Avellaneda 2004, 86–87). It works through the systematic replacement of low-rise row or detached houses with apartment condominiums, a process that responds to upgrades in the land development code. Under this system, city authorities first delineate areas suited for densification using the *tratamientos* system, and then private developers are encouraged to redevelop, for profit, properties in those areas in order to increase the population densities inside the city. However, private developers exercise a lot of control over the densification process, because they are free to choose the location of projects within the *tratamientos*.

I developed a set of graphs to explain the complex articulations of planning, socio-spatial segregation patterns, and private sector interest and actions. First, the diagram in the top of Figure 9 represents the “Sprawled City” which is the model of development that distinguished United States’ cities during the twentieth century and that was put into place in Bogotá between the 1940s and the 1970s. This model is based on the private sector

determining the growth patterns and the urban form. Later on, based on the private sector's initiatives, the public sector sets land-use and density limits. In this case, the free market appraises the land based on its location in relation to infrastructure, environmental and social assets, and for-profit-developers determine the morphological characteristics of the city according to their own prediction of market demands. Codes incentivize economic development in the real estate industry in order to increase taxation for the city. The sprawled model, however, relies heavily on the fair competition between developers that offer a sufficient supply of housing products, and citizens' demands, rationality, and "freedom to choose." However, some in the United States argue that the sprawled model became unsustainable, in part because access to housing is limited by an individual's capacity to spend what the market demands, and because the model incentivizes the consumption of land and resources to expand the urban infrastructure.

Figure 9-bottom represents the European alternative to the sprawled city, which was partially implemented in Bogotá prior to the 1940s, and then again after the 1980s as a way to preserve the natural environment from urbanization and reduce socio-spatial segregation. I named this model of growth the "Compact City." The compact city requires an inverse process from that of the sprawled city. In compact cities, the public sector produces a normative image of a city that controls expansion and uses resources more efficiently. The private sector develops the city in compliance with the public sector through stringent planning regulations and incentives. The most commonly used regulation are growth control measures, such as Urban Services Boundaries (USB), incremental densification policies, form-based codes or public-private partnerships. The private or public sector intervenes to accommodate new residents in the city by densifying the centrally located areas or transit oriented developments.

## SPRAWLED CITY

### Private Sector

*Growth patterns,  
urban form  
& buildings*

### Public Sector

*Land-use &  
density norms*



## COMPACT CITY

### Public Sector

*Growth limits,  
land-use, &  
urban form  
norms*

### Private Sector

*Buildings*

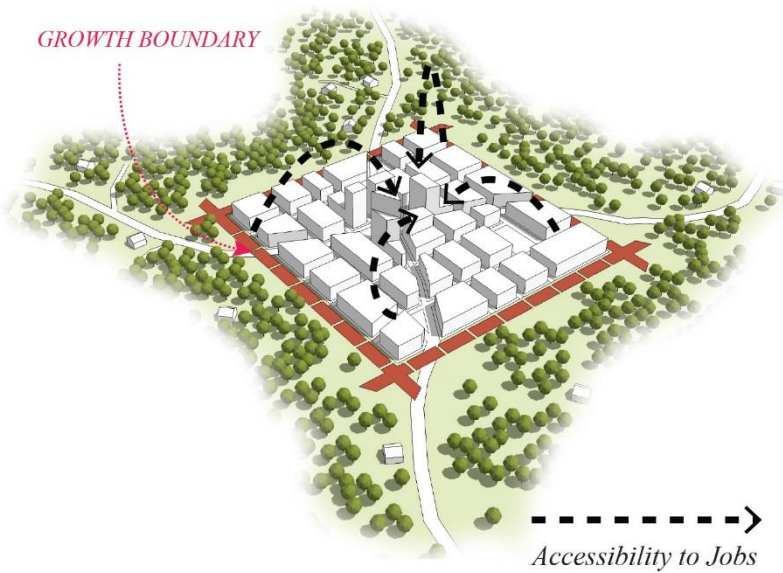


Figure 9: Diagrams explaining the Sprawled and Compact city.

Illustration by the author.

This allows for the implementation of energy-efficient transit systems, making air cleaner and people healthier as they reduce the distances travelled by private vehicles and incentivize walking and biking. Some argue that this form also increases social equity, incentivizing the interaction of different social groups by compelling them to live in proximity.

However, growing cities with stark social inequalities and local governments prone to cooptation by private sector interests face challenges that neither the United States nor the European model predicts. For instance, as Figure 10 suggests, in the “Uneven City” the public sector may attempt to establish a growth boundary to decrease the supply of land and incentivize densification; however, facing booming population growth and stark private forces, the public sector is unable to control urban development. As a response, the private sector set its own growth patterns informally at the margin of public sector control. These growth patterns are moderated by social class differences, determining urban forms and land uses.

As a result, peripheral developments often either take the form of gated communities for the wealthy, or substandard, illegal settlements for the very poor. In the central city, densification is uneven; it can take the form of multi-family luxury condominiums for the wealthy or incremental self-help housing for the very poor. This causes urban development to become ungovernable and unpredictable. Therefore, planners in the uneven city are unable to predict the location, amount, or form of housing or economic opportunities. They are therefore unable to predict and provide needed infrastructure and as a result, life quality decreases.

## UNEVEN CITY

**Public Sector**

*Growth limits*

**Private Sector**

*Growth patterns*

**Social Class**

*Land-use &  
urban form  
norms*

**Private Sector**

*Buildings*

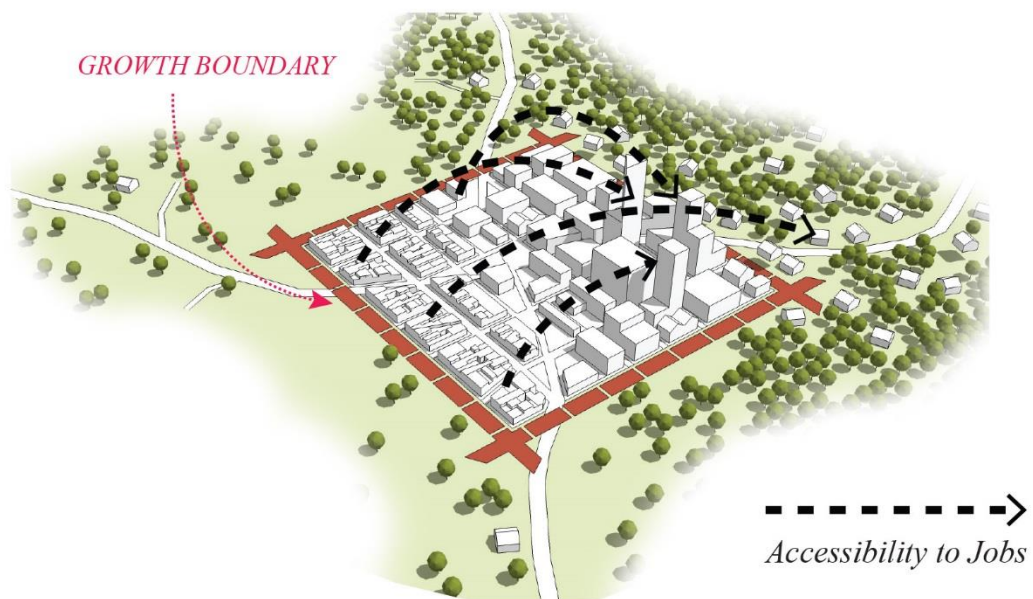
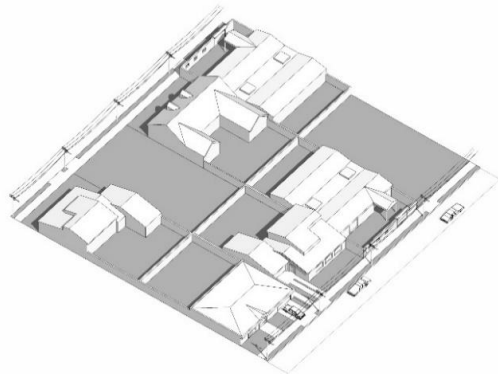


Figure 10: Diagram explaining the case of Bogotá.

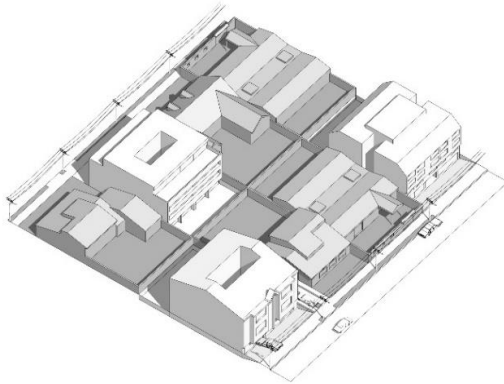
Illustration by the author.

At the neighborhood scale, such biased land markets reproduce inequalities in the built form as illustrated in Figure 11 and Figure 12. Following what I observed in the case of Bogotá, the evolution of the urban form is different between higher- and lower-income neighborhoods. Figure 11 follows the historical evolution of an archetypical high-income block, classified as stratum 4, 5, or 6. While the plots start as suburban housing, the successive upgrades in the land development code transform them first to mid-rise condominiums and later into high-rises. This evolution does not respond to an overarching policy objective but rather to a real estate rationale based on the maximization of profit. In this case, authorities upgrade or restrict the code based on the influences of landowners and developers that are seeking to maximize their returns at any specific point of time. These controls incentivize monopolistic practices in real estate by restricting the supply of land deemed for densification.

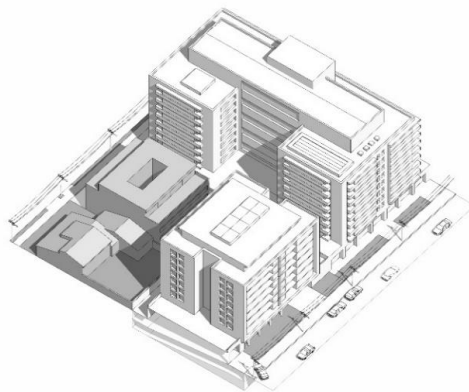
On the other hand, Figure 12 represents the historical evolution of a lower-income block, classified as stratum 1, 2 or 3. In this case, facing the unavailability of resources, zoning codes are manipulated to remain flexible. While in expansion areas this flexibility allows the production of housing through “sweat equity” that is very affordable, in the consolidated areas the freedom to build anything facilitates the action of slum lords that produce poor living conditions and overcrowd, leading to neighborhood decay, vacancy, and the invasion of unwanted land uses. Alternatively, these processes lead to speculation with land prices and gentrification in well-located areas.



1. In Bogotá, during the 1960s, according to the zoning plans of the 1940s and 1960s, the areas in the north were initially built as high-income single-family homes.



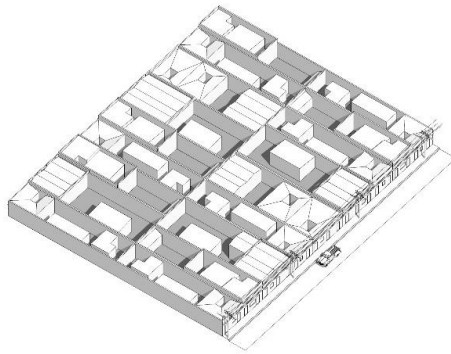
2. The regulations of the 1990s allowed moderate densification to turn single-family houses into multifamily mid-rise condominiums



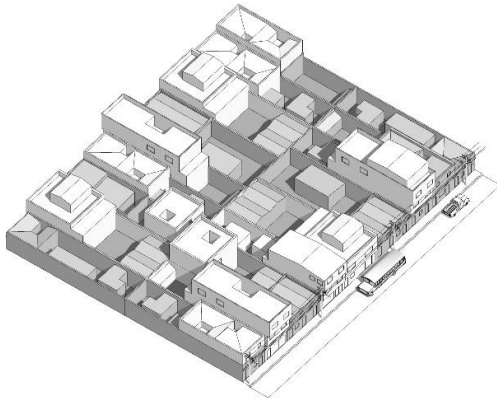
3. Zoning regulations in the 2000s further allowed more densification in already consolidated properties to maximize profits from land markets.

Figure 11: Densification pattern for areas of high income in Bogotá

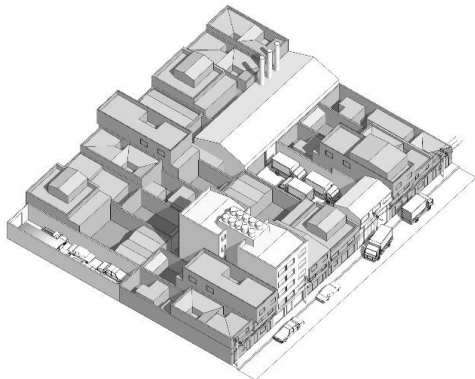




1. The ordinances of the 1940s and 1960s delineated working-class neighborhoods with high densities, minimum lot sizes, and poor infrastructure standards.



2. The areas soon were densified through self-help expansion of the houses and changes of use in the face of height limitations and little oversight from the municipality.



3. Currently, neighborhoods are experiencing further densification and/or decay. Some are experiencing built-form transformations from invading commercial or light industry land uses.

Figure 12: Densification pattern for areas of low income in Bogotá



With these definitions in mind, my hypothesis is that Bogotá follows the “Uneven City” model. Specifically, the Stratification policy not only embodies and reproduces the system of socio-spatial segregation: Stratification also influences the decision-making of private sector developers and therefore serves to shape the incremental densification patterns in Bogotá. To study this phenomenon, I set out to address the overarching question, *Does urban densification in Bogotá relates to the policy of Stratification?* To answer this question, I proposed the following research objectives:

- 1) Determine if a relationship exists between incremental densification and Stratification.
- 2) Identify the consequences of this relationship in terms of spatial disparities in the production of new areas of housing and nonresidential use.
- 3) Identify the consequences of this relationship in terms of socio-spatial segregation.
- 4) Explore the mechanisms that facilitate this relationship.

In order to answer the proposed research questions I used a “convergent parallel mixed methods” approach. Creswell defines this method in the following way:

Convergent parallel mixed methods is a form of mixed methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design, the investigator typically collects both forms of data at roughly the same time and then integrates the information in the interpretation of the overall results. Contradictions or incongruent findings are explained or further probed in this design. (2013, 46)

I believe this approach to mixed methods design was most appropriate to address the research problem, as it calls for a combination of both quantitative and qualitative data to explore the findings from different sources. As I learned during my preliminary interviews, the location of incremental densification projects in Bogotá depends on

quantifiable variables such as the location of the project in relation to the physical features of the lot, the neighborhood, and the accessibility to transportation systems. However, it also depends on qualitative phenomena such as the historical development of the local zoning ordinances and the social perceptions about the site, which deeply influence the local housing market.

For these reasons, in order to address my first two research objectives “1) determine if a relationship exists between incremental densification and Stratification;” and “2) identify the consequences of this relationship in terms of spatial disparities in the production of new areas of housing and nonresidential land-use” I used quantitative methods. Specifically, I based my analysis on the data of building permits granted in the period 2010 to 2015 in Bogotá compiled by the Direction of Information, Cartography, and Statistics at the SDP. This database includes information about each permit’s location, date, and the approved use, height, and total area.

To address my third research objective, to “identify the consequences of this relationship in terms of socio-spatial segregation,” I relied on quantitative socio-economic data from the multipurpose surveys that the DANE conducts every seven years. Finally, to meet my fourth objective to explore the mechanisms that facilitate the relationship between incremental densification and Stratification, I relied on qualitative data. First, in order to get the perspectives of agents of urban development, during the summer of 2016 I conducted and recorded thirteen anonymous in-depth interviews. Second, I reviewed the comprehensive city plans that were approved since 1979, the Stratification regulations, and other historical planning documents and local literature.

## **THE MIXED-METHODS APPROACH IN URBAN PLANNING RESEARCH**

Planners have borrowed research methods from many disciplines (Dandekar 1986, 42). They use research approaches to obtain information to advance the field both in theory and in praxis. Creswell defines research approaches as “plans and the procedures for research that span the steps from broad assumptions to detail methods of data collection, analysis and interpretation” (2013, 33). Scholars define them as quantitative or qualitative in nature; however, some have been suggesting a third approach called mixed methods. In planning and other disciplines, the concept of mixed methods challenges the idea that quantitative and qualitative methods are mutually exclusive and a researcher must choose to use only one of the approaches in a project. Creswell, for instance, claims that quantitative and qualitative methods are the two extremes of a continuum on which mixed methods stands in the middle (2013, 34).

This idea that mixed methods holds the middle ground is recent. It was only in the late twentieth century that methodologists accepted the mixed methods approach as a valid type of research. According to Friedmann, the planning field was born during the eighteenth century from the concept that scientifically based knowledge could be applied for society’s improvement (1987, 51). In the early twentieth century, this concept enjoyed remarkable success with Taylor’s theories of scientific management, which attracted even the most radical to observe society as a large workshop and planning as a form of social engineering (1987, 56). However, in planning as in many other fields, the social revolutions of the 1960s led to the recognition of methods that previously had been considered unscientific, invalid, and inconsistent. For instance, Davidoff (1965) made the discipline recognize that there are different groups in society with different needs that may result in different ways of planning. At the time, Altshuler (1965) also advocated that planners

recognize their own limitations that were affecting their pursuit and conception of “the common good.” In response, qualitative methods became well suited to account for these different social dimensions and planners’ limitations and egalitarian goals (Silverman 2015). Consequently, these new theoretical underpinnings and the revived interest in qualitative methods, as well as other forms of planning, such as advocacy, radical, and communicative planning emerged, and shifted the planning discipline from physical-technical plan making, to policy analysis that had a primary concern with social systems. Peter Hall described this sudden shift:

In 1955, the typical newly graduated planner was at the drawing board, producing a diagram of desired land uses; in 1965, s/he was analyzing computer output of traffic patterns; in 1975, the same person was talking late into the night with community groups, in an attempt to organize against hostile forces in the world outside (1988, 334).

Johnson and Onwuegbuzie (2004) claim that a new revolution in research methods is currently underway. The mixed methods approach is gaining in popularity as a framework that incorporates the strengths of both quantitative and qualitative designs. More importantly, it allows researchers to select different approaches “with respect to the underlying research questions, rather than with regard to some preconceived biases about which research paradigm should have hegemony in social science research” (2004, 23–24).

Dandekar (1986) argues that planners often have misconceptions about the relationship between quantitative and qualitative research approaches. The first is that the use of one excludes the use of the other, and that a planner has to choose between becoming either a quantitative or a qualitative researcher. Dandekar opines that there is no reason that both approaches should be mutually exclusive, but rather they are complementary. He points out that the decision to choose one approach or the other should be based on the reasons for collecting information. If a planner wants to claim that his data is representative

of a population, s/he must choose a quantitative approach. If, on the contrary, s/he wants to gain understanding of a process and how that process is connected to a system, a qualitative approach would be more suitable.

In this case, following Dandekar's ideas, I am using the mixed methods approach because I want to understand the process of densification in Bogotá and connect it to local patterns of socio-spatial segregation. However, in order to increase the validity of these claims, I must also use quantitative data to show the patterns and their effects in space. This use of mixed methods research also has the advantage of protecting the investigation against the pitfalls of using quantitative or qualitative methods only, which I will address next.

Scholars, especially after the 1950s, have identified multiple pitfalls to quantitative research. Quantitative research has been defined as an approach that tests objective theories by examining the relationships among variables. These variables should be measured numerically in order to be analyzed through statistical procedures. The analysis is performed in a deductive manner to gather specific conclusions from more general data. Quantitative researchers set up their studies to avoid biases to the greatest extent possible. They use strategies to ensure the validity and reliability of the procedures and thereby protect the integrity of the research and control for alternative explanations. Research is required to be specific enough to allow for the replicability and generalizability of results. Traditional quantitative research methods include surveys and experiments (Creswell 2013).

Although quantitative analysis was designed to be objective and protect against biases, it does not always do so. Krenz and Sax (1986) critiqued the assumption that quantitative methods are always objective, since the intrinsic biases in researchers'

preconceptions always influence the results of an experiment. The usual example of this problem is the racist biases that commonly influenced quantitative research done before the 1960s. Krenz and Sax's second critique was that quantitative experiments are unable to yield truth. The post-positivist principle that there are no absolute truths leads to a situation in which quantitative experiments may be used just to determine evidence for either rejecting or not rejecting a hypothesis. Therefore, through a quantitative approach science cannot advance on solid ground to build theory.

Krenz and Sax point out several additional issues that they perceive as failures of the quantitative approach. Firstly, they claim that too often quantitative analysis is poorly done. A researcher can control mathematically the results of an experiment, for instance by increasing the universe of individuals included, or by asking trivial questions just for the sake of gaining statistical significance. This is a problem, because through these methods a researcher can influence the results of an experiment. Secondly, they argue that quantitative researchers poorly understood causality. Often researchers using such methods are unable to distinguish complex relationships. The authors provide the following example: for many years medieval physicians believed that malaria was caused by bad air in the lowlands, and that therefore individuals that built in the hilltops were immune to the disease. With the discovery of the parasite that caused malaria and its transmission by the *Anopheles* mosquito the true cause of the disease was uncovered. However, contemporary scientists know that is not only the presence of the mosquito that triggers a malaria epidemic; there is also a set of social and economic conditions that facilitate the transmission of the disease; for instance, improper sewage systems or bad cleaning habits in residential areas. Krenz and Sax attribute misconceptions like those stated to the

“infrequency with which [quantitative] researchers think about important epistemological issues” (1986, 67).

On the other hand, qualitative research also has been the focus of scholarly critique. In qualitative research, investigators seek to understand the meanings that individuals and groups ascribe to human issues and problems. The process of research involves an inductive analysis through which more general patterns are observed in specific data, and it is best employed in the analysis of emerging or past questions and procedures. It focuses on the meaning of a situation in order to render its complexity. Qualitative methods include narrative research, grounded theory, ethnographies, and case studies (Creswell 2013).

Dandekar (1986) advocated for employing more qualitative research in planning. He claimed that it offers planning researchers advantages over quantitative methods in that qualitative research can be effective when data sets are scarce. Planning, as an action-oriented discipline, needs methods that are scientific, but it often does not allow the time and resources to gather quantitative data sets that are specific enough to be used in all situations. Such situations include research in remote communities where there is no available complete or up-to-date information about the conditions of the population or about the built environment. In addition, databases might not contain the particular qualitative factors, such as values, biases, attitudes, and historical, political, or cultural precedents that are needed to understand a problem. Finally, as in research in the humanities, planners have to take into account that public agencies might not adequately collect data or informants might not provide accurate information about the conditions they experience.

The case of Stratification in Bogotá provides a good example of how a single approach using only either quantitative or qualitative methods may mislead an

investigation. Many local research projects use the strata as a proxy for the income levels of city residents, employing this indicator for analysis in different fields. These analyses infer that population characteristics are different between each of the six strata. However, they overlook the fact that the Stratification indicator is not constructed with income information, but rather it is based on the physical form of the city. In this investigation, I found that the education levels of the population are very similar within strata 1 and 2—in which residents have mostly elementary or high school only—and within strata 4, 5, and 6—where most residents are college educated. This renders the separation into six levels arbitrary. It is evident then, that complex social perceptions among city residents and officials play a strong role in this system and they must not be disregarded. Even though the strata do not account for levels of income or education, every Bogotano perceives that these variables are associated with the place one lives, and therefore the Stratification indicator is present in every viewpoint, decision, or evaluation that city residents conduct in their everyday lives. This point is proven in the common use of expressions such as, *¡Se le salió el estrato!* [Your stratum was revealed!], which describes when a person behaved in a way that is associated with a lower education or income level to which s/he belongs. Alternatively, we say, *Se cree de mejor estrato* [S/he believes herself/himself of a better stratum], when a person behaves in a manner associated with a higher income/education s/he has. We also inquire about the stratum of a place when we visit a site and are delighted or annoyed by its aesthetic qualities, and when we aim to live and attend sites with people of the same stratum as ours.

In addition, it is common for people to look for a partner of “the same stratum” and to feel awkward about being friends or going to school with people living in a lower stratum. This does not mean that people of different strata do not interact with each other,



but that the Stratification system is important for the people because it represents the differences of income, education level, and cultural background in a single indicator. This shows how perceived social class is something very important for the Bogotanos. These contradictions support my claim that in order to understand any phenomena, in such a complex context, it is necessary to maintain a critical view. I believe cross validating both the quantitative and qualitative evidence helps in this respect

#### **THE QUANTITATIVE AND QUALITATIVE METHODS USED**

As my first step, I gathered quantitative information and triangulated it with initial qualitative findings. In January 2016, I visited the SDP where I met with former colleagues and discussed the best sources of information. They recommended that I use the latest version of the *Mapa de Referencia* [reference map], which was published in December, 2015. This map uses a GIS database compiled by the *Infraestructura de Datos Espaciales del Distrito Capital* (IDECA), and contains vector information on streets, city blocks, parcels, and building footprints for Bogotá, and is publicly available online. I combined this information with that I pulled from the database of building permits from 2010 (provided by the Direction of Information, Cartography and Statistics at the SDP), and used ArcGIS to conduct statistical and spatial analyses and produce my own maps.

To obtain information regarding the social and economic characteristics of the population, beyond that provided by the stratum indicator, and facing the outdated information from the 2005 census, I used the projections of population per block for the year 2011 that were elaborated by the SDP and the DANE. For the social and economic data, I used the multipurpose surveys, *Encuesta Multipropósito* (EM) [multipurpose survey] for the years 2007 and 2014, which I obtained from the DANE website. I performed social segregation assessments using the open-source software Geo-Segregation Analyzer

(Apparicio et al. 2014). Finally, I combined all the information into in a single database and ran an econometric analysis using the software R and ArcGIS. The main limitation of the quantitative data was the short time period for which information was available. To work around this, I triangulated the results of my database analysis with qualitative sources of information.

Consequently, during my second stage of fieldwork during the summer 2016, I gathered qualitative data. I conducted thirteen anonymous in-depth interviews. Four of these were interviews with policy makers working in the management of Stratification and zoning, and in the team working on the new comprehensive plan at the SDP. I conducted another five interviews with urban planning scholars working in different local universities, and one with a locally recognized senior urban planning consultant with more than thirty years of experience. Finally, I conducted three audio-recorded in-depth interviews with developers who work at different scales in the city, and I had several informal conversations with others who declined to give formal interviews.

I used the database of construction permits obtained for the quantitative part to identify which developers were working in different areas of the city, so that I could approach developers working across different strata. Very few of the developer firms contacted responded positively to my phone calls requesting formal interviews. Those persons who responded positively were primarily those working in large construction firms located in the North of the city. The firms involved in projects in the Center and South, mostly small or single person firms, responded negatively to my calls. They said they were not interested in an interview, deliberately delayed our meeting dates, or simply not show up to the appointments we set. As an alternative research strategy, I visited new building

projects and had informal discussions with the persons in charge of showing condominiums to potential customers. In several projects, these were the developers themselves.

The other agents of city development that I interviewed were urban planning professionals with several years of experience who often move between the private sector, the public sector, and academia. In the local context, the differences between these sectors are blurred since the same professionals alternate between jobs in these different sectors. For instance, academics and private consultants in urban planning become public officials when their political party is in power, and they leave office when there is a change in the municipal administration, at which point they go back to work in academia or the private real estate industry. As an example, currently under Mayor Peñalosa's administration, the chair of the SDP is the former head of the private urban planning consulting firm *Contexto Urbano*, and many of the directors appointed in the SDP's departments are former employees of the same firm. In the same way, under the previous administration of leftist Mayor Petro, the head of the SDP was the former chair of the *Instituto de Estudios Urbanos* [Urban Studies Institute] of the National University in Bogotá. When Petro left office, he re-assumed his academic appointment. I contacted the urban planning professionals, academics, or independent consultants by prioritizing those who had worked in the POT or on the local land development codes in each of the *Unidades de Planeación Zonal* [zonal planning units] (UPZs). I also reviewed the academic literature and contacted scholars who had published academic papers about real estate development, zoning, and Stratification in the city.

After conducting the interviews, I transcribed their audio recordings. The consent of the interviews, as required by the Institutional Review Board of The University of Texas at Austin, includes the guarantee that I will not disclose the identity of any of the

interviewees. I will therefore identify them only by their job in either the public sector, the private sector, or academia, and their approximate years of experience in the field. In cases where personal names were mentioned in the interviews, I will represent them only with randomly selected initials. I finally coded the transcripts of the interviews and my notes to identify behavioral patterns and perceptions that explain the information drawn from the quantitative part.

Additionally, in order to complement the interviews, I conducted several field surveys in different parts of the city, documenting with pictures and notes the location of incremental densification projects, their surroundings, and architectural characteristics. These surveys helped me understand the physical changes in neighborhoods introduced by the densification projects. To complement the surveys, I also searched for newspaper articles published during the last fifteen years that addressed social conflicts brought about by development, as well as pieces advertising densification projects.

The primary limitation of the qualitative part was the small number of interviews I was able to conduct with developers. This responded to the sensitivity of the issues addressed and to the difficulties in reaching out to this relatively inaccessible community of individuals. Most of the time developers did not respond to my telephone calls, stood me up in our scheduled meetings, or outright declined to meet. I often got these kind of responses when I visited or called developers: ‘We are busy and working now, call us maybe next week’ or ‘I am out of town now and cannot answer any question.’ Another response I received was: ‘We don’t talk with anyone about our work or this project, we have been visited by people from the municipality, students, the DANE and so forth but we have not talked with anyone. We are acting according to the law’ (Field notes June 2016).

However, most of the time my working hypothesis aligned with the responses I received in the few both formal and informal conversations I had with developers. Therefore, I decided to continue the research with the small sample of conversations, suspecting that I would be able to triangulate their responses with data from other sources. As expected, later I found in the local real estate discourse an important source of information that complemented the developers' perspectives. Consequently, I explored the university libraries in Bogotá for every publication on real estate, appraisals, and the construction industry.

For the historical section, I visited the SDP's library and the main public archives of Bogotá. In these, I reviewed the zoning and land development codes of the city from the years 1944, 1961, 1967, 1979, 1990, and the current land-use and height ordinances approved for the 117 UPZs. I also reviewed the official Stratification regulations and updates from the years 1997, 1999, 2002, 2004, 2007, 2009, and 2013. I provide in Figure 13 a graphic explanation of the methodology I used.

#### **MY POSITIONALITY AS PLANNING PRACTITIONER AND COMMUNITY MEMBER**

My position as a native of Bogotá and a practitioner of both architecture and urban planning in the city brought me into a complex position related to the insider/outsider status that is discussed so much in social science research theory. According to Gair:

The notion of insider/outsider status is understood to mean the degree to which a researcher is located either within or outside a group being researched, because of her or his common lived experience or status as member of that group. (2012, 137)

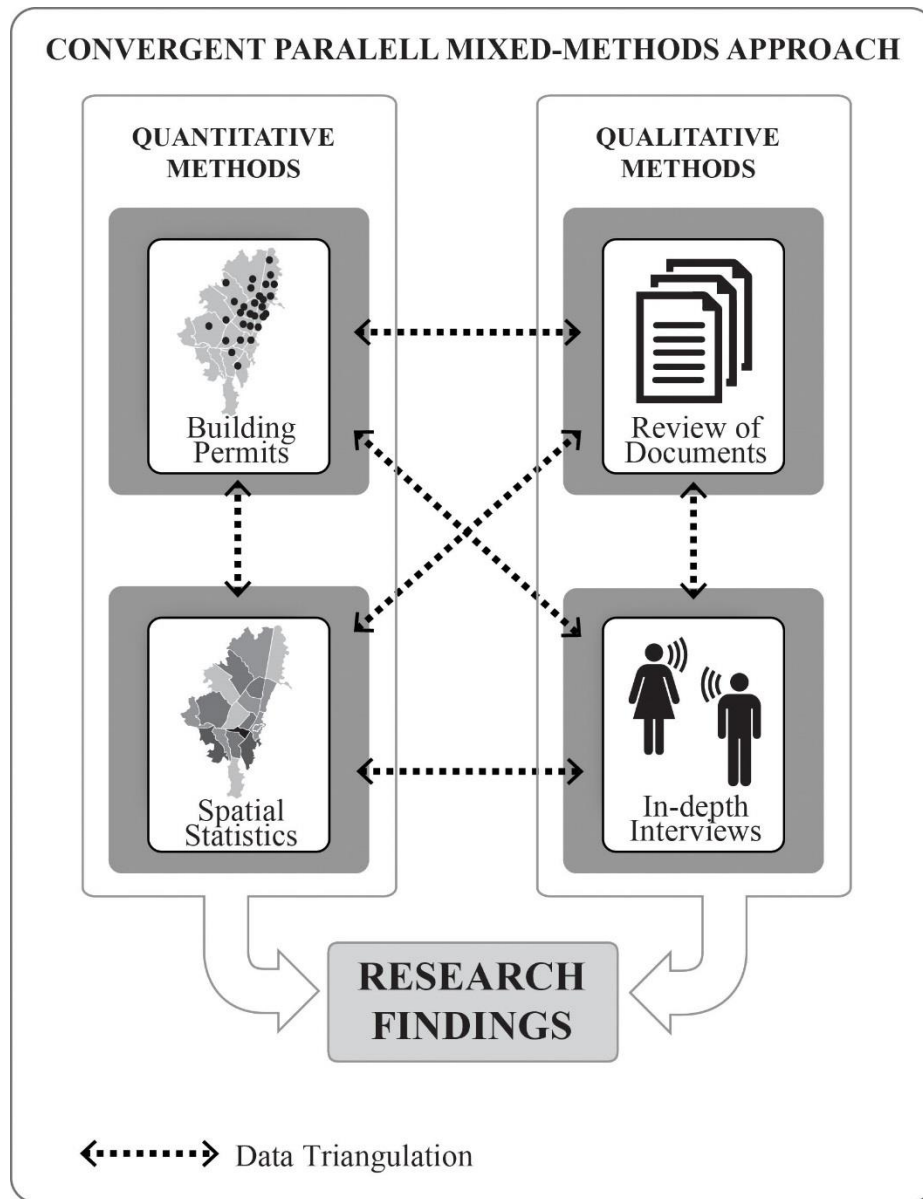


Figure 13: Diagram of the convergent parallel mixed-methods approach

Illustration by the author.

In the humanities, scholars believe that being either an insider or an outsider brings certain advantages and disadvantages in the objectivity of the research. I think my case in this research is precisely an example of this current critical debate about the complexity of this traditional insider/outsider perspective. While scholars in earlier discussions assumed that a researcher was either an insider or an outsider, more recent theoretical underpinnings of insider/outsider status have revealed the complexity and blurred boundaries that are often encountered by researchers between both positions (Merriam et al. 2001). I identify myself as both insider and outsider in my social position with regard to local Stratification and the transformations of the built form.

In terms of social background, I feel I am insider in Bogotá firstly because I was born in the city and lived there most of my life. This condition situates me inside the social and political context of the subject being studied. Specifically, regarding the system of Stratification, I was born in a family belonging to Bogotá's middle class, and lived my whole life considering myself as a member of this middle social class—or Stratum 4. In this position, I have been alienated from both the lower classes living in lower strata areas, whom I perceive as foreign, but for whom I also feel empathy for their conditions of disadvantage. In addition, I grew up separated from the higher classes in strata 5 and 6; nevertheless, I have always been aware throughout my life of their position of privilege because they have access to better urban services, jobs, and educational opportunities.

However, I may be also taking an outsider perspective with regard to the same issues because of my experiences living abroad for extended periods, mainly in countries with social and spatial systems that are very different from those of my country of origin. I have lived for extensive periods in societies, such as the German and the Austrian, where the social and spatial differences among members of the population are less pronounced

than they are in Colombia. In those contexts I experienced the advantages of everyday life in societies that do not explicitly separate their citizens according to income level, as Stratification does in my country. In addition, those countries have stronger welfare housing systems that prevent the urban forms and neighborhoods from becoming socially and physically fragmented, as they have in Bogotá, and they thus avoid the stark forms of concentrated poverty and urban violence that I experienced when I was growing up.

I also lived in China and the United States, places with increasing social differentiation that are different from those of my country, but have their own characteristics that also influenced my judgment and positions with regard to social transformations. In China, I lived in Shanghai where the social and spatial structures were undergoing rapid changes. They were moving from a former urban position of social and physical horizontality to a state of difference built on newly created income inequalities. I remember being shocked by the rapid urban transformations in Shanghai, where older neighborhoods and traditional communities were being displaced *en masse* to make way for taller structures and newly rich inhabitants in the older city core.

In the United States, although at the physical level cities are very homogeneous, race is the main determining factor of social and spatial differentiation. While traditionally most of the population live in suburban neighborhoods of detached single family houses, I have been experiencing how in the United States, as in China, a transitional phase of increasing social differentiation currently follows transformations in built form. The spread and influence of the new social desire to live in dense and compact cities is changing the landscape of cities across the United States. The White higher classes are moving to condominiums in high rises located in refurbished downtown areas, often at the cost of displacing minorities of color to the peripheral areas—as is the case in Austin, the city



where I live. I believe my experiences living and observing—as an outsider—social groups and physical changes in cities across the world have enriched my research perspective by providing insightful critical views to my insider perspective as a native of Bogotá.

On the other hand, I also face the philosophical disciplinary differences between the normative stance of the field of architecture and the social science approach of urban planning. I was educated in architecture at the National University in Bogotá. My education there was based on a perspective that has privileged physical interventions above critical thinking, aiming for physical interventions to solve social equity struggles. This situates me in an outsider position with regard to the field of planning, which is currently theoretically based in the social sciences. Nevertheless, my recent education as an urban planner in the United States has given me an insider's perspective on this field.

My years of studies for my Doctor of Philosophy degree in Community and Regional Planning have led me to question my original thinking regarding the built form and social justice, which came from a discipline closer to engineering and the arts. For instance, my education in architecture and urban design through design studios taught me that social outcomes could be achieved by physical interventions. However, the lessons I have learned from the planning literature warns that the urban form have a complex relationship with social justice (Talen 2006). To that end, my education in planning has provided me critical knowledge from the social sciences and led me to a more holistic understanding of urban problems. As in my social insider/outsider perspective described before, I believe that the disciplinary contradictions I have encountered in my education and experience, rather than being a disadvantage, have enriched my research and understanding of planning problems by providing me with multiple viewpoints.

However, the insider/outsider perspectives described above come also with limitations. These limitations were specifically evident in the process of interviewing informants. I had positive experiences accessing people in academia and some members of the developers' community because of my studies in architecture in a local university and my work as planner for the city. However, I had problems pursuing interviews with people who were outside of the mainstream local architecture and construction practices. This was a problem particularly in the South, where local private developers often have not attended the traditional universities and they are not members of the larger developers' associations. As I approached these individuals, they perceived me as an architect, a member of a higher privileged stratum of Bogotá society. In these cases, my local networks and roots became obstacles for my investigation. I tried my best to approach this community through field research and through informal conversations. I visited several construction sites in the South and spoke with the persons in charge, often the developers themselves. This method helped me to make a neutral approach to the interviewees, and that improved their perceptions of me. I documented these conversations and my insights in my field notes.

## **Chapter 5: Historical planning policies and socio-spatial segregation**

Bogotá is one of the largest cities in Latin America, and in recent years, it has been emerging as an important center of trade and innovation on a global scale. Nonetheless, a large share of the population has low levels of education and strong rural attachments. While the population of Bogotá's city core currently surpasses 8 million inhabitants (SDP, n.d.), only half were born in the city; the rest are migrants from the countryside. Most migrants came from the neighboring departments of Cundinamarca, Tolima, and Boyacá, while less than 1 percent of the population was born abroad. In terms of education, about two thirds of the population only reached elementary or high school, while only a quarter have professional degrees from a college or university (DANE 2010).

Because of its location away from the sea, Bogotá's economic development was traditionally limited to agricultural production in the fertile surrounding areas, national government offices, and a small industrial base. In recent years, however, the city has developed a large service and trade sector related to the growth of oil production in the country, the international Eldorado Airport—the third busiest of Latin America—and a growing financial sector. This new service sector now accounts for more than 80 percent of the economic activity in Bogotá. The city hosts the headquarters of a handful of large financial, transportation, and trade conglomerates, operating not only in Colombia but also in the Andean region and Central America.

The economic development leading to urban growth has traditionally raised concerns in the city because of its traditional unruly spillover into the surrounding savanna region. The city shares the flat lands of the savanna with another 35 municipalities in the Cundinamarca department. Most of them have small urban centers and extensive rural areas. Pasture, flowers, and crops grow in these rural lands, and they are the traditional

recreational site of Bogotá's elites, as they own large country houses and social clubs scattered across the plain. Locals are very proud of the fertility and beautiful natural landscapes of the savanna. They refer to Bogotá's savanna as having "the best agricultural lands of Colombia" and frequently advocate for its environmental conservation. Nevertheless, since the 1990s, municipalities closer to Bogotá, such as Chía, Cota, Funza, Mosquera and Soacha, are experiencing exponential urban growth, and consequently, property owners are intensively transforming agricultural lands into large housing settlements or industrial warehouses. This phenomenon is not new, as the city has a long history of rapid ungovernable growth.

By the early twentieth century, when Latin American metropolises such as Buenos Aires, Mexico City, and Rio de Janeiro were rising powerhouses in trade and industry, Bogotá was an isolated city in the interior of the continent with no more than a hundred thousand inhabitants. Nevertheless, by mid-century, the city rapidly reached a population of half a million, setting an alarming pattern of rapid growth into the future. As a result, from the 1940s onwards, managing urban growth became a central topic in the agenda of the local government. By 1953, in order to control the unruly development of the savanna, a short-lived military government took the opportunity to annex to Bogotá seven municipalities at the time bordering the city: Usaquén, Suba, Engativá, Fontibón, Bosa, Usme and Sumapaz. They became localities of the new especial district of the capital city of Colombia, later known as *Distrito Capital*. As urban growth happened in these new areas, the traditional patterns of geographical social segregation of Bogotá soon expanded into them. Usaquén and Suba in the North became expansion areas for the wealthy, while Bosa and Usme in the South became large areas where impoverished migrants lived in settlements of informal origin.

As a result, today this large number of neighborhoods developed at different levels of informality has become a major physical characteristic of the city. This scale of informal sprawling urbanization has brought permanent challenges for public policy as it has perpetuated the social inequities inside the city. According to the city data, the share of the population living in settlements of informal origin can account for 30 percent of the total (DAPD 2000b, 158). However, these communities live with many disadvantages in comparison with the rest of the city; for instance, they have few connecting roads and poor transit infrastructure, which makes access to jobs and services very difficult. In addition, the private urban development industry neglect these the informal areas, perpetuating their state of marginality.

In this chapter, I will argue that the planning history of the city demonstrates how changing approaches to growth management unintentionally laid the foundations for the socially segregated morphology that characterizes the city today. In order to prove this point, I will separate the local historical planning approaches in four different phases that respond to the changes of approaches between the United States model of “Sprawled City” and the normative “Compact City” approach rooted in Europe. Through these phases, I will show how foreign models of planning, mostly aimed to shape a specific normative idea of good city form have been implemented in the city by the influence of foreign practitioners and consultancy firms. In addition, in other times, there has been an adaptation of other more “procedural” policy approaches to urban planning in order to address urgent local social challenges. Later, I will suggest that the policy approaches since the late 1970s, responding to the latest international paradigms of planning, have aimed to change the traditional pattern of social and spatial segregation by regulating urban form and promoting densification. However, in the context of a limited implementation of a newest policy

approach since the 2000s intended to correct them, the formal approaches from the late twentieth century have led to effective but uneven patterns of densification across the city. Finally, I will show how the current land-use and density regulations of the city do not respond to the overarching policy objectives, but instead respond to the patterns of social segregation embedded in the Stratification system.

I am basing this historical review on two major works in the literature about local urban development. First, Alberto Saldarriaga-Roa's *Bogotá Siglo XX* (2000), which compiles a detailed review of the urban planning and housing policy history of the city. Secondly, Rodrigo Cortes-Solano's *Del Urbanismo a la Planificación en Bogotá 1900-1990* (2007), which provides an insightful analysis of the private interests and public ideologies behind the zoning ordinances produced in the city. I am also reviewing directly the different decrees, statutes, and ordinances that have set the urban development of the city, specifically focusing on Acuerdo 21 of 1944 (Plan Soto-Bateman); Acuerdo 65 of 1967; Acuerdo 7 of 1979; Acuerdo 6 of 1990; and Decreto 190 of 2004 (POT).

## **1920S TO 1940S: NORMATIVE IDEAS OF URBANISM AND FOREIGN PRACTITIONERS**

The first approach to urban planning in the history of the city was an expansion plan: *Bogotá Futuro* introduced in 1923. This plan was inspired in the city beautiful movement and it was fashioned by early architects in the city resembling the 1860s *Ensanche* plan by Idelfons Cerdá in Barcelona, and the Burnham plan of Chicago of 1909. However, Bogotá Futuro was only concerned with the future urban design and size of the city. First, it set a pattern of urban growth towards the north on account of the local geographical constraints, such as the hills to the east and south, and the marshlands in the west. Then, it proposed a street geometry consistent of a grid of orthogonal streets crossed by a network of diagonal avenues, with urban services such as churches, parks and schools

located at the crossroads. Bogotá Futuro was however never enforced, the city at the time lacked a regulatory framework that obliged developers to follow any delineated plan, and therefore, apart from two isolated neighborhoods, nothing remains today of this first attempt at urban planning.

It was only with the arrival to the country of the Austrian urbanist Karl Brunner and his appointment as chair of the new urban planning department in 1934 that neighborhoods in the city started to follow a certain preconceived design. Brunner deployed the rules of City Planning According to Artistic Principles (Sitte 1889) to delineate a set of neighborhoods of great urban quality in the outskirts of the city, between the colonial center and the emerging suburban development of Chapinero. As head of urban planning in the city, he also conducted the first slum removal and resettlement project of the city. The plan aimed to create a parkway, the *Paseo Bolívar*, to set the limit of the city with the Eastern Hills and become a place of recreation for the citizens. Many families of native indigenous origin lived in shacks on the lands of the future Paseo Bolívar since the colonial time. The authorities resettled these groups in the first social housing urbanization project delineated in undeveloped sites at the south of the city. This project initially was conceived as a semi-urban settlement but eventually became the consolidated neighborhoods of *Restrepo* and *Centenario*.

Brunner carefully designed these neighborhoods to represented ideas of pedestrian scale, sinuosity of streets, vistas, and the importance of the elements of nature. The houses were built detached from one another, each on a large parcel that allowed a family to develop small gardens to grow food and maintain livestock. Only twenty years later, however, many of these parcels were converted informally into multi-story dwellings and artisan industries due to the pressure of a growing city, and today very few houses conserve

the ample gardens that Brunner envisioned (Pulgarín-Osorio 2009). Overall, Brunner's urban planning in Bogotá relied on a set of independent interventions, as he disliked engaging with urban plans at the city scale.

By the 1940s, local architects, some fresh from the recently created Architecture program at the Universidad Nacional, began to criticize Brunner's piecemeal approach to urban planning. Educated in new European ideas about the international style in architecture and the principles of rational planning from the CIAM, they classified Brunner's work as fragmentary and old fashioned, referring to it as "feudal urbanism." Because of their influence, the Mayor removed Brunner from the head planner post and the city departed from a school of planning based on the aesthetics of the city beautiful to follow a newer aesthetic movement of urbanism emerging in Western Europe at the time.

The local architects impersonated by the newly created Colombian Society of Architects pushed forward the commissioning of a brand new city master plan to the renowned international firm Town Planning Associates in 1948. This firm was at the time one of the major planning firms in the world, led by the Catalan Josep Lluís Sert,—president of the CIAM and later dean of the Harvard Graduate School of Design. Sert brought in the Swiss architect Le Corbusier—by the time already a world-famous celebrity in architecture and urban planning—to delineate Bogotá's plan. The plan was first denoted *Plan Piloto* and later *Plan Director* after Le Corbusier's involvement ended. Historians recall that Le Corbusier was surprised by the city. He could not understand how the Spanish and later the Colombians picked such an odd place to build the capital of the country. Bogotá is isolated at the top of the Andes, 2,600 meters above the sea and more than 500 kilometers away from the nearest port. As a result, he determined that the city had no chance of future large industrial and commercial development. He therefore laid the plan



expecting that the city would merely grow from half a million people in 1947 to triple that size by the year 2000. In reality, it took just twenty years for the city's population to surpass the mark set by Le Corbusier. By 1960, Bogotá was growing to reach two million persons.

Le Corbusier's plan followed a functional approach, integrating ecological systems, transit, and land uses into a single vision of a city. He envisioned a city with wide avenues and high-rise residential complexes with a strict separation of land uses. For that purpose, the Plan Piloto recommended containing the growth of the city toward the west, site of sensitive wetlands, and instead proposed to focus growth along the north-south axis at the foothills where land was more suited for urbanization. Cortés-Solano suggest that the Plan Director had two main practical contributions to the future planning of the city: It introduced the hierarchical classification of the avenues, and the separation of uses into sectors, both principles derived from CIAM's Athens Charter (Le Corbusier and CIAM 1943). These two approaches were included in all of Bogotá's planning regulations until the 2000s. Other important subjects included but not adopted were the protection of environmental elements and the provisions of social housing that were innovative for the time. In terms of urban form, the plan proposed the demolition of large areas in the center of the city to give way to high multi-family towers inside green mega-blocks, and approach that was highly criticized at the time and impossible to fund.

Although the city intended to introduce new planning ordinances to implement the proposals of the Plan Piloto, these were interrupted in 1953 with the instauration of General Gustavo Rojas Pinilla as military dictator of the country (1953-1957). This short-lived military government engaged instead in a series of major public works such as a new airport, the construction of highways, and the development of a new public administration center. The design and location of these projects did not follow the suggestions of any

previous study. The authorities simply placed the projects where land was readily available for urbanization—mostly in the fringes by desiccating the wetlands to the west. In addition, as mentioned before, the dictatorship also enacted the annexation to Bogotá of six surrounding municipalities (Usaquén, Suba, Engativá, Fontibón, Bosa and Usme), to halt their unruly urban development, but also opening the door for further sprawl as the city with this move increased six times in size.

### **1950s TO 1970s: SOCIAL SEGREGATION THROUGH DENSITY AND LAND-USE NORMS**

Salazar-Ferro (2007) explains that during the 1940s the city authorities debated strongly between implementing the European normative approaches or the United States' model of planning—established by the Standard Zoning Enabling Act in 1924. This model was based on the development of land-use and road plans to moderate city development by controlling indirectly the interventions of the private sector. At the time, the city was growing very rapidly and the authorities had to respond to increasing pressures from landowners and private sector developers. As a result, the authorities moved on to adapt the Standard Zoning Enabling Act to the local context, which proved to be a more practical solution. This first United States inspired zoning plan of the city was passed during the administration of Mayor Jorge Soto del Corral (1944-1944) with the contribution of his secretary of public works, Alfredo Bateman, and therefore became known as the *Plan Soto-Bateman* (El Consejo de Bogotá 1944).

The Plan Soto-Bateman, as shown in Figure 14, instead of focusing on designing specific urban growth projects—as Brunner and Le Corbusier proposed—established a separation of the city into seven zones: commercial and civic; mixed-use; central residential; exclusive residential; working-class residential; industry; and forest reserve. Each zone had a strictly differentiated level of land use mix and density maximums to be

followed by the landowners aiming to develop a parcel. The plan established a physical difference between the residential “elite” areas located in the North and the “working” class residential areas primarily located in the South, and thus became a platform for social segregation through density and land-use norms.

In the residential areas of the North, the plan prohibited any industrial or large-scale commercial activity, while setting high standards for the urban form. For instance, the norm required minimum lot fronts between 10 to 12 meters, building footprints of maximum 50 percent to 60 percent of the lot, setbacks between 3.5 to 5 meters, and a maximum height of three floors. Conversely, in the working class residential areas the rules were much less strict, as it allowed the same activities than in the mixed-use zones, such as industry, heavy retail, and warehousing. In terms of building envelope, the plan set a minimum parcel area of a 150 square meters, with a minimum lot front of 7.5 meters, two floors of height and no setbacks. In this way, the Plan Soto-Bateman intended to reduce the price of development in the city, facilitating the creation of housing supply in the working class areas, but at the same time it strengthened the polarized shape that the city had adopted. Eventually, the Plan Soto-Bateman became very important for the current city morphology as the authorities enacted it during a period of exponential growth and the interrupted adoption of the Plan Director.

Upon the return to democracy, the president appointed Jorge Gaitán as the mayor of Bogotá (1961-1966). He wanted to re-institute a democratic framework for urban planning in the city after the dictatorship. According to Cortés-Solano, Gaitán understood that the rapid growth of the city impeded the enforcement of a normative planning platform such as Le Corbusier had envisioned. Bogotá’s population growth rate during the 1950s and the 1960s was almost 7 percent annually—among the highest in the world. As a result,

mayor Gaitán introduced the notion of a “flexible” plan. This new approach provided a set of rules for city expansion based on market demands, while also creating a Planning Commission to negotiate the norms with property owners in a case-by-case basis (El Concejo del Distrito Especial de Bogotá 1963). These market friendly reforms further facilitated the development of rural lands in the periphery, thus benefiting a handful of large-scale property owners in the savanna.

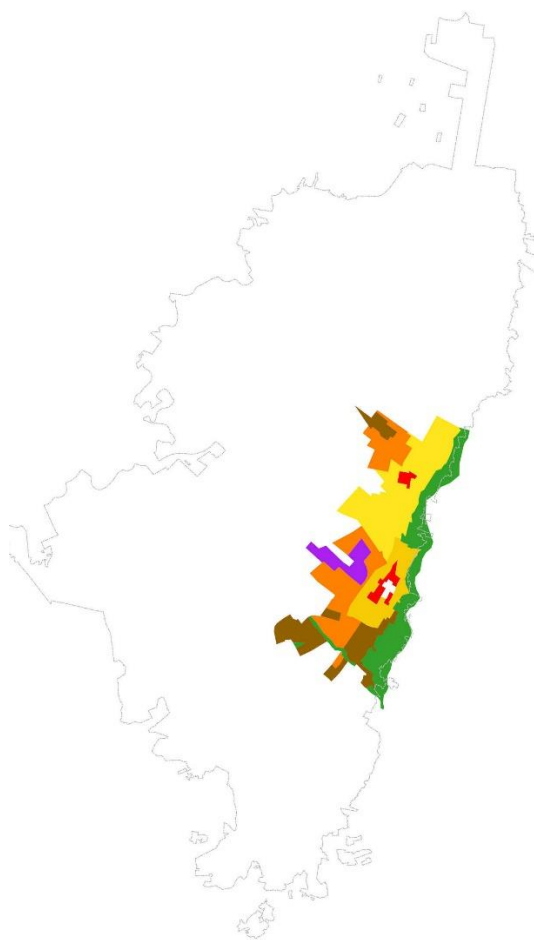
Gaitán’s planning tools to manage growth in the city were a new road plan and a new zoning code that continued the patterns set by the Plan Soto-Bateman, while also adopting some details from the Plan Director. While in the 1950s planners focused on environmental concerns, such as the preservation of the wetlands in the west and promoting a compact city growth, by the 1960s, the urbanization of the periphery was a de-facto reality, motivated largely by the annexation of the surrounding municipalities and the construction of roads. This led development to sprawl uncontrollably along the access roads, forming an octopus-shaped city. Gaitán’s road plan, or *Acuerdo 38*, enacted in 1961 (El Concejo del Distrito Especial de Bogotá 1961b), aimed to organize this growth by linking the satellite areas through ring-roads that encouraged infill development.

At the same time, the city was receiving alarming levels of migration from impoverished peasants displaced by violence and the poor economic opportunities in the countryside. Migrants in need of housing were occupying public lands, but more often, they were acquiring small lots in illegal subdivisions of peripheral rural lands with no access roads or utilities. Individuals that became known as *Urbanizadores Piratas* [pirate developers] promoted these illegal subdivisions. They often disappeared after they sold the properties and left the communities to fend for themselves for the provision of utilities and against the eviction attempts of the municipal authorities. The overwhelming scale of these

emerging informal settlements in the peripheries made the administration during the 1960s to try different administrative processes to recognize the settlements and open the doors for the public sector to invest in their improvement.

*Acuerdo 30* (El Concejo del Distrito Especial de Bogotá 1961a), and later *Acuerdo 65* (El Concejo del Distrito Especial de Bogotá 1967) introduced a new set of urban form regulations aimed to update the norms of 1944 and cope with the new challenges of informal urbanization. These new regulations changed the approach of the Plan Soto-Bateman, which divided the city between wealthy and working class areas, and instead introduced density levels to classify the residential areas. However, in the practice, the division of the city among areas with different dwelling densities masked a way to preserve the system of socially segregated development, as Figure 15 suggests. The new regulations divided the city in areas of low, middle, and high density, and later created some new special categories, named *Residencial Obrero* [working-class residential] in the *Acuerdo 30*—later renamed *Residencial Especial* [special residential] in *Acuerdo 65*—that were implemented to delimit areas in which illegal subdivisions were tolerated.

In the newer *Acuerdo 65*, this category further decreased the required standards of urbanization, by introducing new minimum standards to regulate self-help housing and control the action of the *Urbanizadores Piratas*. These became known as the *Normas Minimas* [minimum norms]. These norms set minimum lot areas at 65 square meters, and reduced minimum lot fronts to 5 meters.

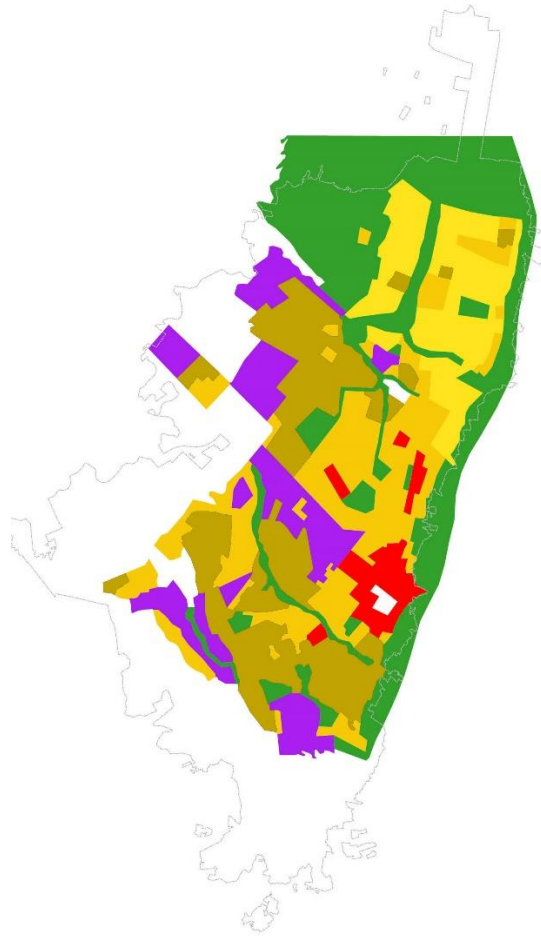


**LEGEND**

- SINGLE-USE RESIDENTIAL
- CENTRAL RESIDENTIAL
- MIXED USE
- WORKING CLASS RESIDENTIAL
- INDUSTRY
- NATURE CONSERVATION

Figure 14: Land-use plan Soto-Bateman

Source: Adapted from *Bogotá Siglo XX*  
(Saldarriaga-Roa 2000)



**LEGEND**

- LOW-DENSITY RESIDENTIAL
- MEDIUM-DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- INDUSTRY
- CIVIC AND INSTITUTIONAL
- NATURE CONSERVATION
- COMMERCIAL

Figure 15: Land-use plan DAPD 1960

Source: Adapted from *Bogotá Siglo XX*  
(Saldarriaga-Roa 2000)

New settlements in the Residencial Especial zones were only required to have a delineated area for the roads, street lighting, a water fountain and a public telephone to service the community, and individual latrines for each parcel. These new ordinances further increased the differentiation in the physical shape of the residential areas in the North and the South. By the 1970s, the North took a shape similar to North-American suburbia, with wide roads, large houses, front yards and parks, as shown in Figure 16, while small parcels, no green areas, narrow unpaved roads, and poor services distinguished the South, pictured in Figure 17.

These conditions of marginality in the South soon turned many informal settlements into slums where poverty and disease were widespread. Motivated by this, during the 1970s, major international development agencies proposed to implement a set of slum improvement projects in the city, such as the *Planes de Desarrollo de Emergencia* [urgent development plans], proposed by the ECLAC<sup>6</sup> and funded by the Inter-American Development Bank. Most of the times, the country's receipt of international funds for urban development was made contingent upon their acceptance of these plans, often designed from abroad by foreign professionals.

During these years, the Colombian president created the *Departamento Nacional de Planeación* (DNP) [national department of planning] and appointed the Canadian Lauchlin Currie as the first director. The President assigned Currie the task of drafting the first national development plan to cope with the urbanization challenges.

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<sup>6</sup> Acronym for the United Nations' Economic Commission for Latin America and the Caribbean



Figure 16: Residential subdivisions in the north of Bogotá in the 1960s

Source: *Bogotá vuelo al pasado* (Villegas 2010).



Figure 17: Informal settlements in the south of Bogotá in the 1960s

Source: *Bogotá vuelo al pasado* (Villegas 2010).



Currie was alarmed by Colombia's extremely rapid urbanization rates and preoccupied with the growth of informal settlements. His solution was to cope with both challenges at the same time, by using what he called an "accelerating growth" strategy. He proposed that the national government financed the construction of affordable housing, both to create millions of low-skilled jobs for rural migrants through the construction sector and to relieve the increasing housing shortages. This would change urban growth patterns in the city from the traditional process of illegal subdivision of rural lands by Urbanizadores Piratas to growth by the construction of large-scale multifamily residential compounds—resembling those Le Corbusier proposed twenty years before. For that purpose, the government created the UPAC that facilitated access to mortgages for the lower and middle classes and channeled public resources to both public and private construction firms.

The changes introduced by Currie encouraged the rapid development of large-scale projects of affordable housing at the district scale. This focus on the lower scale eventually eclipsed new attempts to draft an updated comprehensive plan at the larger city scale. District plans were drafted everywhere where land became available or where people were settling informally. The first project of this kind was the affordable housing plan *Ciudad Kennedy*, funded by the Alliance for Progress.<sup>7</sup> Some other projects were the slum-improvement plan PIDUZOB I in the eastern foothills, and the large-scale serviced plots for self-help housing initiative named PIDUZOB II or *Ciudad Bolívar* in the southern hills, both financed by the Inter-American Development Bank. During the 1970s and 1980s, the Instituto de Crédito Territorial implemented other district-scale housing projects and

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<sup>7</sup> The Alliance for Progress was a program initiated by U.S. president John F. Kennedy in 1961 to fund development initiatives in Latin America.

experimented with different approaches to construction, such as prefabricated housing, serviced plots, and incremental solutions, all along the *Calle 80* corridor. National or international institutions designed and implemented these plans with little connection to any city-level comprehensive plan.

While Currie's policies for the middle urban scale were based on the rapid development of large tracts of land with high density or self-help housing, on the smaller scale, his policies were different—though also primarily based on the rules of market. Cortés-Solano pays close attention to these changes from the late 1960s onwards, a period he calls the “liberalization” of the city. He explains that the intense pressure of population growth led technocrats to recommend abolishing the heights and density limitations in the city included in Acuerdo 65. This shift coincided with a critique of comprehensive planning and zoning that was emerging worldwide. In the United States and Europe, voices within the field were proposing the phasing out of traditional approaches to separating land uses, while environmentalists argued that cities should control growth to protect the natural environment, while increasing densities in the central areas to make cities more energy efficient. Professionals from these fields proposed that the environmental and social challenges of cities could be overcome by changing the approach of zoning from regulating land-use and densities into normatively regulating the urban form. Planners and policy makers in Bogotá were receptive to these changes in the international paradigms, eventually enacting a new plan that would radically change the density and land-use norms that had dominated the city since the 1940s.

#### **1980S TO 1990S: GROWTH MANAGEMENT AND INCREMENTAL DENSIFICATION**

Thibert and Osorio (2014) argue that the annexation of peripheral municipalities in 1953 and the development-friendly reforms introduced by economist Lauchlin Currie in

the 1970s, made Bogotá develop a neoliberal model of urban development much earlier than other Latin American cities. This is supported by Saldarriaga-Roa (2000) and Cortés-Solano (2007), who describe how neoliberal policies and the private sector have been shaping the land-use and building regulations across the city's history, but strongly after the 1970s. Saldarriaga-Roa identifies this period as *La Ciudad Inmobiliaria* [real estate city] and sets Acuerdo 7 enacted in 1979 (El Concejo del Distrito Especial de Bogotá 1979) as the first regulation to operationalize private sector control over city planning. This was due in large part to the power gained by private developers over the economy, facilitated by the introduction of the mortgage system UPAC. The UPAC system detached mortgage debt from the Colombian currency—which at the time was devaluating rapidly—and instead created a parallel unit of constant value only to be used for mortgage-lending, thus offering homebuyers stable monthly payments. The system was a huge success and triggered the growth of the local housing market at an unprecedented scale, while directing large funds to the private sector construction industry.

The Acuerdo 7 revolutionized the way urban development was being conducted in the city by changing planning from focusing on zoning areas to focus on the control of the urban form. However, this transition facilitated the liberalization of urban planning norms and prompted the emergence of the construction industry as a principal driver of urban development. All these changes happened without regard for the interests of the municipality or of those of existing communities. In Cortes-Solano's words (2007, 198):

[(Acuerdo 7) as a transitional document that, clearly inserted in a perspective of deregulation to permit the free action of developers in the construction of the city. It took refuge in the *urban design*, a discipline erected as an alternative to the crisis of Planning, and that appears as the only possibility that has remained for acting on the urban form.]

*[El Acuerdo 7] como documento de transición que, al estar claramente inserto en una perspectiva de desregulación para permitir la libre acción de los promotores en la construcción de la ciudad, se refugió en el diseño urbano, disciplina erigida como alternativa a la crisis del planning, y que aparece como la única posibilidad que ha quedado para actuar sobre la forma urbana.*

The Acuerdo 7 was based in Fase 2, an urban development study financed by the United Nations Development Programme. Fase 2 was commissioned to the British and Canadian firms Llewelyn-Davis Weeks Forestier-Waker & Bor, Kates Peat Marwick & Co. and Coopers & Lybrand, in partnership with the Colombian Consultécnicos Ltda. (1973). Fase 2 analyzed the city growth during the 1960s, highlighting that Bogotá was a rapidly growing city reaching three and a half million inhabitants, most of whom were low-skilled recent migrants from the countryside who were living in conditions of poverty. The consultants determined that the density of the city was very high, reaching 179 persons per hectare, due to overcrowding in small structures in the informal settlements in the South, and in newer settlements emerging also in the West. Fase 2 also found that the central areas of the city were progressively losing population. This was due to incremental colonization of the older residential neighborhoods by heavy commercial and industrial land uses. Paradoxically, this trend produced decay and blight in areas with high levels of connectivity and provision of services.

Based on this assessment, the Fase 2 team in 1973 predicted a rapid future growth of the city, to reach five million persons in 1980 and eight and a half million inhabitants by 1990. According to this forecast, they proposed a set of growth scenarios for 2000: In the first scenario, they envisioned a pattern of growth with no state intervention. They argued that the concentration of investment, employment, and services exclusively in the central core—or in the affluent neighborhoods in the North—would keep putting a burden on the mobility system. This will keep affecting the quality of affordable housing and

public spaces for the lower and middle-income people—who were living in the inner-ring suburbs in the South and West.

As an alternative, the Fase 2 study proposed another approach to reorient urban growth. Instead of disorderly urban growth following the present access roads into the peripheral municipalities in the savanna—thus extending the current patterns of social segregation—they proposed to consolidate the existing city by achieving a rounded shape. The consultants thought that in this way growth would be less land consuming and decrease the levels of social segregation. To achieve this pattern, urban growth had to be reoriented into infill areas, decentralizing jobs and services in a set of sub-centers connected with each other by transit, and located in close proximity to the bulk of the residential areas. Specifically, in the South and West, the sub-centers would reduce the mobility needs and increase the economic opportunities of the lower income population living in slums. They called this strategy of creating sub-centers *Ciudades dentro de la Ciudad* [cities inside cities].

The city introduced Acuerdo 7 in 1979 to operationalize the proposals included in the Fase 2 study, with a short-term scope from 1980 to 1985, forecasting population growth that would reach six million in 1985. In order to operationalize the *Ciudades dentro de la Ciudad* concept, the city administration had to contain urban sprawl, focus new development in the infill areas, and densify the inner city and the sub-centers. Accordingly, Acuerdo 7 introduced three unprecedented strategies. The first was the incorporation of a USB to act as a growth control measure. The second strategy was to incentivize development in the infill by liberalizing density controls for new residential projects within the USB. However, according to the Acuerdo 7, these new projects were set primarily to serve for affordable housing via multi-family housing blocks or serviced sites programs.

The new middle and high-class residential developments should instead be conducted through the incremental densification of the central city. This led to the third strategy, a framework for the incremental densification. This strategy incentivized the incremental densification in existing neighborhoods by delineating micro-zones that responded the rationale of the profit from real estate development. These micro-zones became the *tratamientos* and classified neighborhoods depending upon their age, location, and current physical characteristics using the tax assessment as a measure tool. The different *tratamientos* responded to different levels of land use mix, existing heights, existing setbacks, building footprints and age, and social decay of each neighborhood.

Acuerdo 7 created three main *tratamientos*. The first was *Rehabilitación*, which was applied to neighborhoods in high demand by the real estate market to incentivize developers to acquire properties with small structures and invest in densification projects. The second *Tratamiento* was *Redesarrollo*, which was meant to encourage redevelopment by aggressively liberalizing the height limits, to encourage the private sector to invest in areas undergoing urban decay. The third *Tratamiento* was *Conservación*, which applied in neighborhoods that were more recent or in areas under historic preservation where densification was not allowed.

Following the proposal of Fase 2, Acuerdo 7 delineated the mega-core of the city, along the foothills from the southern neighborhood of Restrepo to the northern area of Chicó, as a *Tratamiento de Rehabilitación* and *Redesarrollo* in order to incentivize densification. The plan also created a set of sub-centers in the peripheral areas (as seen in Figure 18) where densification was also allowed. In terms of social segregation through density and land-use norms, Acuerdo 7 abolished the practice of urban form differentiation according to social groups or densities from the previous regulations; however, it

introduced the use of the system of Stratification to determine parking requirements. At the time, the Stratification was a new tool introduced by utility companies following a mandate from 1968 (El Presidente de la República de Colombia 1968). Specifically, Acuerdo 7 set a minimum of a single parking space per each ten units for strata 1 and 2; one per three units for strata 3 and 4; and one to one in strata 5 and 6. In this way, the Acuerdo 7 was not explicitly using the social strata as a determinant of the physical form of the city, but it was implicitly forcing the construction of different housing typologies in the different strata to comply with the parking minimums.

In addition, while Acuerdo 7 allowed incremental densification in all the neighborhoods included in the mega-core—equally in both its northern and southern sections—the *Decreto 1025* of 1987 and *Decreto 067* of 1988 instituted differing height restrictions. These ordinances privileged densification in the Chapinero area, allowing even higher structures in the place where most development at the time was taking place. According to Decreto 1025, elements such as the potential for mobility, utilities supply, soil characteristics, and the dimension of the lots justified this move. However, soon after, the Decreto 067 in 1988 further modified most of the height and land-use regulations of several neighborhoods north of Chapinero, those that the Acuerdo 7 set to preserve their built form characteristics. It reclassified them from Conservación into Rehabilitación, in this way almost duplicating the area for densification in the city (Rincón-Avellaneda 2006).

Because of this, Cortés-Solano suggests that the Acuerdo 7 was subordinate to the real estate market, as it set land-use and height regulations according to the levels of profit that developers could obtain from any parcel (2007, 195). He further argues that the loose regulations in the numerous new areas denoted as mixed-use in Acuerdo 7 were, in practice, a recognition by the state that the real estate market was the “natural” instrument

to produce suitable urban spaces to meet local housing demands (2007, 198). Cortés-Solano suggests that private sector profit-based urbanism in Bogotá since Acuerdo 7 produced the soaring density increases in the city. He proves this fact by showing that density in the city rose from 295 persons per hectare in 1985, to 389 persons per hectare in 1993.

Recently, two different studies using satellite imagery demonstrate the unusually high density of Bogotá. The first study by Inostroza, Baur and Csaplovitz (2013) used satellite images to measure the expansion of ten Latin American cities over a period of approximately twenty years (1988-2010). Bogotá was one of the cities they selected for this analysis. Results showed that the capital of Colombia was the largest outlier among the cities analyzed in both density levels and expansion patterns. With 213.8 persons per hectare, it was the densest of all, almost twice as dense as the cities below it on the list, which were Lima with 133.1, La Paz with 112.1 and Santiago with 107.5 persons per hectare. Bogotá is today six times smaller in area than Buenos Aires, but with half the population. A second study by Parés Ramos, Álvarez Berríos and Mitchell (2013) used night-time satellite imagery between 1992 and 2009 from eight Latin American cities, including Bogotá, to assess urban density. The results revealed that Colombian cities (Bogotá, Medellín, and Cali) experienced the most compact densification, as determined by the growing intensity of nighttime lights in the timeframe analyzed. Based on this analysis, the authors claim that Colombian cities are among the densest in the world, comparable to Asian cities such as Mumbai and Hong Kong.

However, density levels are unequal across the city. Rincón-Avellaneda (2004) demonstrated that density levels in Bogotá were much higher in the peripheral localities in the South and West than in the central areas and the North. She proposed that these uneven



densities reflected different densification processes. According to Rincón-Avellaneda, in Bogotá there is a difference between the levels of density of the built form—taller versus smaller buildings—and the differences between the densities of population—the amount of persons living inside a unit of area. Higher income neighborhoods are denser in terms of built form as a result intensive investment in real estate. However, lower income areas are denser in terms of population—there are more people in the same unit of area—reflecting overcrowding of precarious and small self-help structures. These differences in density levels heighten the uneven access to urban services, public spaces and recreation areas and worsen the congestion in the city.

Soon after their implementation, and after many building permits were granted, *Acuerdo 6* in 1990 replaced Decreto 1025 and Decreto 067. This new statute for the physical ordering of the city aimed to correct the excess of these previous regulations. This new statute modified the scope and scale of the *tratamientos*, accepting the idea that the city had developed as a collection of fragments instead of following a single normative master plan. Specifically, it introduced the concept of “local zoning”. According to this discourse, the land-use and height regulations should comply with the “physical values” and origins of each neighborhood, mostly to respond to concerns that the community was raising against densification processes. Nonetheless, the plan kept employing criteria for the determination of the areas suited for densification based on the real estate market.

As a result, *Acuerdo 6* restricted heights in many neighborhoods included in the densification decree 067. However, many of these neighborhoods were located in the South of the city and of little interest to private developers. At the same time, the *Acuerdo* further increased the heights limits in the neighborhoods that the private sector was transforming in the North, specifically in the localities of Chapinero, and Usaquén. An example of this

was the increase in the height limits in an area of detached single-family houses along the *Calle 100* to allow for office and retail use in higher structures that developers were pushing for. This regulation caused the displacement northwards of the financial center of the city, located on *Calle 72* in Chapinero, to *Calle 100* in Usaquén. These changes made Acuerdo 6 blur the mega-core and sub-center model of Fase 2 and Acuerdo 7 via a set of local zoning regulations, which ended up not complying with the overarching proposed urban structure.

Overall, the market friendly approaches taken by Acuerdo 7 and Acuerdo 6 reduced the power of central planning in the city. During the 1980s and 1990s, the city planning office progressively lost power vis a vis private developers, to the point that its role was reduced to performing only menial bureaucratic functions. At the time, the city council was highly permeated by the interests of the construction chamber and large scale property owners, and because of this, the mayor's ability to pursue clientelist practices was limited (Gilbert 2015). To make matters worse, during the late 1980s the national government faced a deep social and economic crisis wrought by violence stemming from the drug cartels, the leftist guerrillas, and a local fiscal crisis. This left the administration of Bogotá with scarce resources to intervene in the rising crime, chaotic traffic, informal urbanization, and the crisis facing utility companies in their struggle with powerful unions. Surprisingly, by the end of the 1990s, there were structural changes in public policy that allowed the public sector to retake control of the city and even bring urban improvement to worldwide attention during the 2000s. The next section explain those changes, but also how the promise of bringing social equity to urban planning practice, made in a subsequent plan, failed to deliver fifteen years later.

## **2000s: POT AND THE UPZs, BOTTOM-UP AGAINST TOP-DOWN PLANNING**

The first change that improved the administration of the city was the democratic election of mayors introduced in 1988. Previously, the president appointed them and their period was limited to two years. The second elected mayor, Jaime Castro (1992-1994), passed the Organic Statute in 1993 releasing the executive branch of government from the chains of the city council, unions, and the national government. Castro began a series of fiscal reforms that later allowed mayors Antanas Mockus (1995-1997 and 2001-2003) and Enrique Peñalosa (1998-2000) to initiate the transformation of the city that has been so extensively documented by scholars (Beccassino and Peñalosa-Londoño 2000; Dávila 2004; Gilbert and Dávila 2002; Gilbert and Garcés 2008). The second major change was the enactment of the National Law of Territorial Ordering in 1997, known as *Ley 388*, (Congreso de Colombia 1997). This law standardized all urban planning practices in the country under the principles of social equity, such as the “right to the city” and the “social purpose of the private property.” *Ley 388* allowed mayors, communities, local planners, and developers to play under the same transparency rules, limiting the traditional obscure influences of private interests, clientelism and NIMBYsm<sup>8</sup> in local urban planning.

Bogotá used this new law to enact a new comprehensive plan (POT) approved in 2000 and later compiled and updated in 2004 through *Decreto 190* (Alcalde Mayor de Bogotá D.C. 2004). The mayor changes of *Decreto 190* involved the introduction of institutional rules and planning tools for city and developers to share both costs and revenues of the urbanization activities across the city, under the principle of *reparto equitativo de cargas y beneficios* [equitable distribution of costs and revenues]. Under these

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<sup>8</sup> NIMBYsm comes from the acronym for the phrase “Not In My Back Yard”, or Nimby. It is a pejorative characterization of opposition by residents to a proposed new development or land use because it is close to them.

new rules, the city required that developers set aside land or money for affordable housing and infrastructure improvements before approving expansion and redevelopment projects. This framework was operationalized through a new planning tool named *Planes Parciales* (PPs), which was akin to the Planned Unit Development tool used in the United States. These reforms included in Decreto 190 were set to discourage further incremental densification, which according to its critics, had overly densified neighborhoods, only increasing profit for landowners without regard to the heavy impacts in existing roads, parks, and utility infrastructures. As mentioned in the study conducted for Decreto 190 (DAPD 2000b, 75):

[This densification and change of land use was not accompanied by the improvement of infrastructure networks, public spaces, and amenities. Densities 10 or 20 times higher and new commercial and service uses were being supported by the preexisting urban space.]

*Esta densificación y cambio de uso no se acompañó por la adecuación de las redes de infraestructura, los espacios públicos y los equipamientos; densidades 10 o 20 veces superiores y nuevos usos comerciales y de servicios fueron soportados por el espacio urbano preexistente.*

On the other hand, the studies that led to Decreto 190 had identified similar problems as those outlined in the Fase 2 study, which had been conducted more than 25 years earlier. These persistent problems included strong socio-spatial segregation that was producing an unbalanced supply of urban services, unplanned growth patterns, and the deterioration of the residential areas through progressive invasion by office, retail, and industrial land uses.

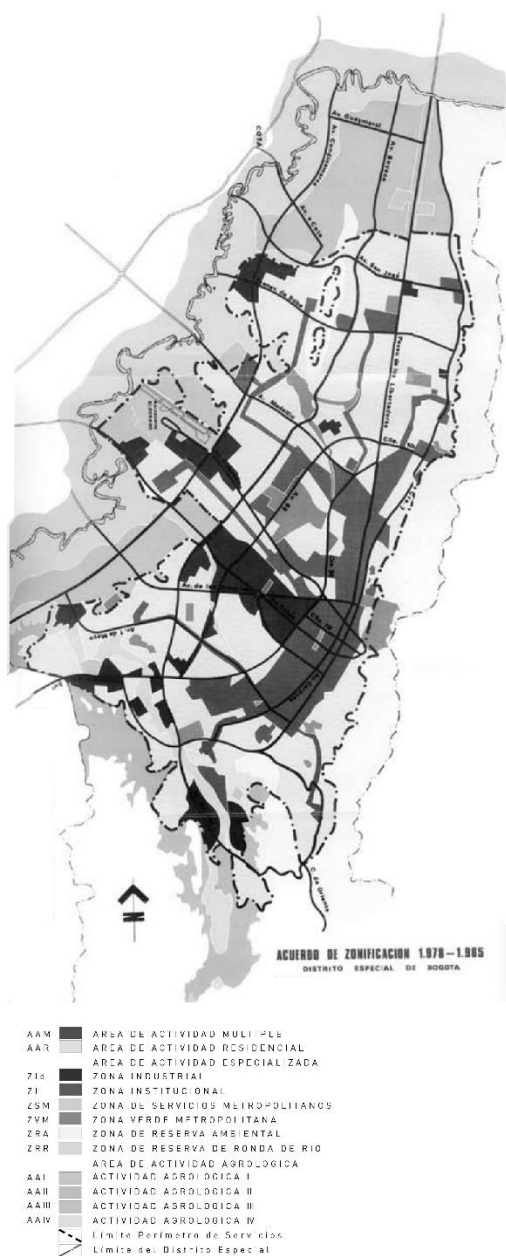


Figure 18: Land-use plan Acuerdo 7

Source: Adapted from *Ordenamiento y administración del espacio urbano en Bogotá* (DAPD 1981)

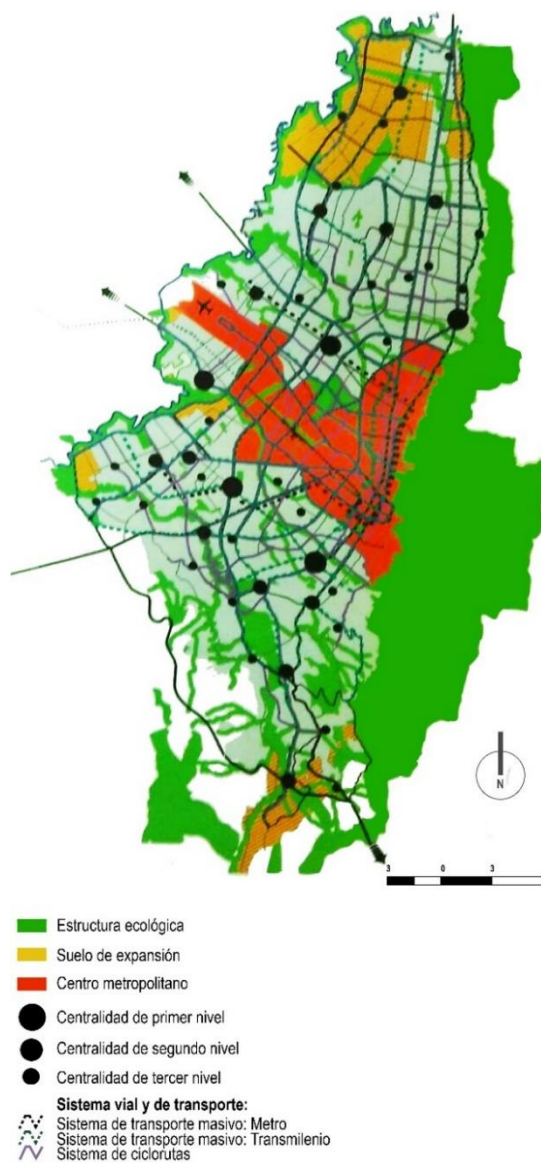


Figure 19: Spatial structure Decreto 190

Source: Adapted from *Decreto 190 Documento resumen* (DAPD 2000a)

To address these challenges, Decreto 190 envisioned a new structure for Bogotá, shown in Figure 19, delineating a city based on three major sectors. The first sector was a central core with most of the employment activities and the urban services, including most of Acuerdo 7's mega-core, and a large extension to the western peripheries to reach the airport covering most of the industrial sites of the city. The second sector was the residential areas in the North and South, which should be—as Acuerdo 7 proposed—structured around local sub-centers connected by high-capacity transit. The third sector were the expansion areas, which finally dismantled the USB, covering all the still rural plain areas of the savanna inside the Distrito Capital. They included the last empty lots prone to flooding in the south-west close to Bogotá River where most informal development was taking place at the time. In addition, this sector included the hilly area in between the USB and the southern town of Usme, and a large area in the north-west between the USB and the Bogotá River. The latter area is dominated by agricultural and recreational lands and its potential development has recently become a source of controversy between the municipal administration and environmentalist groups.

In the central city, Decreto 190 offered a set of small scale planning tools as an alternative to the incremental densification model rooted in Acuerdo 7. The main one was *Planes Parciales de Renovación Urbana* (PPRUs)—mentioned previously in Chapter 2. These were planning tools that allowed private developers to set aside a consolidated neighborhood in delineated zones to formulate a local plan that could alter the property and street layout. The purpose was to generate new for-profit housing and retail areas, and new public spaces and affordable housing units. PPRUs planning process should be negotiated between the developers and the property owners, and requires the accord of at least 51 percent of the owners to become approved by the city. If the city approves a PPRU, the

developers can exercise the power of eminent domain to acquire the properties of those owners who refused to participate.

Although private developers were initially enthusiastic about PPRUs, experience would show that they are very challenging processes. One example is the case of Los Olivos in Chapinero Alto. As explained previously in Chapter 2, a set of legal conflicts between the different landowners and the city halted this PPRU process indefinitely. There are many other cases across the city where protests and lawsuits among the different property owners and developers have also put a stop to PPRU processes. PPRUs have met stark opposition from neighborhoods associations, and negotiations to reach agreement with 51 percent of property owners have proven to be very difficult, lengthy and costly. The PPRUs that have been developed are of very small scale of two to four blocks, which has made the private sector to reluctant to invest in the formulation of new PPRUs.

The other planning tool proposed by Decreto 190 to control densification and increase citizen oversight in the processes of redevelopment were the so-called UPZs. The city administration divided the city into 117 UPZs, which had to develop their own local land-use and density regulations in compliance with the larger structure set by Decreto 190. In practice, however, the UPZs were also areas delineated from the top that did not represent the consolidated communities of the city. As a result, the processes of formulating the norms for each UPZ atomized decision-making and undermined the broader city structure envisioned in the POT. Each of the UPZs was developed independently, often heavily influenced by private developers or by strong neighborhood associations motivated by NIMBYsm. As a result, fifteen years later, there are parts of the city that rapidly developed in contradiction to the structure delineated in the comprehensive plan. In other

areas, the UPZs regulation was never accepted and therefore development must still comply with the old regulations of Acuerdo 6.

Acknowledging these problems, different city administrations attempted to abolish the UPZs system by revising Decreto 190. However, these attempts failed for different reasons. A first revision by the mayoral administration of Samuel Moreno (2008-2011) stalled because of the suspension of the mayor due to corruption charges. Mayor Petro made a second attempt, but his revision to the plan faced opposition from city council. Nevertheless, Petro later passed Decreto 562 in 2014 to abolish most of the UPZs and instead turning these areas into the tratamiento *Renovación Urbana*, a regulation that dismantled the height limitations, thus returning to a hyper-scaled version of the incremental densification model of Acuerdo 7. Petro's Decreto 562 was motivated by the the continuing need to redevelop areas in the central city and the South that were rapidly losing population. However, the subsequent mayor Peñalosa abolished Decreto 562 in 2016. Peñalosa, who in his first administration criticized the incremental densification model, argued that Decreto 562 created a disorderly model of city, overburdened the existing green and transit infrastructure, and was passed without any citizen participation. Nonetheless, the regulation of Decreto 562 was valid for about a year and the building permits granted in this period are still sound.

#### **ARRANGEMENTS AND SOCIAL SEGREGATION IN BOGOTÁ'S URBAN PLANNING**

This historical review illustrates how the density and land-use norms and the various approaches to densification approaches have reinforced the patterns of socio-spatial segregation. The policies from the 1940s to the 1970s sought to facilitate private sector development to address urgent housing shortages, but in the process established a system of social segregation through density and land-use norms. After 1979, the



incremental densification policies, which were intended to transform the old segregationist model of planning, were able to control sprawl but failed to disrupt the system of social segregation. Instead, this approach increased heights in the wealthier areas in the North, while restricting heights and allowing hazardous and unwanted land uses in the South, further benefiting private sector developers and landowners while diminishing the quality of life for the majority of the population. This phenomenon heightened social injustices because these planning rules have disproportionally increased the value of land in the northern neighborhoods, while decreasing land values in the southern poorer areas.

From Acuerdo 7 onwards, none of the planning ordinances sought to continue the segregationist approaches from the mid-twentieth century. On the contrary, all the plans aimed to de-concentrate the areas of employment and services from center-north axis along the piedmont, to encourage development in the western and southern peripheries. However, the transition from the top-bottom visions of urban development into small-scale approaches through local zoning codes has proven problematic. Local zoning approaches, including the UPZs, have impeded the consolidation of most of the sub-centers and have perpetuated the concentration of employment and services in the traditionally wealthier areas.

The lack of transparency in planning and policy design processes has made it difficult for the public to contest these strategies. Even today, it is difficult for the public to access the official plans of density and land-use regulations for each of the UPZs. They are not available on the SDP website and citizens have to visit the planning offices in a particular day of the week to get access to them. Although the SDP established an online map to view the city's planning norms (SINU-POT), the system only allows the user to view the rules for one property at the time, making it impossible to understand the larger

picture of local planning regulations. Therefore, for the analysis of the historical regulations I had to sum the fragmentary information of the SINU-POT with digital copies of the density and land-use regulations of Acuerdo 7, Acuerdo 6, and the UPZs, obtained directly at the SDP. I incorporated this information into a GIS to produce a set of maps of Bogotá that show the evolving patterns of maximum height limits in the periods 1979–2015.

Figure 20 shows a map with the heights limits of Acuerdo 7. The map shows how heights limits correlate with the mega-core and sub-centers, and illustrates the CBD located at the center of the city in *Calle 26*. However, this clear structure of Acuerdo 7 dissolves in further zoning ordinances. The next major zoning reform, Acuerdo 6, shown in Figure 21, expanded the densification areas northwards, moving the CBD to *Calle 100*, in the limits of Chapinero with the locality of Usaquén. However, it maintained the height limits in the southern parts of the mega-core that were not of interest of developers. Finally, Figure 22 displays in a single map the joint height regulations independently produced by 93 different participatory planning processes for each of the UPZs, following the mandate of the POT in 2000. There are 117 UPZs in Bogotá, but as of 2015, some of them had still not developed density and land-use regulations because they were part of zonal plans or include major infrastructure, such as the international airport, which required differentiated district planning processes. The map shows how the UPZs further expanded densification northwards, including higher heights limits in most of the localities of Chapinero and Usaquén. Specially, these regulations allowed the deregulation of heights in Cedritos (also explained in Chapter 2) introducing maximum Floor to Area Ratio (FAR) limits up to 5.5, the highest of the city.

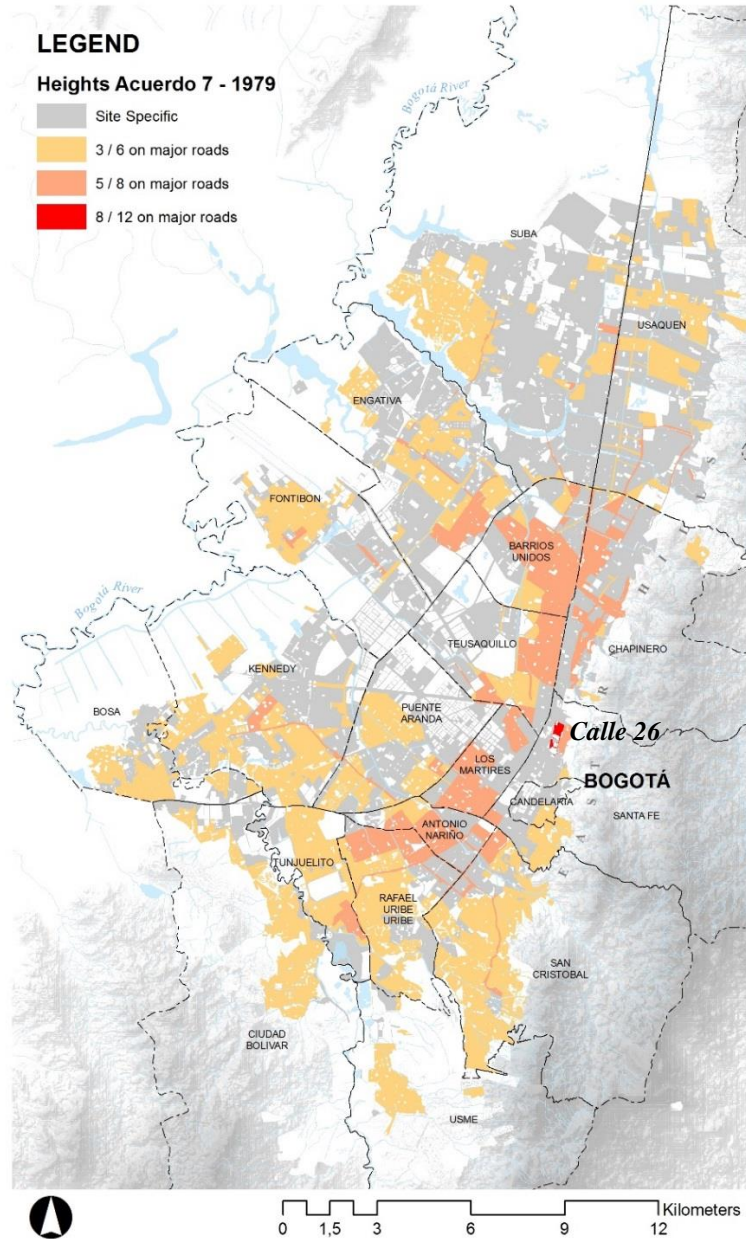


Figure 20: Height limits in Acuerdo 7 of 1979

Source: Adapted from official zoning map of Acuerdo 7 of 1979. Background Image: ASTER GDEM, a product of METI and NASA

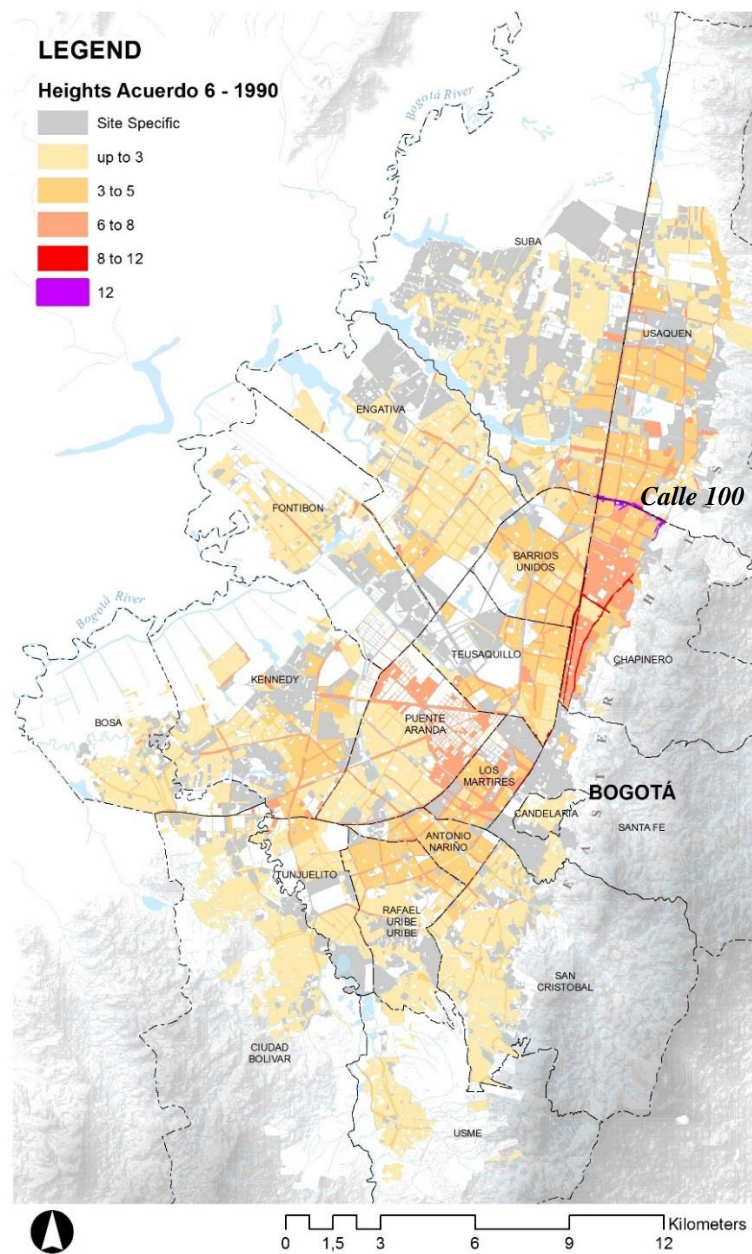


Figure 21: Height limits in Acuerdo 6 of 1990

Source: Adapted from official zoning map of Acuerdo 6 of 1990. Background Image: ASTER GDEM, a product of METI and NASA

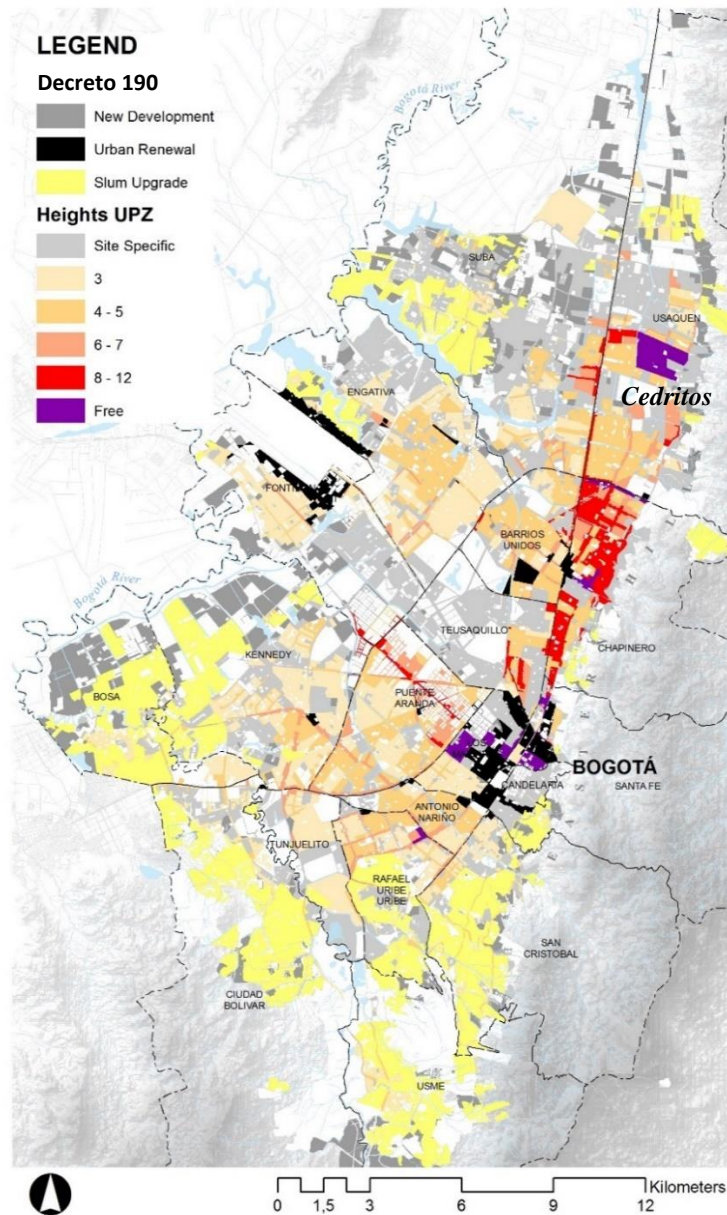


Figure 22: Height limits in the UPZs 2004-2016

Source: Adapted from SDP-SINUPOT. Background Image: ASTER GDEM, a product of METI and NASA

This phenomenon presumably will lead to the consolidation of a new CBD of the city further northwards, away and disconnected from the majority of the working class population living in the South and West.

Paradoxically, the private sector developers have not redirected development to profit from lower land values in the South, which as the maps suggest have maintained the heights constraints. Instead, the ordinances have periodically increased the height limits. These gradual increments kept housing prices high by maintaining a lid on the supply. Nonetheless, the local planning discourse has attributed this uneven densification to different causes, such as the wealthier neighborhoods having larger lot sizes, strong real estate markets, or better supply of jobs and services. However, all of these qualities of the northern areas are rooted in the segregationist zoning policies introduced in the city by planning ordinances from the 1940s to the 1960s, such as the Plan Soto-Bateman.

This system however, has also been effective in maintaining a city with very high density levels. Table 1 shows the historical population and area growth of the city according to the different national census. The table illustrates how the city has been permanently increasing its population density levels in the last 60 years, notwithstanding economic and population growth. The increase in densities from the 1980s to today may be attributed to the success of the incremental densification policies. In this period, the city went from densities below three hundred inhabitants per hectare to the current estimated average of around 350 persons per hectare, a compact density level in comparison with other cities in the world. The Density Atlas, an initiative of the Massachusetts Institute of Technology, calculates similar densities in the blocks of the Ensanche in Barcelona at 359 persons per hectare,<sup>9</sup> which constitutes a well-regarded example of urban design.

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<sup>9</sup> Data obtained from <http://densityatlas.org/> [Accessed, December 13, 2016].



Table 1: Historical population, area and density in Bogotá 1950–2011

Data Source: *Bogotá, Ciudad de Estadísticas, Boletín 23, Población y Desarrollo Urbano* (SDP 2010).

Year	Population	Developed Area (Ha.)	Density (Pop/Ha.)
<b>1950</b>	648,424	4,091	159
<b>1964</b>	1,697,311	6,875	247
<b>1973</b>	2,571,548	9,144	281
<b>1985</b>	3,982,941	12,805	311
<b>1993</b>	4,945,458	15,658	316
<b>2005</b>	6,778,691	21,107	321
<b>2011<sup>10</sup></b>	7,980,001	22,912	348

However, when I measured densities at the block level, I discovered that densities are very uneven across the city. I obtained from the SDP a database with the projection of population per block in the city for the year 2011 based on the information of the census 2005. I used this data to produce two population density maps. The first map in Figure 23 measures persons per hectare showing how densities are overall larger than 350 persons per hectare in the peripheries of the South and West of the city, while lower in the center and the North. In a second step, I used GIS data obtained from the SDP-IDECA website, which includes building footprints and heights, to calculate the built area per block. Afterwards I calculated the amount of square meters of built area per person using the data from the SDP; I show the results in Figure 24.

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<sup>10</sup> For 2011, the information was drawn from the database of population projection per block obtained from the SDP based on the census 2005.

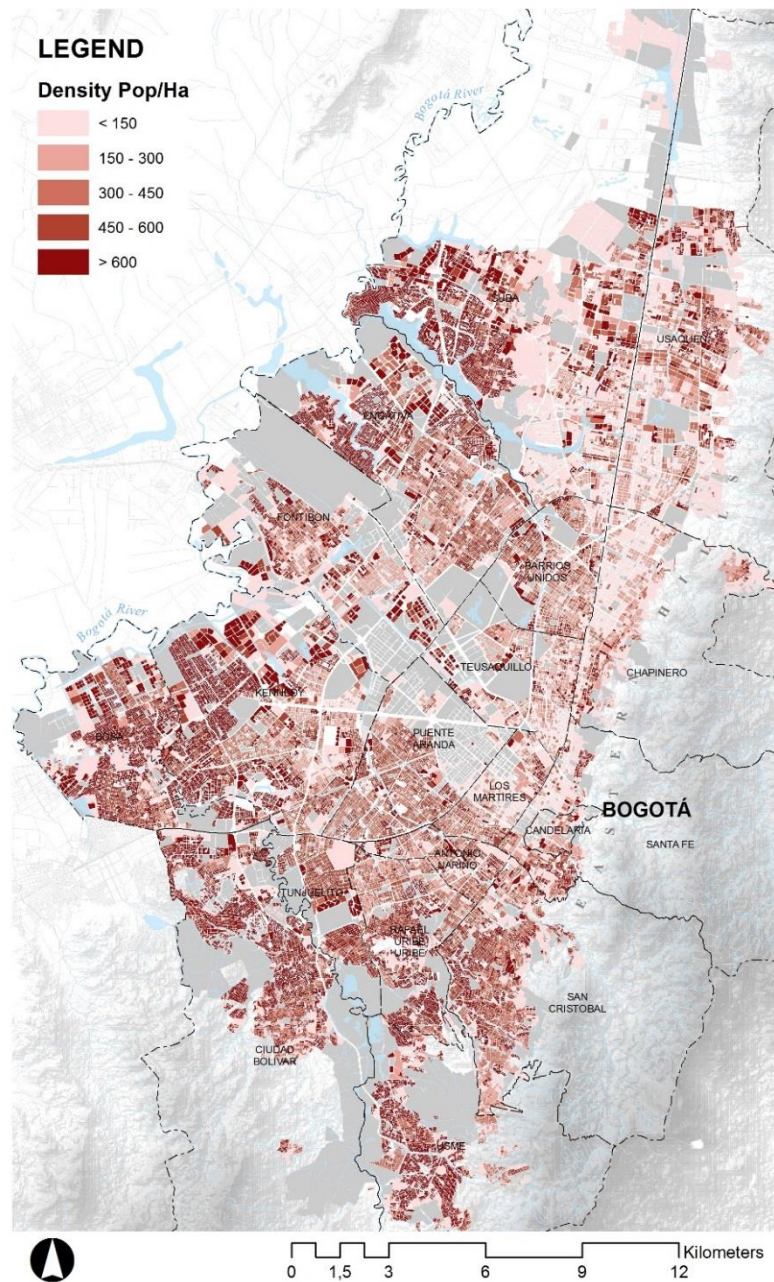


Figure 23: Population per hectare by block (2011)

Source: Illustration by the author using the 2011 projections of population per block based on the census 2005 made by the SDP and the DANE. Background Image: ASTER GDEM, is a product of METI and NASA



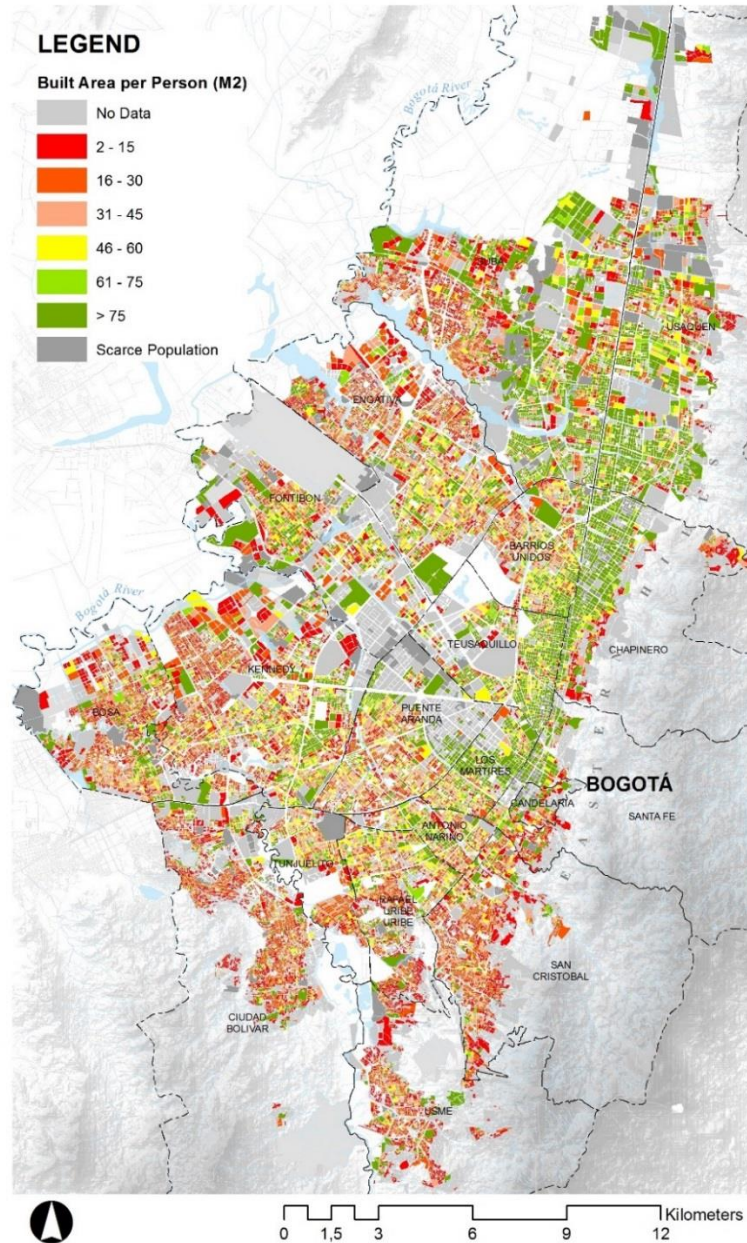


Figure 24:  $M^2$  of built area per person by block (2011)

Source: Illustration by the author using the 2011 projections of population per block based on the census 2005 made by the SDP and the DANE; and the construction footprints and heights database obtained from the IDECA. Background Image: ASTER GDEM, is a product of METI and NASA

The map shows how uneven the density levels are across the city. In the northern localities of Chapinero, Usaquén, Suba, and Teusaquillo, and in the central localities of Santa Fe and Los Mártires, the people in the majority of blocks have per capita built areas well above 75 square meters. These areas may include residential, parking, first floor retail and mixed use. In comparison, a large share of population in the South and West of the city has 30 square meters or less of per capita space. The current last phase of history shows that policy makers are aware of these unbalances, which reflect the influence of the real estate market on city planning authorities.

While the government introduced Decreto 190 to change the incremental densification practices, as the map of heights in the UPZs shows, the private sector development forces have continued business as usual using the regulations drafted at the local scale. I argue that instead of using the policies in the comprehensive plans, private developers and the real estate discourse use the system of socio-spatial segregation, represented by Stratification as a de-facto planning tool. In the next chapter, I explain the Stratification system in greater detail and examine its role in urban development processes.

## **Chapter 6: Stratification system reinforcing historical spatial trends**

### **THE STRATIFICATION SYSTEM ORIGINS AND POLICY DESIGN**

The Stratification policy has its roots in the unequal structure of Bogotá's society and in the socio-geographic distribution of the population shaped by the historical planning regulations. In the 1960s and 1970s, policy makers became concerned with the unequal provision of public utilities such as water, sewage, and electricity in Bogotá. While the consolidated neighborhoods of the elites had high quality and a full supply of services, the majority of middle class and low-income settlements, mostly of informal origin, had no utilities or had precarious self-organized illegal connections. As a result, water supply for the majority of the population was scarce and polluted; sewage was non-existent, and electricity networks highly unreliable. Because of a lack of sewage or waste collection services, the lower income populations had greater incidences of disease, people had to spend more time accessing clean water, and they suffered from constant fires and damages brought by electricity overloads. These conditions were perpetuating the advantages of the elites and the conditions of poverty for the majority.

Policy makers needed to develop a mechanism to bring equity to the utilities system by forcing the elites to subsidize the costs of infrastructure in the areas where the low-income groups lived. In 1968, the government mandated via Decreto 3069 the establishment of differentiated utilities charges according to the different economic level of social groups (El Presidente de la República de Colombia 1968). However, information about both the elites and low-income groups was scarce. At that time, the state had very little information about how much households earned, who was rich, who was poor, and who deserved to be subsidized. As the tax assessment databases were of very poor quality,

each municipality established different stratification systems based on their own, often arbitrary, criteria.

Aware of these problems, in 1994 the national government published an official Stratification methodology in *Ley 142* (El Congreso de Colombia 1994), which mandated the use of this methodology in all the municipalities in the country. The methodology established by the DNP took into account the unreliability and unavailability of household income data, relying instead on the physical conditions of the buildings and neighborhoods to determine the economic level of households, such as indicated in Figure 25. They proposed the classification of all of the urban households in maximum six different socio-economic strata—one being the lowest and six being the highest. Two sets of direct variables (DVs) delineated the strata: The first set of variables described the attributes of the building proper and its close surroundings, and the second set of variables described the urban characteristics of the neighborhood in which it was located. Table 2 shows the specific variables of each set.

Table 2: Direct variables of Stratification according to DNP’s methodology.

Data source: Sepúlveda Rico, López Camacho, and Gallego Acevedo (2014). Translated by the Author.

<b>Set 1: Attributes of the Building and Surroundings<sup>11</sup></b>	
Variable	Options
V1: There is a main entrance to the houses from the street front	Yes No
V2: Access roads (road to access the street front)	Path Pedestrian road Vehicular road on dirt Vehicular road on gravel Vehicular road on asphalt or cobble

<sup>11</sup> Translated by the author from *Características de la vivienda y el entorno*

Table 2 continued.

V3: Prevailing size of the building's front on the street access	Up to 7 meters
	Between 7 and 9 meters
	Between 9 and 12 meters
	More than 12 meters
V4: Sidewalk (prevailing state at the block front)	Without Sidewalk
	Sidewalk without green area
	Sidewalk with green area
V5: Setback (prevailing at the block front)	With setback
	With small setback
	With moderate setback
	With large setback
V6: Garages (prevailing state at the block front)	Without garage or parking area
	With covered garaged used for other purposes
	With garage or parking area
	With garage attached to house
	With single garage part of the original house design
	With underground double garages
V7: Facade material (prevailing at the block front)	Bamboo, cane, mat, boards or waste material
	Without wall finishes: adobe, rammed earth, bricks, prefabricated board
	Plaster without paint
	Plaster with paint
	With wall finishes in masonry or wood
V8: Roof material (prevailing at the block front)	Waste material, asphalt fabric or pieces of roof tiles
	Floor plaque
	Roof terrace or simple cover
	Luxurious or ornamental
<b>Set 2: Urban Characteristics<sup>12</sup></b>	
Variable	Options
Zones determined by the habitat criteria in which the urban block is located	Poverty area
	Red-light district
	Self-help housing without consolidation
	Urban blight
	Industrial
	Consolidated self-help housing
	Commercial predominant
	Intermediate Residential
	Commercial compatible
	Exclusive Residential
	Low-density Residential

<sup>12</sup> Translated by the author from *Contexto urbanístico*

Table 2 continued.

	Institutional
	Vacant
	Green area

Following the mandate of Ley 142, the city of Bogotá conducted its first Stratification census in 1997. However, due to its size and complexity, Bogotá changed the methodology in three ways (Sepúlveda Rico, López Camacho, and Gallego Acevedo 2014). First, while the DNP intended to assign a stratum to every building in small municipalities and to each street front in larger cities, in Bogotá, the stratum was assigned to the whole block. Second, in addition to the set of variables introduced by the DNP, Bogotá incorporated a set of new indicators abridged in the term Habitat Zones (HZ). This form of zoning classifies every block of the city in twenty different zones depending upon its physical and social characteristics. Table 3 shows the HZs in Bogotá. Thirdly, in order to incorporate the HZs into the DV methodology developed by the DNP, Bogotá used a Bivariate Dalenius statistical method. As a result, in order to determine the strata in Bogotá, the methodology combined the set of DVs and HZs in the following equation:

$$\text{Strata} = \text{DV} + \text{HZ} \quad (\text{Ibatá-Ceballos and Torres-Arias 2006, 215})$$

The Ley 142 of 1994 and subsequent regulations also mandated that every municipality in Colombia update its Stratification every two to a maximum of four years. For that purpose, the law requires the creation of a *Comité Permanente de Estratificación Socio-Económica* [Permanent Committee of Socio-Economic Stratification] in every city, to advise the mayor on the application and update of DNP's Stratification methodologies.

Stratification's updates may refer to the evaluation of citizen's requests—if there is any—to modify the stratum of a determined area, or stratum assignation of new blocks in areas where new development—or redevelopment—is taking place. Between 1999 when

the first Stratification update took place and 2016, Bogotá has conducted six updates. The last dates from 2013, when 35,000 new houses were stratified and 37 blocks changed stratum. According to this latest update (Decreto 291 de 2013) shown in Figure 26, in Bogotá, 50 percent of the population lives in newer informal settlements or projects of affordable housing, classified as strata 1 and 2, and 36 percent live in areas of older and consolidated informal settlements or affordable housing multifamily blocks, classified as Stratum 3. AOnly 14 percent of the population live in neighborhoods product of single housing or multifamily formal subdivisions, classified as strata 4, 5 and 6, concentrated mostly in the North of the city.

Table 3: Habitat Zones of Bogotá.

( - ) Means less intensity, and ( + ) means more intensity of the land use. Data Source: Instituto de Estudios Urbanos (IEU). Translated by the Author

1. Poverty ( - )	11. Commercial ( + )
2. Poverty ( + )	12. Intermediate Residential ( - )
3. Red-Light District	13. Intermediate Residential ( + )
4. Self-help housing not consolidated ( - )	14. Commercial compatible
5. Self-help housing not consolidated ( + )	15. Exclusive Residential ( - )
6. Urban blight	16. Exclusive Residential ( + )
7. Industry	17. Low-density residential
8. Self-help housing consolidated ( - )	18. Institutional
9. Self-help housing consolidated ( + )	19. Vacant
10. Commercial ( - )	20. Green area



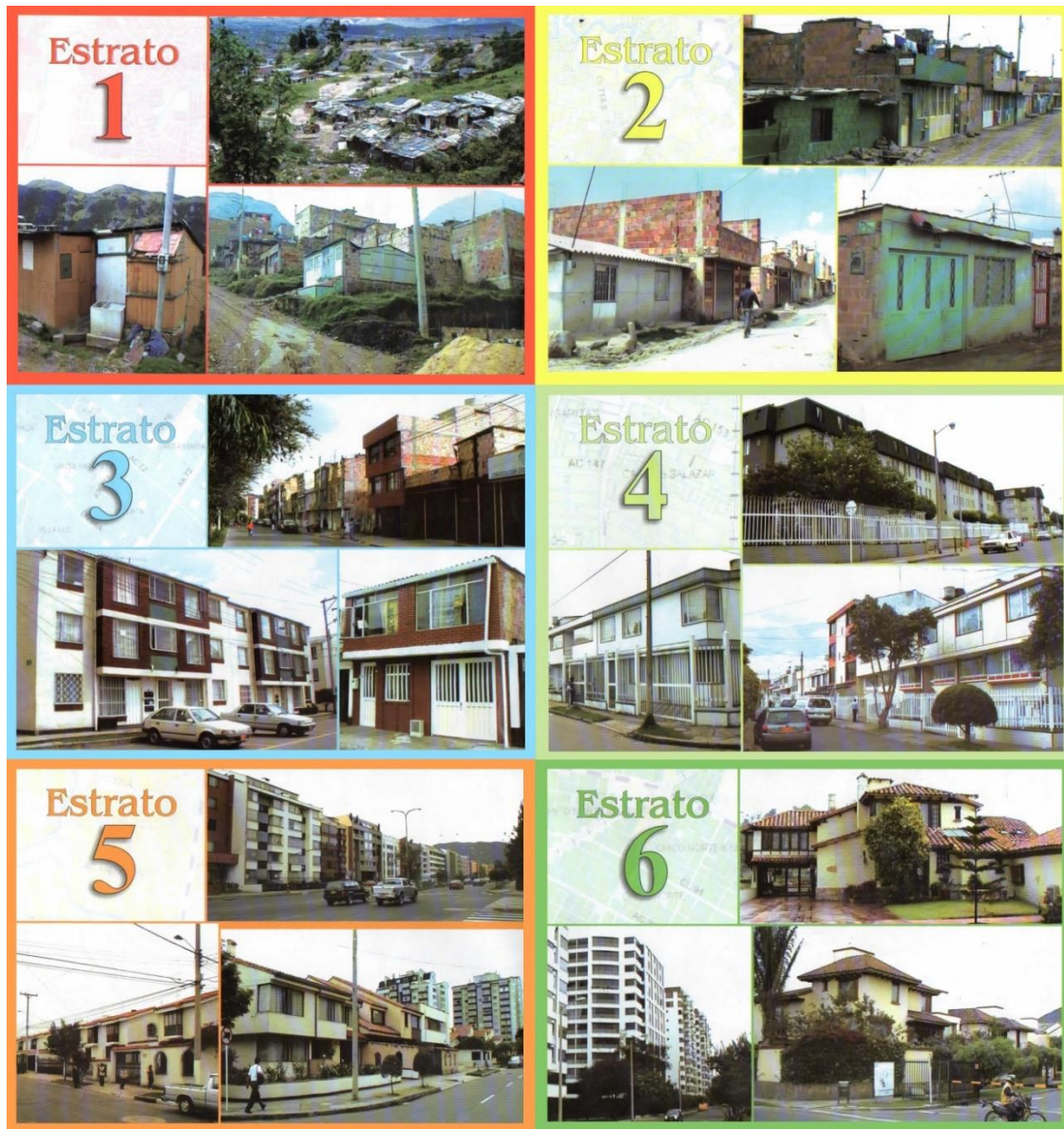


Figure 25: Examples of the built form differences among strata in Bogotá.

Source: *La Estratificación en Bogotá D.C. y Estudios Relacionados 1983-2004* (DAPD 2004)



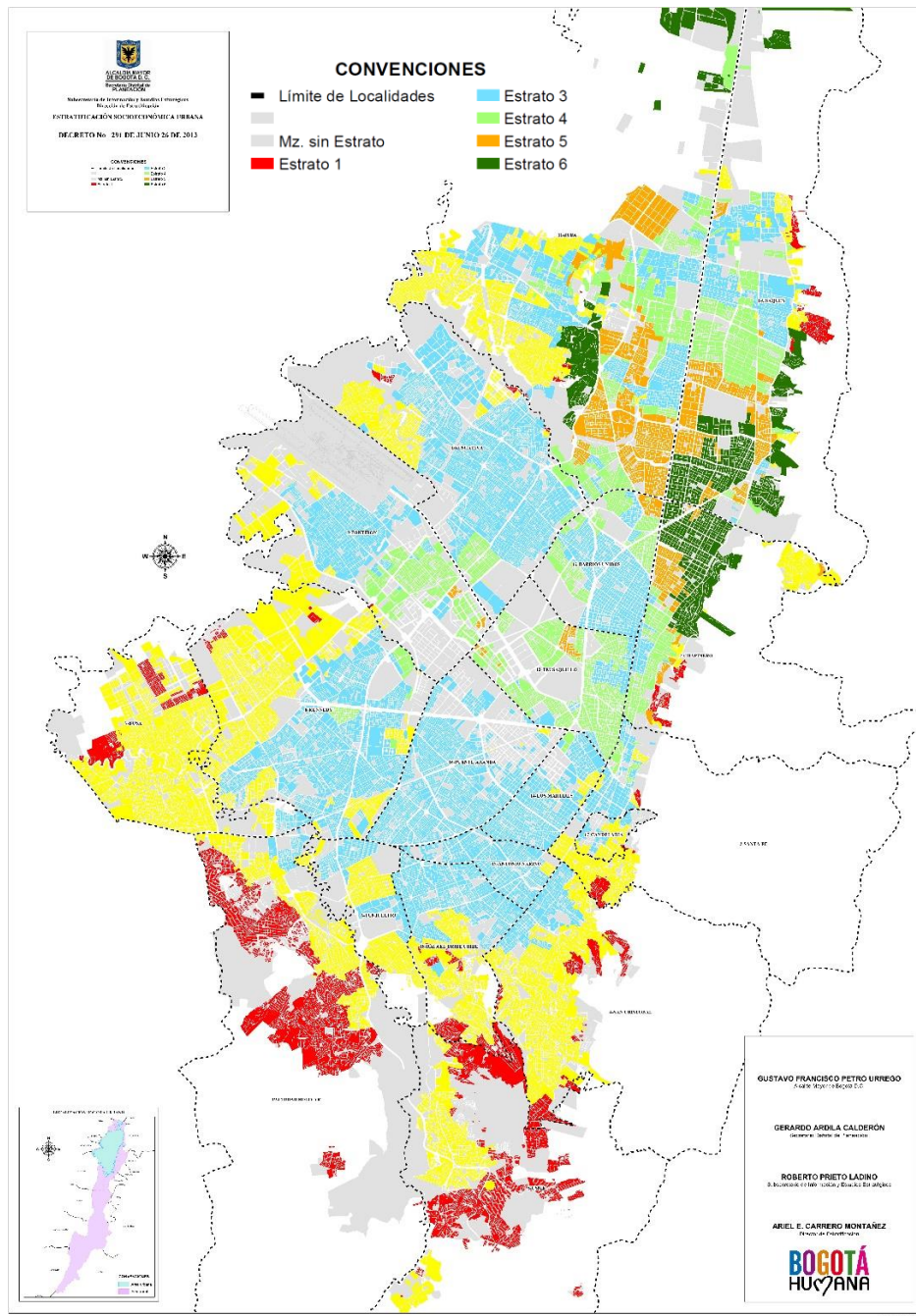


Figure 26: Latest map of the Stratification system in Bogotá.

Source: *Decreto 291 of 2013*

## **CRITICISM OF THE STRATIFICATION SYSTEM**

Despite its role in perpetuating spatial disparities, the Stratification system has been very successful in developing utility infrastructure for the very poor. However, local scholars have criticized the Stratification policy on methodological and social grounds. The general population and also many scholars and policy makers associate the Stratification with poverty levels, but data show that this relationship is complex. Figure 27 shows the percentage of total population in each stratum and Figure 28 shows the percentage of households in poverty in each stratum. The figures show that poverty levels are overall larger in the lower strata areas where the majority live than in the higher strata where a minority live, consistent with the policy assumptions. However, there are inconsistencies. For instance, not all the population in Stratum 1 lives in poverty. In Stratum 1, 50 percent live in poverty while 36 percent live in poverty in Stratum 2. The relationship becomes more complicated in higher strata areas. According to this official data, in Stratum 6—the highest—there is actually a larger percentage of population living in poverty than in Stratum 5.

The SDP conducted the first study that questioned the assumptions of Stratification in Bogotá (DAPD 2004). This study built statistical models based on surveys with socio-economic data and found different pitfalls on the Stratification methodology. Regarding its capacity to predict the economic conditions of households, it outlined that, in reality, the regulation's determination of six strata was arbitrary. According to the statistical models, there was a lag on the quantity of households both in the lowest stratum (1) and in the highest (6). This means that there is a large variability of income among households belonging to both the lowest and the highest strata. They recommended the creation of a new category at the highest level, Stratum 7.

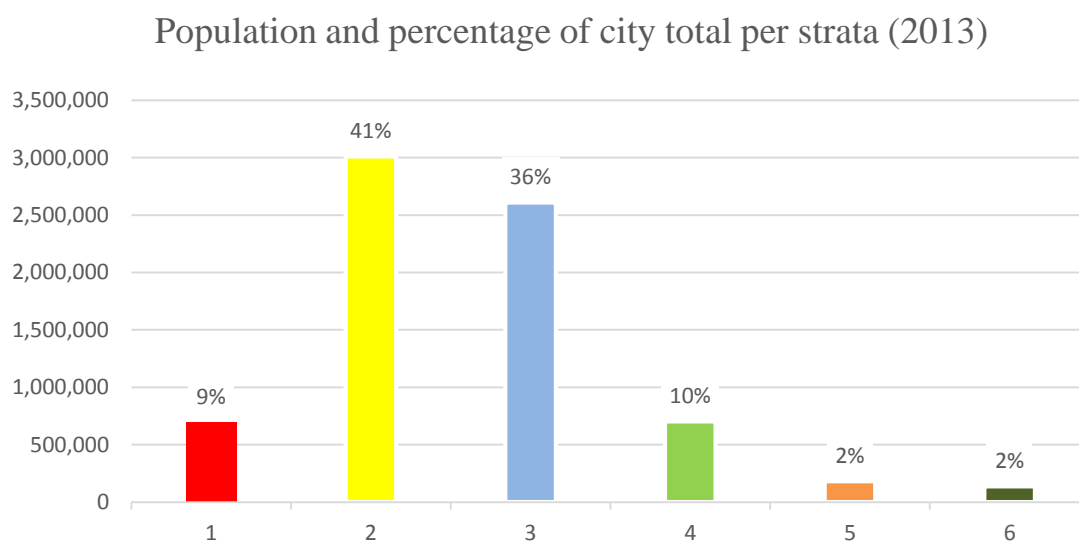


Figure 27: Number and percentage of population per stratum (2013)

Source: Illustration by the author with data from the website of the SDP: [www.sdp.gov](http://www.sdp.gov) (Accessed, December 1<sup>st</sup>, 2016)

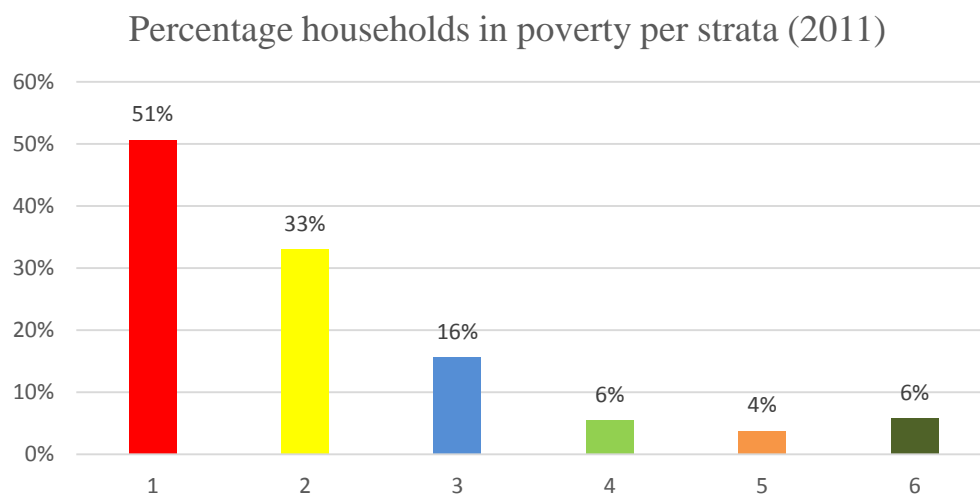


Figure 28: Percentage of households in poverty per stratum (2011)

Source: Illustration by the author with data from *Ciudad de Estadísticas, Boletín No. 42* (SDP 2011)

Later, Ibatá Ceballos and Torres Arias (2006) conducted the first study where the socio-economic statistics surveyed in the national census of 2005, together with data from the national survey of unsatisfied needs were compared with the Stratification zones in Bogotá. They found that actually there was a heterogeneity of household income levels inside each stratum. This meant that the Stratification zones—based on built form characteristics—were not an accurate predictor of income levels among the population. The authors suggested that the causes were that Stratification surveys to date have only stratified new developments, while avoiding the re-stratification of areas changing inside the city. The underlying causes of this, the authors pointed out, were that it is politically hard for a municipal administration to increase the official stratum of a neighborhood. These changes face strong opposition from communities that currently enjoy subsidies. In addition, when communities approach the administration to be re-stratified they only request to lower their current stratum and therefore enjoy a larger subsidy for utility payments. In consequence, the Stratification put in place in the early 1990s has hardly changed twenty years later. Regarding this point, during my fieldwork in the summer 2016, a city official at the Stratification management at the SDP told me:

[The census was done and there was a result, afterwards there were the reclamations, at that time I was not here. As far as I know, the first update was done three years after the original, and from there forward a new update has been done every three or four years. However, it is more than anything to incorporate what is coming up, as the city is growing new neighborhoods are emerging. Every two or three years a new neighborhood is incorporated, and some small sectors are reviewed. In general, the majority of the city has the same stratum that was defined for it in the year 1996.]

*Se hizo el censo y pues hubo un resultado, después hubo las reclamaciones, en esa época yo no estaba acá. Por lo que sé, a los tres años se hizo la primera actualización y de ahí en adelante se han ido haciendo cada tres o cuatro años actualizaciones. Pero es para incorporar más que todo lo que va surgiendo pues la ciudad va creciendo y van apareciendo nuevos barrios, entonces cada dos o*

*tres años se incorpora el Nuevo barrio y se revisan algunos pequeños sectores. Pero en general, la mayoría de la ciudad tiene el mismo estrato que se le definió en el año 1996.*

Aliaga Linares and Alvarez Rivadulla (2010) performed a study where they associated, for the first time, residential segregation scores and Stratification in the city of Bogotá. They observed that there was great variability inside the stratum of socio-economic characteristics of individuals, like income and education. Therefore, the strata were not, as believed, homogeneous in the socio-economic characteristics of individuals inside each zone. The authors also claimed that the models of residential segregation when measured using stratum as the unit of analysis, indicated larger segregation scores than measured by each of Bogotá's administrative districts—named Localities. This suggested that residential segregation within the strata is larger than between the strata in the city.

The influence of Stratification in residential segregation has been explored largely using interviews and life stories by sociologist Uribe-Mallarino (2008). She found deep socially constructed differences in perceptions and behaviors among the individuals belonging to different strata. Individuals living in lower strata areas in Bogotá have settled in self-help houses mostly in urbanizations of informal origin, and individuals in the higher strata areas live mainly in apartments that offer higher social status and security. Research found that these urban form differences have influenced the patterns of social appropriation of the territory. As a result, people feel alienated if moving upwards into apartments or downward into self-help built houses, and thus prefer to stay in their own stratum. Among her interviewees, however, she also found strong geographical perceptions about the division North-South of the city. These perceptions even go beyond those in place by Stratification. Individuals, for instance, responded that a neighborhood of any stratum is “safer” if it is located in the North, rather than the South.

Mobility is another field where society builds separation according to stratum. When asked about places people want to visit for leisure, the majority of the population prefers places classified in their own stratum. This limits the chances of interaction among social classes. This phenomenon worsens when taking into account the acute differences in access to high quality education. People in Stratum 1 and Stratum 2, i.e. lower-income classes, send their children to public schools, while the higher levels (4, 5 and 6) use exclusively private education. However, Uribe-Mallarino also found evidence of social benefits in cases of proximity between higher and lower strata. Border areas, especially between strata 3 and 5, are places of interaction. Evidence indicate that individuals belonging to the higher strata in these cases prefer to walk and use local businesses located in the lower strata areas, instead of using the car to move to farther out locations for shopping.

During the leftist administration of Mayor Petro the criticism of the Stratification system finally emerged from the academic debate and began to influence public policy. During this period, the local government funded several research initiatives to find new policies to replace Stratification. Petro also officially requested permission from the national government to eliminate the Stratification system in Bogotá. A significant outcome of these initiatives was a publically funded study led by professors of the School of Economics of the *Universidad del Rosario*. In the resulting book (Sepúlveda Rico, López Camacho, and Gallego Acevedo 2014), scholars argue that Bogotá's tax assessment system, formerly very inaccurate, is already mature enough to take the place of Stratification as the method to distribute cross-subsidies for utility payments. As a result, the subsequent administration of Mayor Peñalosa passed a regulation that removed the

differentiated percentage according to the stratum over the appraisal value to charge the property tax, and instead set the tax bill based only on the appraisal values.

#### **STRATIFICATION SYSTEM AND URBAN PLANNING**

The Stratification system has an unclear relationship with planning ordinances. In the Ley 388 (Congreso de Colombia 1997), the term stratum, strata, or Stratification is only mentioned twice and only in articles that deal with the provision of public utilities. However, in the current comprehensive plan of the city, Stratification seems to have more importance. Decreto 190 mentions the policy as one of the variables to account for when drafting the UPZs' land-use and development ordinances (Alcalde Mayor de Bogotá D.C. 2004, Art. 50). However, these UPZs ordinances only have validity at the local scale, and actually only a few of the UPZs include neighborhoods of different strata. This limits any attempt to incorporate Stratification into any larger comprehensive physical planning initiative.

In my conversations with planners who were drafting the new POT of the city, I found that they do not consider the social divisions or the Stratification system as an important planning variable. According to them, the physical characteristics of a site, such as large parcel sizes, are more important to incentivize densification in any area. They argue that Stratification does not affect land-use patterns, or the maximum height, density, or bulk of buildings in a neighborhood. They use Stratification only as a variable for diagnosis. Moreover, this variable will become irrelevant in the future, as “the social differentiations in the city have ceased to exist” (Notes on interview with policy maker at the SDP. June 2016). A planning scholar with forty years of experience working in the city explains about Stratification:

[No, it was not really a relevant indicator; mainly it was a complementary confirmation of the way we saw development taking place. It was fundamentally morphological, it was the configuration of that neighborhood, how it was connected, which was the main highway, does it connect or not connect, it was more that. That planning indicator has been important but more in terms of Catastro (tax assessment office), in terms of public billing services of companies... The public sector has seen it always as a result, but not as a policy instrument. As a result of a way of operationalizing the management of those areas, but not as a basis for making decisions.]

*No, realmente no era un dato relevante, principalmente era un complemento de confirmación de lo que veíamos de la manera a través de la cual estaba desarrollando, era fundamentalmente morfológico, era la configuración de ese barrio, cómo estaba conectado, cuál era la carretera principal, se conecta, no se conecta, era más eso. Ese dato a planeación le ha importado mucho pero en términos de Catastro, en términos de servicio público de cobro de las empresas... El sector público lo ha visto siempre como un resultado, pero no como instrumento de política. Como resultado de una manera de hacer operativo el manejo de esas áreas, pero no como un dato de base para tomar decisiones.*

In contradistinction, planners at the SDP believe that infrastructure is more important in triggering investments from the private sector. They provide as an example the new infill projects in the peripheral southwest of the city, where large new housing complexes are built within older neighborhoods of informal origin, mainly motivated by the introduction of the BRT system and new roads. An urban planner working in the new POT of the city explains:

[As soon as the area got the Transmilenio (BRT transit system), all that filled up with projects of developers, and now it even has shopping malls. Therefore, it has to do more with existing attributes; builders obviously are not going to go where there is no infrastructure, where there is the risk of flooding, where there is no public transportation. As soon as they had it they arrived there, you can see it from the aerial photography and urban morphology, it is very clear, and if you look at historical pictures, you can see very clearly, let us say the (changing) vocation of the areas. That has nothing to do with Stratification as such; the city gave them a name and suddenly no one wants to live there? No, it has to do with the available infrastructure, living conditions, and urban services. As all of that changed, the area filled up with constructed projects.]



*Apenas la zona tuvo Transmilenio todo eso se llenó de proyectos de constructores y ahora tiene centros comerciales. Entonces tiene que ver más con los atributos existentes, los constructores obviamente no van a llegar donde no hay infraestructura, donde hay condiciones de riesgo de inundación, donde no hay transporte público. Apenas lo hubo allí llegaron y tú lo puedes ver en las aerofotografías y la morfología urbana es muy clara, y si lo miras en fotos históricas puedes ver muy claramente digamos la vocación del sector. Eso no tiene nada que ver con la Estratificación propiamente dicha, la ciudad fue la que le puso ese nombre y pues ¿nadie quiere vivir allá? No, tiene que ver con la infraestructura disponible, las condiciones de habitabilidad y de soportes urbanos. Apenas eso cambió se llenó de proyectos construidos.*

However, when I inquired about incremental densification in central city areas, the clear relationship between infrastructures, transit improves, and new development became uncertain for the interviewees. Recent studies suggest that the relationship between infrastructure and urban development is very complex and not homogeneous inside Bogotá. A study by Munoz-Raskin (2010) found that the social stratum was an important factor that influenced the change in value of lands in the proximity of BRT stations. While in the middle strata areas, the lands in proximity with BRT stations increased their value after the system was put in place, in the lower strata areas, properties located close to stations decreased in value. In the same way, other researchers found in Bogotá that the introduction of the BRT corridors had complex and context dependent impacts in the surrounding built environment (Rodríguez, Vergel-Tovar, and Camargo 2016). This suggests that infrastructure improvements are not the only variable to take into account to explain the patterns of densification inside the city. The findings of this study confirm that the importance of Stratification in restricting or encouraging densification may depend on the type and location of development. Stratification seems to be an important variable in predicting densification in the central city and consolidated areas, while it is not relevant for newly built densification projects located in the in-fill or expansion areas. This is

because the in-fill and expansion areas are not stratified until after they are developed, and thus are perceived by the public as open and virgin areas.

Viewing Stratification as an irrelevant variable for physical planning may also lead to a neglect of social differences. Feminist scholar Iris Marion Young (1990, 164–65) claimed that policies that ignore social differences as a means to achieve greater equality may have oppressive consequences. Young explains that oppressed social groups often have to prove themselves as equals by achieving high standards, previously set by the dominant group or by those who arrived first. As a result, minorities or newcomers are in a disadvantaged position, making it difficult for them to achieve those standards, thus perpetuating their oppression. The uneven urban form of Bogotá illustrates how these high standards, derived from the Stratification system, serve to perpetuate social divides.

As explained in the previous chapter, during the 1950s, one of the major obstacles to legalize the informal neighborhoods was the urbanization standards set by the city. These standards required specific lot sizes and a high level of infrastructure and provision of utilities before awarding urbanization permits. Policy makers solved this obstacle when they passed the regulation that set the Normas Mínimas. Confronting the high rates of migration and housing deficits of the time, these rules allowed the already built informal settlements to be legalized. However, the Normas Mínimas also encouraged the development of new informal settlements as they provided legal grounds for the action of illegal developers. The result of these processes is that the city was divided between areas of formal origin with larger property sizes and better infrastructure, and areas of informal origin that barely comply with the Normas Mínimas, with smaller lot sizes and no utilities or urban services. Years later, Stratification became a policy that achieved a large social benefit by highlighting these differences in the urban form to develop a system of cross-

subsidies between social classes. This system facilitated the funding of the infrastructure needed to upgrade the utilities into the settlements of informal origin.

However, while policy makers enthusiastically implemented Stratification nationwide as a utility policy, they never clearly related Stratification to the physical planning ordinances. This placed the neighborhoods of informal origin at a disadvantage against the formal city in terms of land market values. For instance, the urban treatments set in Decreto 190 encouraged incremental densification by allowing increasing height and FAR limits in areas where lots were larger—classifying them in the more beneficial treatments of *Densificación Moderada* and *Cambio de Patrón*.

On the other hand, the Decreto 190 classified informal settlements that have gone through legalization and tenure programs as *Mejoramiento Integral*. This tratamiento designation allows only limited heights because of the smaller lot sizes and lack of infrastructure. This lack of parity between zoning ordinances led to the multiplication of land values in the formal areas while freezing land values in the neighborhoods of informal origin. As a result, the size of the lots becomes the standard set by the dominant group—city planners—over the vulnerable—owners of properties in informal settlements. Policy makers in Bogotá are aware of this paradox, but they appear to have not found a fair policy solution to it. A senior policy maker involved in the process of the Decreto 190 explains:

[What happens with those areas (neighborhoods of informal origin) is that they have problems in instituting the zoning ordinances. They are very complicated because the standard that was being applied to these neighborhoods, which were legalized, was a standard very similar to that for the other neighborhoods, which people did not meet. They do not have yards, or setbacks; those were useless prehistoric standards. People continued to build as they liked, occupying a 100 percent of the lots. These lots are occupied entirely leaving only a small patio for example; it is a very different type of housing. Then, that type of housing produces another thing and when you go to set the zoning standards in those neighborhoods, no one knows what to institute. Allowing densities of five stories

without thinking much beyond that, because you are not going to limit the low-income sector from doing those things.]

*Lo que pasa con esos sectores, es que tienen unos problemas para hacer la norma. Son muy complicados porque la norma que se les aplicaba a los barrios que se legalizaron era una norma muy parecida a los otros barrios, que la gente no cumplía, ni tienen jardín, ni antejardín, eran normas prehistóricas que nunca servían. La gente siguió construyendo como les parecía, ocupando los lotes en un 100 por ciento. Estos lotes son ocupados en su totalidad con un patio, por ejemplo, es un tipo de vivienda muy distinto. Entonces ese tipo de vivienda da otra cosa y cuando usted pasa para poner normas en esos barrios, nadie sabe bien que poner. Poner normas de densidades de cinco pisos sin pensar mucho más allá de eso porque usted no le va a limitar al sector popular hacer esas cosas.*

Young also describes how the ideal of a universal humanity without social group differences allows privileged groups to ignore their own group specificity and advantages. I found evidence of this phenomenon in the Bogotá case, specifically concerning different perceptions of the system between people in different strata areas. The dominant groups perceive that they live in an egalitarian society and do not notice the conditions of disadvantage of the oppressed. Uribe-Mallarino and colleagues found evidence of Young's point in their surveys of people in different strata areas in Bogotá. They affirm (2006, 91):

[Those in higher strata manifest themselves as egalitarian, well they are convinced that everybody has the same opportunities, as much as those in lower strata believe that there are not equal opportunities for all, and they conceive the policy of Stratification as 'exacerbating differences and promoting social segregation.']

*Los estratos altos se manifiestan igualitarios, pues están convencidos de que todos pueden tener las mismas oportunidades, en tanto que los estratos bajos no creen que haya oportunidades iguales para todos y conciben a la política de Estratificación como "exacerbando las diferencias y promoviendo la discriminación social."*

Nevertheless, the data about city development reaffirms that there is a relationship between Stratification and urban planning. Figure 29 compares the height limits of each of the historical plans since Acuerdo 7 of 1979 aggregated by the Stratification system. The

graph shows that Acuerdo 7 allowed higher heights in the areas of strata 3 and 4 and lower in the uppermost and lowermost strata. However, later Acuerdo 6 increased heights in the higher strata 5 and 6 to reach the levels of the strata 3 and 4, while keeping the restriction in heights in the lower strata 1 and 2. Further, the rules of the UPZs largely increased the height limits in the areas of strata 4, 5 and 6 and to a lesser extent in strata 2 and 3. The UPZs decreased the average height limits for Stratum 1. The results of the graph further confirm the social disparities set by the historical planning regulations, which have reinforced the difference in the urban form and thus the patterns of social segregation between the North and the South, shown in Figure 30.

I also aggregated the density per block at the stratum level in Figure 31 and Figure 32. The first graph shows how densities per hectare are very uneven across the different stratum. While Stratum 2 has a density that exceeds the average for the city, the higher stratum areas are much less dense. For instance, the neighborhoods classified as Stratum 5 have an average density of about 150 persons per hectare and Stratum 6 of less than one hundred persons per hectare. In the same way, Figure 32 shows the uneven indicator of built area per person across the strata. While a person living in a neighborhood of Stratum 6 have on average 802 square meters of built area; a person living in Stratum 1 have an area twenty times less, averaging 36 square meters per capita. In order to confirm further this relationship and its consequences, in the next chapter I will use data from the building permits issued in the period 2010–2015, which I obtained at the SDP, to associate statistically the incremental densification with the Stratification system. I will explore these unbalances and confirm further the relationship between densification and stratification and its consequences in the next chapter. For this purpose, I will use data from the building permits granted in the period 2010-2015 obtained at the SDP.

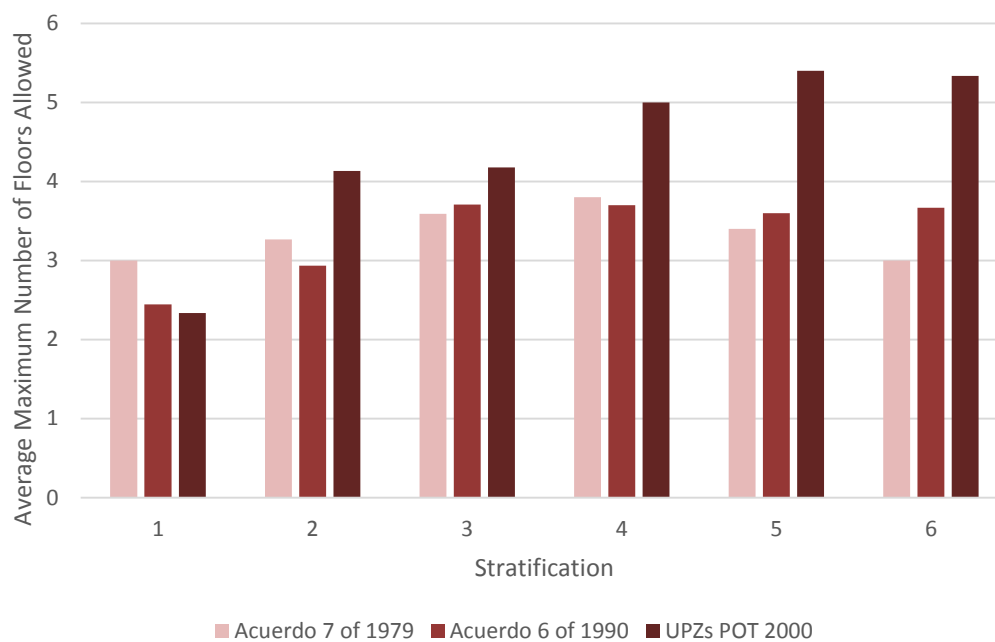


Figure 29: Height limits compared aggregated by Stratification

Source: Official maps Acuerdo 7 of 1979, Acuerdo 6, 1990 and SDP-SINUPOT

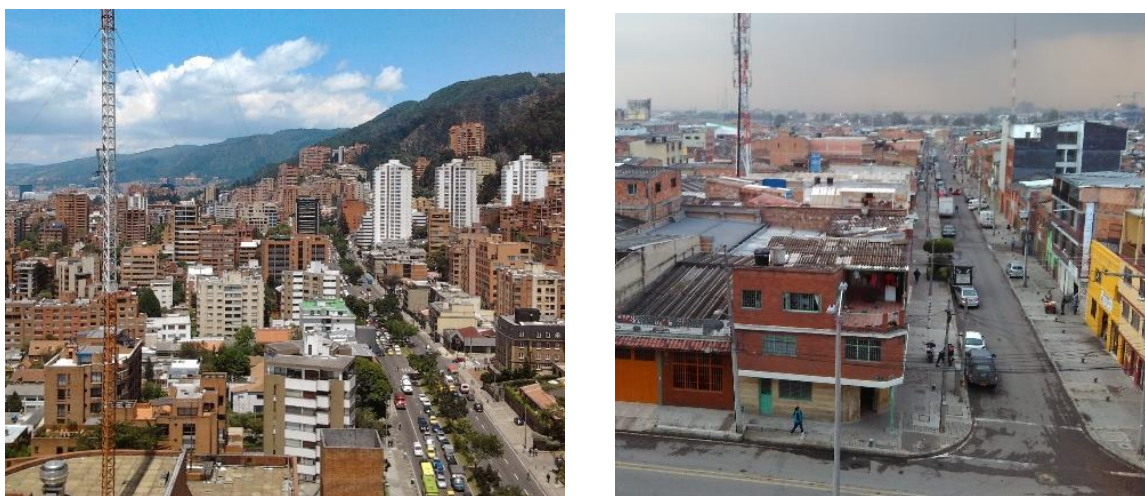


Figure 30: The urban form differences between the North and the South

Source: Photos taken by the author

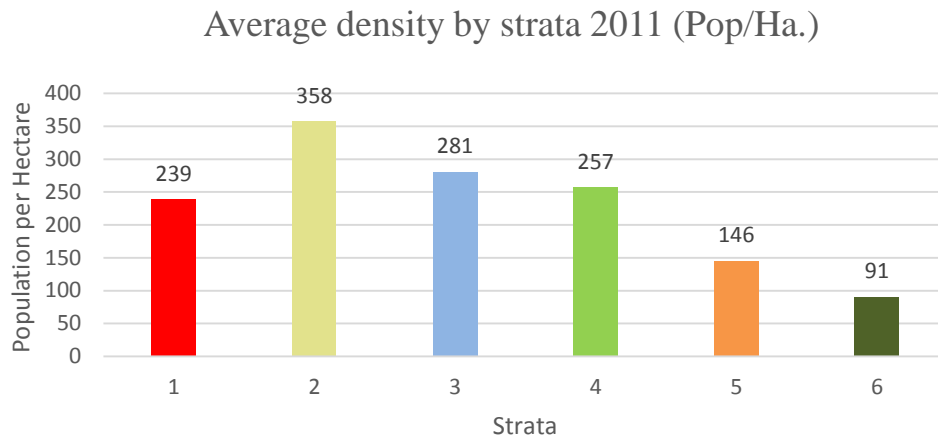


Figure 31: Average population per hectare aggregated by strata in 2011

Source: Illustration by the author using the 2011 projections of population per block based on the census 2005 made by the SDP and the DANE

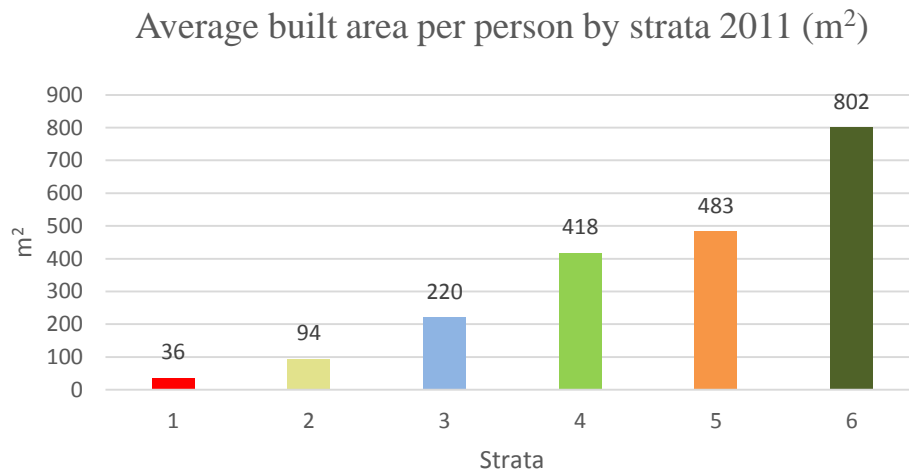


Figure 32: Average built area per person aggregated by strata in 2011

Source: Illustration by the author using the 2011 projections of population per block based on the 2005 census made by the SDP and the DANE; and the construction footprints and heights database obtained from the IDECA. Includes all built area such as housing, parking, retail and circulation.

## **Chapter 7: Correlation Stratification, densification and segregation**

The Stratification system is a social equity policy based on existing urban form differences across the city. The urban form differences respond to planning policies that shaped a system of social segregation based on density and land-use norms from the 1940s to the 1970s. Therefore, the Stratification zones are correlated with the different built form characteristics of neighborhoods such as architectural typologies, street layout, and supply of parks, plazas and open spaces. Specifically, the areas of lower strata, because of their informal origin, have less quantity of parks and open spaces, narrower streets and poor pedestrian infrastructure. Conversely, the areas of higher strata, because of their formal origin, have wider roads, better infrastructure and more quantity of green spaces. While Stratification has been an important tool to subsidize the development of utility infrastructure for the very poor, the planning history of the city—explained in detail in the previous chapters—suggests that local policy makers have not conjoined this system of interclass solidarity with the urban planning objectives of the city.

A better integration of the social Stratification with the planning policies, for example, could have led to a better distribution of the value gained by real estate development and also reduce socio-spatial segregation. Instead, my analysis suggests that policy and local planners downplay the ways in which the patterns of socio-spatial segregation—which are embodied in the Stratification system—influence landowners and developers and hence determine the location and size of incremental densification projects.

To explore this point, in this chapter I will explore the statistical relationship between densification patterns—i.e. location and size of new densification projects—and Stratification. To operationalize this approach, first I will statistically relate the system of Stratification with the production of new housing and nonresidential projects in the city.



As discussed before, I will not control for other built form variables such as supply of parks, roads or the street layout because as the history of planning in the city suggest, these may be correlated with the stratum.

Nonetheless, to cross-validate the results with the perceptions of the local planners' community, I will control for other factors not related to Stratification that they argue are shaping developers' investment decisions. Specifically, I will control for access to the newly implemented BRT system (Transmilenio), which since 2000 has been connecting areas of different strata and which could potentially be catalyzing new patterns of development. Secondly, I will control for parcel (lot) size since this is an important variable for developers. Often, planning norms permit larger developments on larger lots, and lot sizes are not correlated with the stratum. For instance, older areas of informal development in lower strata have actually parcel sizes similar to those of the formal areas in higher strata.

To perform my analysis, I obtained a database from the Direction of Statistics, Cartography and Information of the SDP, which contains information about all the building permits granted in the city in the period 2010 to 2015. The GIS database contains the geo-referenced location of each new project and other information such as the identification of the applied zoning ordinance, approved land use, approved area for construction, lot size, and approved height. I used this database to identify projects that contributed to incremental densification. I did this by selecting 2,060 projects of densification with the following criteria: buildings with heights of four stories or more, lot areas between 100 and 5,000 square meters, and total built areas between 100 and 10,000 square meters. For nonresidential land uses—including retail, public services, and office—I selected 236 permits from the database using the same criteria. I then calculated their distance to the

nearest BRT trunk line—a transportation system that is widely used in the city—using the function “Near” in ArcGIS.

#### **ANALYSIS OF THE DATA**

Before conducting the econometric analysis, I used the GIS database to explore the recent patterns of development in the city. First, data about the total built area of each construction permit for both housing and nonresidential land-use suggests that incremental densification is the most used method for urban redevelopment in the city. The ordinances introduced by Law 388 and Decreto 190 aimed to discourage incremental densification, and instead proposed the use of PPs to ensure that urban growth maintains adequate supply of services and infrastructure, such as parks, roads or schools. However, the data shown in Figure 33 and Figure 34 demonstrate that densification through PPs in the period analyzed only accounted for 6 percent of the densification in housing, and 7 percent of the densification in nonresidential land-use. These results demonstrate that incremental densification is a well-established, unofficial redevelopment tool, making it a challenge to transition to a more formal planning model for larger sections of the city.

The preliminary analysis shows that private sector-led densification is unevenly distributed across strata (Figure 35). For instance, while Stratum 6 accounts for only 7 percent of the land area in the city, developers located 30 percent of the new housing projects and 32 percent of the new nonresidential projects in this stratum. Conversely, Stratum 2 accounts for 30 percent of the land in the city, but developers only located 4 percent of the new housing areas and a mere 2 percent of the new nonresidential areas in this stratum. In addition, there were other imbalances related to the relationship between housing and nonresidential areas.

### Densification housing projects by zoning ordinance 2010-2015 (m<sup>2</sup>)

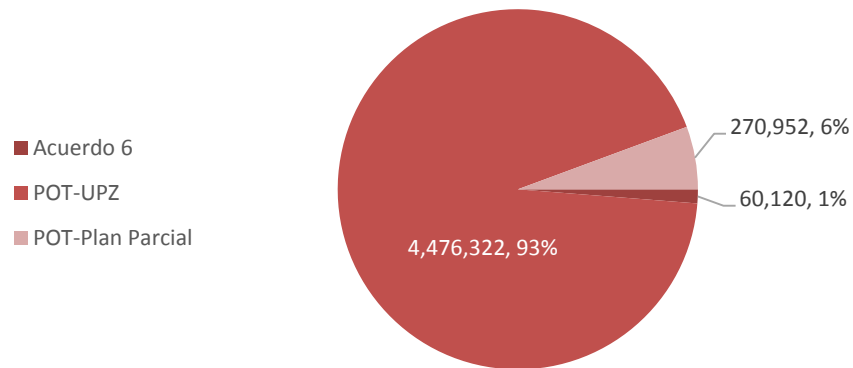


Figure 33: Housing densification by zoning ordinance

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

### Densification nonresidential projects by zoning ordinance 2010-2015 (m<sup>2</sup>)

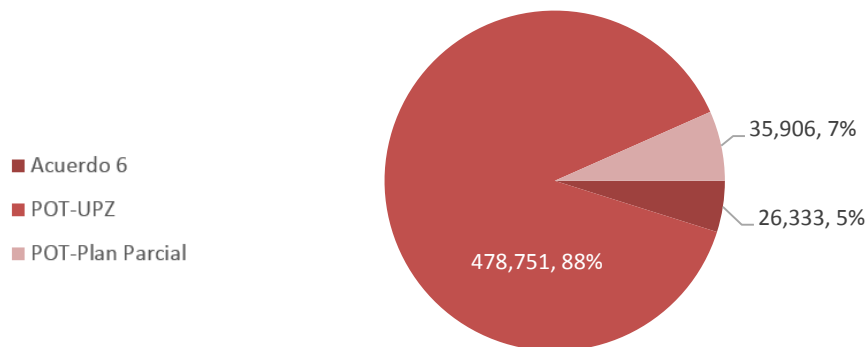


Figure 34: Nonresidential densification by zoning ordinance

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

For instance, Stratum 4 accounts for 12 percent of the urban land but has a 19 percent share of new housing areas. Strata 4, 5 and 6 together account for more than 75 percent of the new housing projects, and more than 60 percent of the new nonresidential projects, while they represent less than 30 percent of the urban land.

Figure 36 shows the evolution per year of these new projects by stratum. The graph for housing shows how the production in the upper strata 5 and 6 is larger and more elastic, in comparison with a more stable and lower production of housing in the lower strata 2 and 3—and almost zero new housing production in Stratum 1. However, the graph suggests some changing trends, specifically about new construction in Stratum 3 for the years 2014 and 2015. In this last year of the analysis, Stratum 3 surpassed the traditional leader, Stratum 6, in new housing area.

On the other hand, in terms of new nonresidential projects the chart shows how developers produce nonresidential almost exclusively in strata 3, 4, 5 and 6, and very few areas in the lowermost strata. Production of nonresidential areas is also in general more elastic than housing, however also with a large representation in Stratum 6. Finally, the graph also identifies a new growing trend of nonresidential areas in Stratum 4 for 2015, which also represents a change from previous years.

The size and location of the incremental densification housing projects vary across the city. Figure 37 shows how developers choose to locate the majority of the housing projects in the northern localities of Usaquén and Chapinero. Projects within these two localities were also overall larger with total approved areas averaging more than 2,500 square meters. In contrast, the majority of the incremental densification housing projects in other localities in the South and West, such as Puente Aranda, Los Mártires, Rafael Uribe, Engativá and Fontibón were smaller than 1,000 square meters.

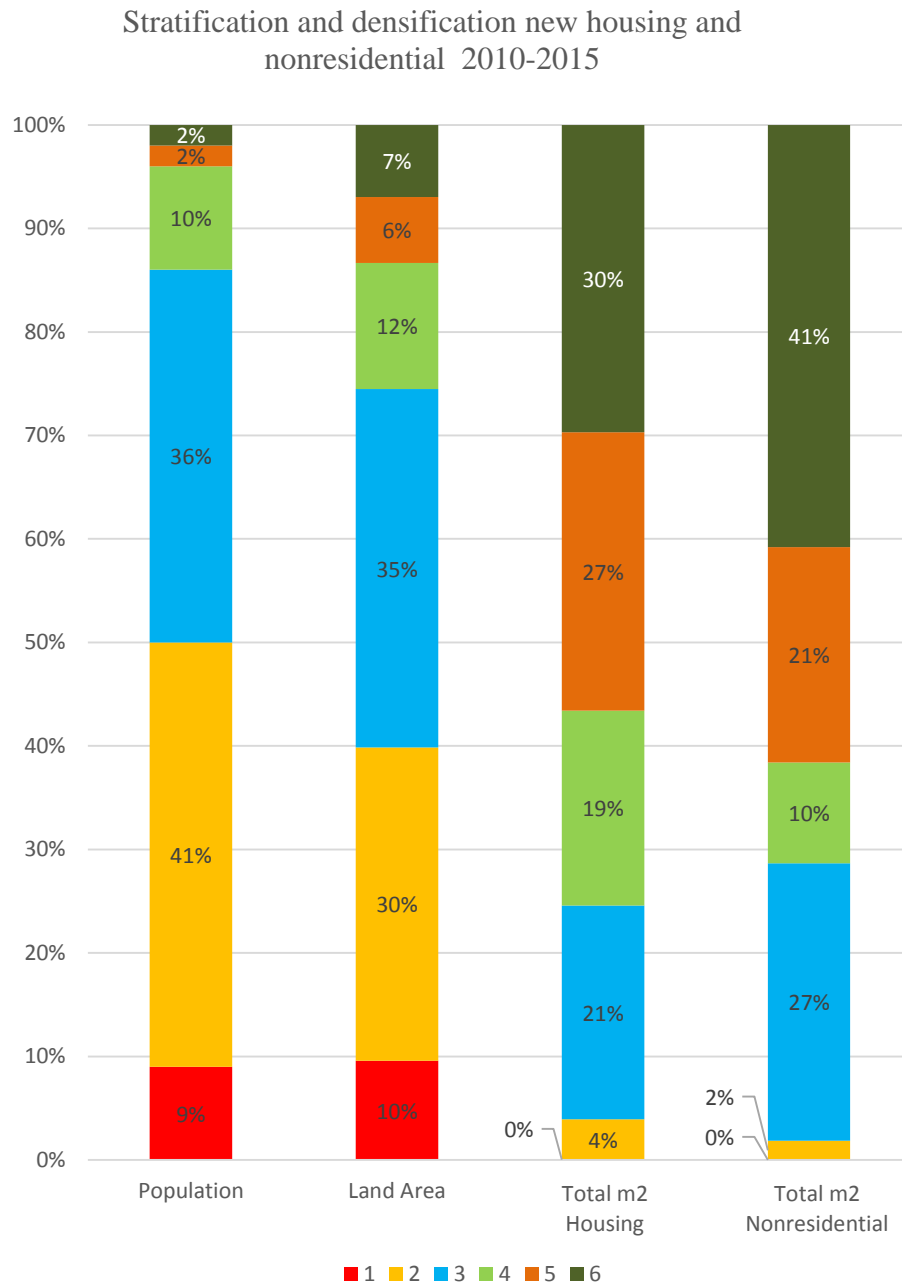


Figure 35: Stratification and densification, percentages 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

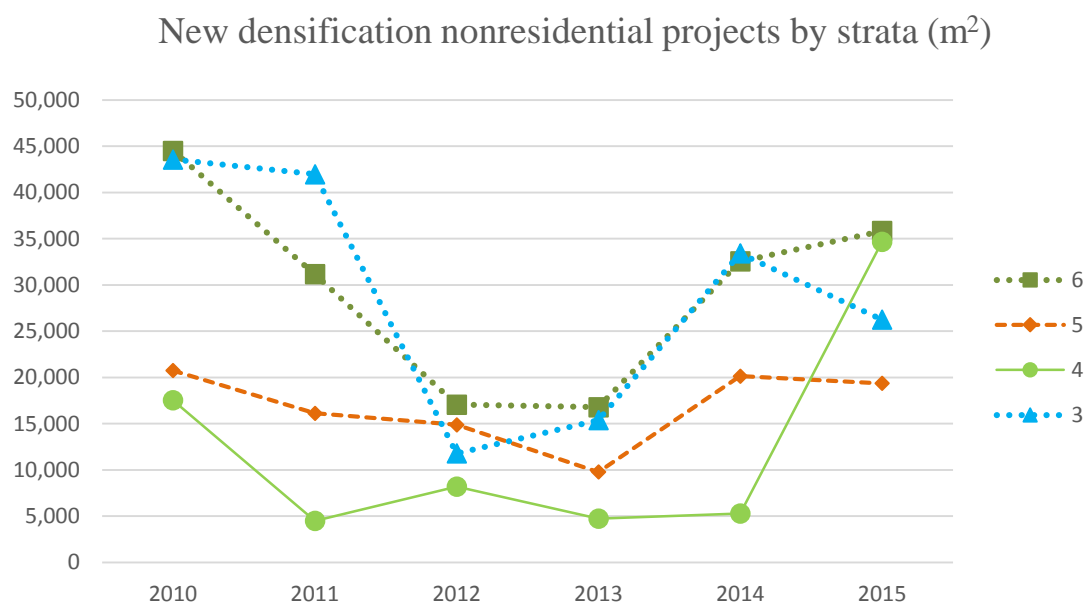
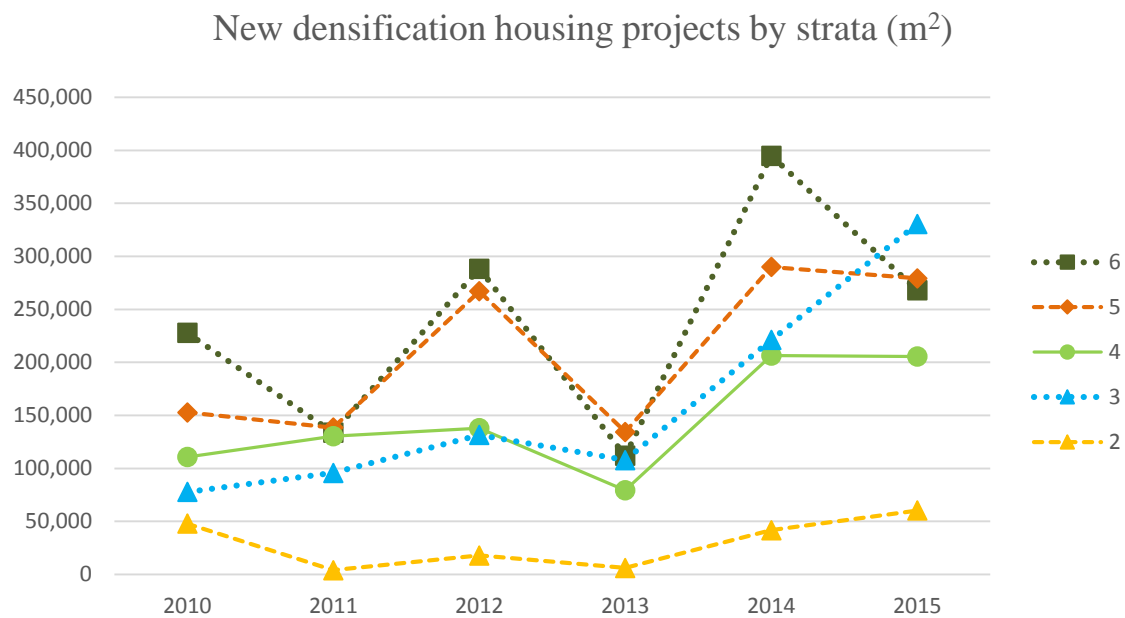


Figure 36: Stratification and densification new built area 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

Figure 38 suggests that this pattern relates to the Stratification system. The map in the figure overlays the housing densification projects to the Stratification map of the city. This shows the correlation between Stratification and incremental densification. While densification housing projects are very close to each other in the neighborhoods of the Stratum 6, they are more isolated and dispersed in the areas of strata 3, 4, and 5, while there are almost no new housing projects in the areas of strata 1 and 2.

As Figure 39 suggests, the location of the densification housing projects have no visual correlation with the public transit system—in this case the trunk lines of the BRT. Across the city, the projects locate both within walking distances of less than 1,000 meters of the system but also further away. Specifically, along the piedmont of the eastern hills, developers choose to locate larger projects further away from the BRT, with distances of 2,000 meters or more to the nearest trunk line. This motivated me, as next step, to develop the scatter plot shown in Figure 40 in order to understand the relationship between built areas, the distance to the BRT, and the stratum.

The scatterplot shows how the projects across the strata have a different relationship with the variables in the study. The projects in areas of Stratum 3 are overall smaller, and most of them locate within walkable distance to the BRT. In contrast, projects in higher strata 4, 5 and 6 are larger, but do not show a definitive location pattern in relation to the BRT, both locating close to the trunk lines and also further apart.

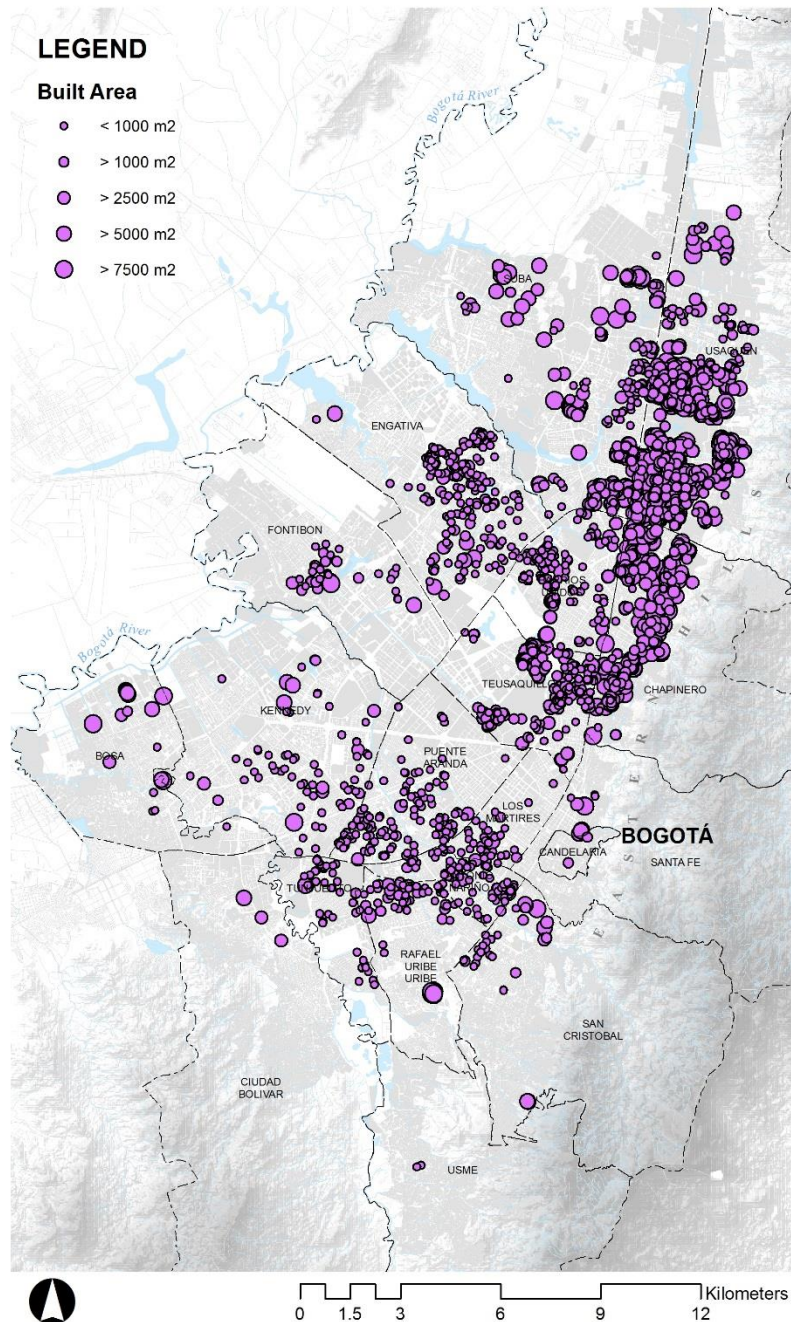


Figure 37: Location and size of densification housing 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP



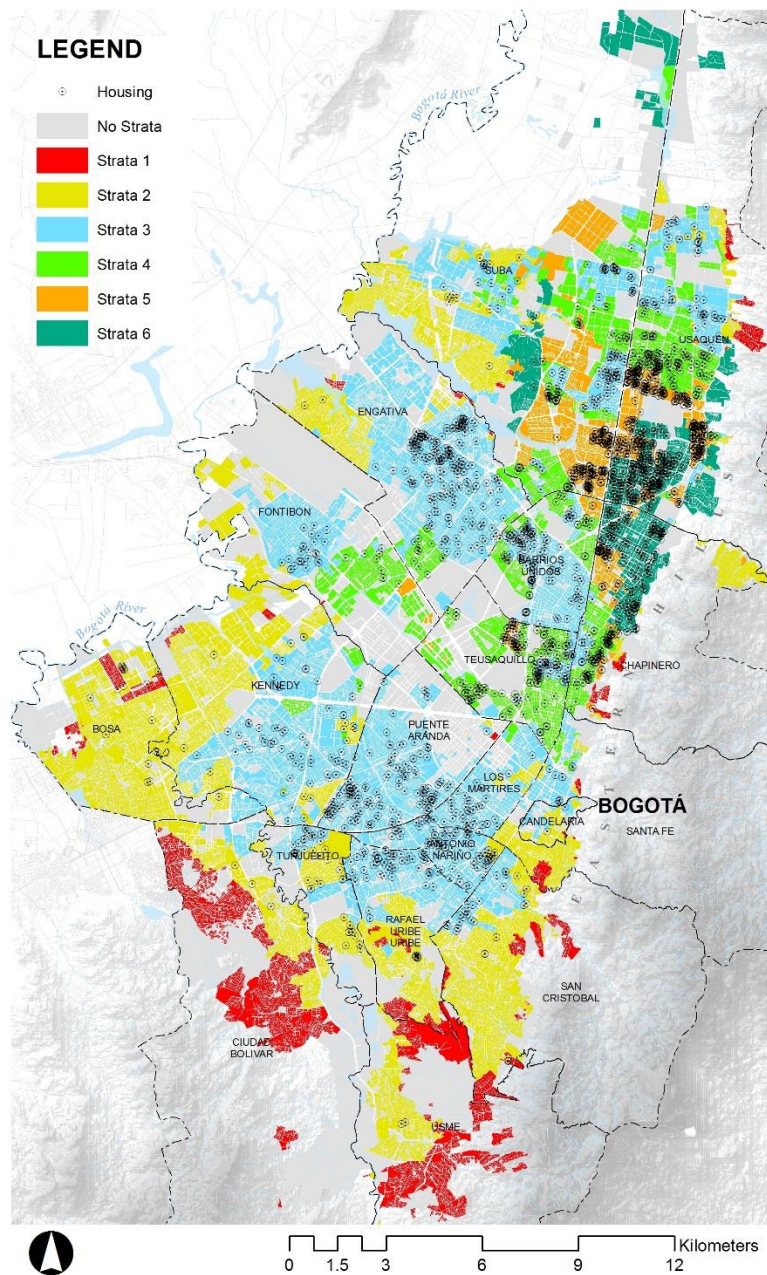


Figure 38: Location and strata of densification housing 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

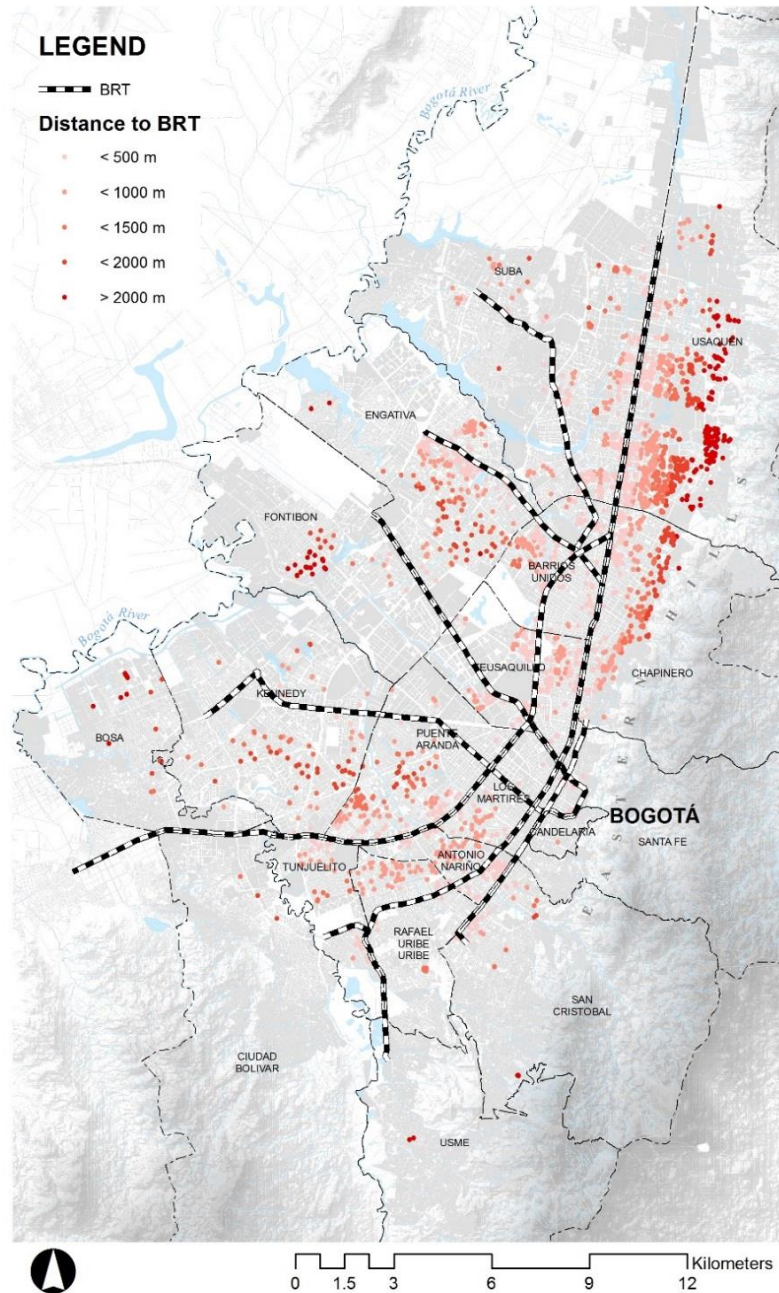


Figure 39: Location and BRT densification housing 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

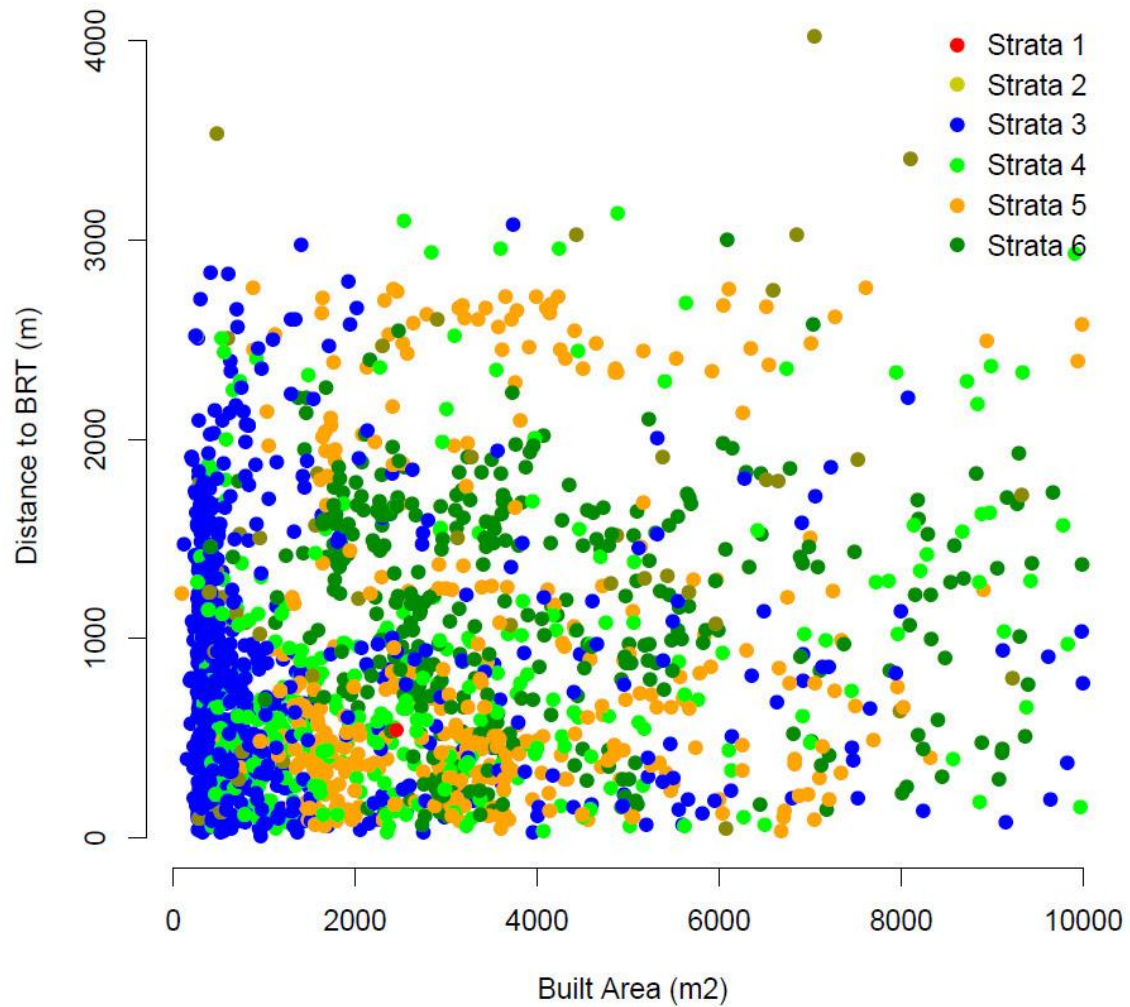


Figure 40: Housing scatter plot of built area, distance to BRT and strata

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

In terms of new nonresidential projects, Figure 41 shows how the projects are highly clustered across the city. They cluster mostly in the locality of Chapinero in the northeast, with other clusters of much lower scale scattered in Usaquén, Barrios Unidos, Teusaquillo, Kennedy, Fontibón and Puente Aranda. Clusters include both large nonresidential projects with more than 2,500 square meters of built area, and smaller projects with less than 1,000 square meters of size. Furthermore, the map in Figure 42 overlays the location of the nonresidential projects to the Stratification map. It shows how nonresidential land-use is located exclusively in the strata 3, 4, 5 and 6 areas, with the largest cluster in the strata 5 and 6 in the Chapinero.

Figure 43 shows the location of the nonresidential projects in relation to the BRT trunk lines. As the map suggests, most of the projects locate within a walking distance to the BRT—except for a few isolated small nonresidential clusters in eastern Usaquén and in central Kennedy. Figure 44 shows a scatterplot of the relationship between built area and distance to the BRT for nonresidential projects. The graph suggests that nonresidential location patterns in Stratum 3 are different from Stratum 6. Similarly than in housing projects, nonresidential projects in lower strata have less built area than in the higher strata, while they tend to locate closer to the BRT trunk lines.



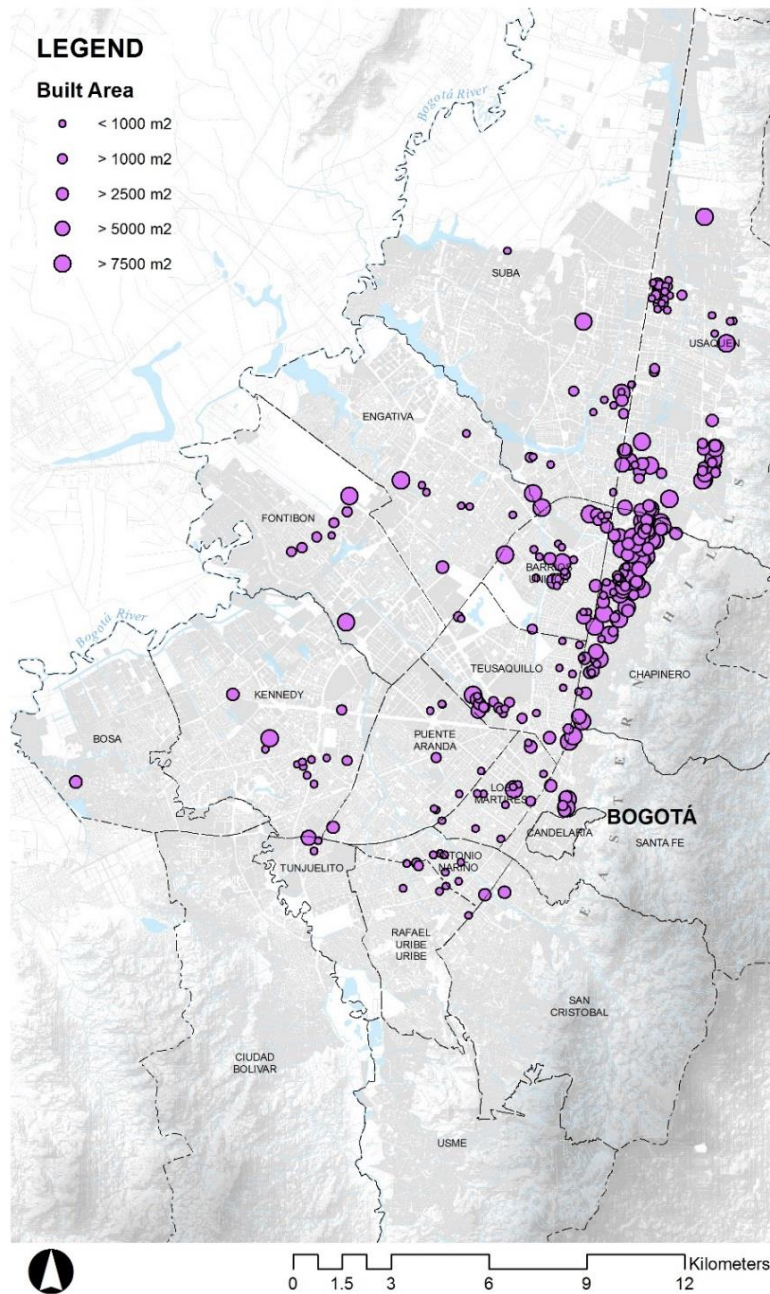


Figure 41: Location and size of densification nonresidential 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

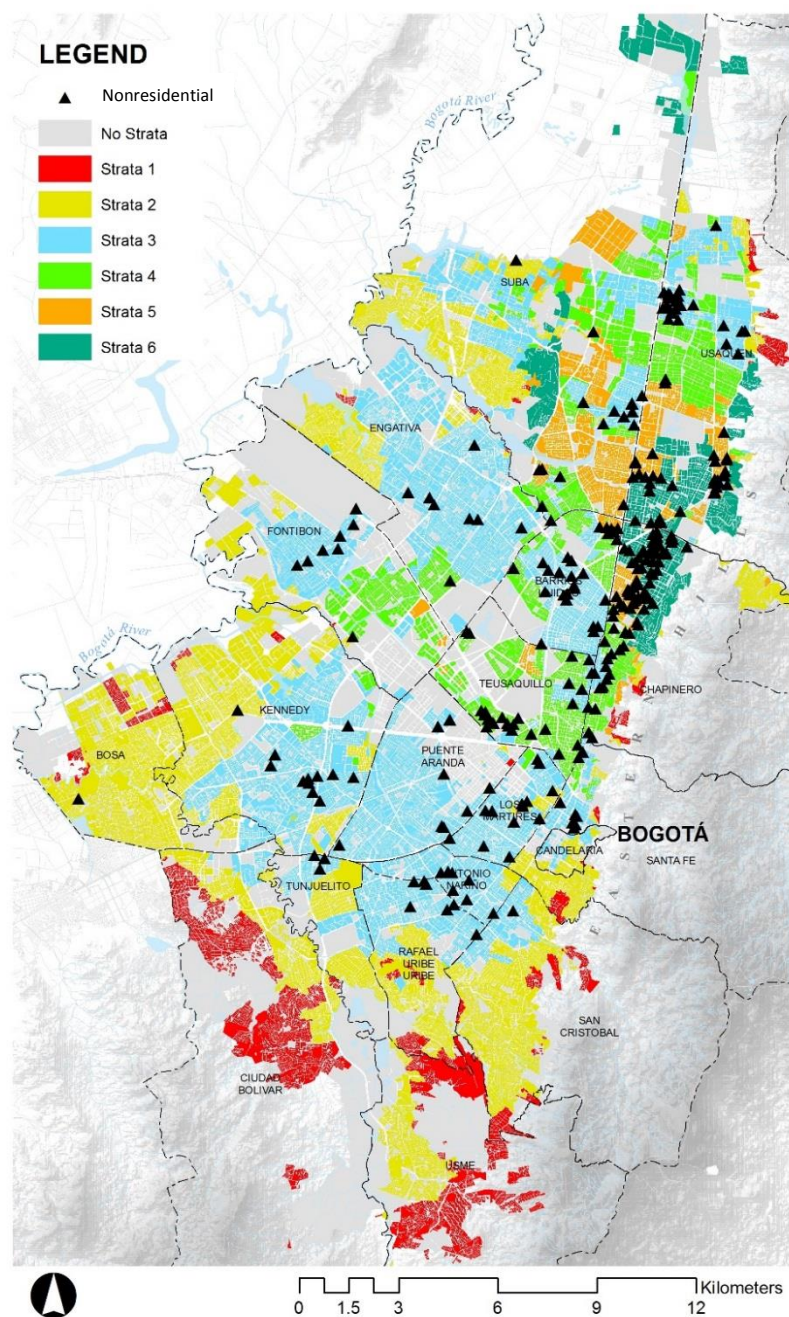


Figure 42: Location and strata of densification nonresidential 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP



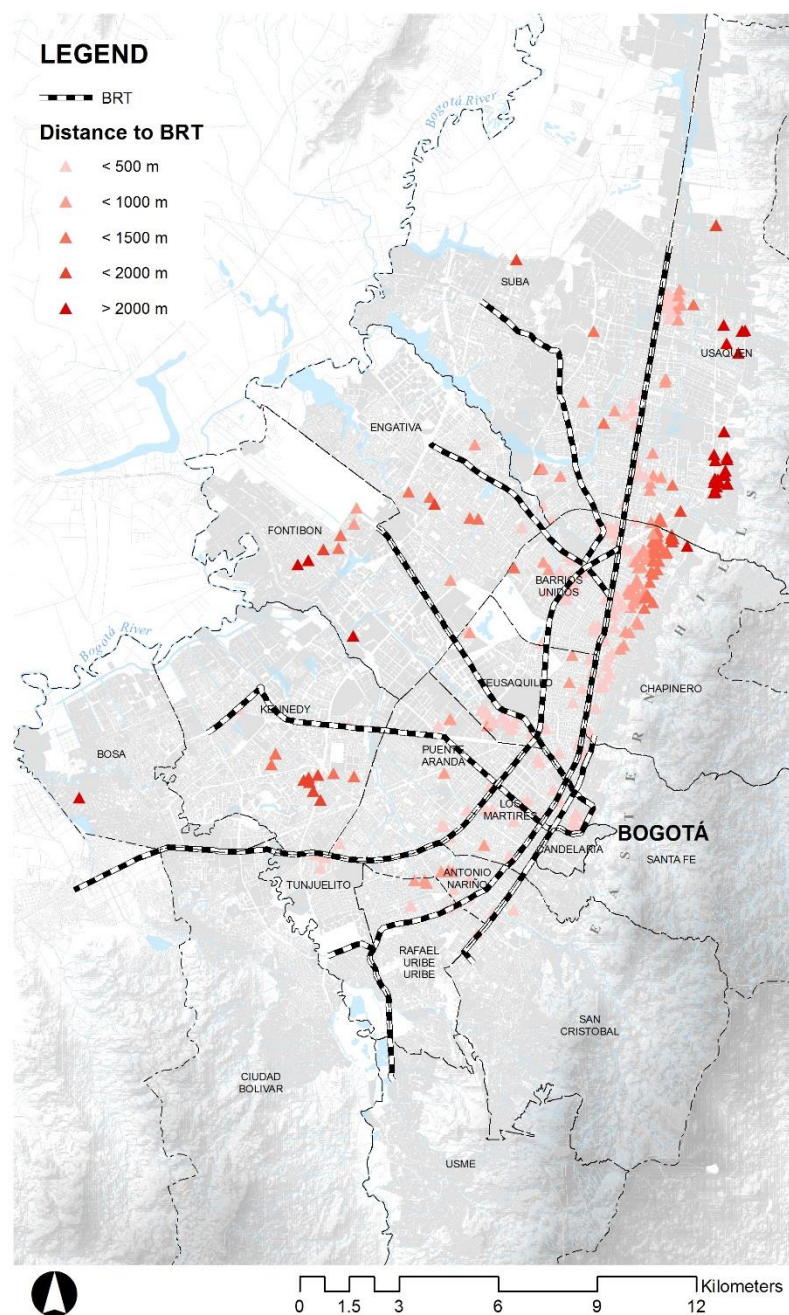


Figure 43: Location and BRT densification nonresidential 2010-2015

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

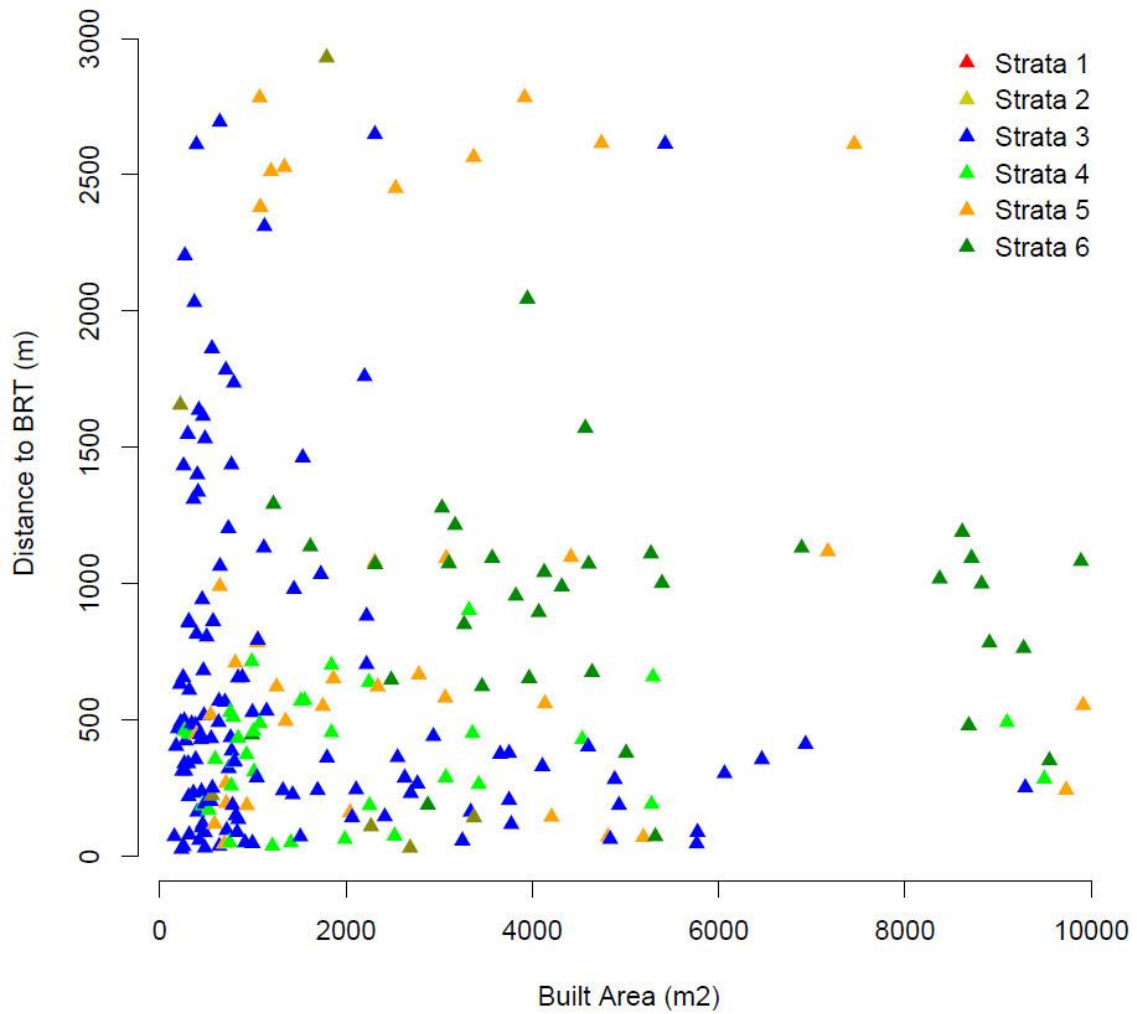


Figure 44: Nonresidential scatter plot of built area, distance to BRT and strata

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP



As a second step, after determining that there is more development in the upper strata areas and observing a visual correlation between the *location* of projects and the stratum, I used the GIS database to assess the relationship between strata with the *size* of each project. In this case, I am using the size of each project as the dependent variable because the planning history of the city suggests that construction firms and landowners have exerted control over the zoning codes. As a result, they have focused development in the wealthier neighborhoods, capturing most of the formal private investment. I wanted to assess if this continues to be true under the latest growth management and densification policies..

I chose to control for other physical and locational factors that may influence the size of projects based on the interviews with policy makers. Planners at the SDP—as I showed in Chapter 6—suggest that access to transit and the size of the lots may be stronger variables than the stratum to predict the size of each project. Consequently, the first control factor I selected was the distance to the BRT trunk lines, measured in meters. In theory, developers may prefer to pursue larger projects in areas within walking distance to the BRT trunk lines as the system is widely used. The second control factor is the size of the lot. The interviews with both agents in the construction industry and policy makers suggested that developers are prone to invest in neighborhoods with larger lots. This facilitates the process of acquiring properties for redevelopment and often bring benefits in the planning ordinances.<sup>13</sup> Finally, I could have used the FAR as a dependent variable. However, this indicator would not have allowed me to control for lot sizes, since FAR is determined by the built area over the lot size.

---

<sup>13</sup> Many density norms in the UPZs allow building higher when the parcel fronts are wider.

The analysis suggests that the effect of Stratification on the size of the densification housing and nonresidential projects is larger than the influence of factors related to access to transit and the size of the lots. Table 4 and Table 5 provide descriptive statistics of the variables selected for housing and nonresidential land-use respectively. The tables show that the data of the variables do not follow a normal distribution. In terms of housing, most of the projects in the sample have built areas up to about 5,000 square meters within my upper limit set at 10,000, while their lot sizes reach mostly 700 square meters, up to the limit set at 5,000. Finally, most of the projects are located within 1,000 meters of the BRT, with fewer projects located within a maximum of around 4,000 meters. In nonresidential land-use, the distribution is even more skewed. Almost all the projects are sized between 100 and 3,000 square meters up to the maximum of 10,000, with lot areas averaging 500 square meters, far below the highest limit of 5,000. Most of the projects also have distances below 1,000 meters to the BRT with a maximum distance of almost 3,000.

Table 4: Descriptive statistics of variables of housing densification

<b>Total Built Area (m<sup>2</sup>) Housing</b>					
Min.	1 <sup>st</sup> Quantile	Median	Mean	3 <sup>rd</sup> Quantile	Max.
100	648	2,416	2,940	4,500	9,998
<b>Lot Area (m<sup>2</sup>) Housing</b>					
Min.	1 <sup>st</sup> Quantile	Median	Mean	3 <sup>rd</sup> Quantile	Max.
100	175	381	544	730	4,833
<b>Distance to BRT (m) Housing</b>					
Min.	1 <sup>st</sup> Quantile	Median	Mean	3 <sup>rd</sup> Quantile	Max.
6	358	703	901	1,299	4,026

Table 5: Descriptive statistics of variables of nonresidential densification

<b>Total Built Area (m<sup>2</sup>) Nonresidential</b>					
Min.	1 <sup>st</sup> Quantile	Median	Mean	3 <sup>rd</sup> Quantile	Max.
157	556	1,220	2,331	3,372	9,913
<b>Lot Area (m<sup>2</sup>) Nonresidential</b>					
Min.	1 <sup>st</sup> Quantile	Median	Mean	3 <sup>rd</sup> Quantile	Max.
66	237	394	522	705	3,097
<b>Distance to BRT (m) Nonresidential</b>					
Min.	1 <sup>st</sup> Quantile	Median	Mean	3 <sup>rd</sup> Quantile	Max.
26	239	486	707	994	2930

## CORRELATION STRATIFICATION AND INCREMENTAL DENSIFICATION

### Linear models

Aware of the non-linearity of the variables, I formulated OLS regressions to explore the results of predicting the total built area of each project using the stratum, the distance to the BRT, and the lot areas, as explanatory variables, for both housing and nonresidential land-use independently. Firstly, for housing incremental densification, in equation (F (3, 2056) = 1126,  $p < 2.2e-16$ ), with an  $R^2$  of .6217, the common logarithm of the predicted total built area of each project is equal to  $-1291 + 514 (\text{Stratum}) + 0.15 (\text{Distance to BRT}) + 2.62 (\text{Lot Area})$ . All the coefficients are significant predictors at  $p < 0.001$ .

According to the interpretation of the coefficients, if the distance to the BRT and the lot area are constant, every increase in stratum results in an increase of 514 square meters in the average mean of the built area of each housing project. On the other hand, if both stratum and lot area are constant, for every increase of one meter in the distance to the BRT, we can expect an increase of 0.15 square meters in the average mean of the built area. Finally, if both the stratum and the distance to the BRT are constant, for every one

increase of one square meter in the lot area, we expect an increase in 2.62 square meters in the average mean of the built area. In this case, the signs of the coefficient for stratum and lot area are consistent with the theory, as every increase in these variables translates in an increase in size of the projects. However, the distance to the BRT coefficient is very small but not consistent with the theory. The results suggest that projects become larger with a longer distance to transit. I present the specific results of the regression in Table 6.

Secondly, for nonresidential incremental densification, in equation ( $F(3, 231) = 95.22, p < 2.2e-16$ ), with an  $R^2$  of .5529, the common logarithm of the predicted total built area of each project is equal to  $-1289 + 508 (\text{Stratum}) - 0.31 (\text{Distance to BRT}) + 3.56 (\text{Lot Area})$ . All the coefficients are significant predictors at  $p < 0.001$ . According to the interpretation of the coefficients, if the distance to the BRT and the lot area are constant, every increase in stratum results in an increase of 508 square meters in the average mean of the built area of each housing project. On the other hand, if both stratum and lot area are constant, for every increase of one meter in the distance to the BRT, we can expect a decrease of 0.31 square meters in the average mean of the built area. Finally, if both the stratum and the distance to the BRT are constant, for every one increase of one square meter in the lot area, we expect an increase in 3.56 square meters in the average mean of the built area. In this case, the signs of the coefficient for all the variables are consistent with the theory, as every increase in these variables translates in an increase in size of the projects, except for the distance to the BRT, that suggest that projects are larger closer to the mass transit lines. I present the exact results in Table 7.

Table 6: R output from linear model for housing

```
Call:
lm(formula = BuiA ~ Stratum + DBRT + LotA)

Residuals:
    Min       1Q   Median       3Q      Max
-11647.0   -544.3   -279.8    213.9   7770.6

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.291e+03  1.067e+02 -12.099  < 2e-16 ***
Stratum       5.146e+02  2.595e+01  19.830  < 2e-16 ***
DBRT          1.581e-01  4.593e-02   3.441  0.00059 ***
LotA          2.628e+00  5.763e-02  45.601  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1371 on 2056 degrees of freedom
Multiple R-squared:  0.6217,    Adjusted R-squared:  0.6211
F-statistic: 1126 on 3 and 2056 DF,  p-value: < 2.2e-16
```

Table 7: R output from linear model for nonresidential

```
Call:
lm(formula = BuiA ~ Stratum + DBRT + LotA)

Residuals:
    Min       1Q   Median       3Q      Max
-8137.8   -805.0   -238.5    421.0   7059.8

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept) -1289.6540   372.1741  -3.465 0.000632 ***
Strata        508.2278   101.4734   5.008 1.09e-06 ***
DBRT          -0.3106    0.1611  -1.928 0.055106 .
LotA           3.5690    0.2832  12.603 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1624 on 231 degrees of freedom
Multiple R-squared:  0.5529,    Adjusted R-squared:  0.5471
F-statistic: 95.22 on 3 and 231 DF,  p-value: < 2.2e-16
```

As my next step, I tested both housing and nonresidential linear models for heteroscedasticity taking in mind the non-normal distribution of the variables object of the analysis. To perform this test, I used the set of graphic diagnostics available in the software R. The residual vs. fitted values graphs for both housing and nonresidential models show a pattern, suggesting positive heteroscedasticity. I attributed the heteroscedasticity to the non-normal distribution in the variables. Therefore as next step, I choose to run the model using logarithmic transformations.

### **Log-log models**

In order to run the model using logarithmic transformation I performed a log transformation for the variables built area, distance to BRT and lot area. To facilitate the interpretation of the coefficients I did not transform the variable stratum. Figure 45 show the transformations in the housing variables through histograms, and Figure 46 shows them for nonresidential land-use. Both figures show that the logarithmic transformations achieve a distribution closer to the normal. With these transformations, I ran linear log-log models. For housing incremental densification, in equation ( $F(3, 2056) = 3779, p < 2.2e-16$ ), with an  $R^2$  of .8465, the common logarithm of the predicted total built area of each project is equal to  $0.54 + 0.14 (\text{Stratum}) - 0.004 \log(\text{Distance to BRT}) + 1.03 \log(\text{Lot Area})$ .

In this case, stratum and the logarithm of the lot area are significant predictors at  $p < 0.001$ , while the logarithm of the distance to BRT is again not significant. According to the interpretation of the coefficients, if both the distance to BRT and the lot area are constant, every increase in stratum results in an increase of 15 percent in the average mean of the built area of each housing project.

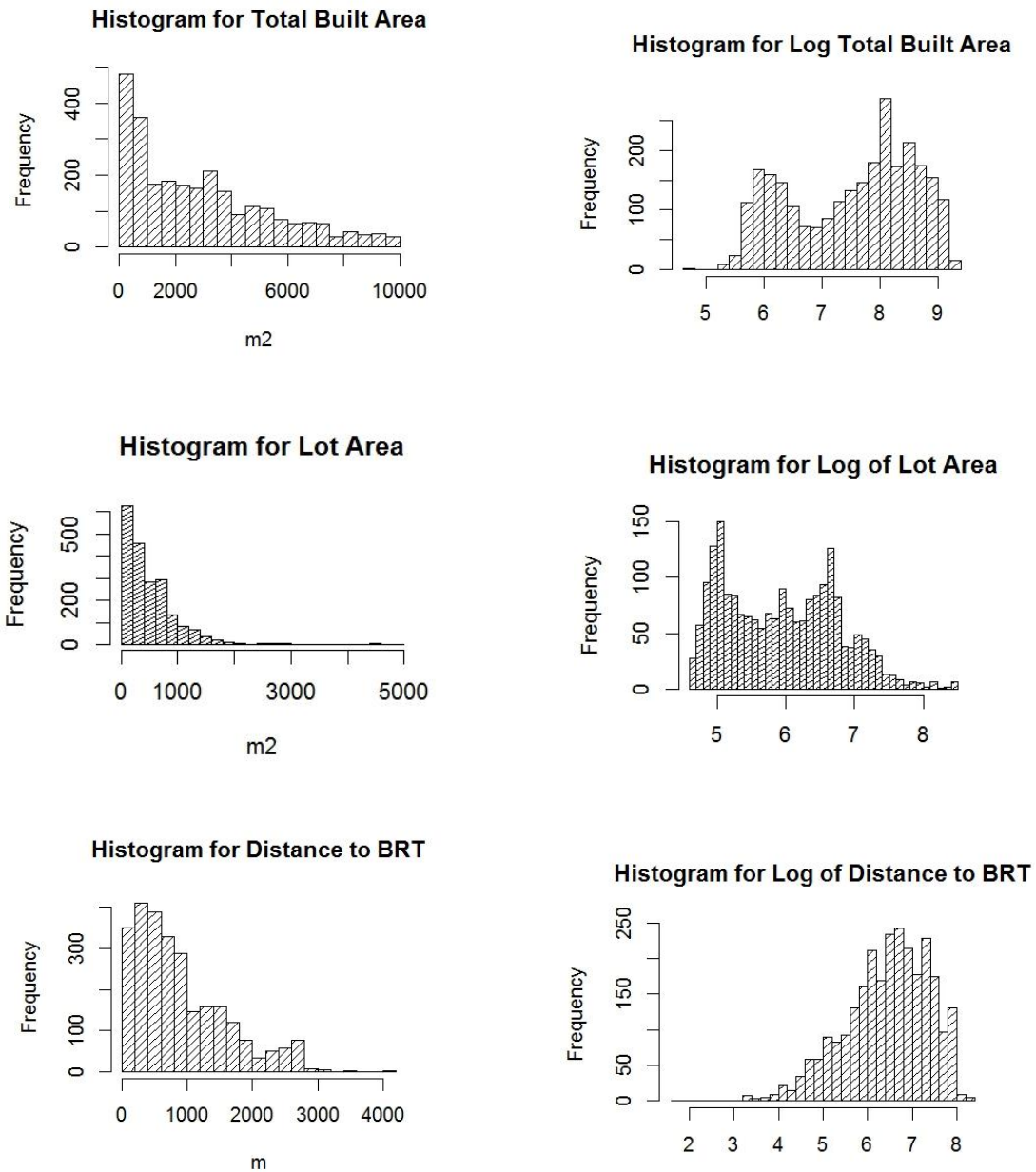


Figure 45: Histograms of variables object of study, housing

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

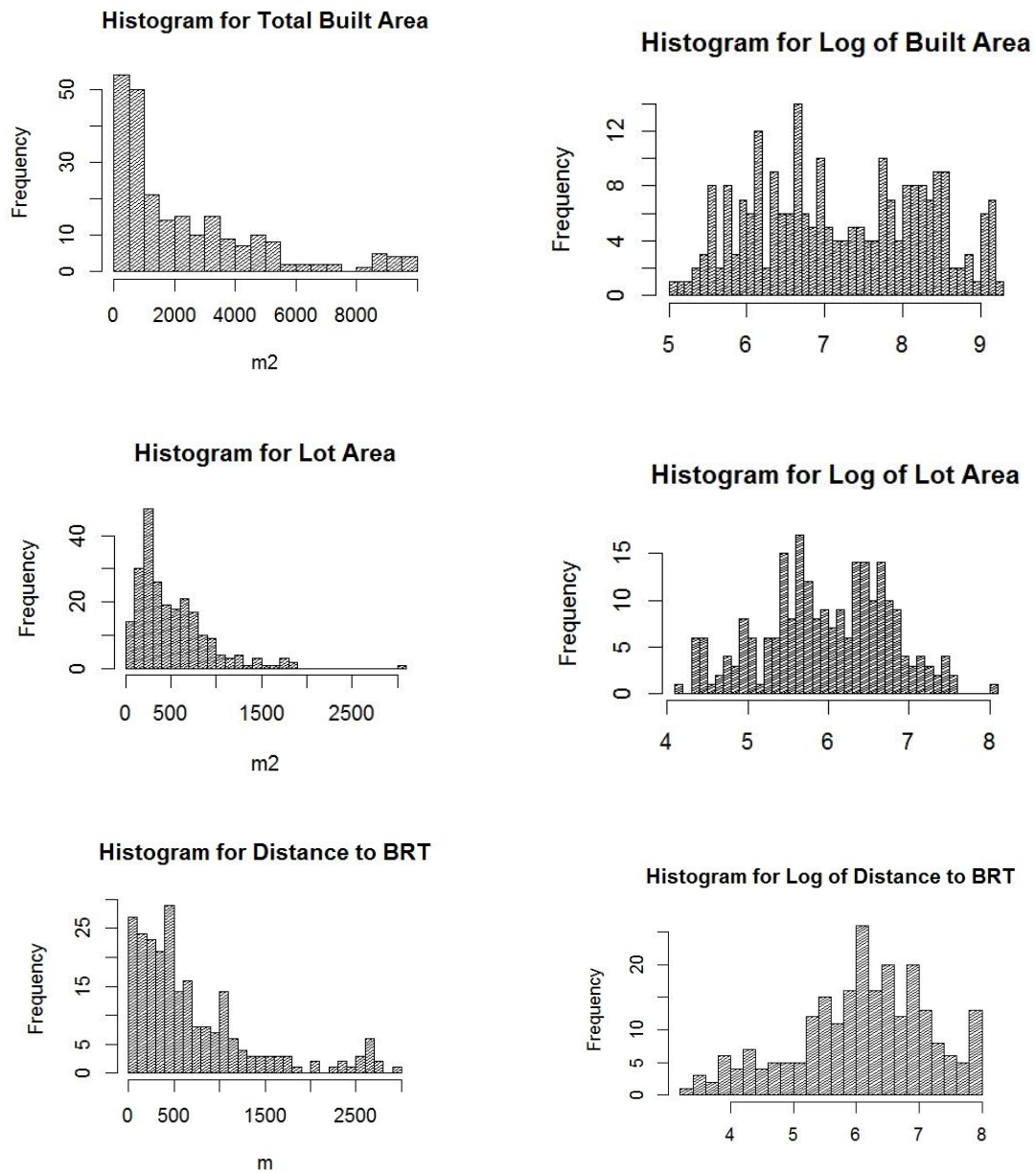


Figure 46: Histograms of variables object of study, nonresidential

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP



On the other hand, if the stratum and the distance to the BRT are constant, for every increase of 1 percent in the area of the lot, we will expect an increase in 1 percent in the average mean of the total built area, which is consistent with the theory. I present the specific results of the regression in Table 8. In nonresidential incremental densification, in equation ( $F(3, 231) = 123.5, p < 2.2e-16$ ), with an  $R^2$  of .6159, the common logarithm of the predicted total built area of each project is equal to  $1.48 + 0.21 (\text{Stratum}) - 0.09 \log(\text{Distance to BRT}) + 0.90 \log(\text{Lot Area})$ . In this case, stratum and the logarithm of the lot area are significant predictors at  $p < 0.001$ , while the logarithm of the distance to BRT is significant at  $p < 0.01$ . According to the interpretation of the coefficients, if both the distance to the BRT and the lot area are constant, every increase in stratum results in an increase of 21 percent in the average mean of the built area of each nonresidential project. On the other hand, if stratum and lot area are constant, every increase of one meter in the distance to the BRT result in a decrease of 0.09 percent in the average mean of the total built area. Finally, if the stratum and the distance to the BRT are constant, for every increase of 1 percent in the area of the lot, we will expect an increase in 0.9 percent in the average mean of the total built area. All the coefficient signs are consistent with the theory. I present the specific results of the regression in Table 9.

In these cases using logarithmic transformations, the plots of residual vs. fitted values—in Figure 47 for housing, and in Figure 48 for nonresidential—suggest that there is a lessen incidence of heteroscedasticity. Specifically, the residual vs. fitted values scatterplot show a more nuanced pattern for the log-log models. In addition, the Q-Q graphs show how the log-log models fit better within a linear prediction line. This suggests that the log-log transformations achieve a better fit and predictions using this data.

Table 8: R output linear model with log transformation for housing

```
Call:
lm(formula = logBuiA ~ Stratum + logDBRT + logLotA)

Residuals:
    Min       1Q   Median       3Q      Max
-2.72392 -0.18300 -0.04229  0.15747  2.45953

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.544672   0.087460   6.228 5.73e-10 ***
Stratum       0.148792   0.008879  16.757 < 2e-16 ***
logDBRT      -0.004680   0.010001  -0.468    0.64
logLotA       1.035749   0.013120  78.945 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4108 on 2056 degrees of freedom
Multiple R-squared:  0.8465,    Adjusted R-squared:  0.8463
F-statistic: 3779 on 3 and 2056 DF,  p-value: < 2.2e-16
```

Table 9: R output linear model with log transformation for nonresidential

```
Call:
lm(formula = logBuiA ~ Stratum + logDBRT + logLotA)

Residuals:
    Min       1Q   Median       3Q      Max
-1.98385 -0.35953 -0.01454  0.29894  2.90302

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.48447   0.39826   3.727 0.000243 ***
Stratum       0.21958   0.04378   5.016 1.05e-06 ***
logDBRT      -0.09011   0.04258  -2.116 0.035391 *
logLotA       0.90852   0.06381  14.238 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.674 on 231 degrees of freedom
Multiple R-squared:  0.6159,    Adjusted R-squared:  0.6109
F-statistic: 123.5 on 3 and 231 DF,  p-value: < 2.2e-16
```

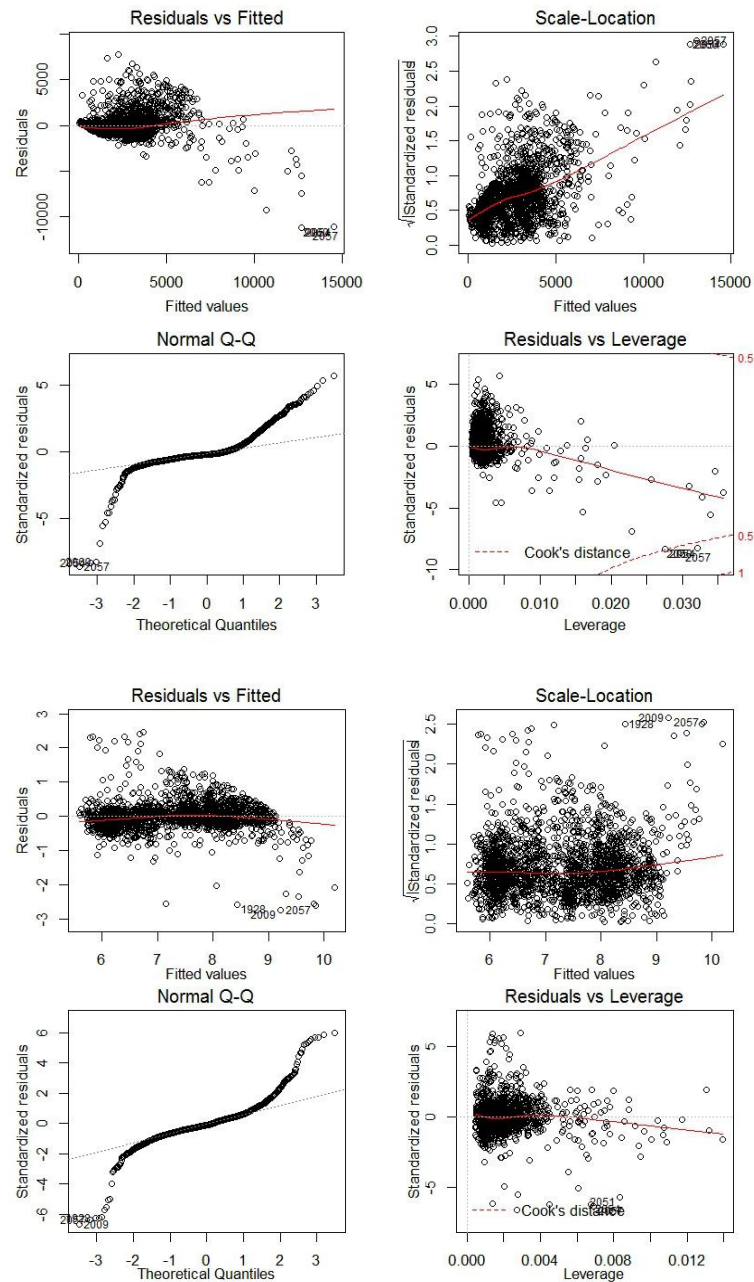


Figure 47: Model diagnostic using scatterplots, housing

Four above: linear; four below: log-log. Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

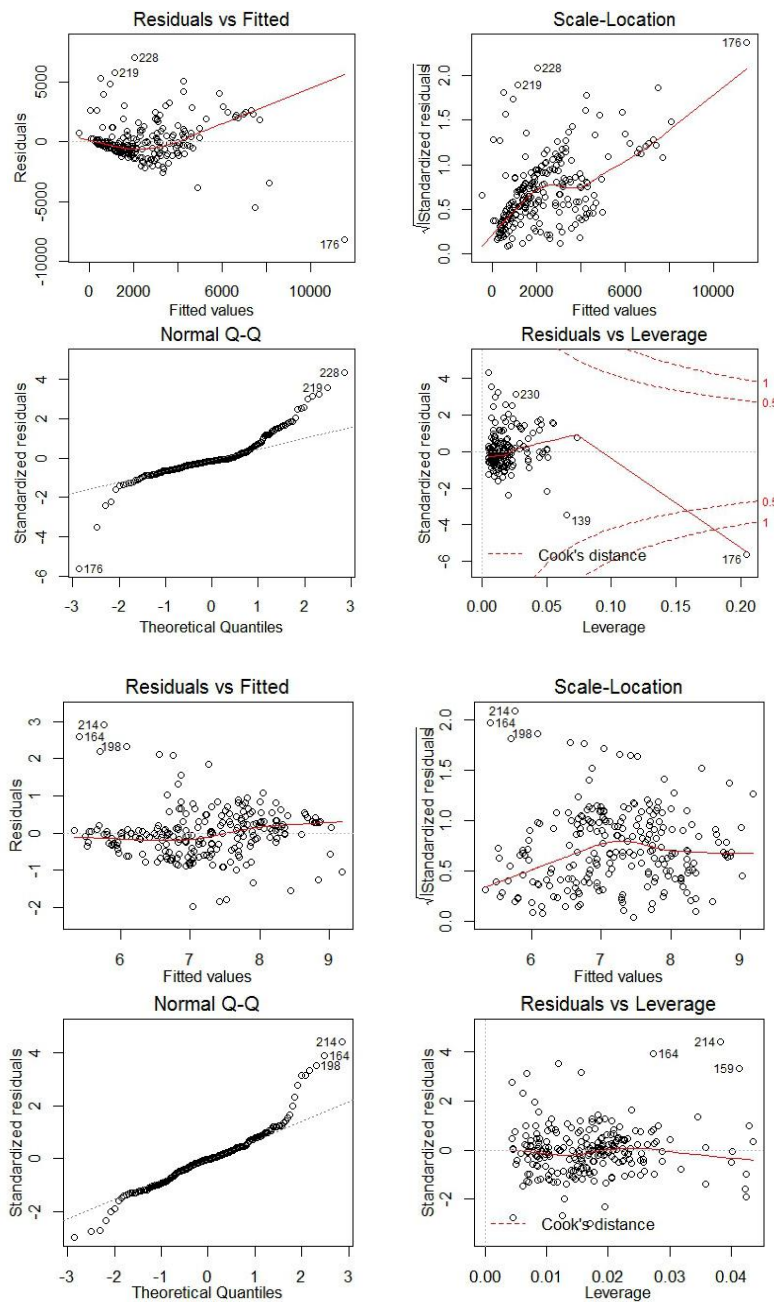


Figure 48: Model diagnostic using scatterplots, nonresidential

Four above: linear; four below: log-log. Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

### **Alternative models: Poisson regression and GWR**

In order to explore other alternative ways to account for the heteroscedasticity in the data, I first used a Poisson regression model. This model assumes that the distribution in the variables is closer to the Poisson curve than to linear. In addition, it assumes the logarithm of the expected value, in this case the built area—a method closer to a log-linear model. Consequently, I built the Poisson models using the variables in their original form.

For housing incremental densification the Poisson regression shows that the predicted total built area of each project is equal to  $5.99 + 0.29 (\text{Stratum}) + 0.0008 (\text{Distance to BRT}) + 0.006 (\text{Lot Area})$ , with all the coefficients significant at  $p < 0.001$ . According to the interpretation of the Poisson coefficients, if both the distance to BRT and the lot area are constant, every increase in stratum results in a growth of 33 percent in the average mean of the built area ( $e^{0.29} = 1.33$ ). On the other hand, if the stratum and the lot area are constant, every increase of one meter in the distance to the BRT will result in a growth of 1 percent in the average mean of the built area ( $e^{0.0008} = 1.00$ ). Finally, if the stratum and the distance to the BRT are constant, for every increase of one square meter in the area of the lot, we will expect a growth in 1 percent in the average mean of the built area ( $e^{0.006} = 1.00$ ). I present the specific results of the regression in Table 10.

For nonresidential incremental densification the Poisson regression of the predicted total built area of each project is equal to  $6.24 + 0.25 (\text{Stratum}) - 0.0021 (\text{Distance to BRT}) + 0.009 (\text{Lot Area})$ , with all the coefficients significant at  $p < 0.001$ . According to the interpretation of the Poisson coefficients, if both the distance to BRT and the lot area are constant, every increase in stratum results in a growth of 28 percent in the average mean of the built area ( $e^{0.25} = 1.28$ ). On the other hand, if the stratum and the lot area are constant, every increase of one meter in the distance to the BRT will result in a growth of 1 percent

in the average mean of the built area ( $e^{0.0021} = 1.00$ ). Finally, if the stratum and the distance to the BRT are constant, for every increase of one square meter in the area of the lot, we will expect a growth in 1 percent in the average mean of the built area ( $e^{0.009} = 1.00$ ). I present the specific results of the regression in Table 11.

Another approach to explore the heteroscedasticity is to use Geographically Weighted Regression (GWR). GWR is a methodology of spatial statistical analysis that estimates a different local coefficient for each observation. This method was developed to explore a non-stationary relationship between the dependent and the explanatory variables (Anselin 1995). This means that the sign and scale of the coefficients vary across the city. A non-stationary condition in a regression model can be identified by conducting a test of spatial autocorrelation of the residuals. In this case, I used Moran's I to identify any spatial autocorrelation within the log-log model—the one that provided the best fit. For the housing case, results showed a Moran's I score of 0.5794, with a z-score of 16.2877 and a p-value of 0.0000. These results suggested a clustered pattern in the residuals. Therefore, as the theory suggest, I decided to use a GWR to determine the non-stationary effects.

I choose to run GWR to assess the specific correlation between stratum as a dependent variable, and distance to BRT as explanatory variable, because in the other housing models the distance to BRT showed no statistical significance. Figure 49 shows the results of the GWR model. While the global coefficient from the OLS log-log model was -0.004, the local coefficients varied for every observation from -0.2 to 0.2. This suggest that there are places in the city where the size of the projects increases with the distance to the BRT while in others the size of the projects decreases with the distance to the BRT.

Table 10: R output for Poisson regression for housing

```
Call:
glm(formula = BuiA ~ Stratum + DBRT + LotA, family = poisson)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-255.404   -23.081   -12.862    9.288   123.926

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)  5.992e+00  1.806e-03  3317.1  <2e-16 ***
Stratum      2.915e-01  3.611e-04   807.4  <2e-16 ***
DBRT         8.857e-05  6.469e-07   136.9  <2e-16 ***
LotA         6.095e-04  4.647e-07  1311.4  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)
Null deviance: 3930537  on 2059  degrees of freedom
Residual deviance: 1818521  on 2056  degrees of freedom
AIC: 1837289
Number of Fisher Scoring iterations: 5
```

Table 11: R output for Poisson regression for nonresidential

```
Call:
glm(formula = BuiA ~ Stratum + DBRT + LotA, family = poisson)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-133.43   -26.24   -14.46    14.32   119.95

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)  6.240e+00  5.015e-03 1244.35  <2e-16 ***
Stratum      2.565e-01  1.183e-03  216.76  <2e-16 ***
DBRT        -2.134e-04  2.200e-06  -96.98  <2e-16 ***
LotA         9.098e-04  2.377e-06  382.78  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)
Null deviance: 500918  on 234  degrees of freedom
Residual deviance: 249688  on 231  degrees of freedom
AIC: 251824
Number of Fisher Scoring iterations: 5
```

I underlay a map showing the strata areas to the map with the GWR coefficients to facilitate the interpretation of the GWR results. The map suggests that projects become larger in proximity to the BRT in the areas of Stratum 3 in the West of the city. Conversely, projects are larger with more distance to the BRT in the areas of strata 5 and 6. The figure also shows how correlation is not statistically significant in most of the south of Bogotá. These results suggests that in Bogotá developers perceive that transit availability is more important to incentivize larger projects in Stratum 3 in the West, than for projects in the higher strata areas in the North or for projects in the South.

I also decided to develop a GWR model for the nonresidential land-use log-log model. However, the Moran's I score of the residuals was 0.001684 with a z-score of 0.2679, and a p-value of 0.788722. This suggests that the residuals are randomly distributed in space and therefore there is no evidence of non-stationarity. This is consistent with the results of the OLS models where the distance to the BRT was always significant. These results strengthen the point that all across the city developers aim to locate larger nonresidential projects close to the BRT trunk lines. Consequently, I did not pursue a GWR with the nonresidential data.

These results are consistent with other studies in the United States. For instance, Guerra, Cervero and Tischler (2012) analyzing data from 20 transit agencies, suggest that the radius of attractiveness to transit may be different for jobs and population. Results show that transit catchment is stronger for jobs within the first quarter of a mile, while for population catchment is stronger at the half-mile threshold. This study however does not distinguished different levels of transit catchment across the different socio-economic groups.



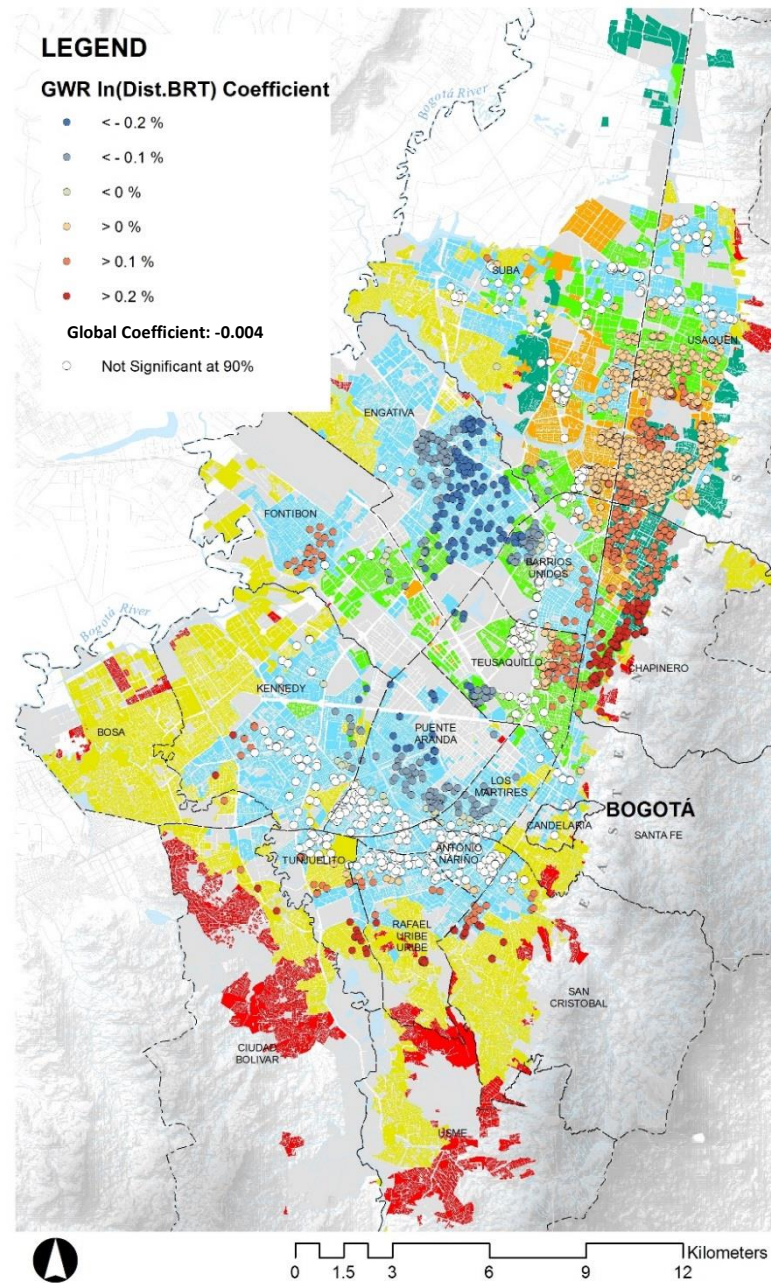


Figure 49: GWR results for built area explained by distance to BRT

Source: Illustration by the author based on the building permits database obtained from the Direction of Information, Cartography and Statistics - SDP

## Model comparison

Table 12: Comparative table of regression results

<i>Dependent Variable = Built Area Housing</i>			
Ind. Variables	Linear	Log-Log	Poisson
<i>Stratum<sup>1</sup></i>	514.64*** (25.95)	0.148*** (0.008)	0.291*** (0.001)
<i>Distance to BRT</i>	0.158*** (0.459)	-0.004 (0.010)	0.0005*** (0.003)
<i>Lot Area</i>	2.627*** (0.576)	1.035*** (0.013)	0.006*** (0.000)
Observations	2059	2059	2059
R <sup>2</sup>	0.62	0.84	
Breush-Pagan test	525.33***	13.885*	525.33***
Durbin-Watson test	1.2664***	1.76***	1.2664***
<i>Dependent Variable: Built Area Nonresidential</i>			
Ind. Variables	Linear	Log-Log	Poisson
<i>Stratum<sup>1</sup></i>	508.65*** (101.47)	0.219*** (0.0437)	0.256*** (0.050)
<i>Distance to BRT</i>	- 0.310 . (0.1611)	-0.090* (0.0425)	-0.0021*** (0.000)
<i>Lot Area</i>	3.569*** (0.283)	0.908*** (0.063)	0.0090 (0.000)
Observations	234	234	234
R <sup>2</sup>	0.55	0.61	
Breush-Pagan test	44.56***	13.38*	44.56***
Durbin-Watson test	1.0132***	1.167***	1.0132***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1;			
(1) Stratum was not transformed in log-log models			

Table 12 shows a comparative table of the results of all the different models explored in this section. First, the table indicates that the models with the best fit are the log-log models, as their scores for the Breush-Pagan, testing heteroscedasticity, have less significance, and the Durbin-Watson scores, testing autocorrelation, approach slightly more to two. Secondly, the R<sup>2</sup> scores suggest that the independent variables explain much

better the variability of the size of the incremental densification projects in the case of housing than in the case of nonresidential. Finally, all the models suggest that there is a statistically significant positive relationship between the stratum and the size of the incremental densification projects, controlling for the transit access and the size of the lot. The  $R^2$  suggest that the models are better predictors for the built areas in housing land use, than for nonresidential. However, the coefficients for stratum show that the magnitude of this relationship is slightly higher for nonresidential than for housing.

#### **CORRELATION INCREMENTAL DENSIFICATION AND SOCIAL SEGREGATION**

Aware of the relationship between the stratum and the size of the incremental densification projects, the next step was testing if these patterns of location and size of the projects increase the levels of social segregation across the city. The main challenge to conduct such a correlation analysis was the absence of recent socio-economic data for the city. The last national census in Colombia was conducted in 2005 and is now more than ten years old. As an alternative, I used data from the multipurpose surveys conducted by the DANE in 2007 and 2014, which surveyed a representative 10 percent of the population of the city. DANE presented the data at the locality scale, which is very large for an analysis of the urban form and the strata. However, I found that the database contains the stratum information of every observation. Taking advantage of this, I was able to perform the segregation analysis at a scale of every stratum area inside each locality.

Consequently, I divided each locality into its strata areas, referring to each of these sub-regions as a “dominion,” following other previous studies (SDP and UNAL 2007, 2013). Bogotá has 61 dominion: 9 dominion of Stratum 1, 16 dominion of Stratum 2, 18 dominion of Stratum 3, 10 dominion of Stratum 4, 5 dominion of Stratum 5, and 3 dominion of Stratum 6. The localities with more dominions are Chapinero, Usaquén and

Suba in the North, which contain neighborhoods of almost all strata. The Localities with least dominion are Puente Aranda in the center that only has Stratum 3 areas, and Usme in the South, with only areas of strata 1 and 2.

My next step was to use the multipurpose surveys of the DANE to obtain the socio-economic data for each of the 61 dominion. Following previous studies in the region (Aguilar and Mateos 2011), I decided to rely on levels of education as a proxy to assess the levels of social segregation in each of the dominion. Figure 50 on the left shows the different levels of education of the population aged eighteen or above for each dominion in Bogotá. The graph shows that in strata 1 and 2, the majority of the population had only elementary or high school education; in Stratum 3, there is a fair share of persons with different levels of education; and in strata 4, 5 and 6, the majority of the population have undergraduate and graduate university degrees.

This graph also shows that the Stratification system, although determined by the built form, is somewhat correlated with the education levels of the population at a large scale. However, as the graph suggests there is not a big difference between the distribution of the levels of education in strata 1 and 2; and between the strata 4, 5 and 6. Based on this, I suggest that in term of education levels, Bogotá roughly has only three different strata. An area with majority of population with university degrees, an area of diversity of levels of education—that corresponds with Stratum 3—and an area with majority of population with only basic elementary or high school levels. Figure 50 on the right shows a map of dominions colored by the share of population with a university degree or higher, illustrating how these differences are spatially distributed.

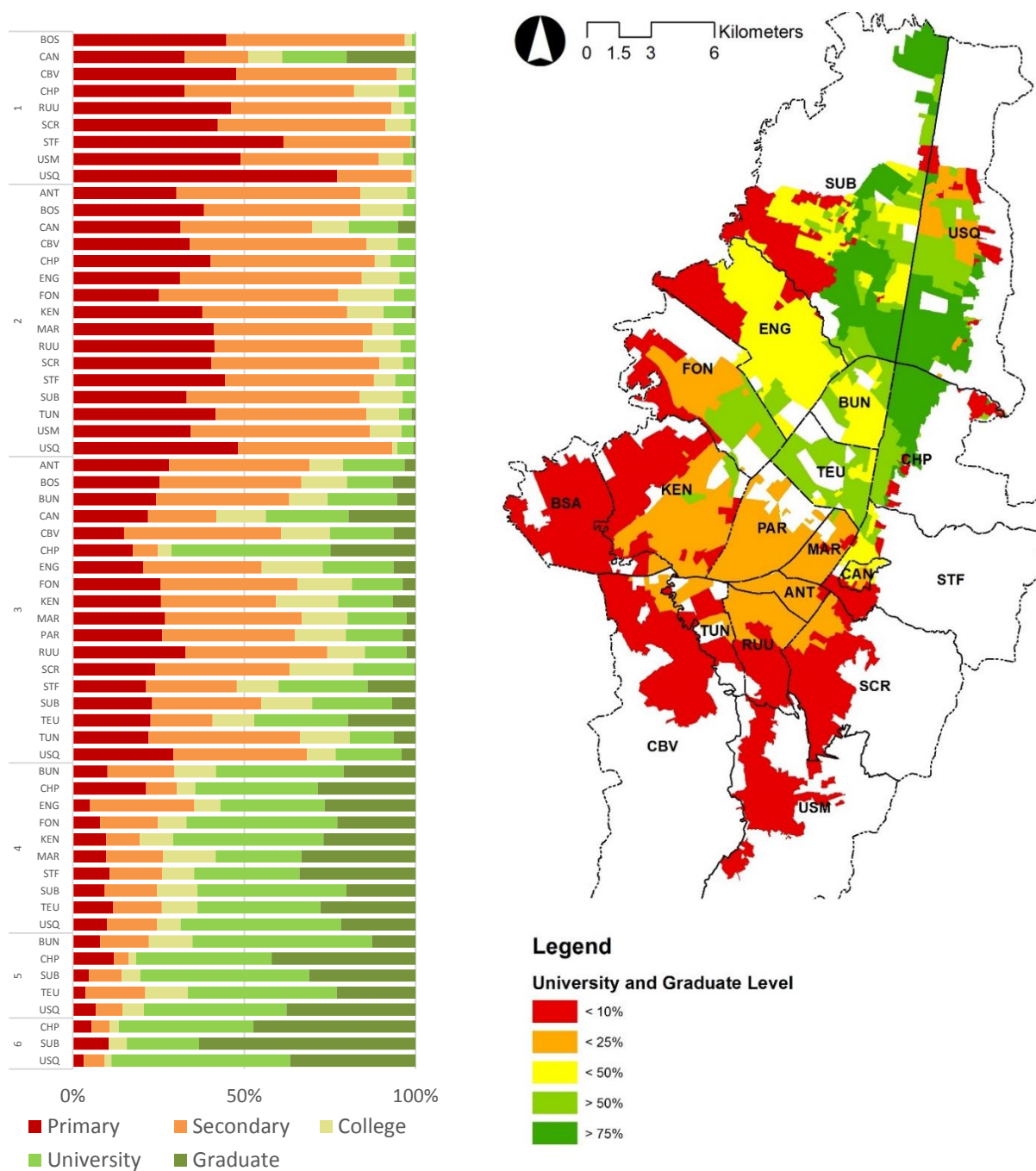


Figure 50: Education levels and Entropy by stratum and locality for 2014

Source: Illustration by the author using the results of the EM-2014

Also, the map shows how the localities of Usaquén, Chapinero, and Suba in the North have the largest share of population with higher levels of education. Conversely, in all the localities in the South, less than a quarter of the population have university degrees. The West of the city is an area of social diversity, with dominions where either the majority or the minority of the population hold university degrees.

As my next step, I analyzed the education levels by dominion for the year 2007, calculating how much education levels have changed over time and thus assessing the levels of residential segregation across the city. I used the software Geo-Segregation Analyzer (Apparicio et al. 2014) to determine the multi-group Entropy levels of each Dominion.

Historically, The Dissimilarity Index (D) has been the most common method to measure segregation in urban areas. D is as the percentage of population of one of the two groups included in the calculation that would have to move to other geographic areas in order to produce a distribution that matches that of the larger area. However, D has two problems: first, it does not account for the spatial pattern of segregation inside a territory and second, it only works for measuring two dichotomous groups, or to balance a minority against all the other groups. Consequently, other formulas evolved to address the problems of D. Theil (1972) proposed the Entropy index—also called the information index or the Theil index (H). Entropy index measures the departure from evenness by assessing each unit's departure from the pattern of the whole city. It reaches maximum of 1 when groups in a district have an equal share division than that of the city, and it has been widely used in literature about residential segregation (Massey and Denton 1988; Iceland 2004).

Figure 51 shows the change in the education levels' Entropy index for each of the dominion in Bogotá between 2007 and 2014. Negative values in a dominion means a

decrease in the Entropy index, suggesting that in this dominion the distribution of education levels is growing apart of that of the whole city, and this can be interpreted as an increase in social segregation. Conversely, positive values means that the distribution of the education levels approaches to that of the city, suggesting that levels of segregation are decreasing. The graph on the left shows how segregation is changing within the dominion, increasing in both the Stratum 1 and the strata 5 and 6. This means that in the period analyzed more low skilled population are clustering in the low-income neighborhoods, while individuals that are more educated are increasingly arriving to the traditionally higher income areas. Opposite, the graph shows how the middle strata areas are becoming more diverse in education levels, suggesting that in these areas the social segregation is decreasing. Figure 51 in the right show the changing Entropy index across the city. The map shows how segregation is increasing mostly in the North, specifically in the localities of Usaquén, Suba, and Chapinero, while across the rest of the city, segregation is decreasing.

The next question is, How are the patterns of incremental densification related to these changing levels of segregation? To respond to this question I aggregated the data of square meters of densification in new housing projects from the SDP with the socio-economic data obtained at the DANE for 2007 to 2014 at the dominion level. It is important to recognize an important limitation of this method as the data in the SDP database are only from permits given in 2010 and later. Consequently, to relate them to the social data of period 2007 to 2014, I subtracted all the permits given after 2013 that do not influence the social data of 2014, acknowledging that I compared change in social data of 2007 to 2014 with building permit data only from 2010 to 2013.

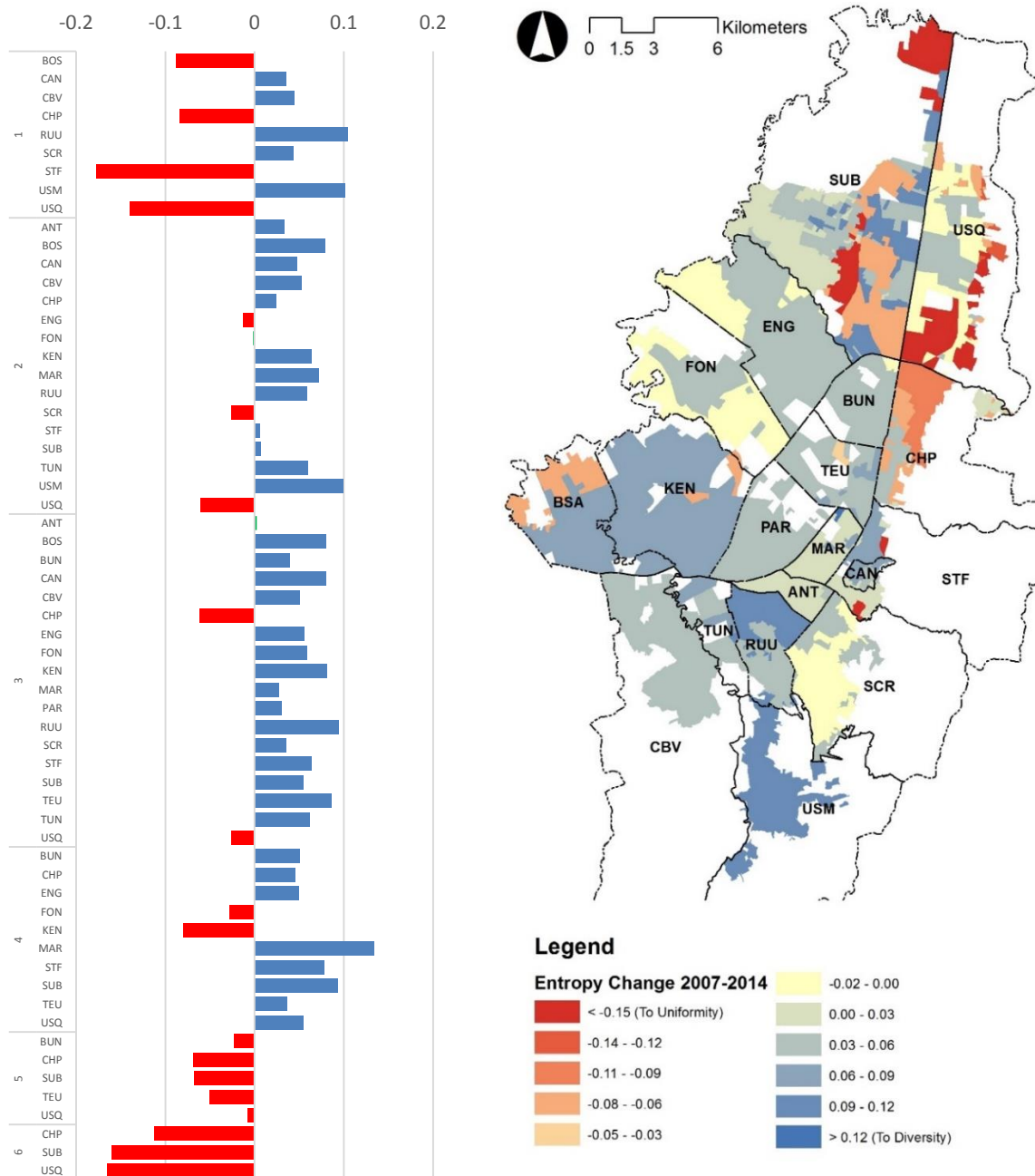


Figure 51: Entropy education level change 2007-2014 by stratum and locality

Source: Illustration by the author using the results of the EM-2014 and EMB-2007



In order to analyze how the patterns of incremental densification relate to changing levels of segregation, I conducted a correlation scatterplot analysis, shown in Figure 52. I sought to correlate the total area of incremental densification, normalized by the dominion's area in hectares, with the Entropy segregation score change of each dominion. The graph suggests that in the middle strata 3 and 4 areas with less densification per hectare, segregation levels decreased. Conversely, in the higher strata 5 and 6 where there was more incremental densification per hectare, the segregation levels increased. The correlation curve suggests that up to 150 new square meters of new housing projects per hectare for each dominion, the levels of segregation tend to decrease, but after that number, they tend to increase. The p value suggest that this curve is significant with 95 percent of confidence, but the  $R^2$  score of the curve is low at .15. This suggests that there is a large unexplained relation between incremental densification and segregation levels. I attribute this phenomenon to the movement of the population in the market of rental units and existing developments, which I did not address in this research due to limitations in the data sources.

In summary, this chapter suggests that there is a statistically significant relationship between the Stratification system and the patterns of incremental densification in the city for the period 2010-2015. Controlling for the size and location of a lot in relation to the BRT system, we can expect an increase of 15 percent in the area of housing projects and a 20 percent increase in case of nonresidential projects, for every increase in stratum. However, these incremental densification patterns, affected by the policy of Stratification, had only a marginal effect of about 15 percent in the change of segregation levels between 2007 and 2014.

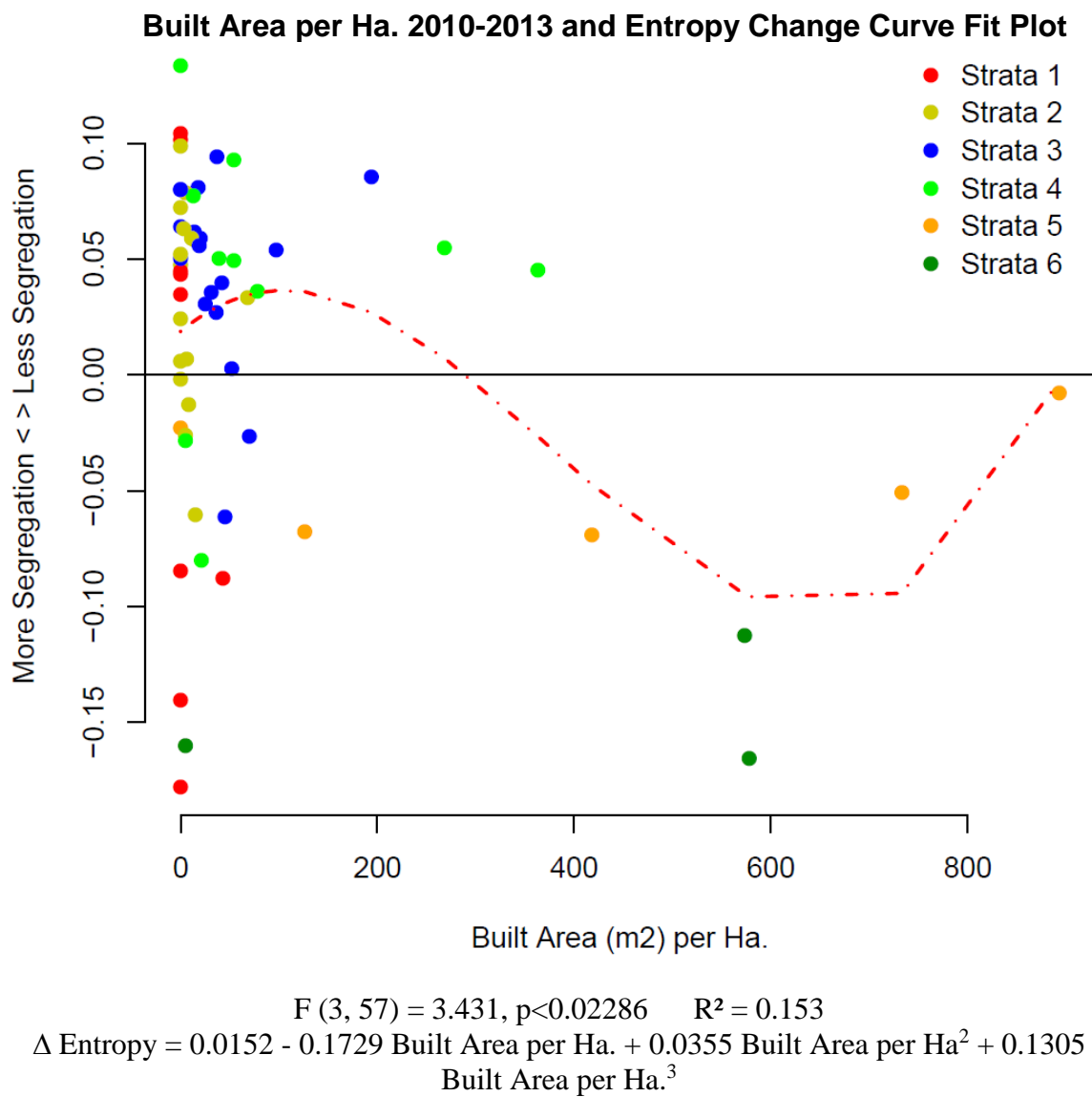


Figure 52: Entropy education level change 2007-2014 and total built area

Source: Illustration by the author using the results of the EM-2014 and EMB-2007

In the middle strata areas 3 and 4, this limited effect translates to decreasing segregation. On the other hand, in both the lowermost strata 1 and 2 and the uppermost strata 5 and 6, densification—or the absence of it—leads to increasing segregation.

Additionally, although this was not the purpose of this chapter, this econometric analysis found that the distance to the BRT system is a complex and changing variable in terms of predicting the size of the incremental densification projects. New nonresidential projects tend to be larger the closer they are to transit. For housing, however, this relationship depends on the stratum. While projects in Stratum 3—specifically those in the locality of Engativá in the West—tend to be larger the closer they are to the BRT, in the upper strata 5 and 6, densification projects are actually smaller with a closer distance to transit. This illustrates the challenge that the city faces if they seek to use the BRT to incentivize transit-oriented developments in higher strata areas.

However, the different mechanisms that lead to these relationships between Stratification and densification are unclear. In the next chapter, therefore, I will explore the reasons and drivers of these relationships through the analysis of interviews with developers, policy makers and scholars, in addition to a review of local real estate literature.

## **Chapter 8: Stratification in private sector and housing markets**

In this chapter, I will introduce evidence from thirteen in-depth semi-structured interviews and several informal conversations with various agents of urban development in Bogotá and then triangulate the findings with the results of the quantitative part of this study. The objective of the interviews was to understand how the social Stratification system in Bogotá influences the attitudes, behaviors, and ideologies of agents of urban development, and thereby affects the spatial patterns of incremental densification in the city. First, the interviewees emphasized the local effects of the social characteristics of the population that inhabit a neighborhood on its land values. Members of the general public associate social characteristics with the Stratification system, and as a result, the private sector has informally adopted them as a parallel, unwritten system of exclusionary spatial planning.

Secondly, through conversations with private developers who work at different scales and in different areas of the city, I learned that their practices and perceptions of Stratification differ depending on whether they are working in older larger firms, or if their practice is newer, rooted in a community, or mostly empirical. While larger firms tend to perpetuate the traditional exclusionary planning system, newer and smaller firms are more willing to take risks and challenge established practices by investing in areas of lower strata. Finally, I will highlight comments made in the interviews and passages from the real estate literature that illustrate the role of the real estate sector for planning and production of affordable housing.

### **THE IMPORTANCE OF SOCIAL DIVISIONS IN SETTING LAND VALUES**

I wanted to understand how the Stratification policy influences the incremental densification patterns in the city. In the interviews I conducted, mainly with private

planning and real estate consultants, I found that the social divisions of Colombian society explain in large part the relationship between Stratification and urban development. This point is evident in the fact that all interviewees acknowledged that there is a social order that is not written anywhere, but that rules the behavior of local urban development agents who shape how the city is transformed. This regulation is informal and mainly enforced through developers' attitudes, interests, and behaviors. For instance, a private urban planning and real estate consultant with extensive experience Bogotá explains that this traditional social divide is a fact, accepted by all as intrinsic to Colombian identity:

[Should projects represent the identity or social conception of communities? I would say yes. Finally what we wonder is whether we are a society that is interested, or which has lived the experience of social mixture, as we are all jumbled inside the country. And it turns out that no, our identity is one in which the different social groups, social strata, or conditions separate us from each other. Even in small towns, there are those two blocks where the important people of the village live and there is another block where the least important people live. Important in what? Politically, socially, culturally or economically...it does not matter, but let us say that from the start we tend to be a segregated society...]

*¿Los proyectos deben representar o deben responder lo que es la identidad o lo que es la concepción social de las comunidades?, yo diría que sí. Finalmente lo que nos preguntamos es si en el país somos una sociedad que está interesada o que ha vivido su experiencia de mezcla social, como que todos estamos revueltos. Y resulta que no, resulta que nuestra identidad es una identidad en donde las diferentes categorías sociales, grupos sociales, estratos sociales o condiciones sociales se separan y viven separados unos de otros. Incluso en los pueblos pequeños existen aquellas dos manzanas donde viven los importantes del pueblo, y en otra manzana donde viven los menos importantes del pueblo. ¿Importantes en qué? en lo político, social, cultural o económicamente, no importa, pero digamos que de entrada tenemos tendencia a ser una sociedad segregada...*

Private consultants are not alone in indicating that a system of social and spatial division directs urban development. Evidence shows that large sectors of civil society also view the social divide as part of the local context and opposed to any change in the patterns of spatial separation. A well-known example is the strong opposition to former Mayor

Petro's policies of inclusionary zoning, proposed in 2014. These new ordinances transgressed the socio-spatial order of the city as they sought to relocate families living in lower strata areas into new affordable housing projects in public lands located in areas of higher strata. Petro argued that this was a strategy to tackle the traditional socio-spatial segregation in the city. However, as a consultant in urban planning explained:

[In the review process of the POT, that was done last year and the year before with the administration of (Mayor) Petro, he sought that, in this exceptional modification of the POT, the mixture of uses would be made on site, and that within areas of higher strata, there were islands of affordable housing. The social reaction against this was overwhelming from the first moment. First, in the sense that the upper strata are not going to want social groups of lower strata coexisting in the same territory with them. They argue security issues, which is suspicious because no one tells me that the localities of lower strata are more unsafe than the others. We could look at the data, and maybe they are not. Second, groups of lower strata may not find it pleasant to live in areas of higher strata where public services are certainly more expensive, and they will surely be seen in a less pleasant way "as flies in a glass of milk." Therefore, the (social) coexistence will not be assured, and this is no good for either group. This corresponds to my initial idea that culturally we are not used to living together.]

*En el proceso de la revisión POT [Plan de Ordenamiento Territorial] que se hizo el año pasado y antepasado con la administración de [el Alcalde] Petro se buscó en la modificación excepcional del POT que esa mezcla de usos se hiciera en el propio sitio, y que en sectores de estrato alto existieran islas de viviendas de interés social. La reacción social fue contundente en el mismo momento, primero en el sentido de que pues los estratos altos no van a querer que grupos sociales de estratos más bajos estén conviviendo en el mismo territorio con ellos, así argumentan temas de seguridad, lo cual es sospechoso porque nadie me dice que aquellas localidades de estratos bajos son más inseguras que otras, de pronto podríamos mirar los resultados y no lo es tanto. Segundo para los grupos de estratos populares tampoco les resulta agradable vivir en estratos más altos, donde yo qué hago viviendo en sectores de estratos más altos donde los servicios públicos son seguramente más caros, donde seguramente será visto de forma menos agradable, "como mosco en leche," y seguramente la convivencia no va a estar asegurada por tal motivo, por lo tanto esto no agradaba ni a unos ni a otros, y eso responde a mi primera idea de que culturalmente no estamos acostumbrados a vivir mezclados.*

Newspaper articles also reflect the stark opposition of sectors of civil society to the inclusionary zoning ordinances and the idea of de-concentration of poverty that was introduced during the Petro administration. When I reviewed newspaper articles from 2014 that addressed the development of affordable housing in areas of high strata I found a great deal of opposition to the initiative, even from individuals living far from the proposed projects in areas of lower strata. Here I present anonymous quotes extracted from the commentaries section of the newspaper article titled “Social housing in Chicó in Bogotá” (El Tiempo 2014). Chicó is a traditional upscale neighborhood where the municipality owns a set of properties, now used as parking lots, which the new ordinance seeks to transform into affordable housing:

[Are they placing a house with hoodlums in front of the *Andino* (upscale shopping mall in Chicó) and at the foot of the European embassies? How nice, now there will not be anything to show in Bogotá.]

[I do not live in these areas because I cannot buy there (I do not have the money). It is also an interference with nature. It is only natural that if one is born, grows up, is educated, works, and earns good, lives there. We must not give these privileges to those who have not earned them with their sweat.]

[I am Stratum 3, falling into 2, and as the popular adage says “every parrot on his stake.” The properties that the IDU (city’s urban development agency) has in these areas should be used for free parking, so (to use) when one goes there with his “pichirilo” (car) for work or other duties...]

*¿Van a colocar una vivienda con maleantes al frente del Andino y al pie de las embajadas Europeas? Qué bonito, ahora si ya no hay que mostrar en Bogotá.*

*Yo no vivo en esos sectores porque no he podido comprar allá (no tengo el dinero). [...] También es una interferencia con la naturaleza. Es natural que uno nace, crece, se eduque, trabaja y si gana bien viva en esos sectores. No debemos regalar esos privilegios a quienes no los han ganado con su sudor...*

*Soy Estrato 3 tirando a 2, y como dice el adagio popular “cada loro en su estaca,” estos lotes que tiene el IDU [Instituto de Desarrollo Urbano] en estos sectores deberían de utilizarlos para parqueaderos públicos gratis, cosa que*

*cuando uno vaya a este sector con su “pichirilo” [auto] ya sea por trabajo o hacer una diligencia...*

In 2015 a judge repealed Mayor Petro’s initiative, accepting a class action lawsuit against the project filed by fifteen residents of Chicó and supported by a city council member. The judge blocked the project, arguing that the development of affordable housing in Chicó will make the city lose public money. The judge argued that because the market value of the public lots was 30 billion Colombian pesos, each proposed apartment would have a value of 850 million or 1,153 minimum monthly wages. This value greatly exceeds the upper legal limits set for an affordable apartment, which is roughly 100 million pesos or 135 minimum monthly wages. As a consequence, the city will lose money if it offers the apartments at a lower-than-market price to a limited number of families.

This ruling, however, raises a set of questions. According to the judge’s rationale, the city cannot use such properties for any public use that does not generate a higher monetary revenue than does selling it off to developers. Therefore, the citizens could block any kind of project on these sites, including schools, parks, hospitals, or fire or police stations, by arguing that it makes more economic sense to sell the highly valued properties for private development, and provide services elsewhere where land is cheaper. In reality, however, this economic rationale may not be the main reason that residents initiated the class action suit. The real concern of the neighbors to this project was the devaluation of their properties that might result from the presence of lower income groups in the neighborhood, which may be attributed to NIMBYsm or, as Mangin would call it, “New Exclusionary Zoning” (2014). An anonymous comment on a news article about the lawsuits (Reina Romero 2015) illustrates this point:

[I find it very good (the rule of the judge), I am not of high stratum, but you cannot mix up people like that, that brings grave social implications. On the other hand, the people that have invested so much in their properties, this must be



because they have worked for it, and they do not deserve for their properties to be devalued.]

*Me parece muy bien, yo no soy estrato alto, pero no se puede revolver así a la gente, eso trae implicaciones sociales graves. De otra parte, la gente que ha invertido mucho en sus viviendas, pues será porque lo ha trabajado y tampoco merecen que les devalúen sus predios.*

This episode highlights the importance of market values as a driver behind both public and private interventions in the city. What variables determine land values set in Bogotá, and are these land values related in any way with Stratification, as both the affirmations of planning consultants and the class suit against inclusionary housing suggest? In the United States, for instance, the social conditions in neighborhoods are important in the appraisal of a property. According to the United States Appraisal Institute, the social characteristics relevant for determining the desirability of a neighborhood include the population density; the occupants' skill levels, age levels, and employment status; the presence of crime and litter; and the availability of public services and neighborhood associations (1992, 176). In the Colombian context, members of the public and the development sector perceive that Stratification is a proxy for such individual socio-economic variables even though the system is premised exclusively on built form. Economist Oscar Borrero-Ochoa (2000), the founding father of land appraisal in Colombia, explains this phenomenon in his book about real estate values. He argues that in Colombian cities, unlike cities in other parts of the world, land is not valued exclusively in relation to, for instance, the distance from the city center as a proxy for accessibility to employment and services. Instead, land is valued depending on which social group occupies it (Borrero-Ochoa 2000, 18):

[However, it is not true that only the lower strata are located in the periphery. This is only partially valid. The value of the land depends on the social strata that occupy it. The experience of our cities indicates that the higher strata lead

development. Around them tend to cluster the middle strata. The planning system then, segregates the popular levels (lower strata) from the high and middle strata... Intermediate cities also have this segregation, but less marked, as the upper and middle strata live mixed, but only separated from the popular level by a few blocks. That is the case of Manizales, Pereira, and Bucaramanga, where from the apartment towers in middle and upper class neighborhoods people can see the nearby popular areas. However, there is no road access between them to allow separation and prevent devaluation... In this way, the land is valued according to the social level that occupies it, and as the middle level approaches the upper strata, the land will increase in value.]

*Sin embargo, no es cierto que en la periferia se ubiquen únicamente los estratos bajos. Esto es sólo parcialmente válido. El valor de la tierra va dependiendo del nivel social que la ocupe. La experiencia de nuestras ciudades indica que quien jalona el desarrollo es el estrato alto. A su alrededor tienden a agruparse los estratos medios. El sistema de planeación ubica a los niveles populares segregándolos de los estratos alto y medio... Las ciudades intermedias también presentan esta segregación, pero menos marcada, ya que los estratos altos y medio viven mezclados, separándose únicamente del nivel popular por escasas cuerdas de distancia. Así sucede con Manizales, Pereira o Bucaramanga, en donde desde las torres de apartamentos de clase media y alta se ven los barrios populares a corta distancia, pero no hay acceso vial entre unos y otros para permitir la separación y prevenir la desvalorización... De esta manera la tierra vale de acuerdo con el nivel social del que la ocupe y en la medida que los niveles medios se acerquen al estrato alto, la tierra se valorizará.*

Ultimately, my interviews with planners and the discourse of real estate professionals reveal that Stratification plays a key role in shaping perceptions of different areas of the city. In so doing, Stratification in effect acts like a planning policy that shapes the process incremental densification and hence the urban development of Bogotá. As a result, the system of Stratification may also be having an effect on the housing markets, as I will explain in the next section.

## **MARKET FAILURES IN THE HOUSING PRODUCTION IN RELATION TO STRATIFICATION**

As developers build out the few remaining empty lots located within the urban limits, the provision of affordable housing becomes more challenging. According to the

former chair of the city's Housing Department, María Mercedes Maldonado (2016), the production of affordable housing has reached an unprecedented low. She cites the latest data from the DANE for the period between January and August 2016 to argue that only forty-two units of the most affordable housing type, *Vivienda de Interés Prioritario* (VIP), were built in the city. Currently, the city has a housing backlog that surpasses 300,000 units (SDHT 2016). The geographic characteristics of the city restrain the supply of land suitable for urbanization since mountains surround the city in both the east and the south, and the administrative limits of the city are constrained by the Bogotá River in the west. As a response, unruly developments of affordable housing are spilling all over the savanna outside the city.

Local developers and policy makers have been attributing the cost of housing to a market failure caused by the limited supply of urban land. However, other scholars have been relating this market failure with the speculative practices of large-scale property owners (Borrero-Ochoa 2016; Araque-Solano and Caballero-Quintero 2009). In this section, I will explain how the Stratification policy relates to market failure in the housing sector in Bogotá, based on the evidence from the interviews I conducted. The evidence I collected in the interviews suggests that the Stratification policy is related to the rising cost of housing in the city.

The construction industry in Bogotá has traditionally been one of the main bases of the city's economy. A handful of large-scale construction firms dominates the real estate market. These firms, some associated with important local families, others with businesspersons or banks, have grown exponentially and have influenced the planning of the city, mostly through the close relationships they maintain with the local administration by supporting the political campaigns of the mayors or of key city council members. The

growth of most of the firms was enabled by the national housing policy reforms of the 1970s and 1980s, which introduced the UPAC mortgage system and eliminated government involvement in housing production. These policy reforms channeled large public funds to the private development of large-scale multifamily housing compounds. As a result, a handful of firms specialized in the construction of these compounds, later diversifying into building shopping malls and, more recently, single-house gated communities in the periphery. These large firms became big critics of the planning policies of former Mayor Petro. He aimed to restrict urban growth in the peripheries, but these firms argued that the limited supply of urban peripheral lands is the main reason for rising housing costs. An owner of a large construction firm explains:

[The most important of governments, what they said in the congress of CAMACOL (national association of construction companies) is that it has been demonstrated that a government that does not offer land or that does not produce zoning on new land, is a city government that will see the (housing) production costs rise. As in the case of Petro, there was no offer of new land, there was no new zoning for these sectors. The zoning inside the city turned very difficult, that made it such that land was not offered the way we would have wanted, and as a result the price of land increases. As a consequence, twelve years of the same, in which there was not any available land, well that caused an increase in the cost of housing that was absurd. The official entities do have an important role in the regulation, whether it be with the city on urban renewal projects or in the periphery.]

*Lo más importante de los gobiernos, lo que dijeron en el congreso de CAMACOL es que está demostrado que gobierno que no ofrezca tierra y que no produzca normatividad sobre tierra nueva es un gobierno de una ciudad al que se le van a subir los costos de producción. Como en el caso de Petro, no hubo oferta de tierra nueva, no hubo normatividad nueva sobre sectores. La normatividad dentro de la ciudad se puso muy difícil, eso hizo que no se ofertara tierra como nosotros hubiéramos querido, y por consiguiente se sube el precio de la tierra. Por consiguiente, 12 años de lo mismo, que no hubo oferta de la tierra pues causó un incremento de costo de la vivienda que fue absurdo. Las entidades oficiales si tienen un rol importante sobre la normatividad ya sea con la ciudad en proyectos de renovación urbana o en los bordes.*

On the other hand, scholars point out that the city's current affordable housing policy is not reaching the very poor, not just because of a limited supply of affordable units, but also because the cost of the units is simply too great and the requirements for accessing mortgages are unrealistic for individuals working in the informal economy. As Borrero-Ochoa explains, the problems with the housing policy and the limited supply of land set aside by the city planning authorities makes illegal development the only housing option for the very poor (2000, 20–21):

[Families that have been living in the city for some time, paying to lease rooms (tenements), are unable to buy in the governmental market. The cheapest house costs today in our large cities between 15,000 and 20,000 US dollars, and requires three to four times the minimum monthly salary to access financing. Lots with services are very few and overly expensive. The only alternative left to them is going to the pirate market: buying a property with neither permits nor infrastructure, outside the city limits. Pirate developers buy large plots of land, divide them into small lots, and sell them cheap. A pirate lot of 72 square meters can cost around 3,000 US dollars today. The community solves the lack of utilities by putting pressure on local politicians who will force utility companies to provide water and energy in exchange for votes...

The problem with this mechanism is the additional cost generated for the city and utility companies. It would have been better to provide sufficient popular land, gradually expanding the urban perimeter and achieving growth that is planned and at a lower social and economic cost... When urban planning is done contrary to social needs and market laws, it generates more urban chaos. Planning should go before the demand to channel needs. The direct opposition (to expansion) from behind a desk creates a social discontent that only politicians can solve by violating the rules they themselves adopted in the City Council].

*Las familias que llevan un tiempo viviendo en la ciudad, pagando cuartos de arrendamiento (inquilinos), tienen la imposibilidad de comprar en el mercado gubernamental. La vivienda más barata cuesta hoy en nuestras grandes ciudades entre 15,000 y 20,000 dólares y requiere entre tres y cuatro salarios mínimos legales mensuales para poder acceder a la financiación. Los lotes con servicios son muy reducidos y exageradamente costosos. Les queda sólo la alternativa de acudir al mercado pirata: comprar lotes de terreno sin permisos ni obras de infraestructura, fuera del perímetro urbano. El urbanizador pirata compra*

*grandes globos de terreno, lotea y vende a bajo precio. Un lote pirata de 72 metros cuadrados puede costar hoy alrededor de 3,000 dólares. El problema de los servicios será solucionado por la comunidad y la presión de los políticos que obligarán a las empresas de servicios a dotar de acueducto y energía a cambio de votos populares...*

*El problema de este mecanismo es el sobre costo que generan a la ciudad y a las empresas de servicios. Habría sido mejor dotar de terrenos populares suficientes ampliando gradualmente el perímetro y obteniendo un crecimiento planificado y a menor costo social y económico... Cuando la planeación urbana va en contra de las necesidades sociales y las leyes del mercado, genera un mayor caos urbano. La planeación debe ir delante de la demanda encauzando las necesidades. La oposición frontal desde un escritorio crea un malestar social que sólo los políticos pueden resolver violando las normas que ellos mismos aprobaron desde el Concejo Municipal.*

Newer evidence suggests, however, that there is a complex relationship between the supply of urban land and housing prices in Colombia. In a study of nineteen Colombian cities, Borrero-Ochoa (2016) discovered that the supply of urban land could only explain 50–60 percent of housing costs. Borrero-Ochoa attributes the other unexplained 40–50 percent to monopolistic practices by landowners that are aggravated by the Stratification system. He found that, as expected, housing is more expensive in more affluent cities such as Bogotá or Medellín, since these have higher demand for housing in strata 4, 5, and 6, and limited supplies of peripheral land. However, according to the author, the evidence shows that housing prices are not actually lower in poorer cities that have larger supplies of peripheral land, such as Ibagué or Montería. He claims that this responds to behaviors of local property owners and construction firms. In order to maximize their profits from urbanization projects, landowners and construction firms tend to restrict the development of land only until the areas are suitable for building for buyers in the higher strata 4, 5 or 6. This argument is convincing taking into account the characteristics of the real estate markets in such cities. The largest share of housing demand is often within the informal

sector. As a result, the formal market is very small and easily monopolized by a small number of landowners and construction companies.

Araque Solano and Caballero Quintero (2009) found similar contradictory results following changing housing prices in Bogotá in recent decades. They argue that in Bogotá the supply of urban land did not have much effect on reducing new housing costs; on the contrary, they found evidence that new housing prices actually increase when the city expands. The authors argue that this responds to the coexistence of a formal and an informal real estate market and to the strong socio-spatial segregation in the city. On one side, the patterns of social segregation restrict the choice of location for families in the northern, western or southern peripheries. On the other, the very poor qualities of the housing stock in the informal areas increases the demand for new housing with better characteristics.

My interviews also suggest that the socio-spatial segregation operationalized in the Stratification policy serves to decrease housing affordability, regardless the supply of urban land. I infer from my conversations with developers that the Stratification policy causes a segmentation of the housing market and thus an increase in housing prices. A developer in a large firm confirmed this point:

[Yes, (Stratification) is important because the strata have different tastes for the real estate business. Then for example, a Stratum 6 in Chicó is in oversupply, then that is a stratum that does not interest me. A Stratum 3 in Barranquilla or Bogotá is in high demand. Then yes, the stratum because given the conditions of the sector it can be in great demand, then we do look at the stratum. But in the same way in Chicó it can be in oversupply, there can be a lack of availability of a Stratum 6 elsewhere].

*Si (la Estratificación) es importante porque los estratos tienen diferentes apetitos por el negocio inmobiliario. Entonces por ejemplo un Estrato 6 en el Chico ya está sobre ofertado, entonces ese es un estrato que no me interesa. Un Estrato 3 en Barranquilla o en Bogotá está altamente demandado. Entonces sí, el estrato porque dadas las condiciones del sector puede estar altamente demandado,*

*entonces sí miramos el estrato. Pero así en el Chicó como puede estar sobre ofertado puede haber falta de oferta de un Estrato 6 en otro lugar.*

This statement suggests that there is a segmentation of the market, producing a bias for development in higher strata areas. Market segmentation is a strategy used to divide customers into sub-groups and then identify higher yield segments. Leishman (2001) has pointed out that segmentation in a housing market is related to the absence of competition. If suppliers have a monopolistic position in a growing market, they will tend to attend to only the niche of customers that yield the most profit. In this case, the segmentation resulting from Stratification encourages construction firms to develop projects that exclusively target higher strata areas, disincentivizing the production of affordable housing. In the Colombian case, affordable housing units receive demand-side subsidies that are calculated depending on the costs of the units. *Vivienda de Interés Social* (VIS) programs subsidize units costing up to 135 times the minimum monthly salary, and *Vivienda de Interés Prioritario* (VIP) subsidizes units costing up to 70 times the minimum monthly salary. An urban planning consultant working for private developers explains:

[But the interesting thing about the VIS and VIP market is that (a unit) sells very quickly but the profitability margins are low. If you do not build according to schedule, with the budgeted materials and costs, you start to lose the return on your investment. Instead, in the higher strata market, those returns are minimal (in importance) because if you spend 200 million pesos on an apartment, but you sell it for 800 or 700 million, because it depends on where it is located, if it is in a good area, or if not I won't pay it.]

*Pero lo interesante del mercado VIS y VIP es que se vende muy rápido pero el margen de rentabilidad es bajo. Si no construyen con el tiempo previsto, con los materiales previstos y con los costos previstos empieza a perder la rentabilidad. En cambio, para los estratos altos esos rendimientos son mínimos porque si tú le gastas 200 millones de pesos a un apartamento pero lo venden en 800 o 700 millones de pesos porque depende de donde esté localizado, si está en un buen sector o sino no lo pago.*



The interviews suggest that developers use various mechanisms to tailor their developments for higher strata areas. One of them is increasing the size of the apartments. Larger apartments yield more profit for the developer, while raising the prices for the public. A developer in a large firm mentioned that they increase the areas of the apartments depending on the stratum, but also depending on the site: if the site is in high demand or located in a high strata area, they will increase the square footage of the apartments in order to raise the prices:

[We have clear standards for maximum areas. For example in Barranquilla we started to build Stratum 3 with 78 square meters. In Stratum 5 we put 85 meters and two rooms. The same happens in Bogotá, however it is also different, we have larger projects. We built the largest project in Salitre,<sup>14</sup> we built apartments with more than 125 square meters on average. This was in the year 2008, they were the largest areas that had been built in that sector.]

*Hay especificaciones claras sobre áreas máximas. Por ejemplo en Barranquilla comenzamos a hacer estrato 3 con 78 metros cuadrados, en estrato 5 metemos 85 metros y dos habitaciones. Lo mismo pasa en Bogotá, aunque si es diferente, tenemos proyectos más grandes. Fuimos el proyecto más grande de Salitre, hicimos apartamentos con más de 125 metros cuadrados área en promedio. Esto fue en el año 2008, fueron las áreas más grandes que se hayan construido en ese sector.*

Other studies have also shown that building housing only for the higher strata is more profitable. Borrero-Ochoa and Duran (1996) found that the annual increase in property prices in inner city higher strata areas skyrocketed in the period from 1970 to 1990, and even surpassed the increase of prices for offices and retail land-use. The increase even continued through the moderate economic downturn that occurred in the country during the 1980s. In areas of middle strata, there were also continuous increases in prices; however, these were moderate, but larger in the areas close to the higher strata. In

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<sup>14</sup> Salitre is a planned neighborhood developed firstly during the 1990s as an area for affordable housing, delineated as Stratum 3. However recently property values there have exponentially increased.

comparison, the annual increase in prices for the middle-low and low strata was meager and there was development activity only during the economic downturns.

The Stratification system also causes market segmentation in central city redevelopment areas through regulations designed to incentivize incremental densification. As with peripheral lands, larger construction companies preferentially develop higher strata areas to yield the highest profitability at the same time that they divest from areas of lower strata, despite the fact that those lower strata areas may be well connected to services, transportation, and jobs. The successive increases in the height restrictions set by the zoning ordinances respond to this phenomenon. In the inner city, the local height and FAR limits are the tools used to expand or restrict the supply of space for incremental densification.

There is evidence that the construction firms influenced the drafting of these specific land development codes. For instance, I asked a planning officer at the SDP if the private sector has influenced the development of the UPZs created in the POT 2000, and he responded:

[Yes probably, I think for example in the case of UPZ Chicó-Lago-Refugio (predominantly Stratum 6). We had not finished establishing code for a hundred and something UPZs, and it had already been established four times, they fixed it four times, that is a sign of pressure, but where is this pressure coming from? Partly from the markets, the markets pressure...]

*Sí probablemente, yo creo por ejemplo que ese caso de las UPZ Chicó-Lago-Refugio. Ciento y pico de UPZs no las habíamos terminado de reglamentar y ya esa la había reglamentado cuatro veces, la arreglaron cuatro veces, eso es una señal de presión; ¿pero de que deriva la presión? Parte del mercado, los mercados presionan...*

Other planning scholars who participated in the processes confirm how the creation of the UPZs, which were designed to increase citizen participation in planning, disrupted

the propositions of the larger plan, Decreto 190, at the lower scale. More importantly, the creation of the UPZs facilitated the influence of the construction firms on the city regulations related to density and land-use. For instance, they increased the height limits in the North in areas designated for higher strata housing developments. A planning scholar explains:

[If you talk with T. Q. (a planning policy maker) who was the one who did all that, he will always tell you: ‘We messed up with the UPZs, those one hundred and something went a little out of our hands, many of the UPZs do not comply with the planning ideas that were set in the original plan... M. (a planning consultant and scholar) made like twenty UPZs, I told him, ‘I believe in you, I do not see you giving in to J. U. (a developer) to give more density to a property.’ Moreover, they were all those properties in the North. He told me ‘Yes, but there were difficulties in certain things, regulating the UPZs is more difficult...but with a city of this size how else do you do it? There is not much more to do.’]

*Si usted habla con T. Q. quien fue el que hizo todo eso, él siempre le va a decir: La embarramos con las UPZs, se nos salieron un poco de las manos esas ciento y pico, muchas de las UPZs no cumplen las ideas de planeación que se habían hecho en el plan original... M. hizo como 20 UPZs, le dije “yo creo en usted, no lo veo a usted cediendo ante J. U. para darle mayor edificabilidad a un predio,” y eran todos esos predios en el norte. Me dijo “sí, pero había dificultades en ciertas cosas, regular las UPZs es más difícil... pero con una ciudad de este tamaño ¿usted como más lo hace? No hay mucho más que hacer.”*

[The regulations that they gave the UPZs, on the contrary, inhibited the adequate development of the central areas as hubs of economic activity as was hoped. They also blurred a little bit the sectors that we wanted them to continue occupying, and moreover they dispersed those central areas. So there was a failure in how the participatory process in regulation did not come together with the larger objectives of the plan.]

*Las normas que dieron las UPZs al contrario inhibieron el desarrollo adecuado de las centralidades como aglomeraciones de actividad económica como se esperaba. Desdibujaron un poco también los sectores que propiamente queríamos que siguieran ocupando y más bien las dispersaron. Entonces hubo allí con un desencuentro en lo que fue el proceso participativo de la norma con los grandes propósitos del plan.*

The segmentation of the market facilitated by the Stratification policy ultimately contributes to the broader market failure in housing production. This failure has reduced the affordability of housing in the city and it might have decreased the standards of quality of life for the overall population. Policy makers also commented on this. One said:

[In North America, the person that lives downtown lives in a small space, and the person who lives far (from the downtown) lives in a larger space. Here, the person who lives far lives in a poorer space, this breaks up the structure, the decisions of families. There is a market failure because the decision of a poor family is distinct because 'I live wherever I can,' there is not anything available either in the small downtown or in the bigger periphery.]

*En Norteamérica el que vive en el centro vive en poquito espacio y el que vive lejos, vive en mayor espacio. Aquí el que vive lejos vive en peor espacio, esto rompe completamente la estructura, las decisiones de las familias. Hay una falla del mercado porque la decisión de la familia pobre es distinta porque "yo vivo donde pueda," no hay oferta en el centro chiquito ni en la periferia grande.*

She continued:

[That is what economists call poorly developed markets. Remember for instance that you live there (North America). The "gringo," the Colombian, and the Canadian supermarket are different. This makes explicit the conditions of sophistication of a market. Of this jelly here [(in a Colombian supermarket), you find ten (marmalades) there. You can find there fifty marmalades of every flavor. There starts to be sophistication in an offer, because it is a market that punishes you if you do not have quality (goods). This (here in Colombia) is a market so precarious that a person pays fifty million pesos per square meter in a close-by place, even if there is no daylight.]

*Eso lo llaman los economistas que son mercados poco desarrollados. Acuérdate por ejemplo que estás viviendo allí. El supermercado gringo, colombiano y canadiense es diferente. Explicita las condiciones de sofisticación de un mercado, de esta mermelada aquí, tú consigues diez mermeladas allá. Tú consigues cincuenta mermeladas de todos los sabores. Empieza a haber una sofisticación en una oferta porque es un mercado que te castiga si tú no tienes calidad. Este es un mercado tan precario que uno paga cincuenta millones de pesos por metro cuadrado en un lugar cercano, así no tenga luz de día.*

A final dimension of the market failure appears to be the location of jobs. As the offices of corporations and service providers concentrate in specific neighborhoods of the city, people will pay more and sacrifice living conditions for easy-access to jobs. A policy maker at the SDP explains that this has nothing to do with the stratum; however, in response, I argue that part of the market failure is caused by the fact that firms prefer to locate in areas of higher strata in the first place:

[The real estate sales potential in a square meter has skyrocketed in the area, (Chicó) and for many reasons that do not have to do only with the strata. This is an area that is very well equipped, it has many parks, but above all the land prices respond to connectivity. That is to say, it is the residential area closest, let's say, to employment areas, that reduces people's commute time. Everybody in Bogotá is now playing to sacrifice quality of life in terms of space in order to try to reduce their commute. So again we say the obvious, that is the history of humanity, who can pay more for their square meter, let's say that obviously depends on the greatest purchasing power].

*El potencial inmobiliario de venta del metro cuadrado está disparadísimo en la zona, y por muchas razones no tiene que ver sólo por estratos. Una zona muy bien dotada, tiene muy buenos parques, pero ante todo los precios de la tierra se mueven durísimo por la conectividad. Es decir, es la zona residencial más cercana digamos a zonas de empleo, que reduce los tiempos de movimiento de las personas. Todas las personas en Bogotá están jugando a sacrificar calidad de vida en términos de espacio por tratar de reducir su viaje. Entonces nuevamente digamos lo obvio, eso sí es historia de la humanidad, quién puede pagar más por su metro cuadrado, digamos que obviamente depende de la mayor capacidad adquisitiva.*

#### **DIFFERENT DEVELOPERS AND DENSIFICATION MARKETS ACROSS THE STRATA**

I selected the developers I interviewed according to the contact information included in the database of construction permits provided by the SDP. The database showed that the companies that worked in incremental densification projects were mostly smaller firms, while those involved in larger scale infill or peripheral development were mostly larger and older construction firms. The different scale of capital required to do

incremental densification, or infill/expansion projects, explains this trend. While incremental densification projects require one scale of capital and human resources, large housing projects require much more up-front investment and logistical coordination, but also can generate much higher profits. A developer working on an incremental densification project relies on the current characteristics of a neighborhood for the sales—including the social perceptions that are created by the stratum of an area. Conversely, larger firms pursue projects where they can develop whole neighborhoods, build shopping malls, and design green spaces, thus minimizing their risks.

Based on my initial findings, I classified the development firms into large companies working mostly on infill and expansion development, and small firms working on incremental densification projects. I was more interested in the firms working on incremental densification projects because presumably for them, the stratum of a neighborhood would be of bigger concern. Nevertheless, to confirm my assumptions I conducted an interview with the owner of a large construction firm. I asked him about the criteria they use to determine the locations of their projects, and from that conversation, I learned that incremental densification is outside of their business model. They prefer to work in areas with large greenfields, and if these are scarce, as they are in the case of Bogotá, they prefer to work in the peripheral municipalities of the savanna. He suggested:

[We are interested in working in areas that have the possibility of continuity. This means that there are enough lots so that at the end of a project we can move on to build another one. In this way, we can expand our offerings in the same area so that the (previous project) becomes our best advertising mechanism benefiting us for many years.

(I ask) the city also grows through buying two-story houses and transforming them into condominiums. Do you have experience doing that? Or do you prefer building projects where there are large tracts of greenfields?

Do you talk about the experience of buying complexes of houses? It all depends on the expected profitability and the demand from those sectors.

(I clarify) I am referring to sectors that were before at the margins of the market, do you participate in such trends? It is like what you say, maybe Stratum 6 is saturated which leads you to move to other parts of the city, the question is if you are doing that?

Of course, in Cajicá (municipality in the savanna), outside the city.]

*Nos interesa trabajar en sectores que tengan posibilidad de continuidad. Eso significa que haya lotes suficientes para que al finalizar el proyecto podamos hacer otro proyecto después, para que podamos ampliar la oferta en el sector para que el referenciado es nuestro mejor mecanismo de publicidad que funcione por muchos años.*

*[Yo pregunto] La ciudad también crece a través de comprar casas de dos pisos y hacer edificios, ¿ustedes tienen experiencia haciendo eso? ¿O ustedes prefieren más como estructurar proyectos donde tengan grandes zonas de tierra?*

*¿Usted habla de la experiencia de comprar varios conjuntos de casas? Todo depende de la rentabilidad esperada y la demanda por esos sectores.*

*Me refiero a sectores que estaban antes al margen del mercado, ¿participan ustedes en ese tipo de tendencias? Es como lo que usted dice, tal vez el Estrato 6 está saturado entonces lleva a moverse a otras partes de la ciudad, la pregunta es ¿si ustedes están haciendo eso?*

*Si claro, en Cajicá fuera de la ciudad.*

The lack of interest on the part of larger firms to pursue incremental densification projects conflicts with the current planning objectives of the city. While the projects that larger firms develop in the savanna are mostly sprawling gated communities of single-family housing, the vision of planners in Bogotá has been, and continues to be, one of restricting urban sprawl into the savanna. The municipality can achieve this by limiting growth inside the city, as former Mayor Petro proposed, or by encouraging controlled growth in large-scale projects with high densities, as current Mayor Peñalosa suggests. I consider that for both strategies the small and medium size firms working in incremental

densification are important, as they are the major contributors to the densification and revitalization of the central areas of the city.

Larger firms produce the bulk of housing supply for strata 4, 5, and 6, and they dominate the subsidized affordable housing supply since they have achieved the scale and specialization that markets with such low returns require. Figure 53 shows a large densification project by a large construction firm in the North. As a consequence, smaller firms focus on both the very high end and the lower end of the demand. At the very high end are small luxury complexes tailored to the rich who seek to live in the central city. Projects are located in the most desirable areas of the city—areas that locals call “Stratum 8”—where land prices are sky-high. These small firms generally belong to architects who are well connected to those in power, and they custom build their apartments for specific clients. However, I found that firms working on mid-sized projects in unexplored areas of strata 3 and 4 are key to the planning objectives of the city, as they foster compact densification and revitalization of the central city. Figure 54 shows an example of such a project of incremental densification in the South. These smaller and medium sized firms use the Stratification system to identify investment opportunities in underserved areas with high demand.

There are two categories of such small and medium-sized firms pursuing incremental densification in the central city. The first group is composed of companies led by professionals in engineering and architecture who are exploring underexploited areas of the city, mostly those at the borders between Stratum 3 and Stratum 4 areas in the North, and in areas in the central city. The second groups of developers working on incremental densification are grassroots community developers, most often located in the South of the city.





Figure 53: Incremental densification in the North

Source: Photo taken by the author



Figure 54: Incremental densification in the South

Source: Photo taken by the author

I interviewed representative of the first group, which was most receptive to my investigation. For example, a project manager in a new firm confirmed that they are not very concerned about Stratification or land use in the area. If the area is well connected, they are willing to invest:

[We do not immediately reject it when we become aware of a lot located in an area I don't know, in a sector that is purely commercial and depressed, and (where) at night there are a number of dance clubs. We think it is attractive precisely because of that, to change the vocation of the sector. We have built on 13<sup>th</sup> Avenue... the neighborhood does not frighten us, we look first at the urban regulations, whether the city will let us do a profitable project, that the standards are beneficial and that we can develop to a decent height, six floors, eight floors.]

*No tenemos ese rechazo instantáneo que cuando llega un lote donde no tengo ni idea, en un sector que es puramente comercial y es deprimido, y por las noches hay una cantidad de discotecas. Nosotros pensamos que es atractivo precisamente por eso, para cambiarle la vocación al sector. Nosotros hemos construido sobre la 13... El sector no nos asusta, miramos primero pues la normativa urbana, que nos dejen hacer un proyecto rentable, que las normas sean beneficiosas y que podamos en crecer a una altura decente, 6 pisos, 8 pisos.*

In my conversations with such small and medium-sized developers, they also indicated that they are not concerned with the social stigma associated with the Stratification of a site. Instead, they are using it as a method to assess the market. If the sales are poor in a stratum, they migrate to projects in other strata that may have underdeveloped markets. Currently in Bogotá, several firms are moving from working in higher strata 4, 5 and 6 to Stratum 3 in a response to the slowdown in the Colombian economy in 2016. This move to invest in lower class areas, often of informal origin, has been called “new-built gentrification” by scholars, and has been identified in other Latin American cities (López-Morales 2016; Janoschka and Sequera 2016). Here are extracts of conversations with developers where they discussed these trends:

[We are open to any site as I said; it is not easy to get land, so we have moved to different strata and into different areas. At the moment, we are looking into strata 3 and 4; we have worked in 5 and 6. We are now finishing one project in Stratum 6, but we have realized that sales are a little more complicated there in those higher strata. The (Stratum) 3 is selling very well, we are about to start a project, it sold very well in the South in Barrio La Fragua near Barrio Restrepo.]

*Estamos abiertos a cualquier sitio por lo que le decía, no es fácil conseguir terrenos, entonces nos hemos movido en diferentes estratos y en diferentes zonas. En este momento tendemos a los estratos 3 y 4, hemos trabajado en 5 y 6. Precisamente ahora estamos terminando uno en Estrato 6, pero nos hemos dado cuenta que las ventas están un poquito más complicadas en esos estratos altos. El 3 se está vendiendo muy bien, estamos por iniciar un proyecto, se vendió muy bien hacia el sur en el Barrio la Fragua cerca al Barrio Restrepo.*

[We are in another project that is in Ciudad Jardín del Norte, at 129<sup>th</sup> Street down Las Villas Avenue. That sector initially began as a working class area, then it started to have small industries and we bought several houses there. We are doing a front of about half a block. It is a very well located sector, that project is in process and it has gone well for us, it is stratum 3 or 4.]

*Estamos en otro proyecto que queda en Ciudad Jardín del Norte, en la 129 abajo de la avenida Las Villas. Ese sector inicialmente comenzó como un sector obrero, luego pasó a tener como unas industrias pequeñas y compramos ahí varias casas. Estamos haciendo un frente como de media manzana. Es un sector muy bien ubicado, ese proyecto está en proceso y nos ha ido bien, es estrato 3 o 4.*

Developers argue that such densification projects in underexplored areas are addressing the local housing need. They suggest that people who work in the area and do not want to move elsewhere—where their commute will be longer—are buying most of the apartments in these projects:

[It is the first time that we have worked in the South, we have always been towards the North... Well, in the 17<sup>th</sup> South project, where we are located, there is not a lot of projects being offered. We see that this is a very interesting area to continue exploiting because there are very few developers around, so we think that's why it is going well for us. Initially many people in the sector bought from us, a sector that has an area with industrial warehouses, where they have their factories and people from the sector... It may be that some people invest to lease (the condominium), but a good part bought to live there, because if those people

move within the sector, it will be much easier to live, it will be much easier to go from work to their homes.]

*Es la primera vez que trabajamos en el sur, siempre habíamos estado hacia el norte... Pues en el proyecto de la 17 sur donde estamos ubicados no hay mucha oferta de proyectos. Vemos que es una zona muy interesante para seguir explotando porque hay muy pocas constructoras alrededor, entonces creemos que por eso nos va bien. Inicialmente nos compraron muchas personas del sector, un sector que tiene una parte industrial de bodegas, que tienen sus fábricas y gente del sector... puede ser que algunas personas inviertan para arrendar, pero buena parte es para vivir, porque si esa gente se mueve dentro del sector, le será mucho más fácil vivir, les queda mucho más fácil ir del trabajo a la vivienda.*

However, developers also point out the challenges of working in areas of informal origin. Owners have incrementally expanded the houses and introduced mixed uses to the properties, which increases prices and complicates negotiations. In addition, often the densification ordinances only allow heights up to five floors in areas where the people have built up to three or four floors through self-help expansion.

[For us the sector is not important, but what happens with those (self-help) houses? For example, we have tried to do many projects, but those are productive houses, that they started with a floor and then they moved on to the second, and on the first floor, they put a business. Then one ends up buying a three-story house because they have been expanding it, where they (the city) allows building only five. Then if we buy it, we would have to buy it as a commercial (property). Therefore, many times in the negotiation I have to say to the owner that I will get him an 18-month lease, but the person does not want that because s/he has a business there where people always look for them, so it makes these types of negotiations more difficult.

*A nosotros no nos importa el sector, pero ¿qué pasa con esas casas? Por ejemplo hemos tratado de hacer muchos proyectos, pero son casas como productivas, que empezaron con un piso y luego se pasaron al segundo, y en el primer piso pusieron una cosa. Entonces termina uno comprando una casa de tres pisos porque la han ido ampliando, donde dejan hacer cinco. Entonces nosotros si la compramos tocaría comprarla como comercial. Entonces muchas veces en la negociación me toca decirle yo le consigo un arriendo para que se vaya 18 meses, pero la persona no le interesa porque tiene su negocio donde la gente siempre lo busca, entonces hace que este tipo de negociaciones sean más difíciles.*

Other developers addressed increasing conflicts with local communities over the heights of the new buildings, in addition to speculation of land prices, especially in neighborhoods of informal origin. The following story extracted from my field notes illustrates this:

Soon someone showed up and asked us if we needed help. I asked him if we could see the apartments. He said 'Sure,' however, at that same moment a woman with a small kid also showed up at the entrance. The guy nodded at her, a little irritated, and said 'Yes, I will help you, give me a moment.' Later he told us that they were people from the neighborhood. He said, annoyed, 'They always come to see the apartments, but they are not going to buy anything.' I thought that is, of course, unusual for the people of this neighborhood of self-built houses to see these new buildings around with fancy apartments.

As the person was showing us the apartment I asked if they were affordable housing (VIS). I noticed he disliked my comment and told me, 'No, they are not, this is an apartment as any other, this one costs 260 million.' The price was a little higher than I expected, so then I asked him if he was the developer. He told me that he is the partner of the developer, who is an architect; he is in charge of sales. They are a two-person firm. As he got a little more confident about me, he told me more details about the project, 'Two years ago we bought seven houses in this neighborhood for 1,500 million to do this project, everybody in the neighborhood freaked out. They complained much about the height (which is just a couple of floors higher than the self-built homes) and they were all angry. However, now, it became impossible to do another project in this neighborhood, now each neighbor is asking for 1,500 million for each house.'

As we went out of the building, I asked the person if he and his partners would be interested in giving me a longer interview for my research. He looked at me a little angry and said finally, 'No, here came people from the city, from the DANE, from everywhere, we are very clear, we are not talking to anyone about this project.'

However, other developers are part of the communities in which they work. Often these firms have grown through family efforts at the margins of the formal system of financing and without access to technical knowledge. They have attained the necessary permits and build to required standards, thus representing the formalization of the

incremental self-help model of densification. I will end this section with my field notes of an informal conversation with one of these developers in the Bravo Pérez neighborhood in the South of Bogotá. This conversation illustrates the characteristics of the firms, their building, and the sites:

The Bravo Pérez neighborhood is a place I have never visited in Bogota. As the taxi moved through the streets of the South, we left behind the places I knew and where I felt safe. We were driving following the GPS of my cell phone that showed the new projects listed in the database I obtained in the planning office. As we left the main roads, the houses became all self-built, many looked very old. There were fewer people in the streets, and the cars, although many, were mostly old models.

I have learned to fear the South, especially because the groups of youngsters between 16 and 22 years old gathered on the corners as we got into the cab. They dress in particular ways, with wide pants and jackets, and caps, sometimes also with dark glasses. They usually meet in groups of four or five at the corners where they talk and smoke. Sometimes they are accompanied by young women, then I fear less, but if they are men, two or three and I meet them walking anywhere in the city, I feel very afraid. People looking similarly have mugged me several times in the past. We middle and higher class Bogotanos call them “ñeros,” they in turn call us “gomelos,” and we are enemies. That is why I feel scared in these neighborhoods, despite being inside a taxi approaching the red dot on the map on my phone.

Finally, I see a new building amongst the houses of self-construction. I am sure this is the one that is indicated in my phone. I got out of the taxi and suddenly felt very unsafe, in the corner I see groups of youngsters, this is their territory, they have a pit-bull dog barking at us, they shout ‘shut up Killer!’ Older people also walk on the street, which calms me a little. The building is very different from the surroundings. It stands out for its height of seven floors, the glass façade and the paint. There is not any sales office in sight; there is just a notice in the door that advertises apartments with a phone number. I call the number and pretend that I am interested in buying an apartment. A young man answers me and tells me to wait five minutes for him to arrive. Although it is daytime, I feel that even waiting here five minutes is scary.

A few minutes later, a car approaches the parking lot of the building. A young man of approximately twenty-five to twenty-eight years descends. He greets me and invites me to continue to see the apartments on the second floor. Upstairs

there is a couple which also seem to be potential clients, they are with a man whom I presume is the caretaker of the building. I look at this young couple. By their looks, I presume they are not people such as those I see in the North. I assume they are people who also live in the South, I am happy to think that they have just gotten married and are searching for their first home.

The young man begins to show us one of the apartments, the floor is white tile, the kitchen and bathrooms look good. As an architect, even though everything is clean and has good materials, I do not like the design. The layout of the spaces is a bit strange, you lose a lot of space in the corridors and the rooms, they are also very small and dark. Although there is scarce daylight, I am sure the building minimally adheres to the building standards of the city. The guide tells us 'this building has a concrete structure.' Almost all the buildings in the North have concrete structures and we take it for granted, but I guess this is an important point for people that live in self-built structures. I ask for the price of the smallest apartment, about sixty-five square meters and two rooms, the young man tells me 160 million. It seems to me that it is cheap for the usual prices in Bogotá, I am sure that the apartments in the towers of the big developers are more expensive. In the North, an apartment with a similar area will exceed 350 million. However, it is also not affordable housing, whose maximum price is about 79 million.

I began to talk with the young man and asked him if he is an architect, he responded, 'Architects? No! All this has been done with no architects.' He then adds that he is the builder, or rather he is part of the family that is building these types of buildings in the neighborhood. He said, 'We grew up in this neighborhood, my father had a fabric business, but now we have moved on into construction.' I asked him if the social stratum is important for them in selecting the sites where they build. He tells me no, although he knows that the sector is Stratum 3. He then tells me that they have several projects in the neighborhood, one of them reaching ten floors. He said, 'That was thanks to Petro, he gave us that benefit, however we had to pay a lot of money (to the city).'

Finally, I asked about the type of people who buy the apartments and he tells me that people come from all over, especially from Madelena (further south), where they 'cannot stand the smell anymore.' Madelena is a neighborhood farther south that borders the river Tunjuelo, which is heavily polluted.

## **Chapter 9: Conclusions**

Through a spatial-statistical analysis and an analysis of interviews with agents of city development, this dissertation has shown that the Stratification policy has shaped the patterns of incremental densification in Bogotá from 2010 to 2015. Over time, this relationship between densification and Stratification has been influenced by planning mechanisms and by the decision-making processes and practices pursued by developers. In terms of housing development, my statistical analysis indicates that, controlling for the physical characteristics of the property and its access to mass transit, every increase in stratum results in an increase of roughly 15 percent in the average mean of the total built area of each new densification project. On the other hand, for nonresidential land-uses—such as offices, retail businesses and services—controlling for the physical characteristics of the property and its access to transit, every increase in stratum results in an increase of roughly 20 percent in the average mean of the total built area. While stratum and the physical features of the lot explain more than 80 percent of the built area of residential developments, other, unexplained factors may determine the location of nonresidential developments.

Two mechanisms explain why the Stratification policy shapes the redevelopment patterns of housing and nonresidential areas. The first mechanism stems from the inertia of historical growth management regulations. Between the 1940s and the 1970s, the city established a system of social segregation based on the spatial separation of people of different income levels using different building typologies. Detached suburban housing with full provision of services was built for the upper classes, while self-help housing on very small parcels with only basic infrastructure was built by the lower classes. This



separation ultimately laid the foundation for the Stratification policy introduced in the 1980s.

Later on, the city changed the system of social segregation through density and land-use norms with the introduction of Acuerdo 7 in 1979. This was a new model for growth based on a USB and the introduction of policies meant to incentivize the incremental densification of the central areas. Nonetheless, an analysis of the current morphological patterns of the city indicates that social segregation persists through a process of incremental densification. In the last thirty years, the suburban detached housing has been transformed into high-rise condominiums, while the self-help low-income houses have densified informally.

The analysis suggest that a recent policy change in the early 2000s intended to discourage incremental densification in the POT only marginally altered urban redevelopment practices in Bogotá. The data analyzed show that between 2010 and 2015, roughly 90 percent of areas of new development were built using the incremental densification approach, while less than 10 percent of the new area was produced using the newly introduced planning tools, PPs or PPRUs. These were created to impose a fairer distribution of the value added from real estate development between the public and landowners and developers, and to guarantee that densification maintains adequate supply of open space and infrastructure.

The second mechanism is associated with local practices in urban governance, which also became an important variable in the survival of the exclusionary system through successive changes in growth management approaches. I found evidence in the interviews I conducted that developers influenced the drafting of local UPZ regulations in order to increase their profit from the incremental densification processes. Although planning

policies were changed in the 2000s to limit the control of the private sector in urban development, at the same time, the introduction of the system of UPZs diminished the public sector's role in setting incremental densification patterns. This made it easier for the private sector to modify the large-scale objectives of growth management at the local scale. Even though Stratification is a key variable for developers' investment decisions, local policy makers often ignore or downplay Stratification as an important driver for incremental densification. This suggests that there is a disconnection between policy makers and the rationale of the private sector.

The influence of Stratification on patterns of incremental densification is important, because it has led to a disproportionate distribution of private investment in new housing and nonresidential areas across the city. For the period from 2010 to 2015, the areas of the upper-most strata, 5 and 6—which together account for only 4 percent of the population and 13 percent of the urban area of the city—received almost 60 percent of the investments made in new areas for housing. These strata also accounted for more than 60 percent of the investments made in new nonresidential areas. These figures suggest a real estate market segmentation, which reduces the supply of housing for the lower strata increasing housing prices for the population with the lowest income.

Finally, I explored the effects of the current patterns of incremental densification on the social segregation patterns in Bogotá. Based on my statistical analysis, in the period 2007-2014—using as a proxy the education levels of the population, and strata and locality as scale of analysis—I found that incremental densification has a limited and nuanced effect on social segregation patterns. Incremental densification relates to increasing segregation in the areas of higher strata 5 and 6, while it relates to decreasing segregation in strata 3 and 4. My maps and field surveys suggest that these effects may respond to the

numerous, recently developed projects of a smaller scale, especially in areas of Stratum 3 in the West and South. I have shown that these changing patterns of development are due in part to an emerging class of grassroots or young developers, who are working in incremental densification at the margins of a class of legacy large-scale developers.

These findings inform first, a larger theoretical debate about densification policies in urban design and planning brought to Colombia from other countries in the 1970s. The discourses that focused on normative ideas of good city form influenced the development of Acuerdo 7 in 1979, which sought to phase out the system of social segregation through density and land-use norms, and control city sprawl. However, the experience in Bogotá suggests that while these policies were effective in terms of densification—making Bogotá one of the densest cities in the world—they failed to address the continuing problems related to socio-spatial segregation. As other empirical studies suggest, I attribute this failure to a normative approach to urban policy, which inadequately incorporates the “procedural” characteristics of the local context, including stark differences in ethnicities, income levels, and places of origin, that are translated into stark differences in architectural typologies.

Secondly, this work addresses the current gap in literature about growth patterns in Latin American cities, specifically literature concerning zoning codes and social differences. Local scholars have claimed that Latin American literature on urbanism often fails to address the local social characteristics of the region, such as social segregation and poverty. Urban sociologists, on the other hand, have developed a large body of theory about the relationship between social segregation and urban growth in the region and explored its social, political, and economic causes and consequences. However, these studies have not evaluated specific planning regulations and explored their roles within these systems.

My research associates these two bodies of theory by addressing the gaps in both of them and providing a study that explores how specific normative policies in planning often reproduce the social segregation patterns in cities.

My research also contributes to literature on urban governance in the Global South by suggesting that a combination of both normative and procedural urban planning models—introduced to the city by foreign practitioners and consultancy firms—have shaped the evolution of Bogotá’s planning policy over time. Nonetheless, in the local context, the relationship between the public and the private sectors in urban governance does not actually follow either of these models. Instead, this research demonstrates that in Bogotá, as in many other cities in the Global South, the private sector exercises influence over public policy in order to maximize profits from land and housing markets. In the Bogotá case, there has been an ongoing alteration of larger planning objectives through the density and land-use regulations at the lower scale. Instead of the larger structure defined by the comprehensive plans, the city’s densification has followed the residential segregation patterns embodied in the Stratification system. These practices have been identified previously by Koch (2015), who coined the term “Arranged Urbanism.” I argue that the practice of urban planning within these constraints becomes difficult, making urban development difficult to predict.

However, my research also points to an emerging change of paradigms within the older settlements of informal origin and other areas traditionally at the margins of real estate development. A rising class of younger grassroots developers is altering the segregationist landscape of the city through piecemeal interventions. I found that their work is at least partially contributing to decreasing social segregation levels in the West and the South of the city. This points to recent literature that addresses the increasing social

fragmentation that is occurring in the peripheries of many Latin American cities. While this work does not address the positive or negative social consequences of this trend, it explores the motivations and characteristics of the new proximity between social classes.

This dissertation also informs the practice of urban planning in Bogotá. As of this writing in 2017, the mayoral administration of Enrique Peñalosa is in the process of formulating a new comprehensive plan. The empirical findings provided regarding land-use and density norms and urban governance will contribute to the development of smarter policies that can lead to a more sustainable and also socially just city. For instance, based on these findings, I call for a better articulation between large-scale normative planning visions and social policy using the Stratification system. The Stratification system should be considered an urban planning and development tool as much as a utilities cross-subsidy system.

In particular, this research suggests that the Stratification system may be a good tool to cross-distribute the income from the *plusvalía* [capital gains] tax. This tax, introduced via Ley 388 and Decreto 190, forces developers to share a portion of their profits from redevelopment allowed by upgrades in density limits. Although the *plusvalía* has been an important innovation in Latin America, it has been controversial in Bogotá because developers do not agree with the formulas by which the tax is calculated. Also, it is unclear how these *plusvalía* funds are spent by the city administration, and the bureaucratic procedures have become very complicated (Redacción Bogotá 2011; Smolka 2013). The Stratification system is currently used to calculate the tax assessment, but it is not used directly to determine the distribution of the earnings from the *plusvalía*. Currently the *plusvalía* funds are spent on new affordable housing projects mostly in the periphery instead of on improvements in the lower strata areas located in the consolidated city.

Because the Stratification zones serve to distinguish between areas of formal and informal origin, Stratification could be used to facilitate the distribution of plusvalía earnings from developments in higher strata to subsidize improvement in the built form in the lower strata areas. With this logic, these funds may subsidize the activity of small and grassroots developers in the lower strata areas. Most importantly, since citizens and developers alike embrace the Stratification system, such an adoption of the Stratification for the distribution of plusvalía earnings will be very simple.

Finally, my findings have reaffirmed that, as history suggests, land markets are dependent on the specific social, political and economic context of a site. If planners understand these variables embedded in the local context, they will be more capable to implement innovative policies that benefit the whole population, as Hirt (2014, 179) quoted from Light:

National land-use regimes do not arise in response to universal laws of the market that exert the same influence at any location on the planet. Rather, land-use regimes differ from country to country. They are embedded in a complex, historically developing framework of ideology, law and culture. If land-use controls regulate the physical shape of the communities we live in, then it is history itself that regulates what kind of community we view as wholesome, normal and desirable –our ideas of what “the city” and “the good city” mean. (1999, 577)

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## Vita

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