

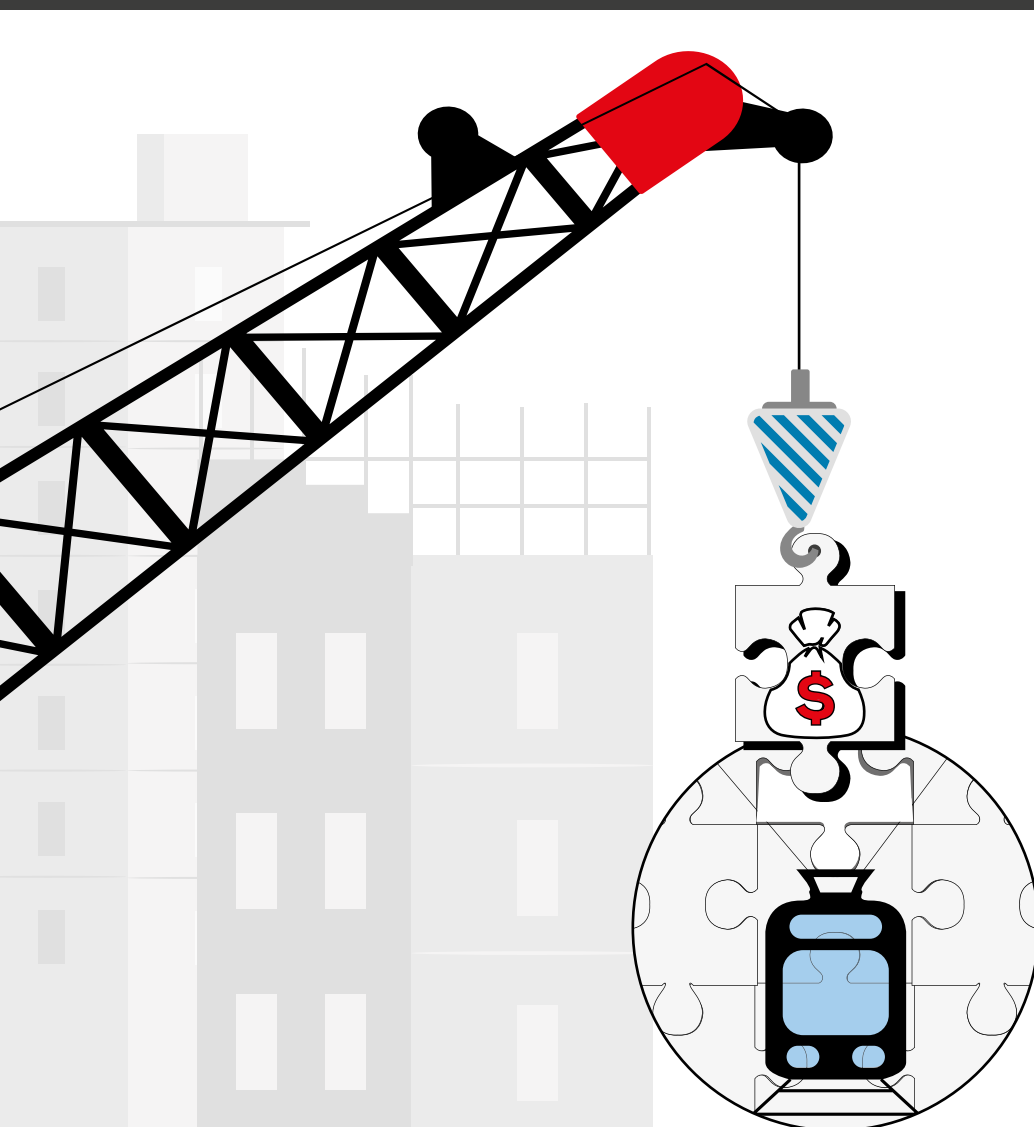
TAX INCREMENT FINANCING FOR URBAN PROJECTS: AN ALTERNATIVE TO FUND INFRASTRUCTURE IN LATIN AMERICAN CITIES?

Ramiro López-Ghio
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The case of Medellín's Carrera 80 Tram Project





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Abstract

In Latin America and the Caribbean (LAC) the overall infrastructure investment gap has undermined the region's ability to sustain recent levels of economic growth. Estimates suggest that the region needs to invest at least 5% of its GDP for a prolonged period of time to effectively close the infrastructure deficit. This paper examines the potential behind Tax Increment Financing (TIF), a form of Land Value Capture (LVC), to help cities invest in the much-needed urban infrastructure. Over the last 30 years, cities around the globe have been increasingly resorting to LVC to expand investments; tapping into publicly induced increments in land values to support capital projects. Despite the recognized potential that LVC offers, most city governments in LAC have been reluctant to use it, even when they have the legal authority and political support to do so. The lack of technical know-how, expertise and experience are restraining cities from piloting LVC programs, especially TIFs. This paper seeks to help municipal leaders better understand LVC and provide them with a framework to assess whether TIFs would work in their cities, facilitating an understanding of the critical design and implementation features. It illustrates the potential benefits of TIFs in LAC by analyzing the feasibility of a developing a TIF program to fund Medellín's Carrera 80 Tram Project in Colombia. Our study finds that Medellín is in a favorable position to successfully implement the region's first TIF program. It could help reach a level of funding of between 21% and 55% of the total investment costs of the first phase of the Carrera 80 Tram Project.

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INTRODUCTION

Cities around the globe continue to expand at astounding rates. By the end of this century, the world's 101 largest cities are expected to grow threefold, reaching 2.3 billion residents altogether – 18% of the projected global population (Hoornweg and Pope 2016). Historically, urbanization has been associated with economic growth due to increased productivity. In 2010, 289 Latin American cities, home to half of the region's population, produced over three quarters of Latin America's GDP (Vargas et al. 2017). However, unplanned urban growth has left many urban dwellers behind, and disconnected from basic public services, such as water, sanitation, and public transport. In most cases, city governments have been unresponsive to the increased demand for services, mainly because they have been unable to deal with the financial burden of investing, operating and maintaining infrastructure services, leading to a sizable infrastructure gap.

In Latin America and the Caribbean (LAC), the overall infrastructure investment gap has undermined the region's ability to sustain recent levels of economic growth. Estimates suggest that the region needs to invest at least 5% of its GDP for a prolonged period of time to effectively close the infrastructure deficit (IDB 2015a). Indeed, underinvestment in urban services has severely impaired cities' competitiveness, accentuating urban poverty and inequality. Recent studies claim that providing water and sanitation services to cover the total LAC population would require a threefold increase of the current annual level of investments for the next 20 years (Barbero 2012). Research also highlights that congestion, partly a result of insufficient investments in public transport services, represents 2% of the region's GDP, while it estimates that 45% of the region's population does not have access to adequate solid waste management services (IDB 2015b).

Research has focused more on studying the size of the infrastructure deficit and how it affects economic growth and development than it has on what cities can do to address this. This report examines the potential behind Tax Increment Financing (TIF), a form of Land Value Capture financing (LVC), to help cities invest in much-needed urban infrastructure. Over the last 30 years, cities have been increasingly resorting to LVC to expand investments, tapping into publicly induced increases in land values to support capital projects. The use of LVC to foster public investments is widely supported by the literature in the field of economics.

The rationale for LVC dates back to 1879, when Henry George in “Progress and Poverty”, suggested that increases in land value should accrue to society since the collectivity creates the value resulting from the use of land. The concept is based on the premise that land value is determined partly by external factors such as public investments in infrastructure. Thus, from an equity standpoint, it makes sense to levy a fee on private beneficiaries of public investments to partly recover investment costs or return the benefits to the public. This creates a virtuous circle: infrastructure improves access to services, access creates value, value can be captured to further finance infrastructure, enhancing access, and thus value (Roukouni and Medda 2012). There is wide consensus among scholars that public investment costs should be at least partially covered by the financial benefits that these produce (Ingram and Hong 2012). One such scholar is Nobel laureate William Vickrey, who supports the claim that cities could finance capital transit projects and fund operating costs by capturing land rents (Smith and Gihring 2006).

There are numerous examples available on how cities are using LVC to finance urban development and transport projects. For example, Washington, D.C. recently issued a US\$145 million TIF bond to support a major waterfront urban redevelopment project in the Southwest. The TIF bonds will be repaid with the property tax revenue generated in the project area. Other cities including Cairo, Mumbai, Bogota, and Rosario have also successfully implemented LVC financing to raise funds to support investments. If properly adapted to local contexts, LVC instruments could become mainstream as effective financing tools for cities everywhere.

Despite the recognized potential that LVC offers, most city governments in LAC have been reluctant to use it, even when they have the legal authority and political support to do so. The lack of technical know-how, expertise and experience are restraining cities from piloting LVC programs, especially TIFs. The purpose of this paper is to attempt to help municipal leaders to better understand LVC and to provide them with a framework to assess whether TIFs would work in their cities by helping them to understand the critical design and implementation features.

The first section of this paper presents a literature review on LVC and the mechanics of TIFs. Part II presents a TIF Analytical Framework that enables an assessment of the feasibility of designing and implementing a TIF program in a given city. The framework is based on the literature review and identifies the critical factors that determine whether a TIF would work in certain countries and cities based on economic, institutional and legal criteria. This section also presents a case study. It analyzes the extent to which TIFs could be implemented in LAC by applying the TIF Analytical Framework to Medellin, Colombia. Medellin was selected based on a screening process summarized below. To assess and validate the findings from the application of the TIF Analytical Framework, Part III then presents a pre-feasibility analysis for a TIF program for the Carrera 80 tram project in Medellin. Results indicate that Medellin is in a strong position to implement LAC's first TIF program. Under existing conditions, it is estimated that a TIF bond would cover between 21% and 55% of the cost of the first phase of the planned Carrera 80 tram project. The last section of this report offers recommendations and concluding remarks.

Ramiro López-Ghio
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Editors

01

PART

LAND VALUE CAPTURE AND INCREMENT FINANCING

By David M. Vetter and Marcia F. Vetter

A Literature Review

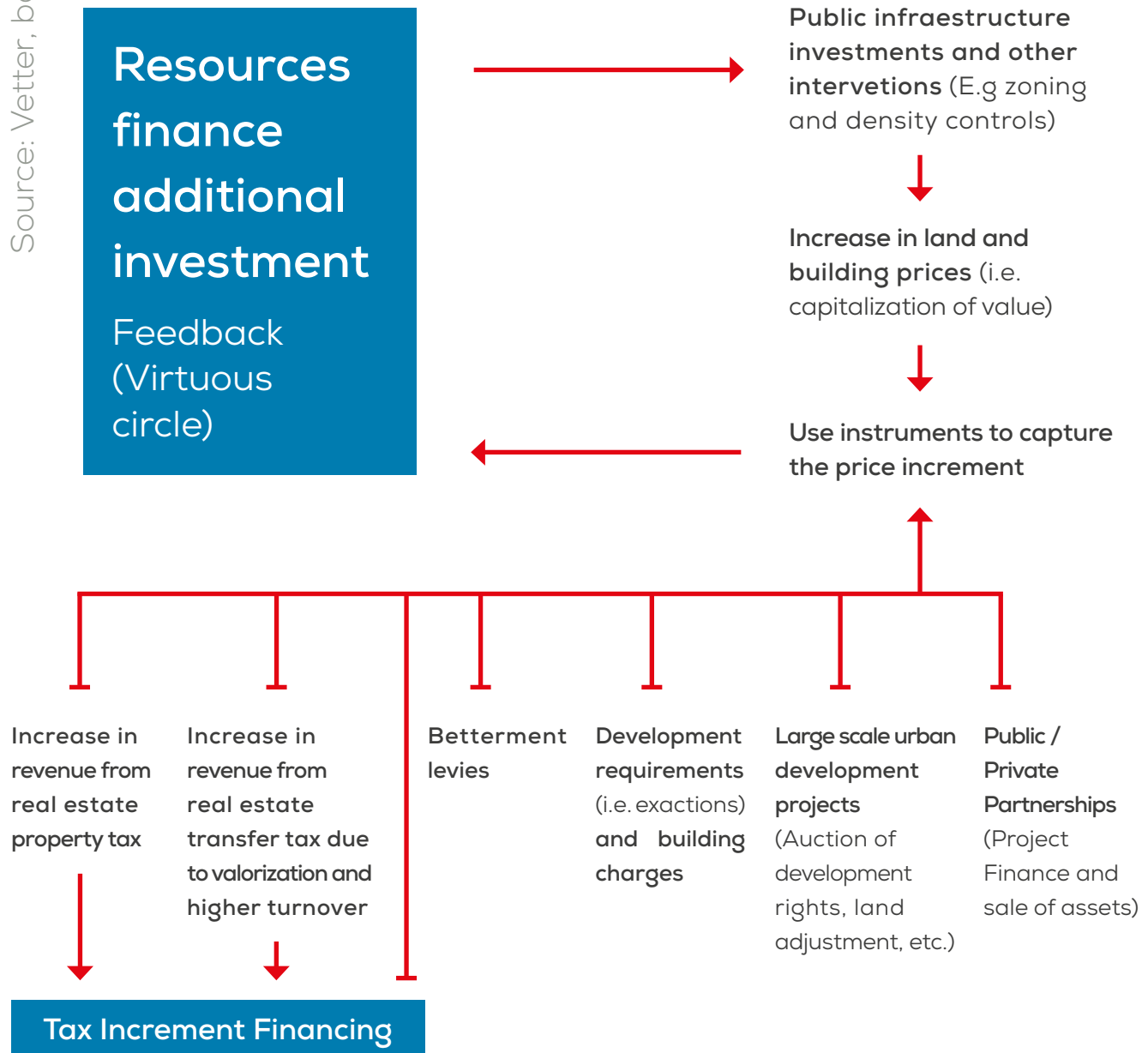
The positive relationship between public interventions and property values has been well documented, especially when the government provides infrastructure services (i.e., water and sanitation, public space, transit), changes zoning and urban density controls (i.e., changes in floor area ratio) or delivers environmental improvements (i.e., remediation of polluted land). There are multiple factors that explain the increase in real estate values as a result of government action. For example, transit projects (i.e., metro, bus-rapid-transit) tend to increase accessibility to amenities and services. In turn, all things equal, households and firms prefer to locate their homes and businesses around well-connected accessibility nodes. This is reflected in a higher willingness to pay, revealed by higher property values in areas with better accessibility. In this sense, the difference in property values before and after the delivery of transit-specific projects is another measure of the economic impact of publicly funded transit interventions in cities.

As highlighted above, the valorization created by the project or regulation can be captured in the form of a fee levied on private beneficiaries (i.e., property owners) by the public sector to help defray the cost of the interventions (i.e., metro station). These resources then create additional fiscal space, allowing the government to deliver other improvements to promote social equity, alleviate shortages of affordable housing, or offset potential gentrification (See Figure 1). This is the underpinning for using LVC instruments, including TIF, for urban development.

Source: Vetter, based on Blanco et al. (2016)

Figure 1.

Financing Infrastructure Investments via Land Capture



Using LVC to finance investments can contribute to the economic efficiency, stability and equity objectives. LVC instruments can help improve the economic efficiency of municipal investments as the beneficiaries show their willingness to pay. Bird (2005) argues that: “The efficient provision of goods and services requires local governments to charge directly for services wherever possible.” Peterson (2009), on the other hand, highlights that:

As long as the spatial distribution of project benefits can be internalized within a well-defined ‘benefit zone,’ it is economically efficient to finance projects by tapping the increases in land values resulting from them. When there are spillover benefits, it is still efficient to recover part of the costs by tapping land-value increases within an identifiable benefit zone.

Ultimately, the amount of value created by the project’s interventions and their contribution to the efficiency, stability, and equity objectives will depend on the quality of their design and the effectiveness of their implementation.

Smolka (2013) and Blanco et al. (2016) describe a number of LVC instruments in detail. Betterment levies are charges based on the valorization of real estate produced by the type of public interventions mentioned above, including infrastructure investment and land use regulation. Development requirements (i.e., exactions) oblige developers to provide land for public purposes or infrastructure in exchange for permission to build. Building rights charges are payments required for permission to develop a property. According to Smolka (2013), these instruments are among the most common in LAC.

Large scale urban development projects employ a number of LVC instruments, including the sale of development rights and land readjustment. In Brazil, land development rights are sold via auction on the stock exchange of Certificates of Potential Additional Construction (Certificados de Potencial Adicional de Construção / CEPACs). Land readjustment involves the merging of individual lots to reconfigure them so as to increase their value and obtain the land necessary for public uses.

As discussed in greater detail in the next section, the timing of resource availability for the different LVC instruments is important (see Table 1). For example, in the case of mass transport in Canada, Haider and Donaldson (2016) conclude that a successful financial strategy should involve both TIF and other LVC instruments to ensure resource availability for capital and operating costs.

As mentioned above, recent research has examined the feasibility of betterment contributions and other LVC instruments extensively in LAC. As such, the focus of this paper is Tax Increment Financing, a more complex and less-studied type of LVC instrument. The following sections provide a conceptual background for TIF and present a six-part evaluation matrix system that helps determine whether TIF would work in LAC cities.

The Timing of Resource Availability for different Land Value Capture Instruments

Source: Authors (2017)

Type of Land Value Capture Instrument	When payment is received
Betterment contributions / levies	One-time payment received before project implementation as agreed with beneficiaries
Land readjustment	One-time payment received at the time of land auctions or sales after project implementation.
Density bonus / rezoning	One-time payment received before project implementation as agreed with developers
Transfer Development Rights	One-time payment received before project implementation as agreed with developers
Development Exactions and Impact Fees	One-time payment received before project implementation as agreed with developers
Special Assessment District (SAD)	Recurrent payments received throughout the existence of the SAD District by beneficiaries
Tax Increment Financing (TIF)	Recurrent payment received throughout the lifespan of the TIF District by beneficiaries

Table 1.

Tax Increment Financing – A Conceptual Background

TIF –first introduced in 1952 in California to raise funds for redevelopment projects in depressed urban areas– is a common LVC tool used by local governments to finance urban development and transit projects by capturing the real estate value produced by them, especially in the United States. In fact, TIF remains the most widely used local government program for financing economic development infrastructure projects in the US; it is legal in forty-nine states and the District of Columbia, and has been implemented in virtually every kind of community. In Illinois, for example, over 500 TIF districts have been created over the last 70 years (World Bank 2015). Between 1990 and late 2000s, over US\$20 billion worth of TIF bonds were issued in the US alone (US PIRG Education Fund 2011).

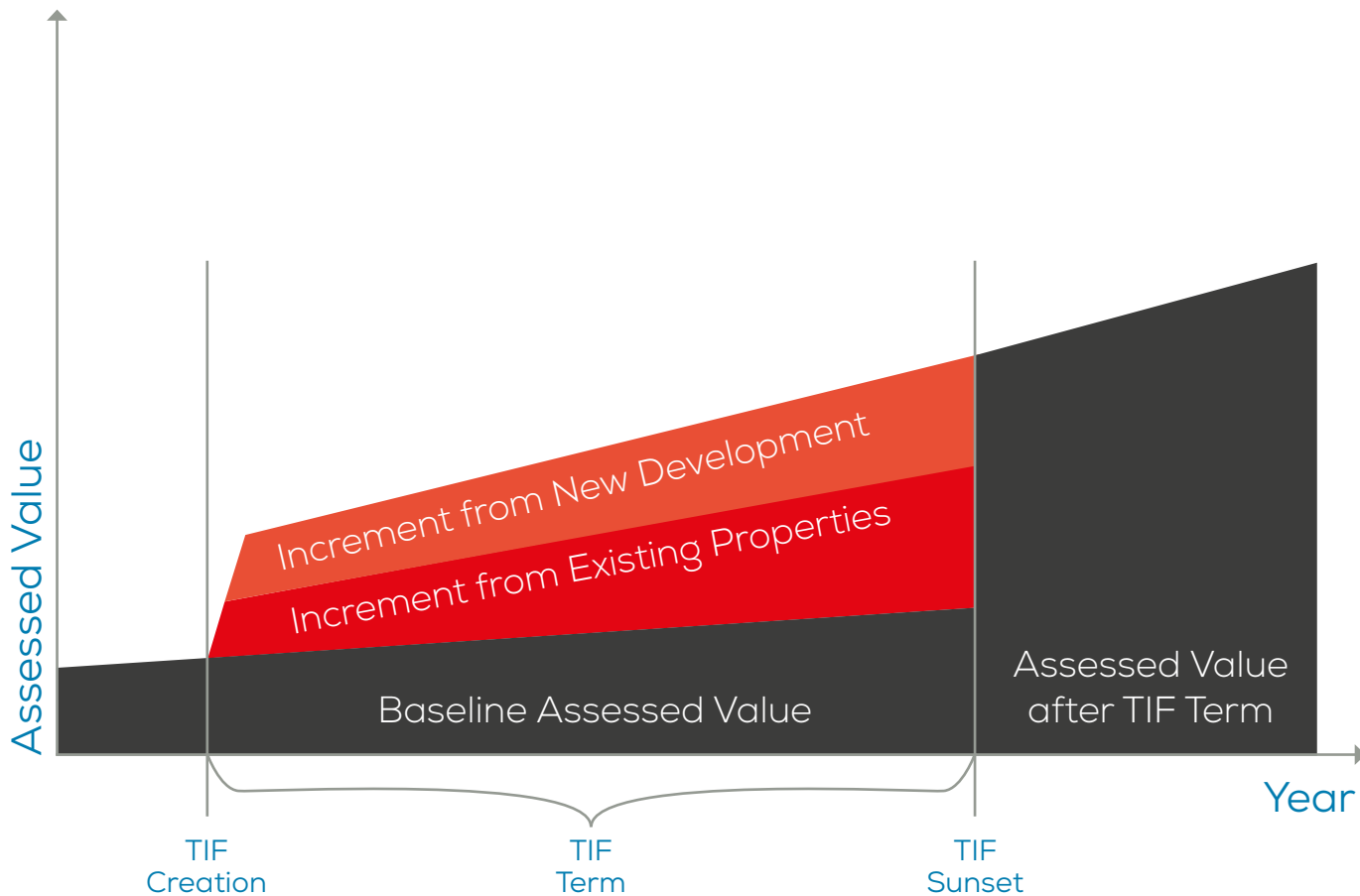
In a TIF program, the city government earmarks the resulting increase in the real estate property tax revenue for use in financing an infrastructure project. To do so, the municipality first defines the project's impact area as a TIF district with a fixed lifespan. [Figure 2](#) illustrates the TIF concept with the total Assessed Value of the stock of land and buildings in the TIF district and its term, plus some additional years. Within this TIF district, the Base Assessed Value is the total assessed value of properties in the TIF district before the project. The Base Assessed Value usually remains constant over the TIF district's lifespan but can also be adjusted for inflation or other factors as shown in the gray trapezoid in [Figure 2](#) (UN-Habitat 2009). Property tax revenue generated by the Base Assessed Value continues to go to the municipality and other entities that use cadastral value as their tax base (i.e., special districts, such as those for schools and water, that are relatively rare in LAC). Thus, when using TIF, the area more directly impacted by the benefits of the investment is defined, and a TIF district is created. The incremental property taxes collected in that district over a defined period (normally 20–30 years) can then be used to pay the interest and amortization of debt issued or acquired to fund part of the investment.

Figure 2.

Source: HR&A (2017)

Illustration of TIF Concept

■ Taxable Value to Normal Taxing Entities



Incremental Assessed Value is the property value generated by the urban development project. Property tax revenue produced by this Incremental Assessed Value is channeled (i.e., earmarked) to cover infrastructure costs within the TIF district or to service debt incurred to finance them, usually in the form of municipal bonds. Thus, TIF does not involve an increase in the property tax rate or a surtax, but rather earmarks the increment in tax revenue produced by the increase in assessed property values in the TIF district to cover project costs. Thus, TIF allows the local government to borrow based on the estimated increase in property tax revenue generated by the project in the TIF district. At the end of a TIF district's lifespan, all incremental property tax revenues revert to the municipality or other entities using cadastral value as their tax base.

Dye and Merriman (2000 and 2006) cite four main reasons for which local governments use TIF to finance urban development projects in the US: (i) to address market failures in infrastructure provision and control of neighborhood effects, (ii) to regenerate blighted areas, (iii) to pass public service funding responsibilities to lower levels of government, and (iv) to shift intergovernmental revenue. The authors argue that the last three of these reasons merely shift development and the growth of property values within cities, but that they do not generate aggregate property values for the whole city.

For example, in the case of a blighted area, suppose that a municipality provides a subsidy of US\$5 million to the developer of a TIF project that increases the aggregate value of the stock of land and buildings within the TIF district, but reduces this growth in other areas of the city by an equal amount. In this case, there has not been a net increase in the total value of the aggregate stock for the municipality, but merely a shifting of this growth to the TIF district.

Effectively addressing market failures would be by far the most likely to generate valorization for the municipality as a whole. TIF enabling legislation in about 20 US states applies what is called the "but-for" criterion, meaning that the private sector would not participate in the development project "but-for" (i.e., except for) government intervention (Youngman 2011). Although this "but-for" criterion could refer to the market failures mentioned above, this

has often been unclear or inexplicit in its operational definitions. Partially as a result of this, “for the most part, as TIF has spread the “but-for” requirement has fallen away” (Briffault 2010). In sum, the requirement that the projects financed by TIF should address market failures has not been clearly and consistently applied, leading to controversial results in the US

Some state laws allow TIF districts only in “blighted” areas. Although the term blight can be defined in numerous ways, the most common, is the existence of buildings or infrastructure in disrepair. This criterion is a carryover from the US’ widely criticized urban renewal program of the 1950s and 1960s, in which focusing on such blighted areas often resulted in gentrification or vacant cleared areas. Lefcoe (2014) notes that such “blighted” neighborhoods may not offer potential for development compared to more rapidly growing areas:

After all, that is where costly new developments have the best chance of being financed, built, and adding greatly to the property tax rolls. TIF funded redevelopment built in distressed areas would seldom boost property values enough for the project to pay its own way.

A wiser approach could be to engender property valorization by addressing market failures and use part of the increment to implement an inclusive housing policy that provides cross subsidies to lower income families. As noted above, an inclusionary housing policy can reduce the chances that the development project will cause gentrification in its impact area. TIF or other governmental subsidies can result in a bidding war to attract businesses, that is, in most cases, a zero-sum game in which a win by one municipality is offset by losses in another. However, this has not been totally resolved in the literature.

TIF can be used by a municipality to push the responsibility to fund service provision to another level of government, such as the state level or special districts that use revenue from the property tax. Although special districts

are rare in LAC, the potential conflict between resources channeled to the TIF district versus the funding for other municipal activities and entities must be carefully assessed. California – the first state to adopt TIF – was the first state to abandon it in 2011, based on the argument that the municipalities were gaming the system by declaring large areas as TIF districts, thereby channeling property tax revenues to these districts and away from the local school districts. This shifted the responsibility to cover the resulting financing gap for the schools to the state government. Accordingly, one of the main criticisms of TIF in the literature has to do with these interjurisdictional conflicts between the funding of the TIF district and other districts (i.e., school and water districts) and levels of government (Youngman 2011; Lefcoe 2014 and 2014b).

Based on their empirical analysis, Dye and Merriman (2006) argue that “policy makers should use TIF with caution. It is, after all, merely a way of financing economic development and does not change the opportunities for development or the skills of those doing the development planning.” To give rise to valorization and economic benefits, the development project financed by TIF should address the market failures. In sum, it is the effectiveness with which the project being financed via TIF addresses market failures that determines its impact on property valorization, rather than the mere fact that TIF is being used to finance it.

Addressing Market Failures as a way to Generate Property Valorization with TIFs

The municipality can develop a strategy to create value through its interventions in the real estate market to correct market failures, including those related to provision of infrastructure (i.e., quasi-public goods such as urban streets) and merit goods (i.e., health and education), as well as neighborhood effects. Land use regulations can cause land valorization by reducing negative neighborhood effects (i.e., externalities) and generating positive ones by controlling land use (i.e., zoning) and development density (i.e., Floor to Area Ratio and Lot Coverage) (See Box 1). A vast empirical literature shows that infrastructure provision and the correction of market failures by government interventions generates real estate property value (Malpezzi 2002 and Baranzini 2008). However, in practice, not all TIF projects are aimed at correcting market failures.

Box 1

Negative Neighborhood Effects and Private Urban Investment

Government interventions can reduce negative neighborhood effects. As the value of any one urban property depends, in part, on the neighborhood in which it is located, the “subjective utility or enjoyment derived from a property depends not only upon the design, state of repairs, and so on of that property, but also upon the characteristics of nearby properties. This fact will, of course, be reflected in both capital and rental values” (Davis and Winston 1965). In other words, property value depends not only on the investment decisions of the owner, but also on the decisions of other owners in the neighborhood. As the investment decisions of owners within a neighborhood are interdependent, some costs and benefits generated in the urban land market are, therefore, not between buyers and sellers. Davis and Winston use the Prisoner’s Dilemma from game theory to show how this interdependence (i.e., neighborhood effects) can result in below optimal investment in urban neighborhoods. In their example, there are two adjacent properties. Each owner would receive a higher return, if they both decide to invest. As with the prisoner’s dilemma in which both prisoners would benefit the most by not “talking”, the urban investor may not invest because he cannot be sure that his neighbor will do the same. To escape this dilemma, the owners would have to coordinate their actions, or the municipal government could help coordinate decisions by informing the market and other stakeholders of its interventions in neighborhoods through its development plans.

For example, multiyear municipal investment programs (i.e., capital budgets) can address neighborhood effects by informing the market of the city’s intentions with regard to its investment and regulatory interventions. Such a program can help coordinate the decisions of investors and other stakeholders in the project’s impact area.

Considerations in the Design and Implementation of TIFs

This subsection covers the issues for each of the following steps involved in designing and implementing TIF, including the following aspects:

- 1.** Definition of the urban development project and the TIF District;
- 2.** Estimation of the current value of the stock of land and buildings in the TIF District;
- 3.** Projection of the increment in the assessed value of the stock of land and buildings in the TIF District;
- 4.** TIF in a municipal financial strategy;
- 5.** Financing the municipal share.

First, to illustrate TIF mechanics and discuss the criticisms of the instrument, this section will use a case¹ developed by Weber and Goddeeris (2007): Westgate TIF District in the State of Illinois.

1. This is a hypothetical case, based on data from a real TIF project.

Box 2

Westgate TIF District in the State of Illinois

A municipal ordinance created the Westgate TIF district in 1983 in accordance with state law. Illinois legislation allows municipalities to create TIF districts and maintain them for a period of up to 23 years. It makes real estate taxes the sole source of TIF revenues and requires overlapping taxing districts (i.e., school and water districts) to participate in the TIF district. The boundaries of the local school district (that also funds itself via the property tax) overlap those of the TIF district. The school district argued that it would not have sufficient resources to handle the increased demands for schooling children of the new residents in the TIF district, as its property tax revenue was frozen at the established TIF base. To resolve this dispute, the municipality agreed to make an annual payment to the school district, and the developer reduced the total number of two- and three-bedroom units to reduce the number of school aged children in the new development. Another solution might have been to let the school district continue to receive the incremental revenue, rather than earmarking it for the TIF district. The developer agreed to purchase most of the parcels in the TIF district and convert them into apartments, townhouses and a parking structure, while the municipality changed the zoning plans to allow 20,000 square feet of retail space.

The municipality provided the developer with a subsidy of US\$5 million to help cover the project's costs, which added up to US\$18 million. It also provided US\$5 million in additional infrastructure investment for project development (i.e., public utilities, street construction, and traffic signals). To cover these costs, the municipality issued a \$10 million TIF bond, pledging the entire tax increment as security. As the municipal bond was tax exempt and the municipality had a high credit rating, the interest rate was much lower than for conventional debt financing.

Although the Westgate Village project did not attract new development to the district for eight years, existing properties increased in value nonetheless, undoubtedly due in part to the development plan calling for municipal infrastructure investment and zoning changes. However, in the early 1990s, development began to increase. **Figure 3** shows the assessed value (AV) of the TIF base (red line) and the increases in AV (blue line) over the life of the project. **Figure 4** shows the increment in property tax revenues over the TIF district's 23-year lifespan.

The municipality used the incremental tax revenue in the TIF district to pay down bonds, make additional infrastructure improvements, and cover eligible costs of the private developer in the district. **Figure 4** shows the annual increases in property tax revenue going to the TIF district. At its termination in 2006, the TIF district had generated a total of \$38.7 million in tax increment revenue over its 23- year lifespan. The municipality used the surplus accumulated in the TIF account after bond payments to support subsequent projects on a pay-as-you-go basis.

Source: Weber and Goddeeris (2007)

Figure 3.

Westgate TIF District: Increases in total assessed value and the base value over 23 years (US\$)

Westgate TIF District: Increments in total assessed value and the base value over 23 years (US\$ millions, in nominal terms)

- Assessed value of TIF base
- Total assessed value of properties within TIF district

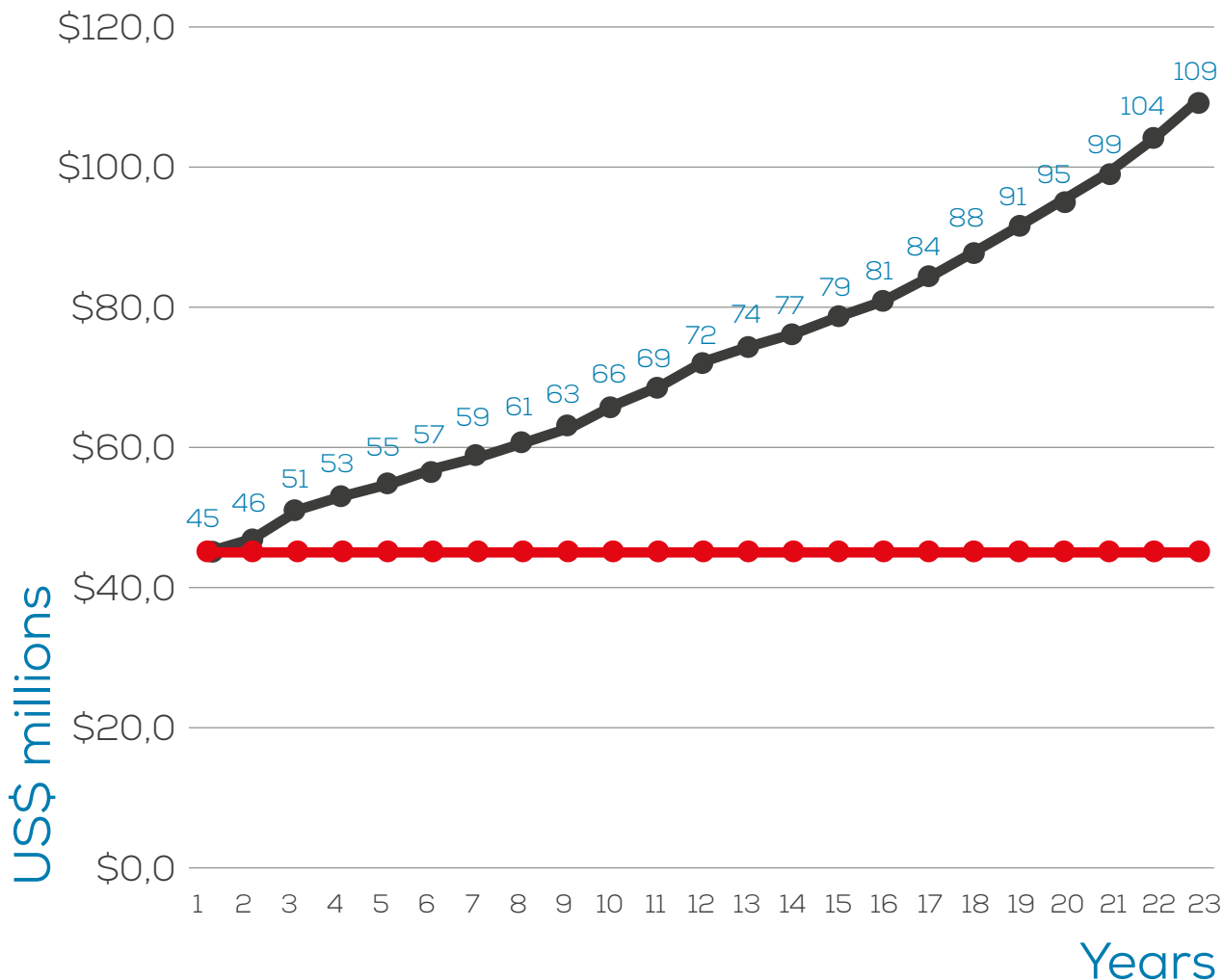
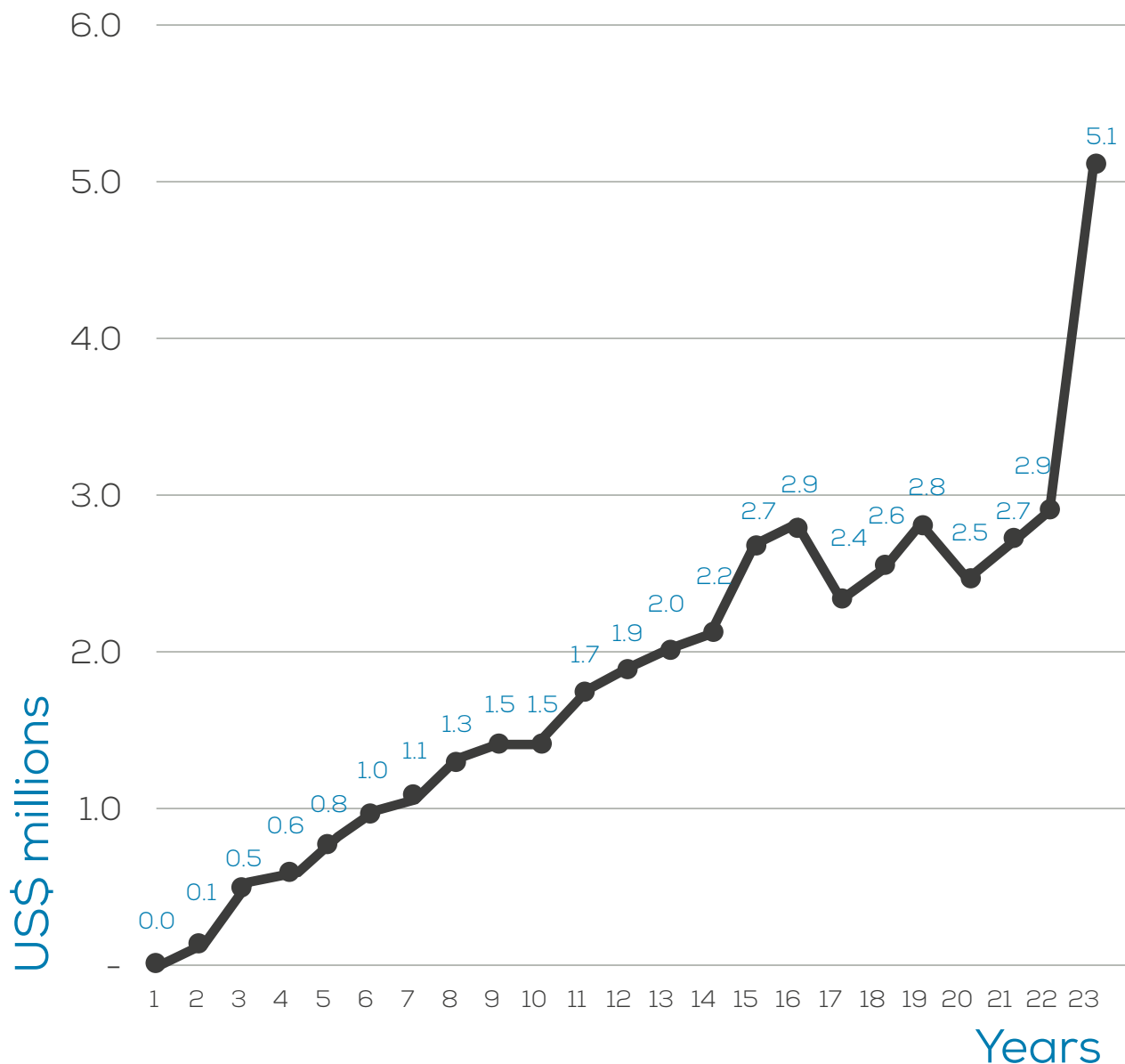


Figure 4.

Source: Author based on data from Weber and Goddeeris (2007)

Westgate TIF District: Total property tax revenue received by district from increment in assessed value over 23 years (US\$)

Westgate TIF District: Total property tax revenue received by the district from increment in assessed value over 23 years



Definition of the urban development project and the TIF District

As discussed above, to create valorization and economic benefits, the development TIF-financed project must address the market failures. In addition to project impacts within the TIF district, other exogenous variables impacting the whole municipality can influence valorization, including the rate of economic growth and inflation and, most importantly, the stage in the real estate price cycle. Entering an inflated real estate market would, of course, increase the risk of a shortfall in the increment in property valorization and, therefore, in the growth of property tax revenues.

Furthermore, the definition of the TIF district requires the municipality to have legal rights to define the boundaries of a special district for TIF and earmark municipal revenue from the real estate property tax or other sources for specific use in the TIF district.

Municipalities normally define the TIF district in terms of the development project's impact area. "Whether the project involves a route or a specific terminal facility, the 'area of direct influence' includes the area in which people (users or non-users) are affected" (Weisbrod and Weisbrod 1997). In this sense, the project impact area is the geographic space in which the proposed project's components will directly influence land and building prices. Blanco et al. (2016) provide an in-depth description of the different methodologies that can be used to define this area (See Box 3). Many of the more rigorous methodologies have been employed in Colombia during its long history of using betterment levies to capture land values.

Box 3

Methods Used for Defining Project Impact Areas in Colombia

Source: Blanco et al. (2016)

Manizales, Colombia uses the following method to define impact areas for betterment levies (Borrero 2012). The first step is to define the general area of the city where civil works of a defined type will have an impact. This general area is then divided into homogeneous areas with similar characteristics including urban regulations, spatial structure, and land use. The next step involves the use of statistical methods to appraise land values for several locations under two assumptions: One with the prevailing situation and another with the hypothetical project. (. . .) Both estimates for each location are compared and extrapolated into homogenous zones, using Geographic Information Systems (GIS) to create contour maps and determine the potential impact in each area. The impact area is defined as the homogenous zone where the project has a positive influence on appraised values.

Alternatively, spatial analysis techniques can be used to determine how the location of infrastructure or public facilities affects their use. For example, to define impact areas for betterment levies for the construction of specific roads and interchanges, Bogotá has used traffic flow modeling based on origin and destination surveys to identify the residential areas occupied by those more likely to use the new infrastructure (Borrero 2012). This method, as with the previous one, works not only to define the impact area but also to determine the distribution of impacts within the area itself. Residents of those areas that benefit more could be charged more.

Although these methods are rigorous, applying them can be expensive and may not be feasible in all cities. For example, the statistical method can require from 100 to 200 observations in a medium size city, depending on the size and number of homogenous zones (Borrero et al. 2011). Indeed, some cities may not have the geo-referenced information system for properties, or the origin and destination surveys required to apply these methods.

How large should a TIF district be?

The answer to this question must consider the amount of revenue channeled to the TIF district for investment versus funding for other municipal activities, including the provision of urban services within the district per se.

In the US, most states allow municipalities significant leeway in defining the size of the TIF district. Covering a large geographic area “allows capture of more incremental revenues and can result in the reduction of the perceived credit risk and a corresponding improvement in the credit rating” (Griefer 2005). In a study conducted by Dye and Marriman (2006), the authors find that there is enormous variation in TIF district size, with an average base of around US\$11 million. But in general terms, in the US, the larger the district, the greater the amount of revenue channeled to the TIF district at the expense of other municipal activities and governmental units, thereby potentially generating political conflict that could jeopardize project implementation. In general, best practice suggests that the TIF district should cover enough of the project’s impact area to provide the necessary funding, but not so much as to underfund other activities of the municipal government and other governmental entities. Given that LAC has no school districts, the impact of the size of the TIF district should be lower, as it competes with a proportionally larger source (the general tax collection for the whole municipality), that is expected to fill the gap of the new activities produced by the TIF district.

How long will the TIF districts remain in operation?

The state or national enabling legislation usually defines the maximum lifespan of a TIF. Generally, this should be long enough to allow for effective financial payback, while allowing sufficient funding of other urban services by the municipality and other governmental units. That said, TIF districts usually operate for between 15 to 30 years in municipalities across the US.

Does the proposed definition of a TIF district effectively balance its size and life with the financial needs of the municipality and other governmental units?

Even though special districts are rare in LAC, the municipal revenue channeled to finance the TIF district should not be available to fund other activities in the municipality over its lifespan. The size and lifespan of the TIF district should effectively balance the revenue channeled to it with the financial needs of the municipality and other governmental units within it.

Who governs the TIF district?

The municipality must propose the establishment of a governing body for the TIF district and define its structure and bylaws. As highlighted by Weber and Goddeeris (2007), “Governance mechanisms must be in place to bring together the interests of a panoply of different stakeholders, each of whom may have very different priorities for the future development”.

Estimation of the current value of the stock of land and buildings in the TIF District

The assessed value of the stock of land and buildings in the TIF district before the project is the base value. The municipality must have a modern real estate cadaster that can estimate the impact of the planned interventions on assessed value, as well as the right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district. The property tax rate is, of course, important in determining the amount of revenue produced in the TIF district. At a tax rate of 1.5%, an increment in assessed value of US\$1.0 billion would generate an additional annual property tax revenue of

US\$15.0 million, which would allow the servicing of a credit of over US\$114 million at 10% annual interest and a tenor of 15 years. Whereas, a tax rate of only 0.5% would service a credit of only about US\$31 million at the same rate and tenor.

Public interventions in the form of infrastructure investments and changes in zoning and density controls may not explain all of the total increment in property values within the TIF district. Other exogenous factors such as economic growth and inflation (sometimes referred to as the “natural” increment in the literature), can cause property values for the whole city including the TIF district to rise or fall. Should the TIF district receive all of the increment in tax revenue due to exogenous variables? In most US states, the assessed base value remains constant for the TIF district over its lifespan, which means that it receives all of the increases in property tax revenue above the base, including that caused by exogenous variables. UN-Habitat (2009) suggests an alternative approach in which the assessed base is adjusted over the life of the TIF district “by the amount of natural growth. Natural growth in property taxes reflects that the assessments will increase over the length of the TIF period even if there is no redevelopment, although the increase is likely to be small.”

A strong argument can be made in adjusting the assessed value of the base for inflation. If it is not adjusted, the municipality may face budget shortfalls in providing other urban services, even including properties located within the TIF district. In LAC, inflation can, of course, be important. During the 2000/2016 period, Colombia’s Índice de Precios al Consumidor (IPC) more than doubled (115.2% or 4.9% per annum). One problem with including the impacts of either exogenously generated economic growth or inflation is that they are very difficult to project and, therefore, increase the uncertainty in the projection of the increment of assessed value needed to finance the project.

Projection of the increment in the assessed value of the stock of land and buildings in the TIF District

Projecting the size of the value increment of real estate properties as a result of investments is methodologically challenging, even in the project's ex-post evaluation, and more so in the ex-ante financial and cost-benefit analysis.

City governments usually adopt sophisticated econometric and spatial analysis models through which they estimate the increase in assessed values of the real estate assets within the TIF District. However, unexpected changes in exogenous variables could lead to misleading results, leading analysts to apply scenario analysis to conduct financial projections in modern risk analysis, especially for stress testing of financial operations and institutions (Marrison 2002) (See Box 4).

Where data availability is limited, governments rely on simpler methods to estimate increases in assessed property values. For example, by analyzing the impact of previous capital investment projects on real estate prices or by examining historical growth trends of property values in specific areas of the city. In any case, best practices suggest that it is essential to run sensitivity analyses as part of any exercise which seeks to estimate future property values. Scenario analysis should include relatively conservative assumptions, which must be straightforward and transparent, so that the stakeholders can review and accept or challenge them.

Box 4

Scenario Analysis in Financial Decisions

Dowd (2002) describes scenario analysis (i.e., ‘what if’ analysis) as a way of defining different scenarios and investigating “what we stand to gain or lose under them. To carry out scenario analysis, we select a set of scenarios – or paths describing how relevant variables (. . .) might evolve over a horizon period.” As one strategist put it, scenario analysis is about devising “plausible future narratives” (Damodaran 2007). The approach would be to develop plausible scenarios based on data from programs seeking to increase revenue from the real estate taxes and LVC. Simulations using these scenarios (i.e., best case, worst case, most likely) will show their impact on municipal revenue collection within the TIF District.

One problem with traditional scenario analysis is that the analyst must specify values (i.e., points) for each of the key variables, even though we know that these values will usually vary over a relatively wide range. An alternative way of analyzing scenarios involves using probability distributions to define key input variables via Monte Carlo simulation (World Bank 2005).

Dowd (2002) goes on to warn that “scenario analysis is not easy to carry out. A lot hinges on our ability to identify the ‘right’ scenarios, and there are relatively few rules to guide us when selecting them. We need to ensure that the scenarios are reasonable and do not involve contradictory or excessively implausible assumptions.”

Source: Blanco et al. (2016)

TIF in a municipal financial strategy

Municipalities must have a credible strategy for financing the development project within the TIF District. Table 2 indicates that some LVC instruments would not involve municipal borrowing, such as the sale of development and project finance including concessions and leasing, while others such as TIF, are tied to the issuance of municipal bonds. As such, LVC instruments can provide flexibility for financing and funding municipal capital projects (Peterson 2009).

Table 2 shows the framework for such a strategy in which Line A illustrates the total operating and capital costs (Lines B and C) of the project over its period of implementation and financing. For example, the private sector might repurpose an abandoned train station under a concession agreement with a private partner. What the private sector does not finance, the municipality will have to cover from either its general budget (Line E), from debt issuance, including TIF Bonds (Line F), or other LVC instruments (Line G). The municipality must be legally authorized to use value capture instruments needed to implement its financial strategy, including those required to engage private sector partners, issue debt, create a TIF District, and to use betterment levies and development charges. In sum, if the analysis shows that LVC per se is viable, the municipality should select the most feasible LVC instrument(s) for its implementation.

Example of a Financial Strategy Using Traditional Funding Sources and LVC Instruments

Source: Authors (2017)

Lines	Project costs and revenue from LVC	Year								
		0	3	6	9	12	15	18	21	24
A=B+C	TOTAL PROJECT COST									
B	Operation and maintenance (OPEX)									
C	Capital (CAPEX)									
	FUNDING SOURCES									
D	Financed by private sector partners (i.e., concessions and leasing)									
E	Annual municipal revenue from the municipal budget (own-source revenues and transfers except from LVC)									
F	Annual municipal revenue from debt issuance									
	TIF Bonds*	X	X	X	X	X	X	X	X	X
G	Annual revenue from other LVC instruments									
	Development Exactions and Impact Fees	X								
	Transfer Development Rights	X								
	Density bonus / rezoning	X								
	Land readjustment									X
	Betterment contributions / levies	X								
H=E+F+G	Total Municipal Share of Project Funding and Finance									

* In a TIF, Year 0 refers to the emission of a TIF Bond, which leads to a positive cash flow. Subsequent years are earmarked property taxes collected throughout the lifespan of the TIF District to repay the debt.

Table 2.

Municipal debt issuance

Planned investments in TIF districts will create benefits over many years, but the investment costs come early on. Borrowing by the municipality and the private partner can allow a closer matching of the benefits and cost streams. Most larger scale projects will require some municipal borrowing. For the shorter term, tax anticipation notes could be an option. Longer term financing can occur via the capital markets (i.e., TIF Bonds or loans from financial intermediaries). Another alternative for financing the municipal share would be a multilateral bank loan, which could complement a TIF bond. The terms of multilateral loans are usually favorable and have very low interest rates and long tenors.

In terms of a strategy, the municipality could use pay-as-you-go to cover initial activities, and then shift to short-term tax anticipation notes, and finally move to TIF bonds in a more robust longer-term financing program. One of the main reasons why municipalities almost always use municipal bonds to finance TIF in the US is that interest on them is not subject to the federal or state income taxes. This can be a significant incentive for investors, especially for those in the higher income tax brackets. For example, for a taxpayer in the 35% tax bracket, a nontaxable municipal bond with a 5% yield would be equivalent to an after-tax yield of 7.7% on a taxable bond. As interest on subnational government bonds is not normally tax exempt in LAC, loans from commercial and development banks, as well as from specialized financial entities such as municipal development funds, could constitute competitive funding sources for TIF.

Although the number of issues raised may seem excessive, these will usually have to be addressed in the prospectus of a bond issue or in negotiations with a bank. Knowledgeable financial analysts in the country should be able to provide ratings and comments on most of the conditions in short order.

Box 5

Hudson Yards TIF Financing Case Study

Hudson Yards, the 18 million sq. foot mixed-use development on the far West Side of Manhattan, was made possible, to a large extent, by the formation of the Hudson Yards Infrastructure Corporation (“HYIC”) – a non-profit corporation with the ability to issue bonds to finance capital improvement in the area including the US\$2.2 billion investment to extend the 7 train across the West Side and US\$425 million in land acquisition and urban realm improvements. HYIC’s bonds are backed by revenue generated through a 130-acre financing district surrounding the project – an example of a synthetic TIF structure.² The revenue streams in this financing district include:

- **Payments in Lieu of Taxes (PILOT):** PILOT payments were the largest source of revenue. The PILOT agreement for the Hudson Yards project exempts private developers planning to develop within the project area from property taxes. Instead, developers are required to make PILOT payments to New York City’s Industrial Development Agency (IDA) for the duration of the agreement. This effectively provides developers and owners of developer sites with a “substantial discount” from typical property taxes.³
- **District Improvement Bonuses and Transfer of Development Rights:** Used to promote higher density in selected areas while also producing revenue increases for the city.

2. A synthetic TIF refers to a financing model in which the city pledges the infrastructure being built or renovated as a security for the TIF bond, or less frequently, when the city pledges its full faith and credit. The city expects to repay the loan from the increment in land values but uses a different collateral to secure the loan.

3. Under a PILOT program, New York City’s Industrial Development Agency (IDA) acquires the land from private developers. This exempts property tax rolls because the IDA is a property exempt entity. At the end of the agreement, the IDA returns the land to developers and they will then pay property taxes to the city rather than making PILOT payments to the IDA.

- **Other Tax Equivalency Payments:** Made by the city to HYIC, in an amount equal to real property taxes received by the city due to new and substantially renovated commercial and residential developments in the districts that are not covered by a PILOT agreement.

To enhance the credit conditions of the bonds, the city provides interest support payments when HYIC receives insufficient revenues from development to pay interest on the bonds. Once HYIC begins to generate surpluses, it will begin to buy back bonds and to set aside money to pay principal once the bonds mature.

\$3.4B
Sources of funds

Payments in Lieu of
Property Sales, and
Mortgage Recording Taxes

Interest Support Payments
through City Council

District improvement Bonus



\$3.4B
Uses of funds

\$425M
Land Acquisition & Public
Realm Improvements

\$765M
Bond Interest

\$2.2B
7 Train Extension

02
PART

TAX INCREMENT FINANCING IN LATIN AMERICA

By David M. Vetter and Marcia F. Vetter

An Analysis Framework

Based on the literature review summarized in Part I, this section presents a TIF Analytical Framework that explains the critical conditions under which a TIF is successfully designed and implemented. There is a clear differentiation between the conditions that are relevant at national and subnational levels.

Methodology

The scoring methodology is based on the methodology used in studies on subnational government access to the capital markets in Mexico (Verdugo and González 2016) and Colombia (Lugo 2017). These studies use four evaluation matrices with conditions for developing and deepening access of subnational governments to the capital markets and criteria for rating performance on each condition. The four evaluation matrices are divided into the following topics:

- National macroeconomic indicators;
- National fiscal, legal, and regulatory institutions;
- National credit allocation systems;
- Municipal fiscal capacity and indebtedness.

Using these criteria, the authors assigned a rating of one to three on each condition: (1) lowest, (2) medium, and (3) highest access to capital market. They then calculated the average score for each of the four matrices for which the summary matrix provides the average scores. Building on this methodology, this study employs a two-stage process to design the TIF Analytical Framework relevant to this study.

■ Stage 1.

Evaluation of municipal capacity to use TIF

In the first stage, two matrices are used to assess the feasibility of using TIF per se. The first matrix covers conditions for the municipality to finance a TIF project. The second matrix addresses the conditions related to the definition of the TIF district and the selection of LVC instruments. A rating is assigned for each of the conditions in the matrices based on the feasibility of employing TIF: (1) low feasibility, (2) medium feasibility, and (3) high feasibility.

A deal breaker category was added to these first two matrices that shows which factors would block the use of TIF altogether for each condition. For example, the inability or unwillingness to create a modern cadaster system would be a deal breaker for TIF. If there is a deal breaker, the overall summary score for all matrices is zero, and possible alternatives that would sidestep or mitigate the problem are discussed. For example, if regulation prohibits municipal borrowing, the municipality may be able to set up a private Special Purpose Entity that could borrow.

■ Stage 2.

The feasibility of financing the municipal share of the TIF project

Once it has been established that the municipality is able to finance a TIF project, a strategy has to be established to finance the municipal share of project costs. This strategy is based on the four evaluation matrices from the previously cited Colombia and Mexico capital market studies. As the conditions defined in these matrices also apply to a great extent to these other sources of funding such as banks, development funds, and other financial institutions, this study uses them to evaluate all of these potential sources of credit.

Using the TIF Analytical Framework during project preparation

There are six evaluation matrices in the TIF Analytical Framework. Each matrix has a maximum score based on the number of criteria included. Scores are normalized to a base of 30 so the matrices all have equal statistical weights.

■ Stage 1. Evaluation of municipal capacity to use TIF

Maximum
Score

Normalized
Maximum
Score

1. Conditions for the project to be financed by TIF.

15 points

5 points

2. Conditions for the definition of the TIF district and the use of LVC instruments.

15 points

5 points

Subtotal:

30 points

10 points

■ Stage 2. The feasibility of financing for the municipal share of the TIF project

Maximum
Score

Normalized
Maximum
Score

3. National macroeconomic indicators.

30 points

5 points

4. National fiscal, legal, and regulatory institutions.

30 points

5 points

5. National credit allocation systems.

60 points

5 points

6. Municipal fiscal capacity and indebtedness.

60 points

5 points

Subtotal:

180 points

20 points

Total:

210 points

30 points

Together, these six matrices form the core of the TIF Analytical Framework, and can serve as a guide in the negotiations among the different stakeholders (i.e., municipal officials, banks, capital market investors) aimed at developing a financial strategy involving a TIF during project preparation and appraisal. The stakeholders can use the TIF Analytical Framework as an operational tool to define what they know versus what they need to know as project preparation and appraisal proceeds.

In the initial phase of project preparation, the main questions are: Are there any potential “deal breakers”? Are there feasible strategies for sidestepping them? The answers will determine whether it is worth moving on to a more comprehensive prefeasibility analysis. As project preparation begins, discussion of the conditions can help identify areas where further research is needed and develop the terms of reference required for the studies. By doing so, the stakeholders can use the TIF Analytical Framework as a kind of checklist of issues to be analyzed during the prefeasibility analysis.

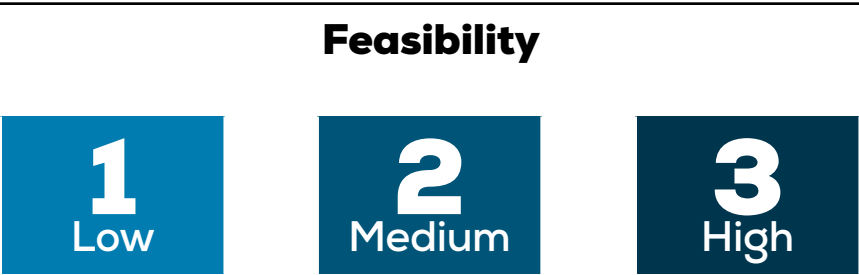
During the prefeasibility analysis, the stakeholders can determine the importance of each condition for the feasibility of implementing TIF and other LVC instruments in the municipality. Can the municipality address any deal breakers and score highly on the other conditions in the TIF Analytical Framework? Does it make sense to conduct a full feasibility analysis, which is usually costly and time consuming?

The full feasibility analysis seeks to establish whether TIF should be factor in a “bankable project”. For this to happen, the proposed project must fully meet all legal and regulatory conditions in the TIF Analytical Framework. In this phase, a review of the issues raised based on the matrices could help prepare the prospectus for a bond issue or in negotiations for a bank loan.

This step-by-step evaluation using the TIF Analytical Framework can reduce the risk of costly failures in project preparation and appraisal. Thus, this tool can help close the financing gap for the effective provision of basic urban infrastructure and provide cross subsidies to lower income families.

Tables 3 through to **Table 8** provide a detailed explanation of the criteria for the six matrices.

Matrix 1: Conditions for a Municipality to Finance a TIF



Municipal control of land use planning, laws and regulations, such as zoning and density levels (i.e., FAR floor-to-area ratios)

Deal breaker: No control of land use planning, laws or regulations

Limited control of land use planning, laws and regulation levels, and limited capacity to effectively develop and enforce these plans and regulations	Full control of land use planning, laws and regulations, and some capacity to effectively develop and enforce these plans and regulations	Full and effective control of land use planning, laws and regulations, and full capacity to effectively develop and enforce these plans and regulations

Condition 1

Multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders

Deal breaker: Unable or unwilling to prepare a multiyear investment program developed in accordance with a longer-term municipal development plan

Willing to prepare an adequate multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders	Preparing an adequate multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders	Effectively implementing an adequate multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders

Condition 2

Table 3.

Protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership

Deal breaker: No legal protection of property rights

Limited protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership	Somewhat efficient and effective protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership	Fully efficient and effective protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership

Condition 3

Favorable economic outlook on the municipality's real estate market cycle.

Deal breaker: Uncertainty of a favorable economic outlook on the municipality's real estate market cycle

Low certainty of a favorable economic outlook on the municipality's real estate market cycle based on adequate analysis of reliable data	Medium certainty of a favorable economic outlook on the municipality's real estate market cycle based on adequate analysis of reliable data	High certainty of a favorable economic outlook on the municipality's real estate market cycle based on adequate analysis of reliable data

Condition 4

Modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them.

Deal breaker: Unable or unwilling to develop a modern real estate cadaster

Fully developed project for developing a modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them	Partially functioning modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them	Fully functioning modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them

Condition 5

Feasibility

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Table 4.

Matrix 2: Definition of the TIF District and Use of Value Capture Instruments

Feasibility

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Legal right to define a special district for TIF

Deal breaker: No legal right to define a special district for TIF

Possible legal right to define a special district for TIF without successful previous experience	Fully established legal right to define a special district for TIF without successful previous experience	Fully established and tested legal right to define a special district for TIF with some successful previous experience

Condition 1

Legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in the TIF district

Deal breaker: No legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district

Possible legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district	Fully established but untested legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district	Fully established and tested legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district

Condition 2

The right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district

Condition 3

Deal breaker: No legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district

High certainty of the existence of a legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district	Fully established but untested legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by a TIF district	Fully established and tested legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by a TIF district

Develop plausible scenarios supported by reliable data concerning the increase of real estate property values in the TIF district

Condition 4

Deal breaker: Unable or unwilling to develop plausible scenarios

The municipality is willing to contract consultants to develop fully plausible scenarios supported by reliable data concerning the increase of real estate property values in the TIF district	The municipality is capable of developing fully plausible scenarios supported by reliable data concerning the increase of real estate property values in a TIF district	The municipality has developed fully plausible scenarios supported by reliable data concerning the increase of real estate property values in a TIF district

Legal authority to use the value capture instruments required to implement the financial strategy

Condition 5

Deal breaker: No or uncertain legal right to use TIF

Established legal authority to use the value capture instruments needed to implement the financial strategy	Fully established but untested legal authority to use the value capture instruments needed to implement the financial strategy	Fully established and tested legal authority to use the value capture instruments needed to implement the financial strategy

Feasibility

1
Low

2
Medium

3
High

Table 5.

Matrix 3: National Macroeconomic Indicators

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Conditions

1. Inflation rate

>7%	2-7%	<2%
-----	------	-----

2. Internal savings rate

<4%	4-28%	>28%
-----	-------	------

3. GDP / Capita (US \$)

<\$3000	\$3000-\$14000	>\$14000
---------	----------------	----------

4. Public Debt / GDP

>75%	26-75%	>26%
------	--------	------

5. Publicly guaranteed debt service / GNI

>2%	1-2%	<1%
-----	------	-----

6. Consolidated fiscal balance of the national central government

Negative	Oscillates around zero	Positive
----------	------------------------	----------

7. Long term interest rate

>14%	2-14%	<2%
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8. Sovereign credit rating

<B	B to BBB	>BBB
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9. Central government's rescue history of subnational governments

Recurring rescue experiences	Occasional rescues	No rescues
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10. The precise and timely provision of the results and forecasts of key macroeconomic variables by the central government

Results not available; no forecast provided	Results partially available; forecasts provided	Results, forecasts and sensitivity analyses available on a timely basis
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Access to financing

1 Low	2 Medium	3 High
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Matrix 4: Evaluation of the National Fiscal, Legal, and Regulatory Institution

Source: Author based on criteria used by Lugo (2017) and Verdugo and González (2016) with editorial changes



Fiscal autonomy / dependency

Deal breaker: N/A

High fiscal imbalance: Percentage of own source revenue less than country's average standard deviation -1	Average fiscal imbalance: Percentage of own source revenue between -1 and +1 standard deviation of the country's average	Low fiscal imbalance: Percentage of own source revenue is greater than the +1 standard deviation of the country's average

Condition 1

Fiscal autonomy/ Intergovernmental transfers

Deal breaker: N/A

Condition 2

The transfer system is not rule-based or predictable; municipalities have little discretion in the use of revenue from transfers and / or need to fund mandates; the transfer system does not encourage own source revenues	The transfer system is partly rule-based and predictable; municipalities have limited discretion over the use of revenue from transfers with some mandates; the transfer system is neutral in the generation of own source revenue	The transfer system is rule-based and predictable; municipalities have discretion over the use of revenue from transfers without funding mandates; the transfer system encourages the generation of own source revenue (transfers are based on performance)

Condition 3

Fiscal autonomy/ revenue

Deal breaker: N/A

Municipalities have no or little authority over revenue generation	Municipal revenue generation is restricted to establishing or acting on a narrow range of tax bases and rates	Municipalities have the authority to establish the tax base and rates for certain taxes

Financial management standards and reporting

Deal breaker: N/A

Condition 4

There are no rules for municipal spending, financial management, accounting and reporting	Standards for municipal budgeting, financial management, accounting and reporting are partial, and are often not applied	Standards for municipalities' budgeting, financial management, accounting and reporting comply with international standards; budgets are complete, understandable, timely and accurate; accrual accounting is used; full annual financial reports are required

Access to financing

1 Low	2 Medium	3 High
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Standards and reporting – audits

Deal breaker: N/A

Audits not required by law	Audits are carried out regularly but cannot be carried out independently and reports cannot be disseminated	Audits are performed annually and in a timely manner by an independent party; the administration, political body, and civil society are informed, and the problems solved

Condition 5

Regulation – insolvency, default, bankruptcy

Deal breaker: N/A

There are no laws or regulations	There are some laws and regulations, but they do not clearly indicate the procedures	There are clearly defined laws or regulations to handle municipalities' cases of insolvency, default and bankruptcy (such as takeover by the debt management board or higher-level government); rescue procedures are clear and applicable

Condition 6

Legal authority of the local governments to borrow

Deal breaker: The municipality has no borrowing authority, neither directly through a Special Purpose Vehicle or through any other public entity.

The municipality is restricted to a narrow range of borrowing instruments	Municipalities are authorized to borrow and perform activities related to borrowing by the constitution or legislation; authority can be a party through legislation; some restrictions on instruments	Municipalities are authorized to borrow and perform activities related to borrowing by the constitution or legislation, subject to the obligation to report on borrowing; almost no restriction on instruments

Condition 7

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Condition 8

Purpose of debt issuance determined by legal framework

Deal breaker: N/A

The loan purpose is not specified by law	The purpose of the loan allowed is determined by law	The purpose of the permitted loan is determined by law and is restricted to capital

Condition 9

Legal authority – subnational governments' debt regulations

Deal breaker: N/A

Authority is political; there is no clear process for the approval or control of municipal debt; recourses and warranties are not available	Authority is based on technical factors; there is a process of approval and control dominated by the central government; there are central government guarantees	The authority to borrow is based on the solvency of the municipality; there is a process for the approval and control of municipal debt; non-central government pledges and guarantees are available to improve municipal debt

Condition 10

Legal authority – fiscal responsibility

Deal breaker: N/A

There is no fiscal responsibility law	There is a fiscal responsibility law, but its application is partial	There is fiscal responsibility law with applicable penalties; elected officials and jurisdictions are responsible for maintaining fiscal and debt constraints

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Matrix 5: National Credit Allocation Systems

Access to financing

1
Low

2
Medium

3
High

Conditions

1. Credit options – sources

The municipal credit must come from domestic sources	Municipal credit can come from domestic or external sources, but credit from external sources is controlled by the central government	Municipal credit can come from domestic or external sources without restriction

2. Credit options – currency

Municipal financing must be in local currency	Municipal financing can be in local or foreign currency, but the foreign currency is controlled by the central government	Municipal financing can be in local or foreign currency without restriction

3. Credit options – central bank

The municipalities have no limit to directly accessing central government financing	Municipal access to central government funding has a limit imposed by law	Municipal access to central government funding is reserved for emergencies and for less than 3 months

4. Credit options – excluding banks

Bank loans are excluded by funds from foundations, state banks and / or municipal development funds	Banks are competitive, but foundations and / or municipal development funds do not include banks	Bank loans are competitive against foundations, state banks and municipal development funds

5. Credit options – bank loans

Bank loans to finance municipalities, with no interest	Bank loans are available to municipalities, but access to them and the total amount available is limited	Bank loans are an inherent part of the municipal financing

6. Credit options – bond issuance

The legal framework does not include bonds	The legal framework allows the use of bonds, but with little security for investors	The legal framework allows bond issuance, and there are intermediaries in the securities market

7. Credit options – bond markets

The central government issues government bonds; there is no municipal bond market	Central government issues bonds on behalf of municipality or municipalities issue bonds with sovereign guarantees	Municipalities issue their own bonds without sovereign guarantees

8. Credit options – bond monitoring

Bond issuance is not controlled	The regulations require the supervision of municipal bonds, but no sanctions for non-compliance are imposed	Regulations require supervision and the regulator has the power to sanction for non-compliance

Access to financing

1 Low	2 Medium	3 High
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9. Credit options – bonds, institutional investors

Institutional investors are excluded from municipal bonds	Institutional investors are allowed, but there are faced with systematic impediments	Institutional investors play an active role in the municipal bond trade

10. Credit options – credit enhancement

Credit enhancement is not allowed for financing tools	Some credit enhancements are allowed but rarely used	A variety of credit enhancement tools are available to improve financing (such as collateral, guarantees, trust funds)

11. Credit options – allocation base

Supply of credit allocated based on political criteria	Supply of credit allocated based on policy criteria	Supply of credit allocated based on clear and transparent performance indicators

12. Market structure – benchmark interest rate

There is no long-term interest rate benchmark	There is a benchmark interest rate for sovereign and corporate bonds with a lifespan of 3-7 years	There are benchmark interest rates for sovereign and corporate bonds with lifespans of more than 7 years

13. Support to market structure

There are no credit support services or they are extremely limited	Partial availability of support services to the credit market	There is a wide range of services and providers to support the credit market

14. Market structure regulation

There is no securities regulatory institution or its performance is limited	A securities regulator exists but has not been active in regulating the municipal bond market	There are securities and / or autonomous regulatory institutions for the municipal bond market

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

15. Market structure – who issues bonds?

Central government acts on behalf of municipal governments	Several municipal governments in a consortium supported by the central government	Municipal governments and banks act in order to increase their capital base

16. Market structure – investors

The bond market does not provide enough security to attract investors	Limited investor interest in bond market	Investors view bonds as secure long-term investments

17. Risk assessment – legal requirements

There are no legal requirements for risk assessment by an authority; evaluation is undertaken by the central government	There are legal requirements whereby an authority and / or lender has to assess the risk; risk can be assessed internally	There are legal requirements that an authority and / or lender use to assess risk

18. Risk assessment – risk adjusted debt

Debt does not have a risk price	The debt, or a part of it, has a price per risk in some circumstances	Debt has a price according to its level of risk

19. Risk assessment – information and dissemination

There are no legal requirements for the production and ongoing disclosure of credit information	There are legal requirements for the production and ongoing disclosure of credit information; but compliance is intermittent and / or is not achieved; dissemination is internal	There are legal requirements for the production and ongoing disclosure of credit information; compliance is mandatory; broadcast is external

20. Risk assessment – who performs?

Any risk assessment is performed by the central government	Risk assessment is undertaken internally	Risk assessment is performed externally by third parties

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Matrix 6: Evaluation of Municipal Fiscal Capacity and Indebtedness

Access to financing		
<div>1</div> <div>Low</div>	<div>2</div> <div>Medium</div>	<div>3</div> <div>High</div>

Conditions

Politics – politics versus debt management

There is no clear separation between policymakers who set the parameters of debt and those who issue debt	Legal/clear separation between policymakers and debt issuers who set debt parameters, but which are not always respected	Legal / clear separation between policymakers and debt issuers who set debt parameters, and practices to support separation

Politics – politics and debt procedures

The municipality has no written procedures to guide lending operations	The municipality has written procedures to guide all lending operations	The municipality has written procedures to guide all borrowing operations; they are updated at least every 2 years

Strategy – debt strategy

The municipality has no debt strategy	The municipality has a debt strategy that defines debt objectives for intervals of 3-5 years; and identifies key indicators	The municipality has a debt strategy that defines debt objectives for intervals of 3-5 years or more; and identifies key indicators based on risk analysis (realistic interest rates, refinancing, internal and external debt)

Table 8.

Strategy – financial planning capacity

The municipality has little ability to perform cost-benefit analyses, to project costs, determine the necessary funds and the amount and structure of the financing, calculate debt service and calculate operations and maintenance funds	The municipality has partial capacity to perform cost-benefit analyses, project costs, determine funding needs and structure, calculate the debt service and estimate funding for operations and maintenance; but it would need assistance for so doing	The municipality has full capacity to perform cost-benefit analyses, project costs, determine funding needs and structure of the financing, calculate the debt service and estimate funding needed for operations and maintenance

Risk assessment – credit rating

The municipality does not seek credit ratings	The municipality seeks credit ratings from at least one national evaluator	The municipality seeks multiple credit ratings, with at least one from a foreign qualifier

Risk-solvency assessment – International ratings

<B	Between B and BBB	>BBB

Information – Contingent Liabilities

The municipality has no policy and procedures for the approval, registration, and reporting of contingent liabilities, including loan guarantees, loan and derivative loans; or does not comply	The municipality has policies and procedures for the approval, registration and reporting of contingent liabilities, including loan guarantees, cash loans and derivatives	The municipality has policies and procedures for the approval, recording and reporting of contingent liabilities, including loan guarantees, loans and derivatives; policy requires for risk be quantified as an expense

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Information – Debt Reports

The municipality reports do not meet all legal or contractual requirements; and / or reports are not public; and / or debt statistics do not exist, are incomplete or do not include debt indicators	The municipality reports comply with all legal and contractual requirements; the reports are public; debt statistics report key debt indicators; is updated as far as the previous three months.	The municipality reports comply with all legal and contractual requirements; the reports are public; debt statistics reporting key debt indicators are published at least every six months; data is updated as far as the previous month

Financial management – budgeting

The municipal budget is not complete (revenues, expenses, assets, liabilities, accounts receivable), realistic or transparent, and / or does not adhere to the rules and procedures	The municipal budget is partially completed (revenues, expenses, assets, liabilities, accounts receivable), transparent and complies with standards and procedures	The municipal budget is complete (revenues, expenses, assets, liabilities, accounts receivable), realistic, transparent and complies with standards and procedures

Financial management – audits and control

The municipality's oversight and audit mechanisms are not based on rules nor are the timely. They are political, late, and ineffective; audits are not public; the results may be negative; <= 1 year of available audit	Municipal monitoring and auditing mechanisms are standards-based, timely, independent and effective; the audit is public; the results of the audit are mostly positive; 1-4 years of available audits	Municipal monitoring and auditing mechanisms are rule-based, timely, independent and effective; the audit is public; the results of the audit are positive; >= 5 years of available audits

Access to financing

1 Low	2 Medium	3 High
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Financial management – complete annual financial report

The municipality does not prepare a complete annual financial report and when it does, it is not on a regular basis	The municipality prepares a complete annual financial report for most of the years, and may or may not publicly disclose it	The municipality prepares a comprehensive annual financial report and publishes it publicly

Surplus or operating deficit

Negative	Zero	Positive

Own source revenue (taxes, fees and charges) / total revenue

<10%	10-25%	>25%

Tax coverage rate

The municipality does not record all legally available tax bases and / or maintain very poor records of economic activity	The municipality actively enforces all tax bases, but has difficulty keeping up-to-date records of economic activity (property, services)	The municipality actively enforces all legally available tax bases and actively updates records of economic activity

Access to financing

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Tax collection rate

The tax collection rate is low; amount billed that is paid <70%	The rate of tax collection is moderate; the amount billed and paid is between 70 and 90%	The tax collection rate is high; the amount billed and paid > 90%

Income growth rate and volatility

The income growth rate is low, and volatility is high; growth rate <2%	The income growth rate and volatility is moderate; growth rate between 2 and 5%	The income growth rate is high, and volatility is low; growth rate >5%

Capital expenditure / total expenditure

Low or erratic capital expenditure	Consistent participation in capital expenditure	Increase in capital expenditure

Debt balance / total revenue

>80%	60-80%	<60%

Debt service / revenue

>25%	15-25%	<15%

Debt history

Antecedents of breaches or payment irregularities	There is no history of default, but there is a history of bad debts	No history of default or payment irregularities

Access to financing

1 Low	2 Medium	3 High
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Assessment of the TIF Analytical Framework

Case Study Selection

The case study was selected based on an initial screening using publicly available information at national and subnational levels, including cadaster systems, tax collection, legislation, institutional frameworks or documented experience on implementing LVC instruments. To prepare this paper, the authors initially chose three projects that from an initial perspective, fitted into the category of “potential for using TIF as part of a financial strategy”. The three case studies were:

- Carrera 80 tram project in Medellin, Colombia
- Electric bus corridor on Eje 8 Sur in Mexico City, Mexico
- CCarrasco Norte social housing project in Montevideo, Uruguay.

These projects are located in three different countries that are relatively heterogeneous in their demographic and economic indicators, and in overall development levels (see table 9).

Table 9.

Selection Criteria for Case Studies

Source: World Development Indicators (2017)

Country		
1 Colombia	2 Mexico	3 Uruguay

Urban population

	Governmental System	GDP per capita (constant 2010 US\$)	Total population (millions)	(millions)	(% of total)	growth (annual %)
1	Unitary	6,251	45.9	34.5	75.0	1.5
2	Federal	8,960	117.3	91.3	77.8	1.9
3	Unitary	11,938	3.4	3.2	94.4	0.6

For all three projects, the Framework was applied using only information available on the internet.⁴ For example, this would be analogous to a situation whereby a potential lender or other stakeholder uses the Framework in a preliminary analysis to help prepare for negotiations with municipal officials. According to this initial assessment, the points below reflect the main conclusions regarding the potential of using TIF as part of a financial strategy:

⁴ In conducting the case studies, the authors found that the literature available on the internet provides a strong theoretical and empirical base for the analysis of TIF and other value capture instruments.

- The Carrera 80 tram project in Medellin: The results of this initial analysis indicate a high potential for successfully using TIF in a financial strategy for the tram project and to indicate areas for further evaluation in the next phases of the feasibility analysis.
- Electric bus corridor on Eje 8 Sur in Mexico City: Unfortunately, during the preliminary exercise it was difficult to find information to fill out many of the conditions of the matrices. It was also necessary to address the many outstanding questions in the matrices before making a decision to further expand the feasibility analysis of TIF for the electric bus corridor. In general terms, the literature demonstrates that TIF would work best on projects in which the benefits are internalized within a well-defined impact area⁵ (see Part I).

Carrasco Norte social housing project: Although the most comprehensive financial analysis that the authors found for Medellin and Mexico City are not available for Montevideo, in general, it would seem that this project would be a reasonable candidate for TIF, if it were being executed today under prevailing laws and regulations. This exercise in “retrofitting” an existing project with TIF demonstrates the utility of the Framework in terms of conducting initial feasibility analyses to assess the use of TIF in projects that have already begun.

5. Some of the inconveniences found during the preliminary analysis are as follows: i) the benefits from improvement in air quality will accrue to the municipality as a whole, rather than being internalized in the project’s direct impact area, although the bicycle paths and some other public interventions (such as changes in zoning and urban density controls) will benefit properties in the impact area; ii) although Mexico City has modernized its cadaster, property tax rates remain quite low; iii) The need for municipal borrowing will depend partly on the extent to which the concessionaire can absorb the cost of the buses (about US\$1 million each).

The preliminary assessment indicated that reliable data to conduct the analysis was more freely available for both Medellin and Colombia. In addition, Colombia has a long-term tradition of applying LVC instruments, such as betterment contributions. A preliminary survey conducted by the authors found that the Municipality of Medellin has been examining the expansion of LVC instruments to finance strategic large-scale capital projects and has drawn the legal framework for TIFs as part of the city's local development planning instruments. Thus, Medellin was selected as the primary case study. The working hypothesis of this research was that Medellin met the conditions to successfully implement a TIF.

The following subsection summarizes the findings from the application of the TIF Analytical Framework to Medellin, Colombia. It illustrates how this Framework can be used to assess the feasibility to finance urban infrastructure through a TIF at the very early stages of project preparation. This analysis follows the five steps in TIF implementation described in [Part II](#).

Background Information about Medellin, Colombia

The Municipality of Medellin is the capital of the Department of Antioquia and is Colombia's second city in terms of population size and economy. Medellin had nearly 2.5 million inhabitants in 2015. Its GDP in 2013 was around US\$27 billion, representing about 7% of the national GDP. In the 2010/2015 period, annual GDP growth in the region exceeded 4%. Fitch Ratings granted Medellin an AAA (Triple A) credit rating on a national scale in 2014, and the city was granted an investment grade rating (Baa2) at international scale by Moody's. These ratings reflect its sound financial management and governance practices, as well as its diversified local economy. Colombia has a long tradition of using betterment levies to capture the valorization generated by government interventions.

Application of the TIF Analytical Framework to Medellin, Colombia

Table 10 summarizes the results of the application of the TIF Analytical Framework to Medellin, Colombia, showing the ratings for the six evaluation matrices. The ratings for Matrices 1 and 2 result from data collected directly with support from the Municipality of Medellin and Medellin Metro. The ratings for Matrices 3 through 6 are from Lugar (2017) for national and subnational levels.

Matrices 1 and 2 provide an assessment on the conditions Medellin would be required to meet to successfully implement a TIF based on municipal capacity, land regulations and policies, capital investment planning, and governance aspects. Matrix 1 shows a high score at 13 for the conditions of the municipality to finance a TIF. Matrix 2 scored 9 for the definition of the TIF district and value capture instruments. On the other hand, results from Matrices 3 to 6 provide the analysis of conditions in the national credit markets and also of Medellin's fiscal capacity and indebtedness. Matrix 3 shows a total score of 19 for the national macroeconomic indicators with the weakest performance on publicly guaranteed debt service as a percentage of GNI and the consolidated fiscal balance of the national central government. Matrices 4 and 5 show highly satisfactory performance on the national fiscal, legal, and regulatory institutions and the national credit allocation systems with scores of 28 and 54, respectively. Finally, Matrix 6 shows a very satisfactory performance for Medellin in terms its fiscal capacity and indebtedness with a score of 54. These results suggest that Medellin has a very high potential for successfully using TIF to finance an urban infrastructure project. The following tables (Table 11 to Table 16) provide a detailed explanation of the results of the aforementioned assessment.

Average Ratings on the Evaluation Matrices for Medellin

Evaluation matrices	Score	Normalized Score
<div> <div></div> <div> Stage 1: Evaluation of municipal capacity to use TIF </div> </div>		
Matrix 1. Medellin: Conditions for a Municipality to Finance a TIF	13 / 15	4.33 / 5
Matrix 2. Medellin: Definition of the TIF district and value capture instruments	9 / 15	3 / 5
<div> <div></div> <div> Stage 2. The feasibility of financing for the municipal share of the TIF project </div> </div>		
Matrix 3. Colombia: National macroeconomic indicators	19 / 30	3.17 / 5
Matrix 4. Colombia: National fiscal, legal, and regulatory institutions	28 / 30	4.67 / 5
Matrix 5. Colombia: National credit allocation systems	54 / 60	4.5 / 5
Matrix 6. Medellin: Municipal fiscal capacity and indebtedness	54 / 60	4.5 / 5
Overall Result	177 / 210	24.17 / 30

Source: Author based on the results of the six matrices

Table 10.

■ Stage 1.

Evaluation of municipal capacity to use TIF

Table 11.

Matrix 1: Conditions for a Municipality to Finance a TIF in Medellín

Feasibility		
1 Low	2 Medium	3 High

Municipal control of land use planning, laws and regulations, such as zoning and density levels (i.e., FAR floor-to-area ratios)

Deal breaker: Very limited control of land use planning, laws and regulations

Condition 1

Limited control of land use planning, laws and regulation levels, and limited capacity to effectively develop and enforce these plans and regulations	Full control of land use planning, laws and regulations, and some capacity to effectively develop and enforce these plans and regulations	Full and effective control of land use planning, laws and regulations, and full capacity to effectively develop and enforce these plans and regulations

Explanation: Land use is controlled by the Alcaldía de Medellín, and the *Secretaría de Planeación*. The current POT defines zoning and density in detail. Those laws and regulations are largely enforced by the *Secretaría de Planeación* and *Secretaría de Gestión y Control Territorial*. However, the city has limited governance to restrict informal settlement growth.

Multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders

Deal breaker: Unable or unwilling to prepare a multiyear investment program developed in accordance with a longer-term municipal development plan

Willing to prepare an adequate multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders	Preparing an adequate multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders	Effectively implementing an adequate multiyear investment program developed in accordance with a longer-term municipal development plan that is effectively communicated to stakeholders

Explanation: The Alcaldía de Medellín develops and produces regular 10-year capital plans, known as Marco Fiscal de Mediano Plazo. The current one for the 2017-2026 period provides a macroeconomic overview, a snapshot of the current financial statements, and projections on municipal expenses and revenues for the upcoming 10-year period. These documents are publicly accessible and are often accompanied by divulgation videos and brochures to facilitate their understanding.

Condition 2

Protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership

Deal breaker: Very limited protection of property rights

Limited protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership	Somewhat efficient and effective protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership	Fully efficient and effective protection of property rights, including the provision of adequate registration of property titles and laws to effectively resolve disputes over ownership

Explanation: Property rights are clearly defined and protected in Medellín. The *Subsecretaría de Catastro* has developed a robust database of all land and built properties in the city with detailed information on ownership, land use, built area, assessed values, and *estratos*.

Condition 3

Feasibility

1
Low

2
Medium

3
High

Condition 4

Favorable economic outlook on the municipality's real estate market cycle

Deal breaker: Uncertainty of a favorable economic outlook on the municipality's real estate market cycle

Low certainty of a favorable economic outlook on the municipality's real estate market cycle based on adequate analysis of reliable data	Medium certainty of a favorable economic outlook on the municipality's real estate market cycle based on adequate analysis of reliable data	High certainty of a favorable economic outlook on the municipality's real estate market cycle based on adequate analysis of reliable data

Explanation: Despite the nationwide deacceleration in the real estate market experienced over the last two years, the basic demand fundamentals in the Medellin Metropolitan Area remain strong, with robust household formation and employment growth. The life of TIF districts typically exceeds 15 years, which means that even if the position on the cycle were negative at the moment of delivery, the project would benefit in subsequent years from a likely strong mid- and long-term real estate prospect.

Condition 5

Modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them

Deal breaker: Unable or unwilling to develop a modern real estate cadaster

Fully developed project for developing a modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them	Partially functioning modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them	Fully functioning modern real estate cadaster with reliable, timely data on market values and other variables needed to estimate them

Explanation: The *The Subsecretaría de Catastro* manages a comprehensive and modern cadaster database that is updated every two years on average and that closely tracks market values with a typical ratio of assessed value to market value of between 60 and 80% according to sources from the city.

Feasibility

1 Low	2 Medium	3 High
-----------------	--------------------	------------------

Matrix 2: Definition of the TIF District and Use of Value Capture Instruments in Medellin

Feasibility		
1 Low	2 Medium	3 High

Conditions

Legal right to define a special district for TIF

Deal breaker: No legal right to define a special district for TIF

Possible legal right to define a special district for TIF without successful previous experience	Fully established legal right to define a special district for TIF without successful previous experience	Fully established and tested legal right to define a special district for TIF with some successful previous experience

Explanation: Medellin's Land Use Master Plan (POT - *Plan de Ordenamiento Territorial*) has established the TIF as a legal instrument, called *Financiamiento por Incremento de Recaudo Impositivo (FIRI)*. However, it does not define the conditions for the creation of a TIF/FIRI District, or the institutions needed for its regulation and administration. A TIF district has never been created in Medellin and detailed regulation about the process and approvals needed to create one should be considered.

Legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in the TIF district

Deal breaker: No legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district

Possible legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district	Fully established but untested legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district	Fully established and tested legal right to earmark municipal revenue from the real estate property tax or other sources for specific use in a TIF district

Explanation: It may be possible to define revenue sharing agreements between the *Secretaría de Hacienda* and an urban operator (*Operador Urbano*) in charge of a TIF district to channel property tax increases generated in the district to financially support a project. However, this has never been done before and some preliminary explorations in the city showed that the institutional framework and intergovernmental coordination required to do so could be challenging.

The right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district

Deal breaker: No legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district

High certainty of the existence of a legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district	Fully established but untested legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by the TIF district	Fully established and tested legal right to adequately control and manage the real estate property tax and other municipal revenues to be used by a TIF district

Explanation: The *Alcaldía de Medellín* has an established track record of effectively collecting revenue from property taxes and other value capture mechanisms (tax and non-tax based) such as *Contribución por Valorización* and *Aprovechamiento Económico del Espacio Público*.

Feasibility



Develop plausible scenarios supported by reliable data concerning the increase of real estate property values in the TIF district

Deal breaker: Unable or unwilling to develop plausible scenarios

The municipality is willing to contract consultants to develop fully plausible scenarios supported by reliable data concerning the increase of real estate property values in the TIF district	The municipality is capable of developing fully plausible scenarios supported by reliable data concerning the increase of real estate property values in the TIF district	The municipality has developed fully plausible scenarios supported by reliable data concerning the increase of real estate property values in potential TIF districts

Explanation: Medellín enjoys the access to data and tools needed to reasonably project increases in property taxes as a result of both new real estate development and increases in the value of existing properties.

Legal authority to use the value capture instruments needed to implement the financial strategy

Deal breaker: No or uncertain legal right to use TIF

Established legal authority to use the value capture instruments needed to implement the financial strategy	Fully established but untested legal authority to use the value capture instruments needed to implement the financial strategy	Fully established and tested legal authority to use the value capture instruments needed to implement the financial strategy

Explanation: Solid experience using some value capture mechanisms, including *Contribución por Valorización*; *Planes Parciales*, which allow land readjustment; *Venta de Derechos de Edificación*; *Cargas Urbanísticas*; and *Aprovechamiento Económico del Espacio*. Despite TIF being contemplated in the POT as a legal mechanism, there is a lack of detailed regulation and it has not been implemented before.

Feasibility

1
Low

2
Medium

3
High

■ Stage 2.

The feasibility of financing the municipal share of the TIF project






Table 13.

* All values are from 2015



Evaluation criteria

Values

1.  Inflation rate
6.77%
2.  Internal savings rate
19.10%
3.  GDP / Capita (US \$)
US\$6,049
4.  Public Debt / GDP
43.80%
5.  Publicly guaranteed debt service / GNI
2.50%

Matrix 3: National Macroeconomic Indicators for Colombia
Source: Author based on Lugo (2017)






6.  Consolidated fiscal balance of the national central government
Negative
7.  Long term interest rate
Intervention rate: 5.5%
8.  International sovereign credit rating
BBB
9.  Central government's rescue history of subnational governments
Occasional
10.  The precise and timely provision by the central government of the results and forecasts of key macroeconomic variables
There are instruments

Table 14

Matrix 4: Evaluation of the National Fiscal, Legal, and Regulatory Institution for Colombia

Rating

1

2

3

Evaluation criteria

1.  **Fiscal autonomy / dependency**
Colombian municipalities have fiscal autonomy and control over indebtedness within the legal system. This autonomy, however, is highly regulated and controlled.
2.  **Fiscal autonomy/ Intergovernmental transfers**
Although national-level transfers are clearly regulated in Colombia, municipalities do not have discretion over them, nor do they encourage the generation of own revenues.

3. **Fiscal autonomy/ revenue**
Although it is the function of the national congress to create taxes, it is up to the municipality to adopt them, determine the elements or attributes and define the tariffs for them.
4. **Financial management standards and reporting**
This aspect can be considered as one of the great strengths contained in Colombian legislation, which provides a detailed regulation of the methodologies, principles, and accounting for information. As mentioned below, Colombia has already adopted the International Financial Reporting Standards - IFRS, as well as the periodicity of their presentation.
5. **Standards and reporting – audits**
As with the previous condition, these regulations are rigorous. Noncompliance generates disciplinary and fiscal sanctions for the responsible officials. The Local Comptroller is responsible for the audit or the Comptroller General of the Republic, in his/her absence.
6. **Regulation – insolvency, default, bankruptcy**
The national government, through the enactment of Law 550 of 1999, dealt with the problem of the insolvency of municipalities. This law defined the structure and content of the restructuring agreements that was part of the set of rules aimed at the fiscal consolidation of the local entities, together with Law 358 of 1997 and Law 617 of 2000, among others.
7. **Legal authority of the GSN to borrow**
Colombian legislation allows municipalities to borrow. In accordance with Decree 2681 of 1993, compiled in Decree 1068 of 2015, there is no restriction on the instruments used, which, in fact, are the same as those allowed for the National Government.
8. **Subnational governments' legal authority to borrow**
Law 358 of 1997 clearly states in its article 2 that the resources of the credit should be used only to finance investment expenses.
9. **Legal authority – subnational government debt regulations**
The definition of debt indicators by Law 358 of 1997 implies that the solvency of the municipality is a determining factor for the contracting of indebtedness. On the other hand, the standard defines public credit operations as the granting of guarantees by state entities.
10. **Legal authority – fiscal responsibility**
The description of the legal framework explained the rules applicable in fiscal matters, and penalties are imposed by the system when a municipality loses payment capacity and consequently debt capacity by not complying with the fiscal rules.

Source: Lugo (2017)

Table 15.

Matrix 5: National Credit Allocation Systems

Rating

1

2

3

Evaluation criteria

1. **Credit options – sources**
Municipalities have access to both internal and external funding sources, and in both cases, authorization procedures are required both within the entity and before national authorities.
2. **Credit options – currency**
As in the previous point, municipalities have access to financing in local and foreign currency, and in both cases, authorization procedures are required both within the entity and before national authorities.
3. **Credit options – central bank**
Note that Colombian regulations contemplate credit from the national government budget to municipalities only in specific cases (Budget credits). In no case are these claims recurrent, and credits are increasingly difficult to obtain. The rules do not include loans from the Central Bank (*Banco de la República*).
4. **Credit options – excluding banks**
Bank loans are a very important source of financing for municipalities. In fact, they are the most recurrent source, because bank procedures are less onerous, and structuring is faster.

5. **Credit options – bank loans**
Bank loans play an important role in financing municipalities. In some cases, they represent 100% of the debt.
6. **Credit options – bonds**
As described in the structure of the Colombian stock market, bonds constitute a fully defined source of financing. There is a well-articulated institutional structure that allows the market to function properly and provides precise regulation on almost all aspects of the bond market.
7. **Credit options – bond markets**
Colombian regulations contemplate the possibility of issuing bonds by the municipalities, but few municipalities and departments have done so. The sporadic emissions by Bogota, Medellin, and some other departments are notable exceptions.
8. **Credit options – bond monitoring**
The regulations clearly establish the mechanisms for the supervision of bond issuers, especially the municipalities, but they do not specify sanctions for breach of obligations. In the event of a default, however, the situation for the municipalities and the responsible authorities would be acute, due to the loss of credibility, the lowering of the credit rating and the legal consequences.
9. **Credit options – bonds, institutional investors**
Institutional investors own around 80% of the municipal bonds issued. These investors are mainly Pension Funds, Commercial Banks, Investment Funds, Trusts, and Insurance Companies.
10. **Credit options – credit enhancement**
Colombian market and legislation include a number of instruments to improve debt conditions or to ensure compliance with obligations through collateral such as pledges, mortgages, revenue pledges, and fiduciary charges.
11. **Credit options – allocation base**
The lenders perform the corresponding risk assessment in which, in addition to verifying compliance with the municipalities' debt indicators, they validate indicators defined by their own methodologies for compliance with financial indices. This risk assessment is conducted by banks and all institutional investors through their risk analysis departments.

- 12. Market structure – benchmark interest rate**
The reference interest rates are given by the National Treasury Bonds (Bonos del Tesoro Nacional – TES) issued by the Ministry of Finance and Public Credit (Ministerio de Hacienda y Crédito Público – MHCP). The Government has developed TES references at fixed rates, and at variable rates. At present the most outstanding references of the market are the fixed rate TES with maturity in Nov-18 and Sep-30 (2015).
- 13. Support to market structure**
There are various actors, each with a specific role (credit rating agencies, independent financial advisors, bond advisers, investment banks, trust companies, etc.)
- 14. Market structure regulation**
Different agents with clearly identified roles are involved in the structure of the capital market. Regulatory matters are mainly handled by the Financial Superintendence through the securities delegate, and from the private sector, there is the Corporation Regulating the Stock Market, which generally issues regulations, and supervises and ensures compliance and discipline of its members. It may, ultimately, perform registration or arbitration and conciliation functions.
- 15. Market structure – who issues bonds?**
Colombian legislation allows municipalities to issue and place bonds in the capital market, prior to compliance with fiscal indicators and procedures and authorizations to national authorities such as Ministry of Finance and Public Credit (Ministerio de Hacienda y Crédito Público – MHCP) and the Colombian Financial Superintendence.
- 16. Market structure – investors**
Investors who act as dynamic agents of the capital market perform risk analysis and only participate in bond auctions in which they feel secure.
- 17. Risk assessment – legal requirements**
All bond issues of both municipalities and private issuers and other public entities must have an external and independent risk rating performed by risk rating companies, of which three operate in Colombia.
- 18. Risk assessment – risk adjusted debt**
Based on their risk assessment and the credit rating agency's opinion, investors determine whether the issuer's interest rate is attractive, given the credit risk.

Rating

1

2

3

19. **Risk assessment – information and dissemination**
Issuers of securities must comply with the disclosure mechanisms established by regulatory agents.
20. **Risk assessment – who performs?**
The risk assessment is carried out by external risk rating agencies, according to the provisions of territorial indebtedness rules.

Matrix 6: Evaluation of Municipal Fiscal Capacity and Indebtedness for Medellín

Rating

1

2

3

Evaluation criteria

1. **Politics – politics versus debt management**
In general, there is a clear separation between those who set the parameters and the regulations for the management of indebtedness (which are defined either by the legislative bodies or by national authorities), and those who manage debt in the municipality, which, in general, is undertaken by Medellín's Secretary of Finance.
2. **Politics – politics and debt procedures**
The rules and procedures for managing indebtedness are fully defined. Although not specified in detail, the financial entity has defined, within the management system, procedures for contracting the debt. The regulations are so detailed that no municipality can skip procedures. The only task left to management is the negotiation processes itself, especially in the intermediary market, given that the capital market adjudication processes use the Dutch Auction, as has been given in the issues made by Medellín.

3. **Strategy – debt strategy**
Medellin defines a debt strategy in which it defines the principles and guidelines of indebtedness. The strategy is defined based on market research carried out by an investment bank that the city periodically hires.
4. **Strategy – financial planning capacity**
Studies and analyses to determine the debt strategy are conducted by the Ministry of Finance' professional teams, with the advice and technical support of an investment bank.
5. **Risk assessment – credit rating**
Medellin has local and international credit ratings.
6. **Risk-solvency assessment**
The rating granted by Fitch Ratings is AAA (Internal) and the MOODY'S Investor Service (Baa2), investment grade
7. **Information – Contingent Liabilities**
Medellin has the necessary policies and procedures to record and quantify contingent financial liabilities, which is a legal obligation. It was not possible to verify the extent to which the municipal government uses these records, but quantification and the financial information on them is available.
8. **Information – Debt Reports**
The debt information of the municipality must be sent to the control entities within the first few days of the month following their completion. This information is sent to the Comptroller of Medellin.
9. **Financial management – budgeting**
Medellin has policies and budgetary manuals that guide its financial and budgetary management. The budget statute is contained in Municipal Decree No 006 of 1998 which compiles Council Agreements No 52/95 and 38/97.

Rating

1

2

3

10. **Financial management – audits and control**
Medellin is subject to control by the Comptroller of Medellin, who annually audits the financial statements and issues opinions on them. The results are public.
11. **Financial management – complete annual financial report**
Policies for disclosure and transparency of information are established in Law 1712 of 2014, whose purpose is to regulate the right of access to public information. The law establishes the procedures for the exercise and guarantee of the right-to-publicity statute and its exceptions. Pursuant to this standard, Medellin and all municipalities have a mandatory obligation to comply with the preparation and publication of the annual management report and all relevant economic and financial information.
12. **Surplus or operating deficit**
For the year 2015 Medellin has a current surplus (savings) and a total deficit, relatively insignificant and bankable.
13. **Own source revenue (taxes, fees and charges) / total revenue**
As of December 2015, own or current income accounted for 42.8% of total revenues.
14. **Tax coverage rate**
Medellin has a solid fiscal structure and an efficient tax management which is reflected in its collection. Annually, the Ministry of Finance plans the actions to be carried out to improve the collection of each of its taxes, which are disclosed annually in the Medium-Term Fiscal Framework that is presented to the City Council.
15. **Tax collection rate**
Medellin's collection rate is quite high. Although public information is not available on the levels of tax evasion in Medellin, effective tax administration and control should put evasion of the principal taxes at around 15%, as is the case of Bogota. In the case of the property tax, like Bogotá, the cadaster is managed directly by the municipality and therefore the lags in cadaster updating are less than in the rest of the country.

Rating

1

2

3

16. **Income growth rates and volatility**
The average real growth rate of Medellín's revenues was around 8% (2000 - 2015 at 2000 constant prices).
17. **Capital expenditure / total expenditure**
According to the classification of expenditure, which includes payroll payments in education and health (financed with national transfers) and human capital formation (investment), investment or capital expenditure in Medellín has averaged 78.4% of total expenditure between 2000 and 2015. Capital expenditures on infrastructure have averaged 62.5% of the total investment.
18. **Debt balance / total revenue**
In 2015, the total debt as a proportion of total revenues was 28.3%. During the 2000-2015 period this participation was on average, 17.6%.
19. **Debt service / revenue**
In 2015, debt service (interest plus amortization) represented 3.1% of total revenues and for the 2000-2015 period, the average was 4.8%.
20. **Debt history**
Medellín is characterized by having a strong credit history, which has granted it investment grade credit ratings.

Source: Lugo (2017)

Rating

1

2

3

The results suggest that Medellín meets most of the critical criteria to successfully design and implement a TIF program to finance urban development projects. The city scored 177 out of 210 points on the TIF Analytical Framework.

On the one hand, the city has full control of land use planning and policies, which allows the adjustment of zoning regulations that usually accompany the economic development strategy behind a TIF (i.e., by encouraging smart growth and densification). Furthermore, the Municipality manages a multiyear capital investment plan, enabling the city to consider funding requirements for major projects early on. Property rights are also well protected in Medellín, which is a stepping stone to properly implementing a property tax system to fund Municipal projects, a key aspect behind a successful TIF as previously highlighted. Medellín also has a functioning real estate market with a strong demand outlook in the Metropolitan Area, which reduces the risk of property values falling below assessed values, deemed a TIF a failure. There is also evidence suggesting that creating a TIF district and earmarking municipal revenue from within the TIF district is feasible. However, to date the city has never implemented this instrument.

On the other hand, Medellín is uniquely positioned to issue municipal bonds as it has done in the recent past. Macroeconomic indicators suggest that Colombia has a healthy fiscal environment and that Medellín has an investment grade credit rating, given the city's strong credit history. The existing legal framework enables the city to issue TIF bonds which could be repaid through revenue generated by the increase of property values as a result of capital projects. To further assess these findings and validate whether Medellín could use TIF to finance a project, this study entailed a more detailed analysis as described in the project-based pre-feasibility study summarized in the following section.

03

PART

MEDELLIN'S CARRERA 80 TRAM

By Shuprotim Bhaumik, Ignacio
Montojo, and Meredith Nissenbaum

A Project-based TIF
Pre-feasibility Analysis⁶

⁶. Currency in this section is based on 2017 prices and exchange rates.

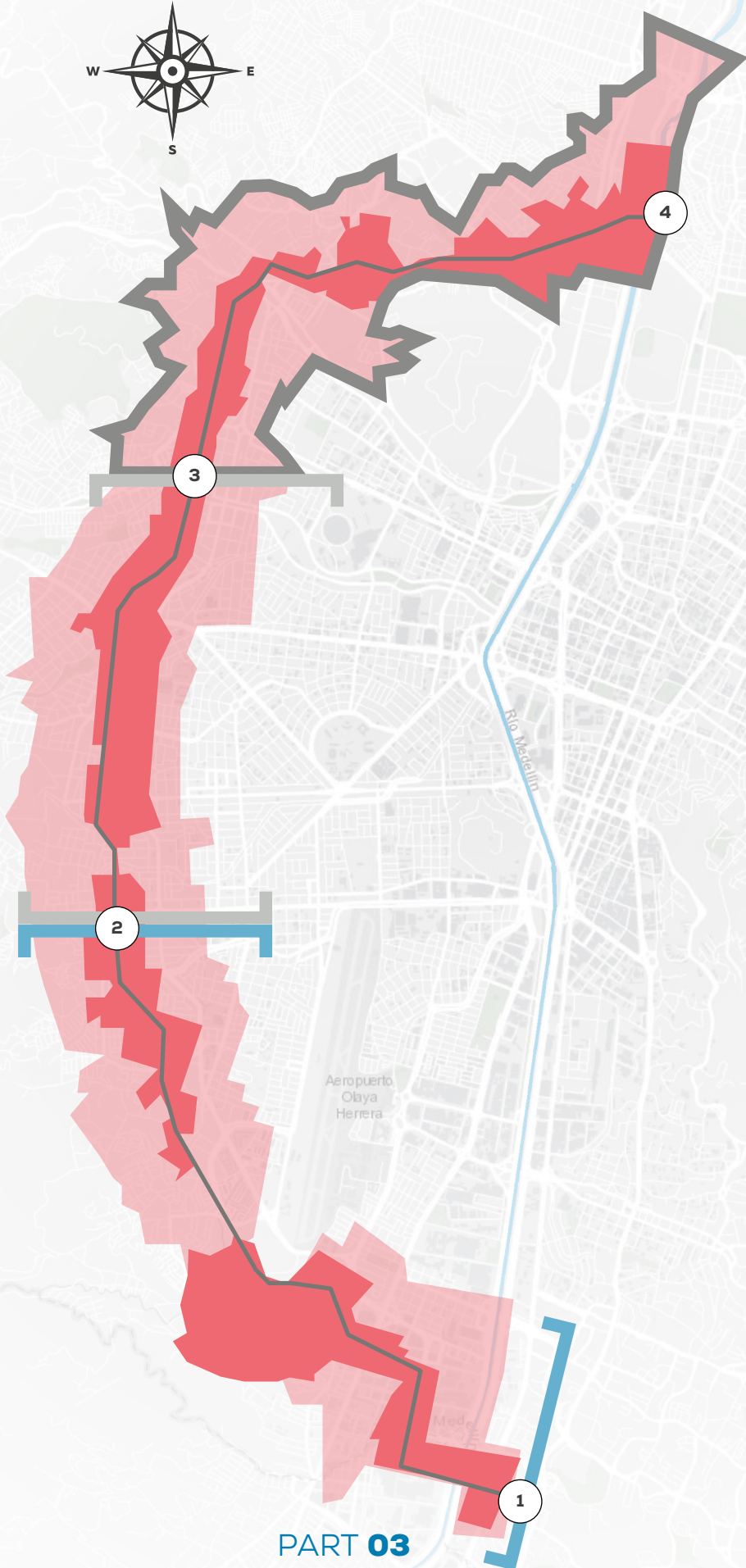
This section examines the pre-feasibility of implementing a TIF in Medellín based on a real-world project. The case study is based on the proposed Carrera 80 Tram Project, one of the city's priorities. The project consists of a new transit line served by a tram system of approximately 14 km with 20 stations that will consolidate a mixed-use urban corridor in the western edge of the city.

The Carrera 80 tram project is currently planned to be constructed in three phases of similar length from north to south to match the availability of public funds and to alleviate the impact that construction would cause on this, Medellín's main artery. The first phase will start at Estación Caribe on Metro Line A and end at Estación Floresta on Metro Line B. The second phase will extend from Estación Floresta to La Palma on the Line 2 of the rapid bus network Metroplús. The third and final phase will end at Estación Aguacatala on Metro Line A to the south of the city (see Figure 5).

The tram line will be a state-of-the-art public transit system that will transform the corridor with compact and sustainable real estate development for a wide range of incomes along with open spaces, public amenities, and pedestrian and bike lanes. The nature of the intervention presents unprecedented opportunities for the use of value capture mechanisms such as TIF and PPPs to relieve the financial burden on the public sector and establish a self-sustaining operational scheme.

Figure 5.

Carrera 80 Tram, Proposed Alignment and Phases



- Impact Area
- Intervention Area
- Phase 1: Study Area
- Phase 2
- Phase 3
- 1 Aguacatala
- 2 La Palma
- 3 Floresta
- 4 Caribe

Project Background

Medellin's Carrera 80 Tram is the most important mobility project in the city's history after the Metro (subway), in operation since 1995. The same institution that manages and operates the latter, *Empresa de Transporte Masivo del Valle de Aburrá Limitada - Metro de Medellin* put forth the former as a priority initiative among its various ambitious plans for expansion and made plans for the tram to be constructed in three phases. The proposed tram line will run along a 14-km corridor with 4 stations and 16 stops, which will transform the mixed-use urban corridor along the western edge of the city where it is located, from Caribe station in the north, southbound to Aguacatala.

This study examines the first phase, which starts at Caribe station on Metro Line A and extends southwards to Floresta station on Metro Line B as shown in [Figure 5](#).

While *Metro de Medellin* is primarily positioning the proposed tram to facilitate greater access to public transit for the residents of the western edge of the city, they also articulated other development and design principles for the proposed project as follows:

- Mitigate environmental impacts, as a tram is significantly less harmful than transportation by car, motorcycle, or truck/bus;
- Allow for the development of public space that articulates and facilitates the multiple activities and uses of the corridor;
- Prioritize increasing the speed of the mass transit system using the proposed advanced technology; and
- Leverage efficient infrastructure design to achieve greater benefits with less investment.

This state-of-the-art transit investment has the potential to transform the corridor in several ways, including the following:

- Compact and dense residential development for a range of income levels;
- Enhanced public amenities and services, including open spaces and pedestrian/bike paths; and
- New commercial activity, including the accelerated development of retail deliveries, as well as the emergence of hotel and office nodes at the intersection of the alignment and other Metro Line A and Line B stations.

Given the substantial capital cost of such an intervention, this initiative will need to consider several approaches in order to relieve the inevitable financial burden on the public sector:

- Opportunities for public-private partnerships (PPP)
- LVC mechanisms, such as TIF;
- Governance scenarios, which include the possibility of establishing a self-sustaining operating scheme and *Metro de Medellín* becoming an Urban Operator – a figure established in the city’s POT intended to manage and operate real estate megaprojects; and
- Potential zoning, regulatory and policy changes that will mean that the study area can more fully leverage the developmental benefits generated by the transit investment.

Project Costs and Current Financing Sources

The total project costs are estimated at US\$812 million, of which US\$375 million will be spent on the first phase that extends between Caribe and Floresta stations. While Article 536 of the 2014 POT contemplates the use of tax-increment financing (TIF, defined in the POT as FIRI for *Financiamiento por Incremento de Recaudación Impositiva*) for public urban investments, transportation improvements in the city have been traditionally funded by a combination of conventional national and municipal sources, including loans, capital grants and basic land value capture mechanisms such as betterment levies.

Funding for the first phase of the project has not been secured, and one of the goals of this study is to assess whether alternative financing mechanisms such as TIF can be utilized, and how much of the funding gap these would potentially cover.

Study Objective, Methodology, and Activities

This study quantifies the projected increment in property tax revenue generated by the first phase of the proposed Carrera 80 Tram system. Building on these projections, it proceeds to assess the potential for using TIF to fund part of the capital costs of the first phase. Ultimately, the desired outcome of this engagement is to assess whether TIF is a feasible means of financing the Carrera 80 Tram project, and whether TIF could be used as a project financing tool in a city like Medellín. The paper estimates the potential increment in property tax revenue in the area impacted by the first phase of the tram project and considers illustrative borrowing options. However, it does not address the incremental value derived from the implementation of phases two and three, particular structuring scenarios, or other potential sources of funding, which should be considered in future studies.

Findings from this study can serve as evidence as to whether the conditions in other Latin American and Caribbean cities allow for the use of TIF as a successful value capture mechanism at institutional, fiscal, regulatory, and administrative levels.

The research involved interviews with several key stakeholders and local market experts, visits to the city's western neighborhoods in which the tram project is planned to be implemented, and the gathering of qualitative and quantitative data in order to understand the dynamics of the socioeconomic and real estate market, the regulatory landscape, and the project plans associated with this geography from both public and private sources.

Projections for new real estate development in the study area (500-meter buffer along the alignment of the first phase of the tram) are generated based on both historical and recent trends, household and population growth projections, and development patterns observed in previous comparable projects. The 500-meter buffer surrounding the tramline was selected as a geography for the study area for several reasons. One of these is that the authors of this study primarily focused on Metro de Medellín's approach to planning transit corridors, where it generally uses 500-meters as a standard for determining the area of influence.⁷ Additionally, 500-meters, or a roughly 10-minute walk, is relatively standard in determining the geography of an impact area. As such, in this study the authors opted for a 500-meter buffer to determine the area of influence to maintain consistency with both common practices and the approach employed by Metro de Medellín.

The research team estimated the value premium that would eventually translate into an increase in assessed values by considering the Ayacucho tram investment, announced in 2011 and opened in 2015. The proximity of the Ayacucho tram investment to the proposed Carrera 80 tram, as well as the comparable type of investment, allowed Ayacucho to become a means of projecting the value premium on existing properties following the investment in the Carrera 80 tram. This approach was also used to determine growth in the capture rate of new real estate development to ensure consistency between the two methods of projecting future values.

7. Metodología para la planificación y gestión de los Corredores Urbanos de Movilidad.

While data is limited for Ayacucho, given that the project was delivered relatively recently, in this study it was found that the average price of new residential development per SQ M in the 500-meters surrounding the Ayacucho street tram increased by 8.1% following the announcement of the project. This increase of 8.1% is separate from year-over-year appreciation in prices in the metro area, as that historic growth was netted out prior to assessing the increase owing to the tram investment.

These projections were refined based on the insights provided by discussions with local developers, and the findings, as well as existing conditions and projections, and some questions regarding different assumptions and processes, were discussed with local government stakeholders.

Finally, these projections for new development are used to estimate the incremental tax revenue between 2020 to 2044 associated with the creation of the tram and to generate illustrative borrowing scenarios. This increase in assessed values and property tax revenues is driven by two main sources. The first is the value premium on existing properties, which ultimately translates into incremental assessed values. The second is the property tax revenue the local government will accrue from new development in the study area. New development is likely to progress at an accelerated rate compared to the projected growth without the tram investment, given higher demand for developable land near public transportation facilities.

It is important to note that this estimation in value premiums was employed as part of a pre-feasibility study, and that there are alternative ways in which to project the value premiums to be expected following the delivery of a tram. Ayacucho was just one example, which offered limited data due to its recency, but still constituted the best possible precedent given the contextual similarities and the physical proximity. An alternative method, by way of example, could include measuring the increase in rents that tenants are willing to pay when their commute times are reduced. For instance, in New York City, FiveThirtyEight –a renowned source for statistical and political analysis– found that New Yorkers will pay a monthly rent which is US\$56 higher to shorten their commute by just one minute.⁸

8. “New Yorkers Will Pay \$56 A Month To Trim A Minute Off Their Commute”, Carl Bialik, FiveThirtyEight

Real Estate Market Overview

The Study Area

The market scan focuses on three key geographies – (1) the “Metro” area, which includes ten municipalities located in the same geographical valley that officially comprises the Metropolitan Area of *Valle de Aburrá*,⁹ (2) the City of Medellín proper, and (3) the predetermined project study area that corresponds to a 500-meter buffer, or roughly an 8-minute walk, surrounding the alignment of the proposed tram.

The study area, spanning roughly 482 hectares, passes through the districts of Aranjuez, Castilla, Robledo and Floresta. As shown in [Figure 6](#), the study area can be defined as the cumulative area encompassing the impact area and the intervention area surrounding the proposed tram alignment as Metro de Medellín defines them.

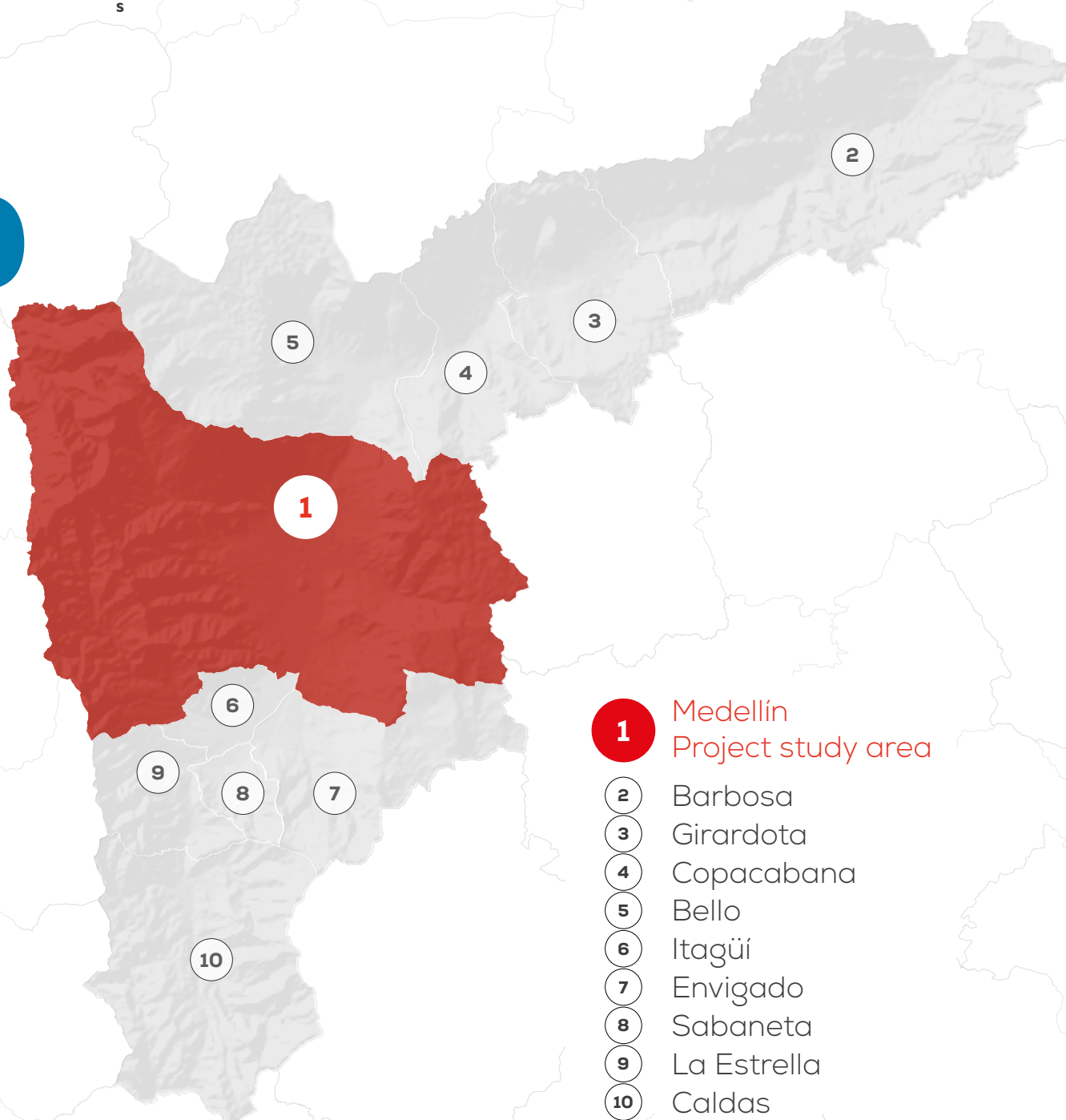
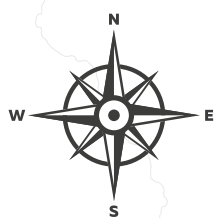
Concerning its built environment and current mix of land uses, the study area is largely residential. However, the commercial uses throughout the corridor vary according to the type and number of uses. The northern-most segment of the alignment, which intersects with the Caribe subway station on Metro Line A and continues towards Pilarica, is, while still largely residential, the most industrial sector in the study area. Between Pilarica and Robledo, along Calle 75, land use remains largely residential, but shifts towards institutional, given the concentration of schools and universities there, including the Metropolitan Technical Institute, the University of Pascual Bravo, and the National School of Mines. Lastly, the alignment moves south towards the Floresta subway station on Metro Line B, via Carrera 80, passing by Colombia Avenue, where there is a relatively large collection of mid-scale residential properties with some retail spaces on the ground floor.

9. The Metropolitan Area of the Aburrá Valley is comprised of the following municipalities: Medellín, Bello, Envigado, Itagüí, Sabaneta, Barbosa, Caldas, La Estrella, Girardota, and Copacabana.

Figure 6.

Carrera 80 Tram Study Area

Source: Authors (2017) based on information from Metro de Medellín



The real estate market analysis encompasses all three aforementioned geographies, and it focused on residential, retail, office, and hotel deliveries in each. For each use, this document analyzes a variety of components, including, but not limited to, annual historical deliveries, price per square meter, number of residential units per building, typical unit sizes, and geographical distribution. One factor that was ultimately of particular importance to the analysis was housing *Estratos*, which are residentially relevant stratifications determined by the quality of housing vis-à-vis the presence of certain characteristics such as a garage or a front yard, etc.¹⁰ While *Estrato* doesn't necessarily serve as an indicator of socioeconomic status, it normal provides insight into average sale prices and median household income. Analyzing the *Estratos* introduced an additional layer of nuance by revealing information on residential supply and demand through a socioeconomic and demographic lens.

Socioeconomic Overview

Medellin has seen consistent population growth in the last ten years, with an annual growth rate of 1.1% from 2008 to 2017,¹¹ detailed in [Figure 7](#). While the city's population growth rate is on par with the nation, the metro area has seen slightly more rapid growth, with an annual rate of 1.3% from 2008 to 2017. This comparatively higher growth rate correlates with the outflow of residents from Medellin into the surrounding municipalities, primarily driven by the lack of affordable land and tighter zoning restrictions. As such, middle-income residents in Medellin, especially those in search of housing units in *Estratos* 3 and 4, are turning to nearby municipalities in search of more affordable options.

A notable point of consideration is that while Medellin geographically only composes roughly 33% of the total area of the metro area, over 65% of metro area residents live within the city limits. Thus, while geographically proximate, the municipalities that surround Medellin differ drastically from Medellin in terms of density and urban characteristics of the built environment.

10. *Estratos* are classified from 1 to 6, 1 representing lower housing conditions and 6 higher conditions.

11. All 2017 data is based on Camacol data through August 2017. It has been annualized to estimate the full year.

Figure 7.

Population and Household Growth in the Metro Area (2010-2020)

Source: Authors (2017) based on information from DANE

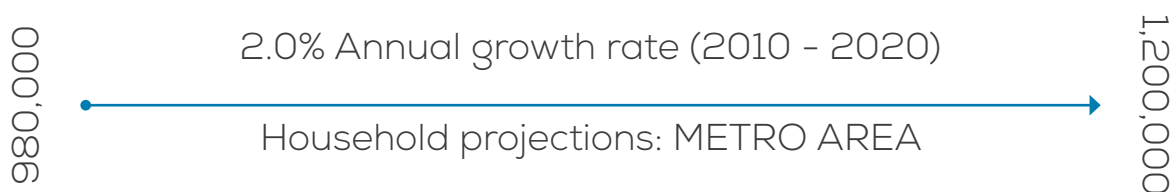
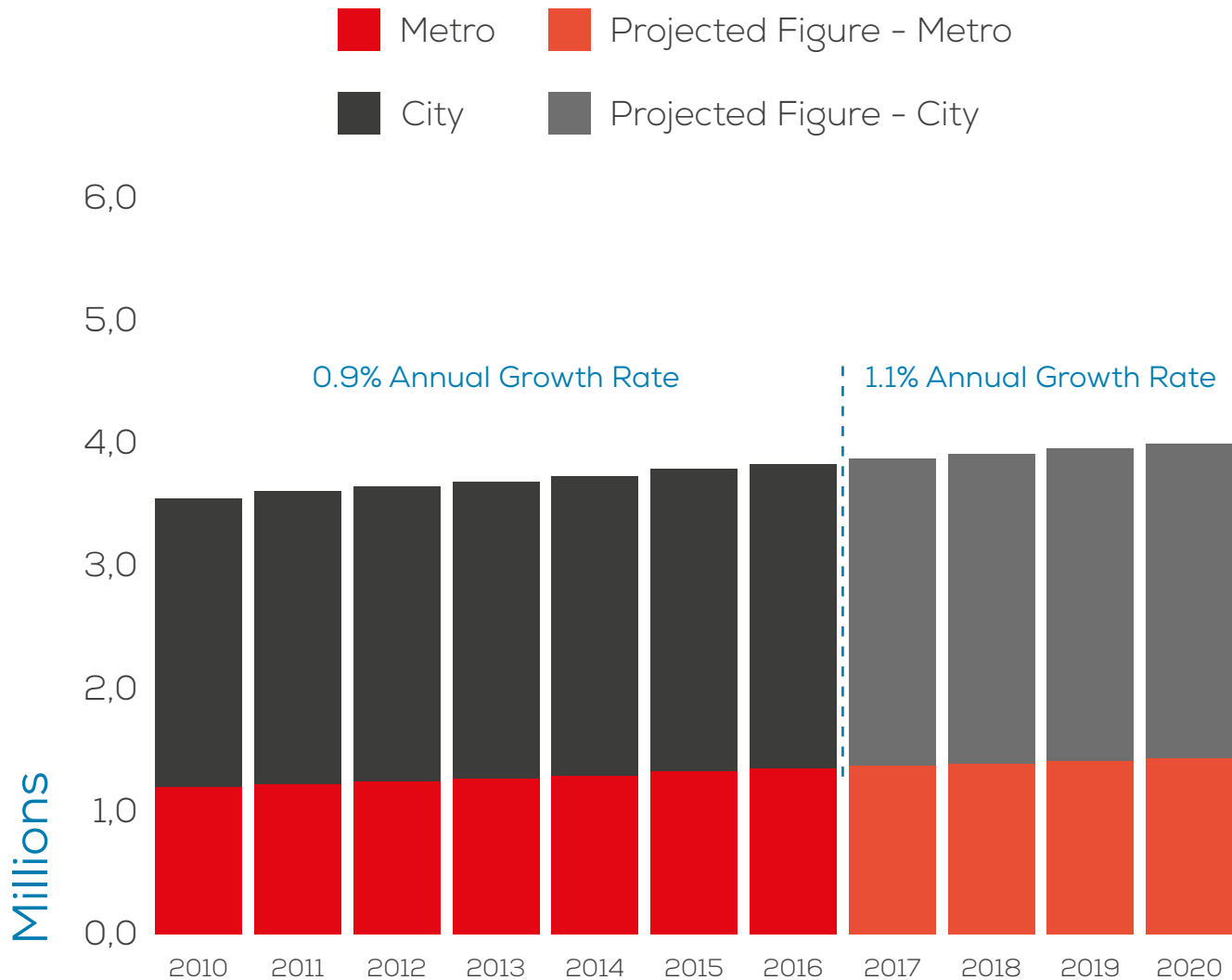


Figure 7 shows that the significant population growth in the Metro Area between 2010 and 2016 is expected to accelerate between 2017 and 2020 at a 1.1% annual growth rate. At the same time, households are expected to grow at a 2.0% between 2010 and 2020, indicating that the average household size is shrinking, which could accelerate historical housing demand.

Residential Market Overview

The metro area has delivered a total of 167,000 new housing units in the last 10 years, 56% of which, or roughly 93,000 housing units were in Medellín. However, the distribution of residential units across the metro area has shifted significantly from 2008 to 2017. As shown in Figure 8, in 2008, 82% of the deliveries of residential units in the metro area were within Medellín. By 2017, this number had dropped to just 29%.

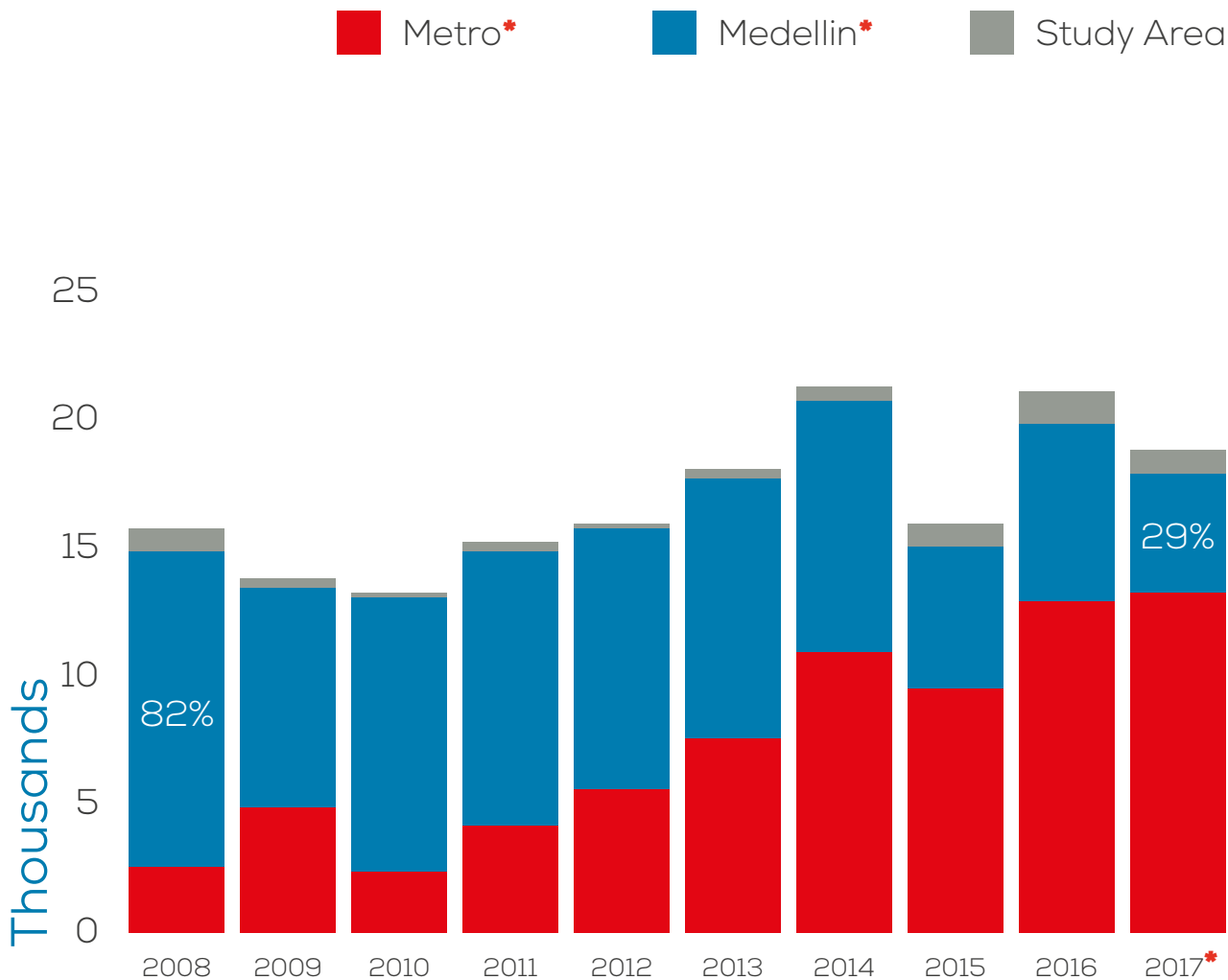
Based on conversations with developers, this trend is primarily due to the fact that land for development in Medellín has become increasingly scarce and relatively expensive. While Medellín was previously a nexus for development compared to the other municipalities in the metro area, demand for housing in the city has surpassed supply, creating an outflow of residents to the surrounding municipalities.

This pattern manifests most visibly in units in *Estratos* 3 and 4, which largely cater to middle-class residents. Figure 9 demonstrates that in the metro area, the overall distribution of residential units by *Estrato* has shifted in the last decade, as units in *Estratos* 3 and 4 now comprise 69% of the residential market in the metro area, as opposed to 55% in 2007. This shift, in conjunction with the outflow of residential square meters added, demonstrated in Figure 9, signals that middle-class residents are the most affected by the scarcity of new residential development within city limits.

Figure 8.

New Residential Units by Geography (2008-2017)¹²

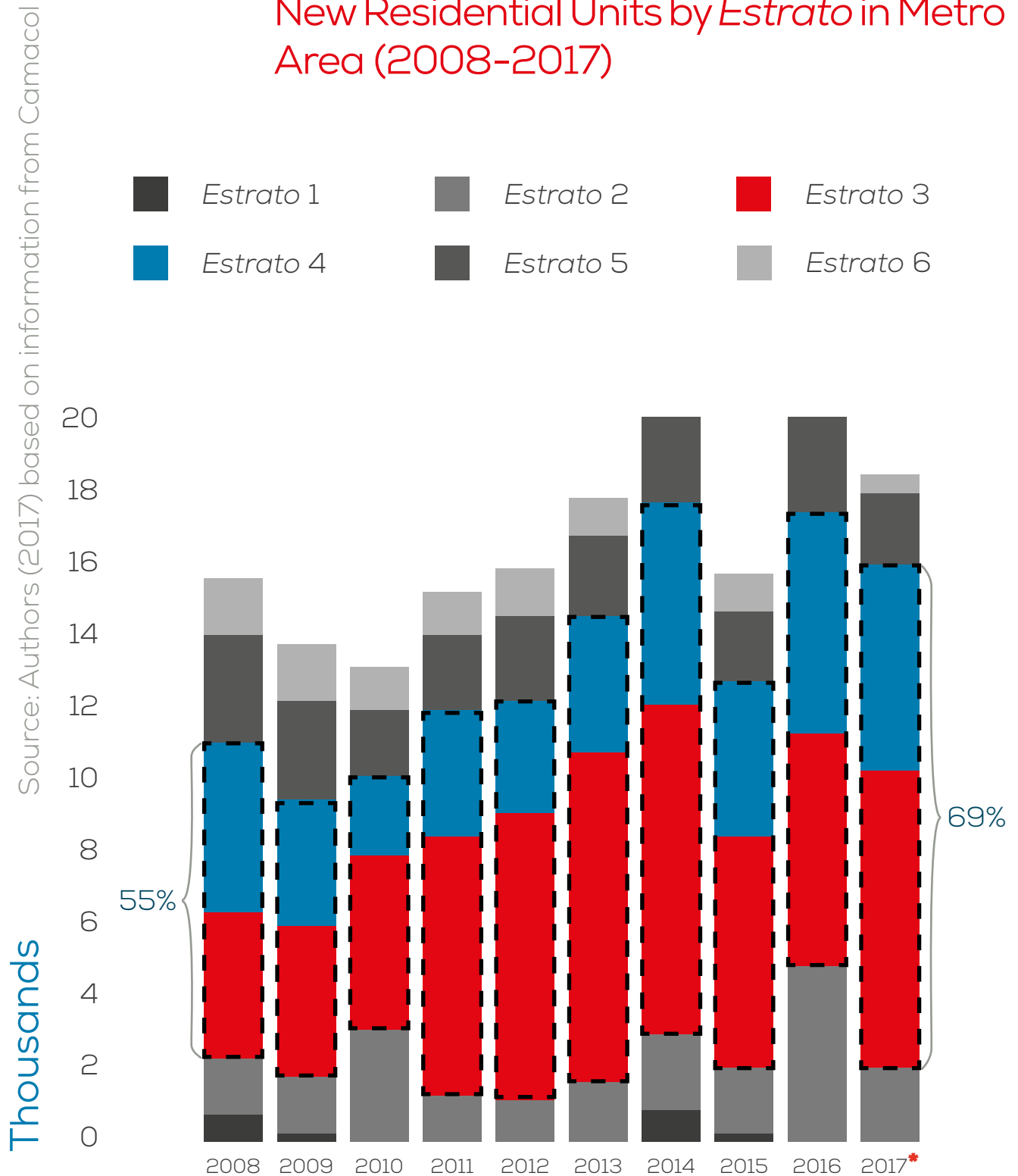
Source: Authors (2017) based on information from Camacol



12. Throughout the analysis, metro area* and Medellin* will occasionally appear. The asterisk on both indicates that they both represent the area that circumscribes an internal geography relevant to the study. Metro area* therefore constitutes all municipalities in the Metropolitan Area of the Valle de Aburrá except Medellin, and Medellin* is all of Medellin except the **study area**. These modified categories were created to add an additional layer to the analysis, which was to compare a geography to its surrounding environment without having the trends of the specified geography skew the one that surrounds it.

Figure 9.

New Residential Units by *Estrato* in Metro Area (2008-2017)

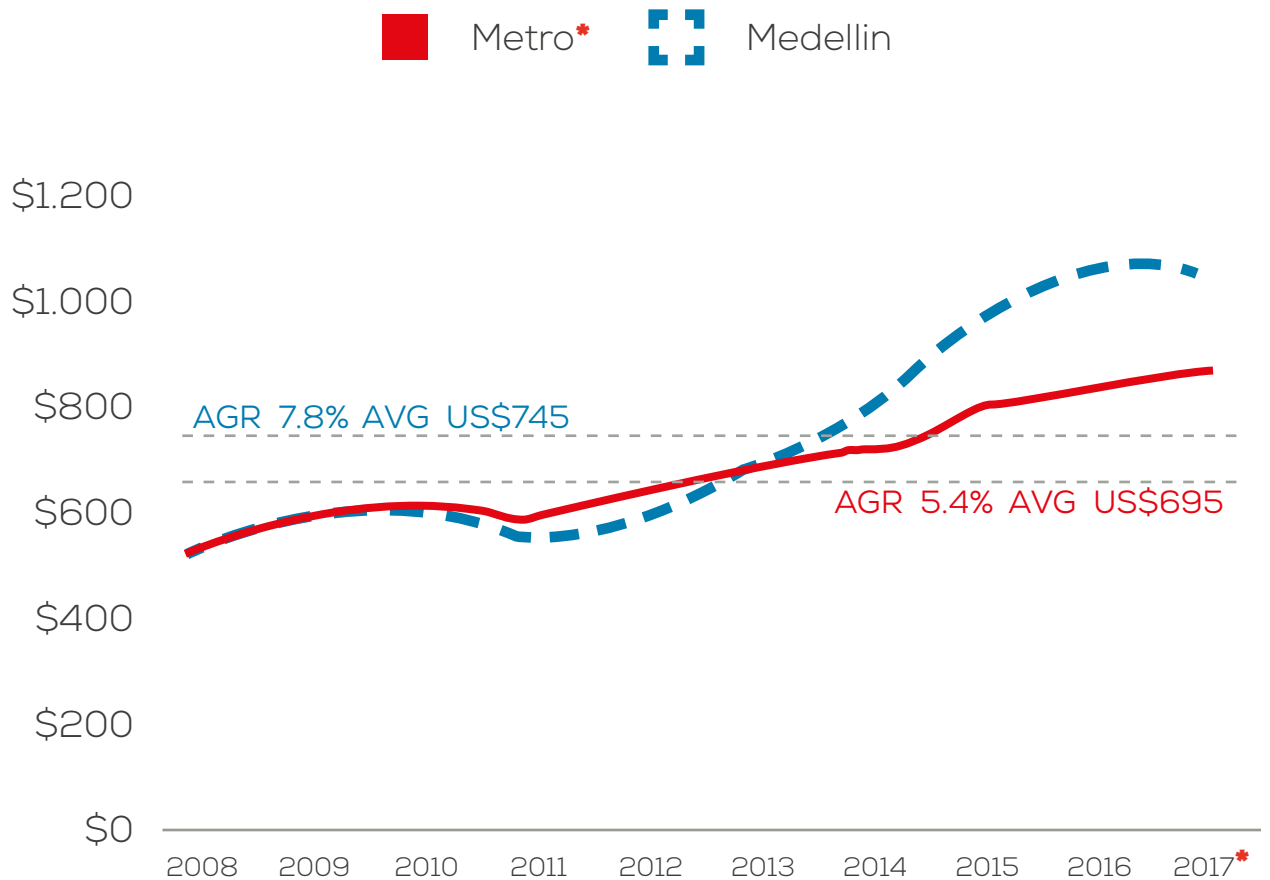


Unsurprisingly, the price of new residential units also reflects the higher demand for properties within the city as shown in [Figure 10](#). In 2017, the average price per square meter of a residential unit in the city was US\$695, 7.3% higher than the average price of a residential unit outside of Medellín, which was US\$640. While prices per square meter in Medellín increased at an annual growth rate of 7.8% between 2008 and 2017, the annual growth rate for the same period outside Medellín was significantly less, at only 5.4%. Much of this divergence occurred between 2014 and 2017, coinciding with the introduction of the POT in 2014, which imposed more restrictive zoning compared to other adjacent municipalities.

The residential market trends for the study area point to the potential for the area to accommodate significant residential growth. As shown in [Figure 11](#), while on average 550 units were delivered annually between 2008 and 2017, the number nearly doubled to 900 units between 2015 and 2017. This trend is also reflected in the study area's capture of total units added in the metro area –the study area captured 3.3% of all new residential units between 2008 and 2017 in the metro area, and this increased to a 4.9% capture rate between 2015 and 2017–. It is important to highlight that the POT projected more housing units than the number projected by the market for the entire city. Furthermore, the study area includes three re-development *Planes Parciales* which will support high-density urbanization.

Figure 10.

Average Price per SQ M of Residential Deliveries*¹³



Source: Authors (2017) based on information from Camacol

13. Note: AGR represents Annual Growth Rate (2008-2017*)

* Currency in this section is based on 2017 prices and exchange rates. The exchange rate used in this document was the average annual exchange rate for 2017: US\$1.00 = \$2,951.15 COL. *Banco de la República*.^[1] For presentation purposes the figures may appear rounded off.

- https://totoro.banrep.gov.co/analytics/saw.dll?Go&Action=prompt&lang=en&NQUser=public&NQPassword=public123&path=%2Fshared%2FStatistics_T%2F1.%20Colombian%20Peso%2F1.3%20Spliced%20Historical%20Market%20Exchange%20Rate%20Data%20Series%2F1.3.2.EXR_Annual%20Average%20Data%20Series&Options=rdf

Retail Market Overview

While the residential market in the study area has grown and prospered in the last decade, commercial uses have not followed suit. The study area only experienced 20,000 SQ M of retail added, negligible office space, and only 35 hotel rooms. While transit investment will probably lead to additional commercial development, this will likely concentrate only in certain parts of the study area where the tram intersects with Metro Line B.

Medellin and the metro area have seen nearly 1.5 million SQ M of retail space added since 2008, as demonstrated in [Figure 12](#) and detailed in [Appendix 1: Historical Real Estate Deliveries by Geography and Use](#). Municipalities adjacent to Medellin have overwhelmingly captured most of the retail SQ M added, with nearly two-thirds of all retail SQ M delivered since 2008 located outside Medellin. This distribution largely mirrors the shift of residential units added from Medellin to the rest of the metro area and is occurring for similar reasons –scarcity of development parcels in the city and their relative unaffordability–, making it difficult for businesses to justify the high rents and property prices in Medellin while significantly more affordable property is available just outside the city limits.

Figure 11.

New Residential Units by *Estrato* within Study Area (2008-2017)

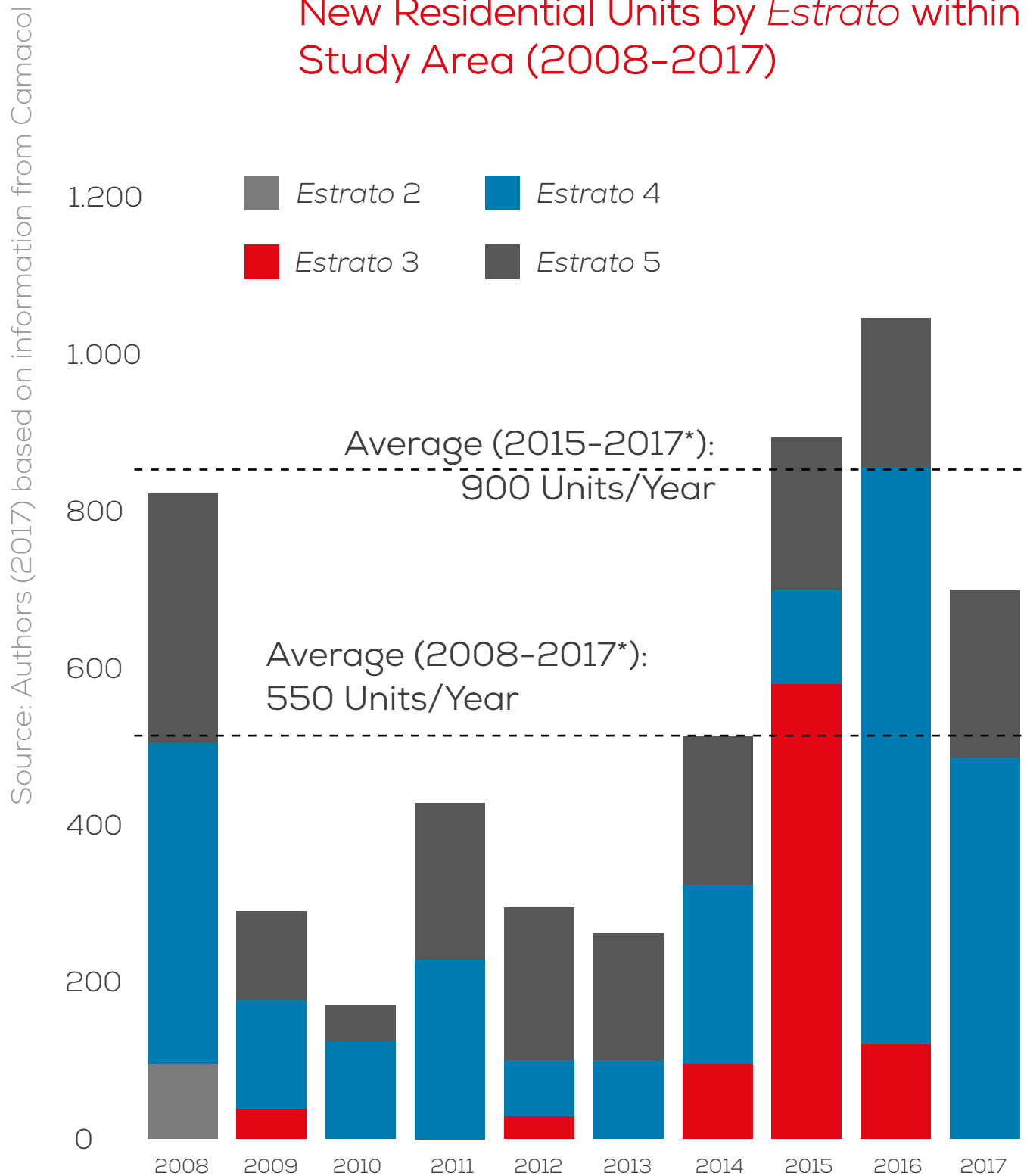
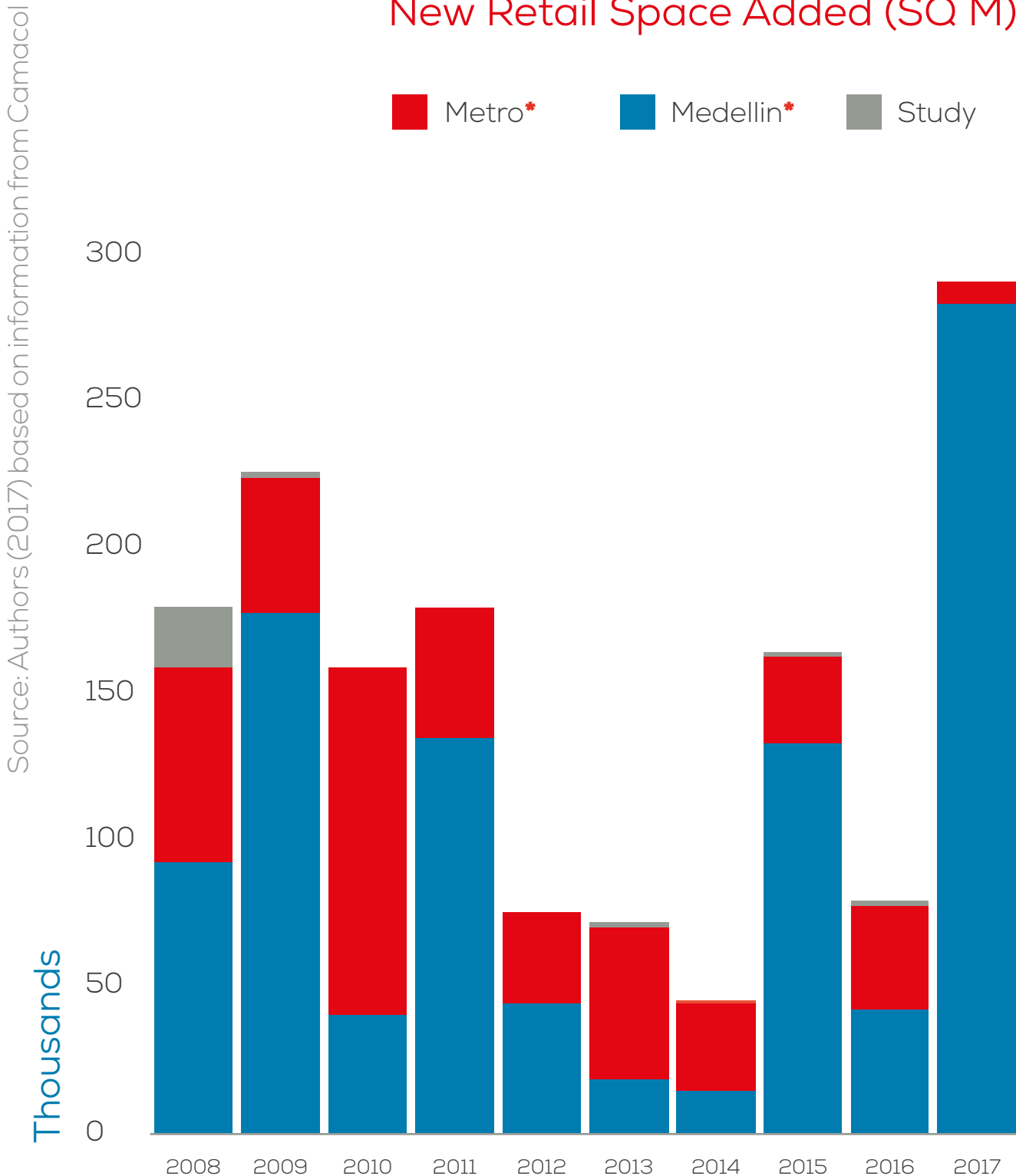


Figure 12.

New Retail Space Added (SQ M)

Metro* Medellín* Study



While only 20,000 SQ M of retail has been added in the study area since 2008, compared to the 1.5 million SQ M in the total metro area, there have been several larger retail deliveries (by SQ M) just outside the study area that serve its current residents, as shown in [Figure 13](#). This observation was confirmed by developers who noted that the existing retail facilities are enough to serve the area's current and future residents.

Office Market Overview

Despite robust office development of close to 570,000 SQ M in the metro area since 2008, there have essentially been no SQ M of office added in the study area in the last nine years. However, contrary to residential and retail delivery trends, over the past decade 76% of annual SQ M of office added were in the city, as detailed in [Appendix 1: Historical Real Estate Deliveries by Geography and Use](#), demonstrating that the city continues to be a prime location for white collar employment.

Access to highways and public transportation is a significant factor for the desirability of office space. As shown in [Figure 14](#), between 2008 and 2017, new office supply largely accumulated around the central transit lines in the city and in the more affluent area of El Poblado. While some municipalities in the Metropolitan Area can be accessed via the same trains and highways that serve Medellin, others remain relatively inaccessible, and are therefore limited in their ability to attract new office developments.

Hotel Market Overview

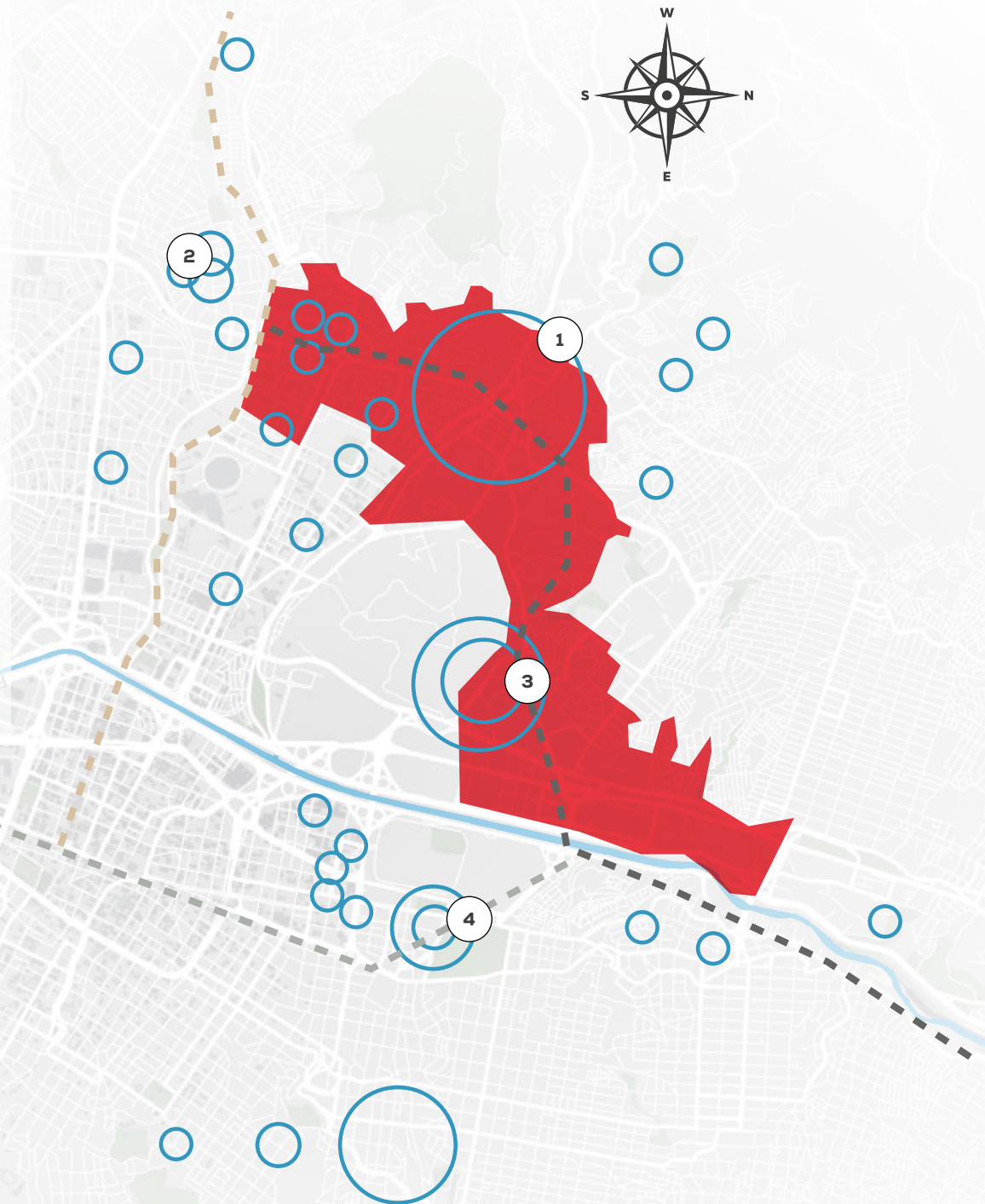
Finally, deliveries of hotel room, which have similarly been extremely scarce in the study area (only 35 rooms were added between 2008 and 2017), largely mirror deliveries of office SQ M as shown in [Figure 15](#), as most SQ M of office added are in well-established business hubs in close proximity to highways and transportation.

Figure 13.

Examples of Large-scale New Retail Establishments in the Study Area (2008-2017)

- Study Area
- - - Proposed Tram
- Medellin River
- - - Line B
- - - Line A
- Retail Delivery

- Almacénes Éxito S.A**
18,900 SQ M, 2008,
N/A COP PSF
- Consumo de Floresta**
1,500 SQ M, 2010,
N/A COP PSF
- Florida Parque Comercial**
14,000 SQ M, 2013,
\$8,000 COP PSF
- Bosque Plaza Centro**
6,300 SQ M, 2014,
\$8,900 COP PSF



Source: Authors (2017) based on information from Camacol

Figure 14.

Office Deliveries in Medellin
by SQ M (2008-2017)

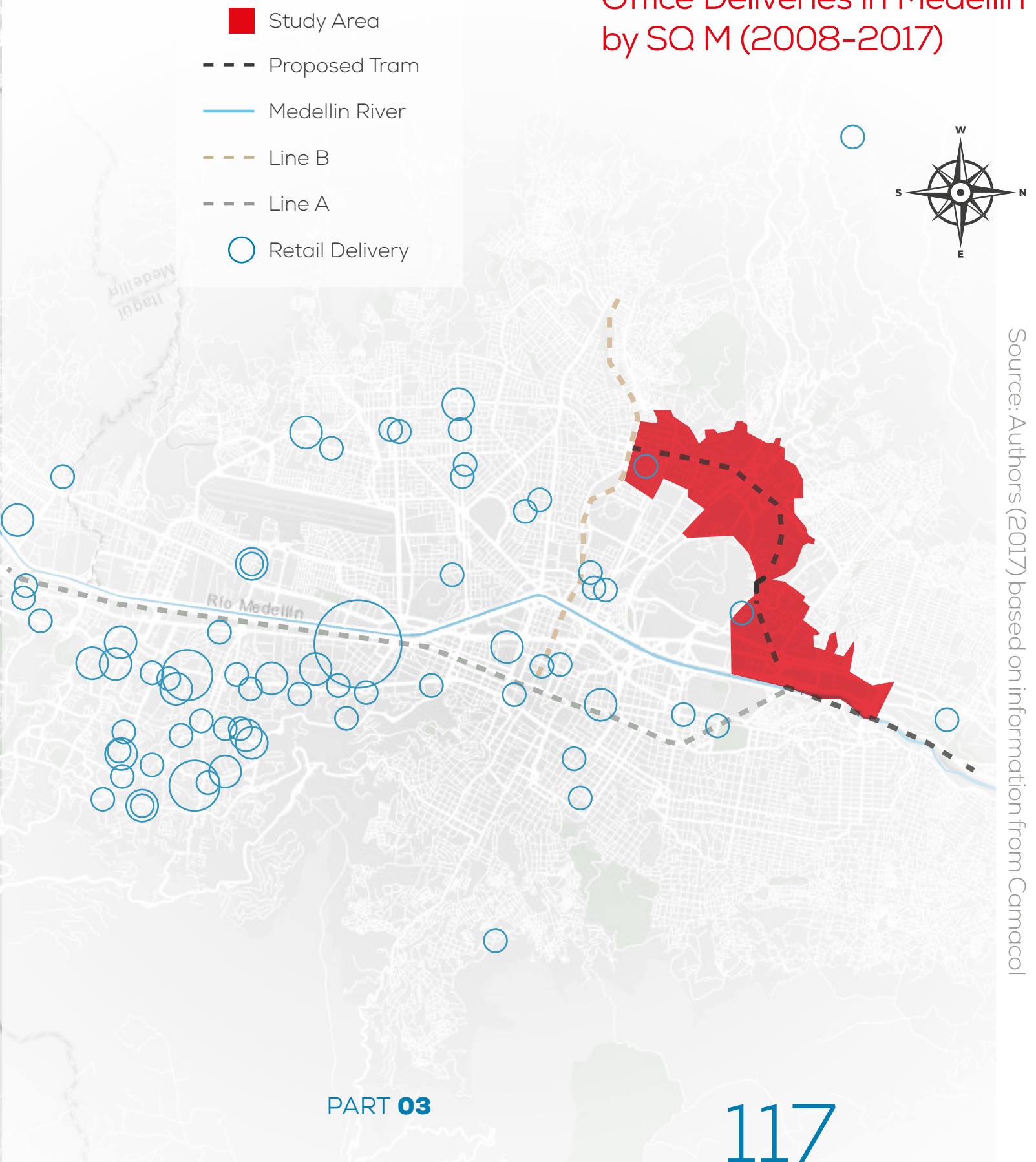
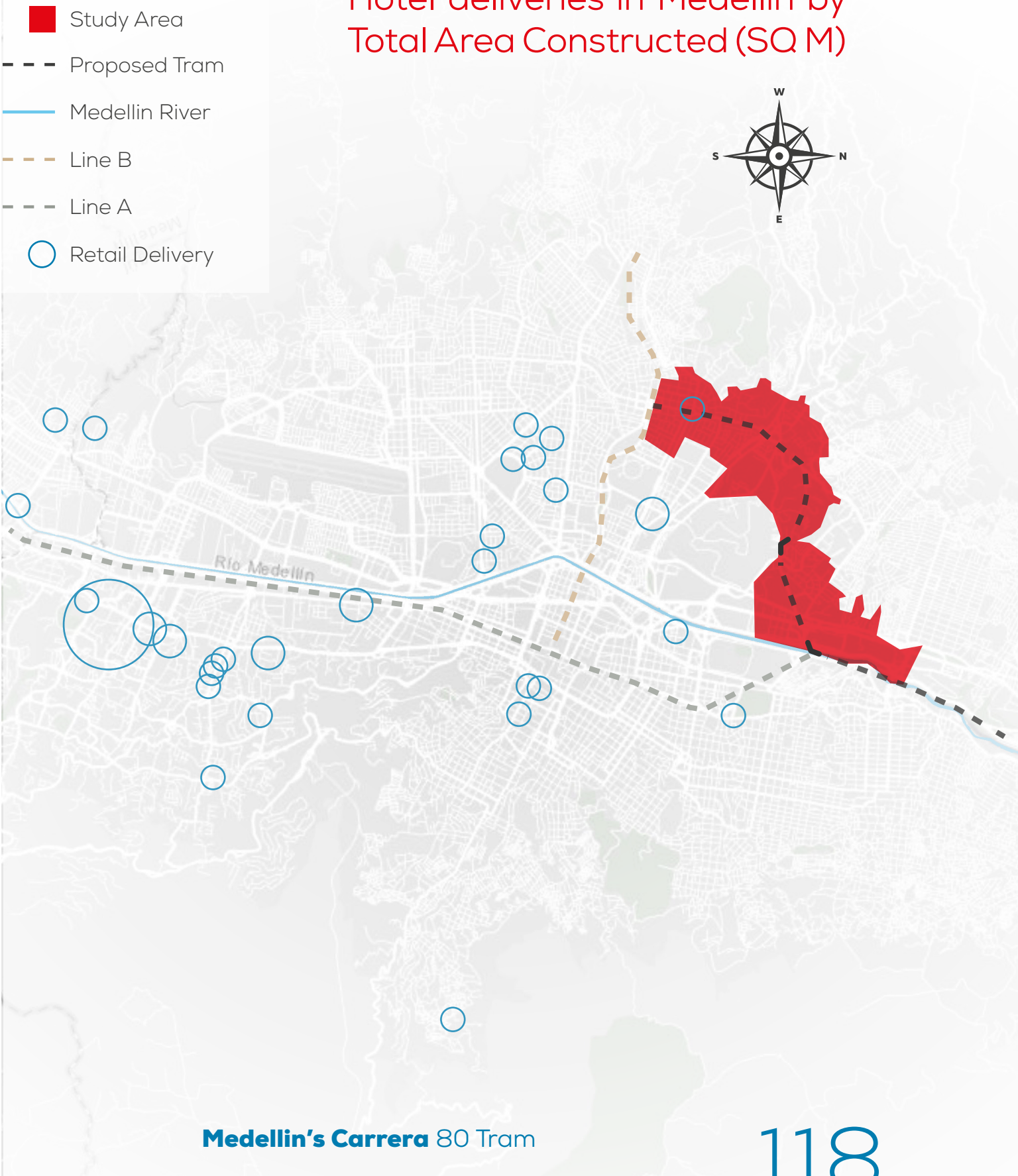


Figure 15.

Hotel deliveries in Medellin by
Total Area Constructed (SQ M)



Source: Authors (2017) based on information from Camacol

Market Overview Conclusions

Based on conversations with developers and the data analysis presented in the previous paragraphs, the points below present key findings for both residential and commercial markets in Medellin and the study area.

Residential:

- The residential market in the metro area is robust, and has seen close to 167,000 new residential units added since 2008;
- However, there have been drastic shifts in the distribution of new residential units in the metro area, as residential units added declined from 82% in 2008 to only 29% in 2017;
- The study area is growing as a residential area and has seen the average number of annual residential units added essentially double in the last three years, predominantly in *Estratos 4 and 5*.

Commercial:

- While the study area only captured 1.3% of the 1.5 million SQ M of the deliveries of retail space since 2008 in the metro area, it is still well-served by existing retail within the study area and new retail malls located around the area;
- The study area has seen negligible office and hotel development in the last 10 years, as these deliveries have been centered around established commercial hubs in the south of the city, around the more affluent area of *El Poblado*;
- The study area could potentially see an increase in SQ M of office added in several years should there be a transit investment along the corridor, particularly around the intersection of the tram with Metro Line B at *La Floresta*.

Projections for New Development

To determine projections for new real estate development slated to occur between 2020 and 2044 –25 years, which is the length of a typical TIF term–, several important factors had to be considered. Demographic analyses of historic and projected population growth served as a starting point based on which to determine the projection methodology. As shown in [Figure 7](#), the population in the Metropolitan Area has grown at an annual growth rate of 0.9% from 2010 to 2016, which is projected to increase to 1.1% between 2016 and 2020. However, it is also notable that the number of households in the Metropolitan Area has increased at annual growth rate of 2% from 2010 to 2020; double the rate of population growth.

Historical and projected household growth from 2010 to 2019 were used to project future household growth from 2020 to 2044. The first step here, was identifying a trendline of growth from 2010 to 2019, and apply this pattern of logistic growth to find future residential deliveries in the Metropolitan Area (see trendline in Households and New Housing Units columns in [Table 25 of Appendix 2: Population, Household, and Housing Demand Projections](#)).

Subsequently, the average study area capture rate of all residential deliveries in the Metropolitan Area between 2015 and 2017, was identified as 4.9% (reflected in the Metro Area Capture column under the Study Area section of [Table 25, Appendix 2: Population, Household, and Housing Demand Projections](#)). The average for this time period was used given the significant shift in number of deliveries in the study area between 2008 and 2017, and 2015 and 2017, shown in [Figure 11](#), and evidenced by their respective average annual residential deliveries –550 units and 900 units–, in an effort to inform projections with data that reflects existing conditions.

Following this, previous tram investments were examined to assess their impact on new residential development. Given the proximity of the Ayacucho

tram, announced in 2011, to the proposed Carrera 80 tram, the study assessed deliveries of residential units within 500m of the tram before and after its announcement, and found a 61% increase when comparing the capture of Metropolitan Area demand.

Assuming that the Carrera 80 study area would be similarly impacted by such an investment, the historical Metropolitan Area capture rate of development deliveries was modified from 4.9% to 7.9%, as shown in the Metro Area Capture column under the Study Area with Investment section of [Table 25, Appendix 2: Population, Household, and Housing Demand Projections](#). Simultaneously, as shown in [Figure 13](#), commercial deliveries have largely located around the intersection on Metro Lines A and B with the Ayacucho tram, thereby demonstrating the dependence on reliable and accessible public transit for office space and other large commercial projects to be delivered.

In addition to reviewing the Ayacucho tram, a literature review was undertaken focusing on studies that have measured the impacts of tram investments on new real estate development and values in surrounding areas.

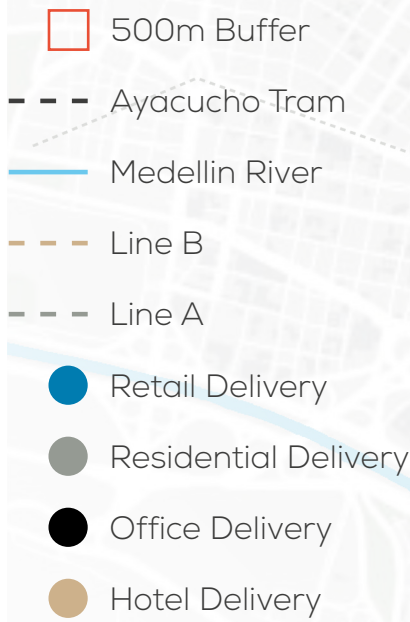
Past studies confirmed that “with few exceptions, [trams and comparable fixed guideway systems] facilitated more significant impacts in terms of value and volume of new real estate development” than other forms of transit investment.¹⁴ A 2005 study commissioned by Portland Streetcar Inc. found that the blocks adjacent to the tram captured 55% of new development in Downtown Portland, compared to only 19% prior to the announcement of the line in 1997. In corridors where market demand is weak or untested, tram investments can be a powerful catalyst for redevelopment. For instance, the Brookings Institution noted that prior to the tram’s opening, South Lake Union was perceived as too distant from Downtown and therefore constituted an untested market for development. The planned relocation of Amazon was a major driver of tram-adjacent development as it provided an employment anchor in the new district and created significant spillover demand for office and residential use.

14. Columbia Pike Transit Initiative: Comparative Return on Investment Study; HR&A, 2014.

Figure 16.



Deliveries by use with 500 meters of the Ayacucho Tram



Another study quantified the average impact of tram investments in terms of property value premiums above the base assessed values and found that a tram investment would catalyze between a 5% to 8% increase in both residential and commercial values.¹⁵

Finally, to determine projected new commercial development added between 2020 and 2044, the Ayacucho tram and historic study area commercial deliveries were re-examined to assess and anticipate projected deliveries, even though there had been few to no commercial deliveries in the study area from 2008 to 2017 (see [Appendix 1: Historical Real Estate Deliveries by Geography and Use](#)).

Therefore, as shown in [Table 29, Appendix 3: Projections for New Development – Base Scenario](#), retail deliveries were projected using a ratio of historic retail SQ M added to residential SQ M in the study area from 2008 to 2017. [Figure 17](#) demonstrates that a few years after the Ayacucho tram began operating, the area started seeing office development, particularly at the intersection with Metro Line A. This same logic was applied to the Carrera 80 tram, assuming that the area where this intersects with Metro Line B at Floresta, might begin to see office development in the mid-term. [Table 29, Appendix 3: Projections for New Development – Base Scenario](#), shows that between 2030 and 2044, that section of the study area could see up to 60,000 SQ M of new office space, corresponding to roughly 4,000 SQ M annually, the average size of new office buildings in the city.

15. West Broadway Transit Study: Economic Development of Transit Alternatives; HR&A, 2015.

Figure 17.

New Office Development within 500 meters of the Ayacucho Tram

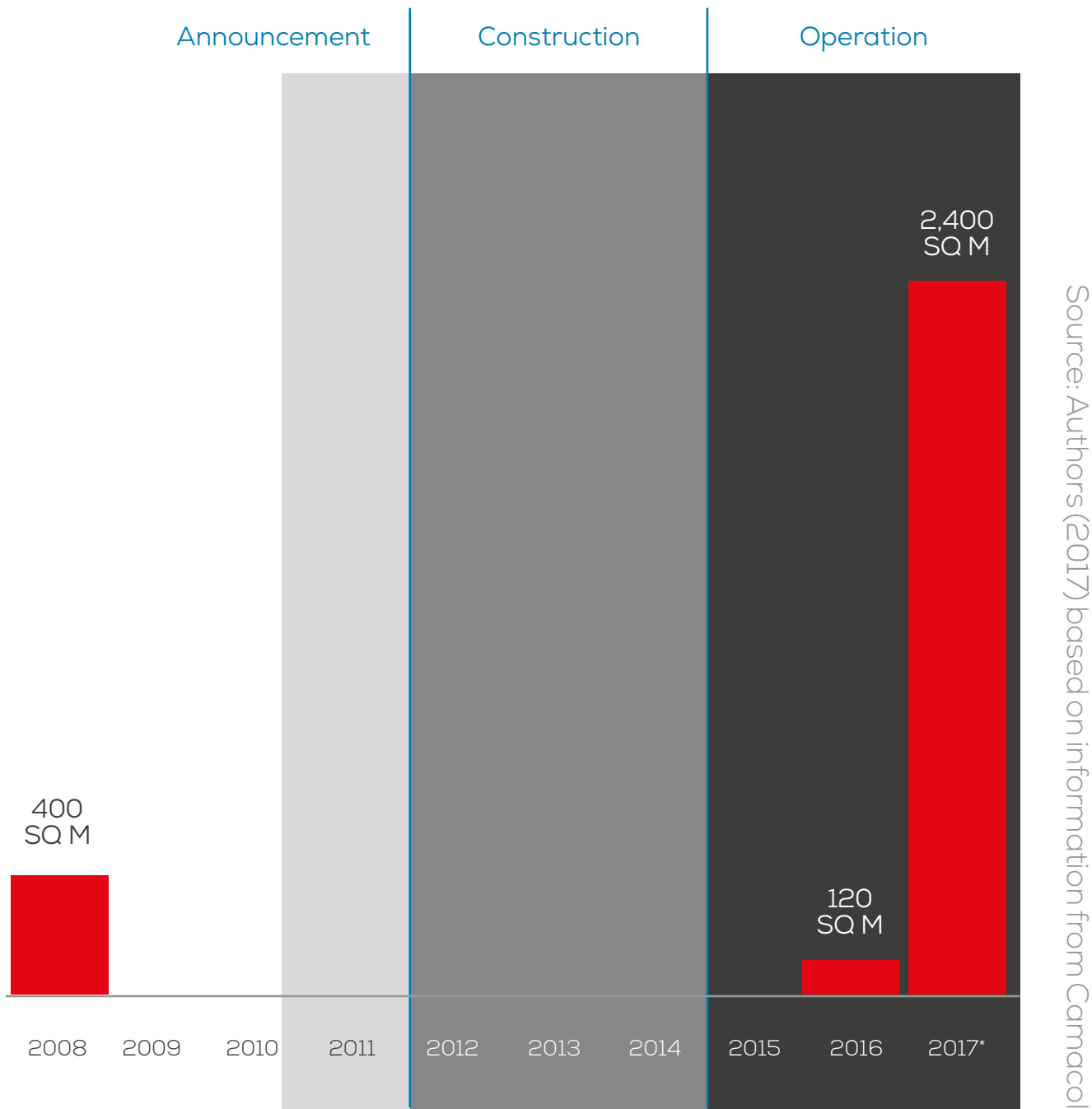


Table 24, Appendix 1: Historical Real Estate Deliveries by Geography and Use, shows that hotel development in the study area in the last ten years has been negligible, so the study assumed that new rooms would only be added in the study area after a critical mass of at least 32,000 SQ M of office space had been built around Floresta, which would occur in 2037. Based on conversations with developers and an assessment of the type of hotel built recently in the south of the city, it is projected that this new hotel could have around 150 rooms and be positioned as midscale or upper midscale.

The results from the analysis and methodology described above for projecting new real estate development in the study area between 2020 and 2044 is summarized in **Table 17**.

Conversations with local real estate developers supported these new real estate demand projections, indicating that the study area could easily see up to 1,500 new housing units per year following a tram investment, accompanied by a moderate amount of ancillary retail, and a node of office development around Floresta in the mid-term. However, they mentioned several factors that could limit the study area's capacity to accommodate the projected demand. They cited, for instance, zoning and institutional considerations, including the need for an Urban Operator (*Operador Urbano*) that can assemble land for cost-effective and timely dense multifamily development.

Table 17.

Base Scenario Projections for New Development (2020-2044)

Base Scenario	
Residential (Units)	
<i>Estrato 3</i>	14,300
<i>Estrato 4</i>	30,200
<i>Estrato 5</i>	13,700
Total Residential (Units)	58,200
Total Residential (SQ M)	
4,120,000	
Office (SQ M)	60,000
Retail (SQ M)	140,000
Hotel (Keys)	150
Total (SQ M)	4,325,000

The evidence of potential limiting factors to accommodate the projected real estate demand, led to the creation of a conservative scenario, under the three following assumptions:

Zoning Constrains:

1. The study area can currently accommodate a maximum of 54,000 housing units, including the existing stock, and a density bonus of 3,250 units. However, only 42,000 of these units are located in areas considered by Metro de Medellín to have high potential for redevelopment. The criteria for having high redevelopment potential determined by Metro de Medellín includes parcels that gather the following conditions:

- Are out of the API ¹⁶ parcels and not public equipment;
- Are not declared municipal or national assets of cultural interest;
- Contain buildings of 5 or less stories;
- Are not in the process of urban legalization;
- Are not service areas/stations;
- Do not have licenses for construction after December 2012, nor do they have *Action Units or Management Units* developed on them;
- Are not part of the existing recreational space network;

16. Reserved áreas that are important for infrastructure or environmental purposes (*Áreas para la preservación de infraestructuras y elementos del sistema estructurante*).

- Are not a public space planned in accordance with *Acuerdo 48 de 2014*;
- Are not affected by risk that cannot be mitigated or *retiro de quebrada*¹⁷ and/or have technology risk of 40% or less.

While there is certainly a possibility that some of those with low potential for redevelopment may be converted over the course of the TIF term, it is assumed that the study area could only accommodate 42,000 housing units in total, with new units replacing existing housing stock progressively.

Land Ownership:

2. Data assessment and conversations with market experts revealed that property ownership in the study area is highly fragmented, such that the average parcel area is a mere 500 SQ M. As a result, land assemblage in the study area for large residential development is, and will presumably be, a slow process unless an Urban Operator is appointed. To account for potential complexities in land assemblage if no policy adjustments are made, it is assumed that the pace of new real estate development is 20% slower than that projected in the base scenario.

Market Cycles:

3. The period between 2008 and 2017 –the focus of the historical real estate assessment– was a time of stable socioeconomic growth in Colombia and Medellin. However, potential economic and real estate cycles in the future could moderate household formation and population projections. Thus, it is assumed that real estate prices would grow at 75% of the historic 5.8% annual growth rate to account for potential periods of less stable growth during the 2020-2044 TIF term.

¹⁷. Retiro de quebrada is a mandatory buffer that must be naturally conserved on both sides of every water stream in the city.

The introduction of these adjustments leads to essentially slower and less valuable real estate development and to setting a limit on the total amount of new development in the study area that would be met in 2042, two years before the end of the TIF term. The projections are shown in detail in [Appendix 4: Projections for New Development – Conservative Scenario](#).

Total Projections for New Development (2020-2044)

	Base Scenario	Conservative Scenario
Residential (Units)		
<i>Estrato 3</i>	14,300	10,000
<i>Estrato 4</i>	30,200	22,000
<i>Estrato 5</i>	13,700	10,000
Total Residential (Units)	58,200	42,000
	Base Scenario	Conservative Scenario
Total Residential (SQ M)	4,120,000	2,960,000
Office (SQ M)	60,000	48,000
Retail (SQ M)	140,000	110,000
Hotel (Keys)	150	150
Total (SQ M)	4,325,000	3,125,000

Source: Calculations made by Authors (2017)

Table 18 compares the new real estate development projected between 2020 and 2044 under the base scenario and the conservative scenario. The following sections of this document use the new real estate development projections in the conservative scenario to project the property tax increment derived from the tram investment.

Tax Increment Projections

As mentioned in Part I, the basic principle behind TIF is that the benefits from public investment will, in a given geography, translate into an increase in the property taxes collected in that particular area, enabling the use of this increase to fund part of the investment.

In the case of public investments in transportation, such as the Carrera 80 tram, the property tax increment is normally driven by two sources:

Increment from Existing Properties:

1. The investment will generate benefits for local residents who will have unprecedented access to transportation. It normally leads to an increment in the market value of those properties (both land and building/equipment), which will be more attractive to users, owners and developers. Under an efficient property tax regime, it is expected that the market value increment will turn into an increase of the assessed values that are eventually used to determine property tax liability. It is important to note that the tax increment is expected as a result of the valorization of the properties and not as a result of an update of *Estratos*.

Increment from New Development:

- 2.** At the same time, better access to transportation will make the area more attractive for new real estate development, thereby accelerating the pace of construction of residential and commercial properties and causing the geography to capture a larger share of real estate demand.

To calculate the tax increment derived from the public investment in the Carrera 80 tram, the increment in the value of the existing properties and the property taxes from new development was projected in an area equivalent to a 500-meter buffer along the alignment (study area) for a 25-year period between 2020 and 2044.

To project property taxes, the *Estatuto Tributario* from the *Acuerdo 64 de 2012*,¹⁸ was consulted, which establishes the applicable tax rates for residential and commercial properties in Medellín based on the property assessed value and *Estrato* as described in [Appendix 7: Property Tax Tables](#). While the particular methodology used to determine the assessed values by the *Subsecretaría de Catastro* is not explained in *Acuerdo 64 de 2012*, local experts shared that they follow market values and that assessed values today are on average 80% of market values.¹⁹

18. This study was conducted prior to the newly approved *Estatuto Tributario* as of November 2017. It is assumed that the tax rates remained unchanged with minor updates to the assessed value brackets.

19. Meeting with *Secretaría de Control y Gestión Territorial*, October 2017.

Property Tax Increment from Existing Properties

To calculate the increment in property tax revenue from existing properties in the study area, the total parcels in it were identified to have an assessed value of US\$1.1 million as of 2017.²⁰ It was assumed that base assessed values would grow at 3.4% annually, in line with the annual increase in assessed values in the study area between 2016 and 2017 and below today's and the historical average inflation rate in Colombia that nears 4.9%. Then the base assessed values were adjusted throughout 2044 by decreasing them annually by 3.7%²¹ to account for the elimination or conversion of part of the current built stock into new development. The projections are represented in the first two columns of the **Table 33, Appendix 5: Property Tax Projections**.

Both the Ayacucho tram precedent and relevant literature that summarized the impacts of tram investment in real estate value premiums were examined in order to estimate the value premium on existing properties derived from a tram investment. It was found that in Ayacucho, the price of new residential development in the 500-meter area around the tram, in the three years following the announcement of the project, was 8.1% higher on average than in the three years before the announcement, after adjusting for natural growth in new residential development prices in those years.

20. Based on tax roll data for July 2017 provided by the *Subsecretaría de Catastro and the Secretaría de Planeación*.

21. This corresponds to one fourth of the percentage of 14.8% that the assessed value of projected annual new development represents on the total assessed value of the existing property.

The evidence from the Ayacucho project also aligned with findings from relevant literature reviews. For example, as part of HR&A's West Broadway work, it was found that among a number of tram investments in the US, annualized value premiums were up to 5%, and end-period value premiums were as high as 45% (see Appendix 6: Precedent Value Impacts of Tram Investment).²² Thus, in this study an 8.1% premium was applied to the adjusted assessed values in the study area given the similarities between the Carrera 80 project and the Ayacucho tram and the support that came from previous experiences, as illustrated in the third column of the Table 33, Appendix 5: Property Tax Projections.

Finally, a tax rate of 0.87%²³ was applied to the incremental assessed value (the difference between assessed value before and after the value premium) to calculate the property tax liability derived from the value premium on existing properties and applied a reduction of 15%²⁴ as a contingency to account for the potential impacts of property tax delinquency.

The resulting increment from value premium on existing properties following these operations between 2020 and 2044 was US\$2.2 million in nominal terms and US\$1.7 million in present value, using a discount rate of 5%, which is close to the average historical inflation. These results are illustrated in the third column of the Table 36, Appendix 5: Property Tax Projections.

22. West Broadway Transit Study: Economic Development of Transit Alternatives; HR&A, 2015.

23. Corresponds to the tax rate in the *ACUERDO 64 DE 2012 ESTATUTO TRIBUTARIO* for a property with assessed value of \$113 million COP in *Estrato 3*, as this is considered the most characteristic property in the **study area** today based on the map of predominant *Estratos* and the current assessed values.

24. The property tax delinquency rate today in Medellín is not public, but according to the Economic and Sector Work of the IDB *Fortaleciendo el Acceso de los Gobiernos Subnacionales a Financiamiento de Capital en América Latina y el Caribe*, this could near 15% today. Considering the significant efforts by the *Secretaría de Gestión y Control Territorial* to improve further the cadaster system and avoid tax evasion, it was assumed the delinquency rate would decrease linearly from 15% today to 5% in 2044 for purposes of the modeling.

Property Tax Increment from New Development

To calculate the increment in property tax revenue from new development in the study area between 2020 and 2044, the study used the new real estate development projections in the conservative scenario, detailed in [Appendix 4: Projections for New Development – Conservative Scenario](#).

In order to determine the market value of the new development, city-level average sale prices in 2017 for residential and commercial properties were used and adjusted for price appreciation using the Metro-level 4.3%²⁵ annual growth rate per SQ M for new residential deliveries between 2008 and 2017.

For the purposes of modeling, market values were converted to assessed values using a 65% rate. This rate is lower than the 80% rate sourced informally in meetings with the *Secretaría de Gestión y Control Territorial* but built in contingency per the formation of the conservative scenario, detailed in the Projections for New Development section.

These assessed values were then inflated using the historic growth rate of 3.4% to project assessed values in the study area from 2020 to 2044, resulting in the assessed values in [Table 34, Appendix 5: Property Tax Projections](#).

Finally, the property tax revenue was calculated by applying the tax rates shown in [Appendix 7: Property Tax Tables](#) for each of the uses. A delinquency rate that starts at 15% in 2020 and is reduced linearly to 5% in 2044 was subtracted from the property tax liability rate to account for the significant efforts the city was making to maximize tax collection.

25. In the Conservative Scenario the observed historic rate of 5.8% was reduced by 25% to account for any future recessions and contractions in real estate demand.

Figure 18.

Annual Property Tax per SQ M of
New Development (2017 USD\$)

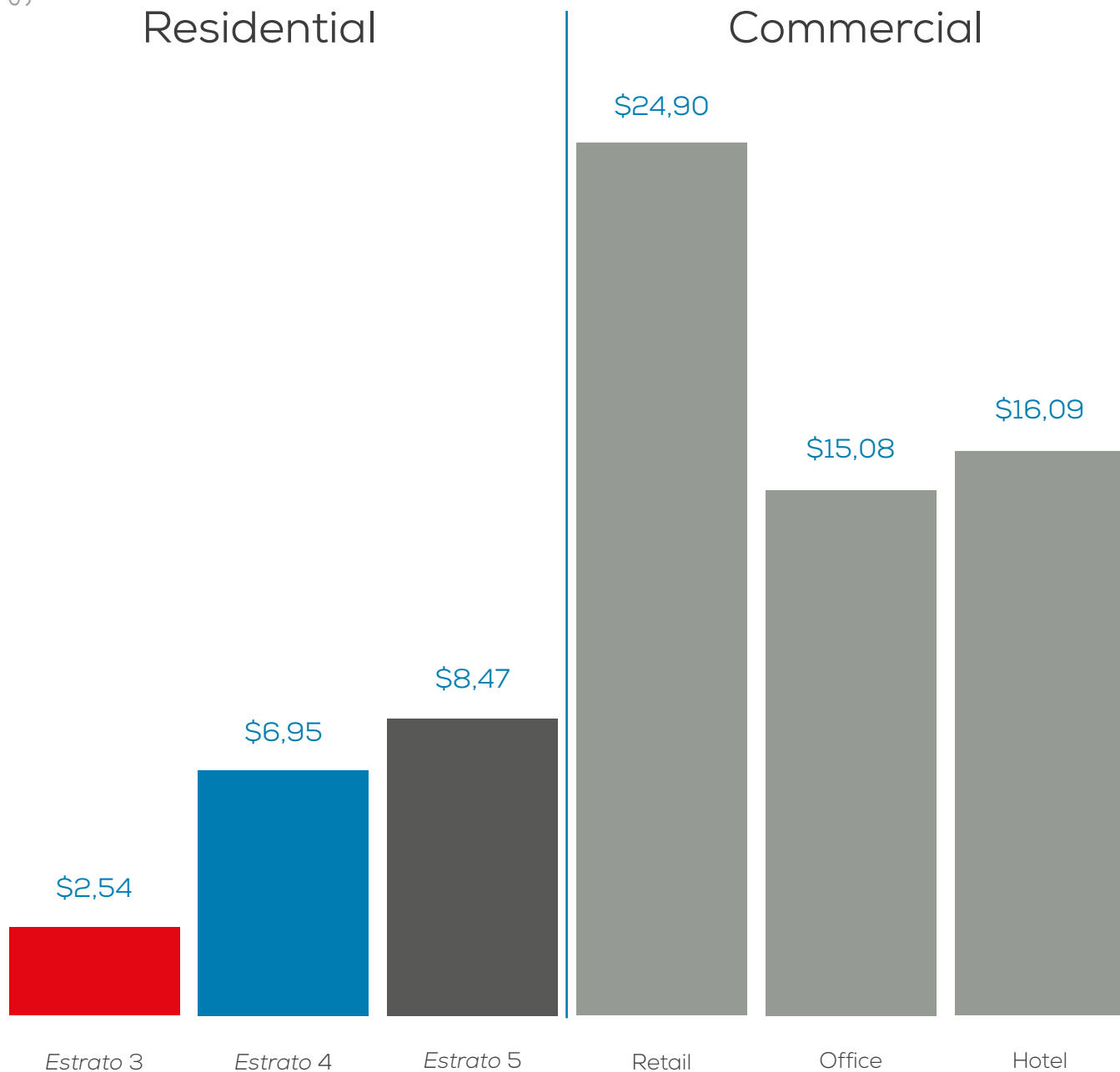


Figure 18 shows the resulting annual property tax liability per SQ M of new development expressed in 2017\$ after following the operations described in this section. Property taxes for residential property would range from US\$2.34 per SQ M for *Estrato* 3 up to US\$7.81 per SQ M for *Estrato* 5. Property tax liability for commercial development would range between US\$13.90 per SQ M for office and US\$22.96 per SQ M for retail.

As shown (in Million COP) in the third column of the Table 36, Appendix 5: Property Tax Projections, the resulting increment in property tax revenue from new development between 2020 and 2044 would be US\$571 million in nominal terms and US\$237 million in present value, using a hypothetical discount rate of 5% of close to average inflation.

Total Property Tax Increment

Between 2020 and 2044, the *Alcaldía* would receive a total of approximately \$ 571 million USD in incremental property tax revenue in the study area following investment in the Carrera 80 tram. Approximately US\$569 million, or 99% of the total, would come from new developments and approximately US\$2.3 million would come from the value premium on existing properties. Figure 19 represents the annual cash flows from property tax revenue over the 25-year term.

Figure 19.

Total Property Tax Revenue

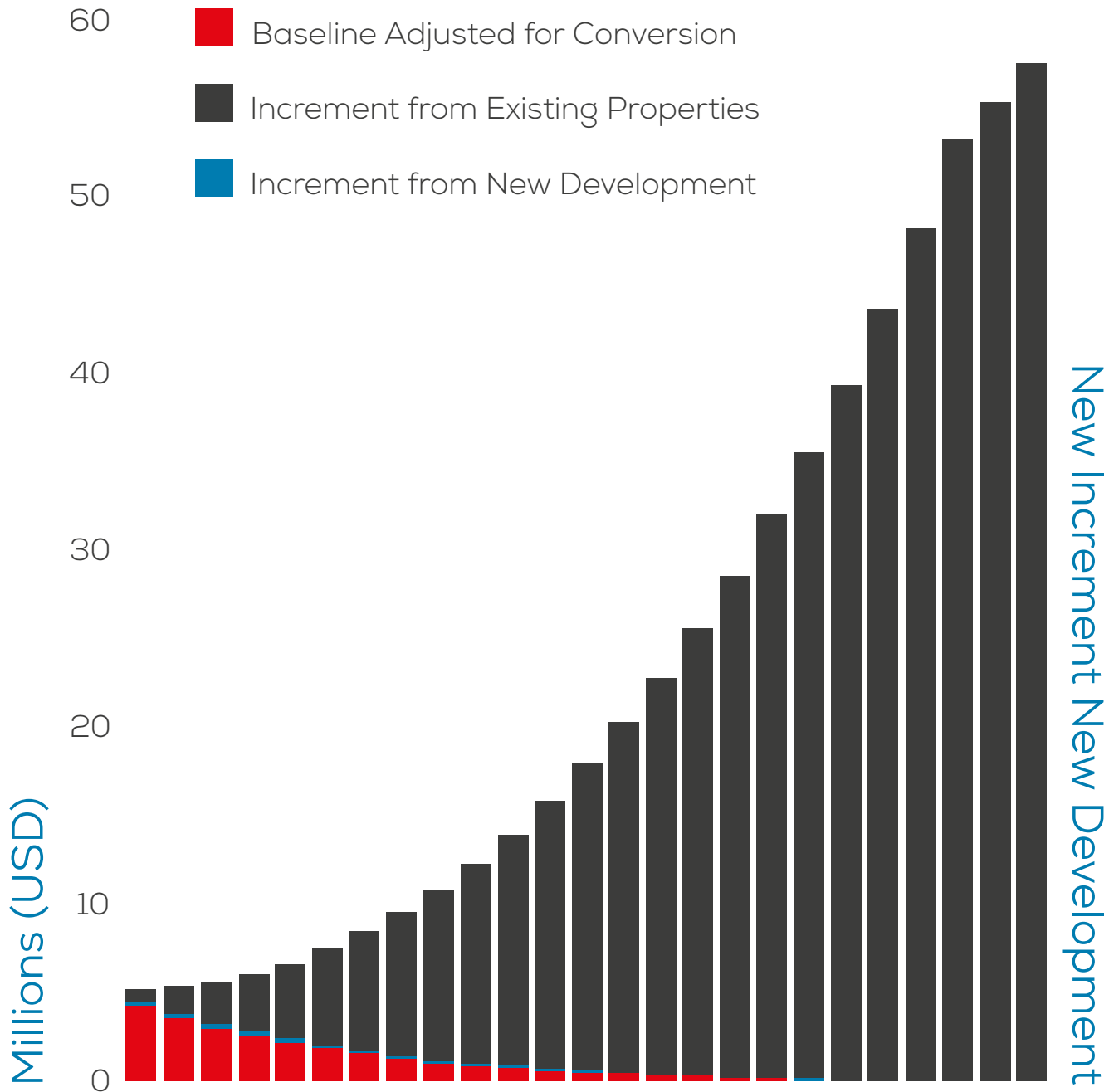


Table 19 shows the breakdown of property tax revenue by use. Property tax from new residential development, particularly in Estratos 4 and 5, represents US\$490 million, or 85% of the total increment. Retail is the second largest driver of property tax revenue, representing 11% of the total, while the premium on existing properties and the property taxes generated by the new hotel and office development make up the remainder 3% of the revenues.

Projected New Development Property
Tax Increment (2020-2044)

		Conservative Scenario
Increment in Base Assessed Value		\$2
Residential		
Estrato 3	10,000 units	\$32
Estrato 4	22,000 units	\$270
Estrato 5	10,000 units	\$188
Total Residential (Units)	42,000 units	\$490
Office (SQ M)	48,000 SQ M	\$14
Retail (SQ M)	110,000 SQ M	\$63
Hotel (Keys)	150 keys	\$2
Total (SQ M)	3,125,000 SQ M	US\$569 million

Table 19.
Source: Calculations made by Authors (2017)

Tax-Increment Financing Options

The substantial increment in property tax revenue of US\$571 million that the first phase of the Carrera 80 tram would generate over the first 25 years of operations, can be used to fund part of the US\$406 million in capital costs for the first phase of the project. While this study does not provide recommendations regarding the financing strategy that the *Alcaldía* should pursue, this section explores the borrowing capacity under different scenarios that try to emulate credit conditions available to large municipalities in Colombia for these types of capital projects.

Tax-Increment Financing in Medellin

While TIF has never been used in Colombia, national legislation provides the basic elements and tools that would enable cities to use it. Municipalities in Colombia have autonomy in property tax matters and can issue debt for capital projects. The Medellin POT from 2014 succinctly defines the TIF instrument in Article 536 (*Financiamiento por Incremento en la Recaudación Impositiva*, FIRI) as a tool to fund open space, public facilities, mobility, and social housing projects as part of urban development processes, through the issuance of bonds to be repaid by the tax revenue generated by the urban development projects being financed via this instrument.

This national and subnational context, coupled with a robust cadaster system that is georeferenced and updated regularly to closely match market values, makes Medellin a place where the use of TIF could be feasible in the near future.

Tax-Increment Financing Options

For illustrative purposes, the study modeled three simple borrowing scenarios based on standard debt instruments available for Colombian municipalities.²⁶ Both scenarios assumed that only incremental tax revenue (tax revenue above the base adjusted at 3.4% annually) could be used to repay the debt, and that one third of the incremental property tax revenue should be set aside to fund foreseeable increases in the cost of delivering public services in the area as a result of the increased number of households.

The three modeled scenarios, detailed in [table 20](#), varied only in the discount rate used to calculate the net present value of the net tax increment. These variable discount rates (3%, 6%, and 9%) reflect financing options with different credit conditions, from bond issuances placed in the capital markets by private parties to more advantageous multilateral development loans. Under these assumptions, the increment from property tax revenue could support between US\$88 and US\$224 million in debt, which would cover between 21% and 55% of the cost of the first phase of the tram.

26. None of these scenarios is meant to present a real financing situation, but to provide a preliminary overview of options and the financial implications of each one from a conceptual perspective.

Table 20.

Financing Scenarios by Discount Rate (USD)

Source: Calculations made by Authors (2017)

Scenario		
1	2	3
Discount Rate	Net Present Value	% of TramCovered
3.00%	\$224	55%
6.00%	\$135	33%
9.00%	\$88	21%

04

PART

CONCLUSIONS

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and Next Steps

Traditional sources of public resources and municipal revenue are not enough to fund the infrastructure needed to make Latin American and Caribbean cities more competitive. In developed countries, cities are increasingly using funds levied on private beneficiaries of property value created by public sector decisions (regulations or physical interventions) through a number of different mechanisms with a varied degree of complexity. Although some LAC cities have a tradition of using Land Value Capture mechanisms such as betterment levies, the region is still only in its early stage of applying more sophisticated mechanisms like TIF.²⁷

Although TIF can be used to finance different types of urban development projects, the evidence in US municipalities (where it is most widely used) shows that this mechanism should be used not only as a mere instrument to finance projects, but also to effectively address a market failure in which the private sector only participates in the project development process due to government intervention that makes participation appealing and profitable. As such, the municipality is creating value through its interventions, and, at the same time, providing public goods and services in areas with a deficit of such goods and services.

TIF requires the assessed values in a given district to reflect the increment created by the municipal interventions. For this to be possible, the municipal cadaster has to be modernized –especially in most LAC cities that do not have an updated cadaster. This process generates a significant revenue increase from property taxes. The widespread use of technologies like Geographical

27. No Latin American and Caribbean city has piloted a TIF program to date.

Information Systems can help to achieve this much-needed modernization, facilitating a more detailed analysis at a lower cost than at present, using the traditional methods.

In the second part of this document, based on a thorough review of the literature, the authors developed an Analytical Framework and Evaluation Matrix that identify the national and local macroeconomic, institutional, fiscal, regulatory and administrative conditions under which a TIF program would work for a specific city. This methodology is based on a step-by-step evaluation that helps reduce the risk of costly failures during the feasibility, negotiation, and planning phases of a project, proving to be a useful tool as a preliminary cross-sectional analysis to prepare these phases with valuable information in different dimensions.

As demonstrated with the initially selected case studies, TIF can feasibly be used in some LAC cities as long as they comply with conditions that are between the medium to high feasibility range for the criteria included in the Framework. TIF generates a virtuous circle that provides additional resources for further investments as a result of increases in revenue from real estate property and transfer taxes due to a higher value created by public sector interventions, importantly, without an increase in the tax rate.

With regard to the selected case study, the projections for new development show that the first phase of the Carrera 80 tram in Medellin could catalyze up to 4.3 million SQ M of new real estate development in the study area: the 500-meter buffer around the proposed alignment, between 2020 and 2044. These demand projections could be limited by existing zoning constraints, the fragmented land ownership patterns, and future real estate cycles and

economic recessions. Under a conservative scenario that accounts for those limitations, the study area would see 3.1 million SQ M of new real estate development, most of it, residential development in *Estratos 3 to 5* totaling 42,000 new housing units.

Under the conservative scenario, the study area would generate up to US\$571 million in incremental property tax revenue in the same 25-year period, from value premiums on existing properties and from new development. The great majority of this increment, US\$490 million, or roughly 85% of the total, would come from new residential development, particularly from units within *Estratos 4 and 5*.

Assuming a capital cost of US\$407 million for the first phase of the project, different illustrative financing options could cover between 21% and 55% of the cost of the first phase, which includes construction, but also land acquisitions for the entire corridor. To ensure that the study area is able to fully capture the benefits of the tram, the investment should be paired with policy decisions such as the appointment of an *Operador Urbano* that can assemble land for redevelopment efficiently, and the allowance of the density and flexibility in land uses needed to accommodate the projected real estate demand.

While the preliminary assessment indicates that the tax increment projected could cover a large portion of the capital costs of the first phase of the Carrera 80 tram, a full feasibility study should be applied in any case, in order

to (1) expand the assessment to the entire proposed corridor (phases one through three); (2) consider all possible sources of revenue contemplated in the *Plan de Ordenamiento Territorial (POT)* in addition to TIF, including transfer and sale of development rights, betterment levies, and exactions; and (3) address the physical realities and the zoning regulations of the area. This more detailed scope of work should also address important financing, governance, and policy issues that are essential to the successful implementation of the project.

The first component of the full feasibility study should consist of the expansion of the analysis conducted in this preliminary assessment to incorporate phases two and three of the proposed tram and to cover the entire 14-km alignment from Caribe station in the north to Aguacatala station in the south. The second component should be centered around the incorporation of other value capture tools that can be used in addition to TIF, including transfer and sale of development rights, betterment levies, and concessions, all of which are defined in the POT.

The previous two components can lay the groundwork for the analysis of the financing, governance, and policy aspects that are instrumental to the successful implementation of TIF and the other value capture tools. This component should include a comprehensive project risk assessment, the structuring of the financing instrument, legal analysis, and research on governance models, in order to conclude the feasibility study with a detailed and actionable roadmap for implementation.

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Historical Residential Units Delivered (2008-2017)

Year	Metropolitan Area	Medellin	Study Area
2008	15,590	12,837	833
2009	13,723	8,770	295
2010	13,127	10,559	173
2011	15,115	10,848	433
2012	15,826	10,146	300
2013	17,793	10,242	268
2014	20,973	10,077	521
2015	15,749	6,212	906
2016	20,742	7,931	1,063
2017	18,468	5,274	711
Sum (2008-2017)	167,106	91,138	5,503
Avg. (2008-2017)	16,711	9,290	550

Table 21. Source: Camacol

Table 22.

Historical Retail SQ M Delivered (2008-2017)

Year	Metropolitan Area	Medellin	Study Area
2008	180,085	86,138	18,917
2009	225,281	47,281	98
2010	160,669	119,362	0
2011	180,337	43,984	0
2012	77,896	32,193	0
2013	72,359	52,148	64
2014	44,982	29,006	46
2015	163,505	28,574	308
2016	79,776	35,095	200
2017	292,083	7,541	0
Sum (2008-2017)	1,476,973	481,322	19,633
Avg. (2008-2017)	147,697	48,132	1,963

Historical Office SQ M Delivered (2008-2017)

Source: Camacol

Table 23.

Year	Metropolitan Area	Medellin	Study Area
2008	70,832	58,672	0
2009	45,759	36,854	0
2010	58,587	58,139	0
2011	21,074	17,739	17
2012	62,071	40,785	0
2013	28,202	25,415	0
2014	59,694	47,808	0
2015	20,848	11,628	0
2016	129,845	84,455	0
2017	71,174	40,256	0
Sum (2008-2017)	568,086	421,751	17
Avg. (2008-2017)	56,809	42,175	2

Table 24.

Historical Hotel Rooms Delivered (2008-2017)

Year	Metropolitan Area	Medellin	Study Area
2008	3	3	0
2009	168	168	0
2010	593	593	35
2011	113	47	0
2012	340	256	0
2013	57	57	0
2014	202	77	0
2015	106	44	0
2016	303	303	0
2017	261	209	0
Sum (2008-2017)	2,146	3,903	35
Avg. (2008-2017)	215	176	4

Appendix 2: Population, Household, and Housing Demand Projections

Population, Household, and Housing Demand Projections by Geography (2008-2044)

Metro

Year	Population	Households	Household Growth	New Housing Units	New Housing Growth
2008	3,401,662	893,407		15,590	0.0%
2009	3,449,665	931,948	2.4%	13,723	-12.0%
2010	3,497,334	954,521	2.4%	13,127	-4.3%
2011	3,544,860	977,458	2.3%	15,115	15.1%
2012	3,592,063	1,000,245	2.3%	15,826	4.7%
2013	3,638,869	1,023,261	2.3%	17,793	12.4%
2014	3,685,382	1,046,419	2.2%	20,973	17.9%
2015	3,731,447	1,069,632	2.2%	15,749	-24.9%
2016	3,777,009	1,092,782	2.0%	20,742	31.7%
2017	3,821,890	1,114,778	1.9%	18,468	-11.0%
2018	3,866,165	1,136,509	1.9%	20,300	9.9%
2019	3,909,729	1,157,942	1.8%	20,953	3.2%

Metro

Year	Population	Households	Household Growth	New Housing Units	New Housing Growth
2020	3,952,494	1,179,074	1.8%	21,605	3.1%
2021	3,994,645	1,200,027	1.0%	22,258	3.0%
2022	4,098,639	1,211,582	1.7%	22,911	2.9%
2023	4,150,119	1,232,521	1.7%	23,563	2.8%
2024	4,201,599	1,253,460	1.7%	24,216	2.8%
2025	4,253,080	1,274,399	1.6%	24,869	2.7%
2026	4,304,560	1,295,339	1.6%	25,521	2.6%
2027	4,356,040	1,316,278	1.6%	26,174	2.6%
2028	4,407,520	1,337,217	1.6%	26,827	2.5%
2029	4,459,000	1,358,156	1.5%	27,479	2.4%
2030	4,510,480	1,379,096	1.5%	28,132	2.4%
2031	4,561,960	1,400,035	1.5%	28,784	2.3%
2032	4,613,441	1,420,974	1.5%	29,437	2.3%
2033	4,664,921	1,441,913	1.5%	30,090	2.2%
2034	4,716,401	1,462,852	1.4%	30,742	2.2%
2035	4,767,881	1,483,792	1.4%	31,395	2.1%
2036	4,819,361	1,504,731	1.4%	32,048	2.1%
2037	4,870,841	1,525,670	1.4%	32,700	2.0%
2038	4,922,321	1,546,609	1.4%	33,353	2.0%
2039	4,973,802	1,567,549	1.3%	34,006	2.0%
2040	5,025,282	1,588,488	1.3%	34,658	1.9%
2041	5,076,762	1,609,427	1.3%	35,311	1.9%
2042	5,128,242	1,630,366	1.3%	35,964	1.8%
2043	5,179,722	1,651,305	1.3%	36,616	1.8%
2044	5,231,202	1,672,245	1.3%	37,269	1.8%

Study Area

Study Area with Investment

New Housing Units	Metro Area Capture	New Housing Units	Metro Area Capture
833	5.3%		
295	2.1%		
173	1.3%		
433	2.9%		
300	1.9%		
268	1.5%		
521	2.5%		
906	5.8%		
1,063	5.1%		
711	3.8%		
997	4.9%	1,605	7.9%
1,029	4.9%	1,656	7.9%
1,061	4.9%	1,708	7.9%
1,093	4.9%	1,759	7.9%
1,125	4.9%	1,811	7.9%
1,157	4.9%	1,863	7.9%
1,189	4.9%	1,914	7.9%
1,221	4.9%	1,966	7.9%
1,253	4.9%	2,017	7.9%
1,285	4.9%	2,069	7.9%
1,317	4.9%	2,121	7.9%
1,349	4.9%	2,172	7.9%
1,381	4.9%	2,224	7.9%
1,413	4.9%	2,275	7.9%
1,445	4.9%	2,327	7.9%

Study Area

Study Area
with Investment

New Housing Units	Metro Area Capture	New Housing Units	Metro Area Capture
1,477	4.9%	2,379	7.9%
1,509	4.9%	2,430	7.9%
1,541	4.9%	2,482	7.9%
1,573	4.9%	2,533	7.9%
1,605	4.9%	2,585	7.9%
1,637	4.9%	2,637	7.9%
1,669	4.9%	2,688	7.9%
1,701	4.9%	2,740	7.9%
1,733	4.9%	2,791	7.9%
1,766	4.9%	2,843	7.9%
1,798	4.9%	2,894	7.9%
1,830	4.9%	2,946	7.9%

Appendix 3: Projections for
New Development – Base Scenario

Table 26.

Distribution of Projected New
Residential Development by Estratos

Source: Camacol

Year	Estrato		
	3	4	5
2020	26.6%	50.4%	23.0%
2021	26.6%	50.4%	23.0%
2022	26.6%	50.4%	23.0%
2023	26.6%	50.4%	23.0%
2024	26.6%	50.4%	23.0%
2025	26.6%	50.4%	23.0%
2026	26.6%	50.4%	23.0%
2027	26.6%	50.4%	23.0%
2028	26.6%	50.4%	23.0%
2029	26.6%	50.4%	23.0%
2030	25.0%	52.0%	23.0%
2031	25.0%	52.0%	23.0%
2032	25.0%	52.0%	23.0%
2033	25.0%	52.0%	23.0%
2034	25.0%	52.0%	23.0%
2035	25.0%	52.0%	23.0%
2036	25.0%	52.0%	23.0%
2037	25.0%	52.0%	23.0%
2038	25.0%	52.0%	23.0%
2039	25.0%	52.0%	23.0%
2040	21.0%	54.0%	25.0%
2041	21.0%	54.0%	25.0%
2042	21.0%	54.0%	25.0%
2043	21.0%	54.0%	25.0%
2044	21.0%	54.0%	25.0%

Table 27.

New Residential Development – Base (Units)

Estrato

Year	3	4	5	Total
2020	455	860	393	1,708
2021	469	886	405	1,759
2022	483	912	417	1,811
2023	496	938	428	1,863
2024	510	964	440	1,914
2025	524	990	452	1,966
2026	537	1,016	464	2,017
2027	551	1,042	476	2,069
2028	565	1,068	488	2,121
2029	579	1,094	500	2,172
2030	556	1,156	512	2,224
2031	569	1,183	523	2,275

2032	582	1,210	535	2,327
2033	595	1,237	547	2,379
2034	608	1,264	559	2,430
2035	620	1,291	571	2,482
2036	633	1,317	583	2,533
2037	646	1,344	595	2,585
2038	659	1,371	607	2,637
2039	672	1,398	618	2,688
2040	575	1,479	685	2,740
2041	586	1,507	698	2,791
2042	597	1,535	711	2,843
2043	608	1,563	724	2,894
2044	619	1,591	737	2,946

Sum (2020-2044)	14,294	30,216	13,666	58,175
Avg. (2020-2044)	572	1,209	547	2,327

Table 28.

New Residential Development – Base (SQ M)

Estrato

Year	3	4	5	Total
2020	21,574	62,167	36,224	119,964
2021	22,225	64,045	37,318	123,588
2022	22,877	65,923	38,412	127,212
2023	23,529	67,801	39,506	130,836
2024	24,180	69,679	40,601	134,460
2025	24,832	71,557	41,695	138,083
2026	25,484	73,434	42,789	141,707
2027	26,135	75,312	43,883	145,331
2028	26,787	77,190	44,978	148,955
2029	27,439	79,068	46,072	152,579
2030	26,359	83,591	47,166	157,117
2031	26,971	85,531	48,260	160,762

2032	27,582	87,470	49,354	164,407
2033	28,194	89,409	50,449	168,052
2034	28,806	91,348	51,543	171,697
2035	29,417	93,288	52,637	175,342
2036	30,029	95,227	53,731	178,987
2037	30,640	97,166	54,826	182,632
2038	31,252	99,105	55,920	186,277
2039	31,863	101,045	57,014	189,922
2040	27,279	106,945	63,151	197,374
2041	27,792	108,959	64,340	201,091
2042	28,306	110,973	65,529	204,808
2043	28,820	112,986	66,718	208,525
2044	29,333	115,000	67,908	212,241

Sum (2020-2044)	677,705	2,184,219	1,260,024	4,121,948
Avg. (2020-2044)	27,108	87,369	50,401	164,878

New Commercial
Development – Base (SQ M)

Source: Camacol

Year	Retail	Office	Hotel	Total
2020	4,081	0	0	124,046
2021	4,205	0	0	127,793
2022	4,328	0	0	131,540
2023	4,451	0	0	135,287
2024	4,574	0	0	139,034
2025	4,698	0	0	142,781
2026	4,821	0	0	146,528
2027	4,944	0	0	150,275
2028	5,068	0	0	154,023
2029	5,191	0	0	157,770
2030	5,314	4,005	0	166,436
2031	5,437	4,005	0	170,204
2032	5,561	4,005	0	173,972

Table 29.

2033	5,684	4,005	0	177,740
2034	5,807	4,005	0	181,509
2035	5,931	4,005	0	185,277
2036	6,054	4,005	0	189,045
2037	6,177	4,005	4,500	197,314
2038	6,300	4,005	0	196,582
2039	6,424	4,005	0	200,350
2040	6,547	4,005	0	207,926
2041	6,670	4,005	0	211,766
2042	6,794	4,005	0	215,606
2043	6,917	4,005	0	219,446
2044	7,040	4,005	0	223,286

Sum (2020-2044)	139,019	60,070	4,500	4,325,536
Avg. (2020-2044)	5,561	2,403	180	173,021

Table 30.
New Residential Development – Conservative (Units)

Source: Camacol

<i>Estrato</i>				
Year	3	4	5	Total
2020	364	688	314	1,366
2021	375	709	324	1,408
2022	386	730	333	1,449
2023	397	750	343	1,490
2024	408	771	352	1,531
2025	419	792	362	1,573
2026	430	813	371	1,614
2027	441	833	381	1,655
2028	452	854	390	1,696
2029	463	875	400	1,738

2030	445	925	409	1,779
2031	455	947	419	1,820
2032	465	968	428	1,862
2033	476	989	438	1,903
2034	486	1,011	447	1,944
2035	496	1,032	457	1,985
2036	507	1,054	466	2,027
2037	517	1,075	476	2,068
2038	527	1,097	485	2,109
2039	538	1,118	495	2,151
2040	460	1,184	548	2,192
2041	469	1,206	558	2,233
2042	478	1,228	569	2,274
2043	0	0	0	0
2044	0	0	0	0
Sum (2020-2044)	10,454	21,650	9,765	41,868
Avg. (2020-2044)	418	866	391	1,675

New Residential Development – Conservative (SQ M)

Source: Camacol

Estrato

Year	3	4	5	Total
2020	17,259	49,734	28,979	95,972
2021	17,780	51,236	29,854	98,871
2022	18,302	52,738	30,730	101,770
2023	18,823	54,241	31,605	104,669
2024	19,344	55,743	32,481	107,568
2025	19,866	57,245	33,356	110,467
2026	20,387	58,748	34,231	113,366
2027	20,908	60,250	35,107	116,265
2028	21,430	61,752	35,982	119,164
2029	21,951	63,255	36,857	122,063
2030	21,088	66,873	37,733	125,693
2031	21,577	68,424	38,608	128,609
2032	22,066	69,976	39,484	131,525

Table 31.

2033	22,555	71,527	40,359	134,441
2034	23,044	73,079	41,234	137,357
2035	23,534	74,630	42,110	140,273
2036	24,023	76,182	42,985	143,189
2037	24,512	77,733	43,860	146,105
2038	25,001	79,284	44,736	149,021
2039	25,491	80,836	45,611	151,937
2040	21,823	85,556	50,521	157,900
2041	22,234	87,167	51,472	160,873
2042	22,645	88,778	52,423	163,846
2043	0	0	0	0
2044	0	0	0	0

Sum (2020-2044)	495,642	1,564,986	900,318	2,960,945
Avg. (2020-2044)	19,826	62,599	36,013	118,438

Table 32.

New Commercial Development – Conservative (SQM)

Year	Retail	Office	Hotel	Total
2020	3,265	0	0	3,265
2021	3,364	0	0	3,364
2022	3,462	0	0	3,462
2023	3,561	0	0	3,561
2024	3,660	0	0	3,660
2025	3,758	0	0	3,758
2026	3,857	0	0	3,857
2027	3,955	0	0	3,955
2028	4,054	0	0	4,054
2029	4,153	0	0	4,153
2030	4,251	3,204	0	7,455
2031	4,350	3,204	0	7,554

2032	4,449	3,204	0	7,652
2033	4,547	3,204	0	7,751
2034	4,646	3,204	0	7,850
2035	4,745	3,204	0	7,948
2036	4,843	3,204	0	8,047
2037	4,942	3,204	4,500	12,645
2038	5,040	3,204	0	8,244
2039	5,139	3,204	0	8,343
2040	5,238	3,204	0	8,441
2041	5,336	3,204	0	8,540
2042	5,435	3,204	0	8,639
2043	5,534	3,204	0	8,737
2044	5,632	3,204	0	8,836

Sum (2020-2044)	111,215	48,056	4,500	163,771
Avg. (2020-2044)	4,449	1,922	180	6,551

Table 33.

Assessed Values of Existing Properties (Million COP)

Source: Camacol

Base Assessed Value				Increment Value in Existing Properties
Year	Base Assessed Value	Adjusted for Conversion	Adjusted for	
			Conversion with Investment	
2020	3,701,000	1,757,000	1,899,000	143,000
2021	3,795,000	1,495,000	1,616,000	121,000
2022	3,892,000	1,272,000	1,376,000	103,000
2023	3,991,000	1,083,000	1,171,000	88,000
2024	4,092,000	922,000	996,000	75,000
2025	4,196,000	784,000	848,000	64,000
2026	4,302,000	668,000	722,000	54,000
2027	4,411,000	568,000	614,000	46,000
2028	4,523,000	484,000	523,000	39,000
2029	4,638,000	412,000	445,000	33,000

2030	4,756,000	350,000	379,000	28,000
2031	4,877,000	298,000	322,000	24,000
2032	5,001,000	254,000	274,000	21,000
2033	5,128,000	216,000	233,000	18,000
2034	5,258,000	184,000	199,000	15,000
2035	5,391,000	156,000	169,000	13,000
2036	5,528,000	133,000	144,000	11,000
2037	5,668,000	113,000	122,000	9,000
2038	5,812,000	96,000	104,000	8,000
2039	5,960,000	82,000	89,000	7,000
2040	6,111,000	70,000	75,000	6,000
2041	6,266,000	59,000	64,000	5,000
2042	6,425,000	51,000	55,000	4,000
2043	6,589,000	43,000	47,000	3,000
2044	6,756,000	37,000	40,000	3,000

Sum (2020-2044)	127,068,000	11,586,000	12,527,000	941,000
Avg. (2020-2044)	5,083,000	463,000	501,000	38,000

Year	Estrato		
	3	4	5
2020	19,954	123,044	79,205
2021	21,450	132,265	85,140
2022	23,037	142,054	91,442
2023	24,722	152,444	98,130
2024	26,510	163,468	105,227
2025	28,406	175,163	112,754
2026	30,418	187,565	120,738
2027	32,550	200,713	129,202
2028	34,810	214,650	138,173
2029	37,205	229,418	147,679
2030	37,293	253,073	157,751
2031	39,815	270,187	168,419
2032	42,486	288,310	179,716
2033	45,314	307,498	191,677
2034	48,307	327,808	204,337
2035	51,474	349,303	217,735
2036	54,825	372,045	231,912
2037	58,371	396,105	246,909
2038	62,121	421,552	262,771
2039	66,086	448,462	279,545
2040	59,034	495,257	323,079
2041	62,758	526,491	343,454
2042	66,693	559,504	364,990
2043	0	0	0
2044	0	0	0
Sum (2020-2044)	973,639	6,736,378	4,279,983
Avg. (2020-2044)	38,946	269,455	171,199

Year	Retail	Office	Hotel	Total
2020	19,779	0	0	241,983
2021	21,262	0	0	260,116
2022	22,835	0	0	279,368
2023	24,506	0	0	299,802
2024	26,278	0	0	321,483
2025	28,158	0	0	344,481
2026	30,151	0	0	368,871
2027	32,265	0	0	394,730
2028	34,505	0	0	422,138
2029	36,879	0	0	451,182
2030	39,395	19,276	0	506,789
2031	42,059	20,113	0	540,594
2032	44,880	20,986	0	576,379
2033	47,867	21,898	0	614,252
2034	51,028	22,848	0	654,328
2035	54,374	23,840	0	696,726
2036	57,914	24,876	0	741,572
2037	61,659	25,956	40,333	829,332
2038	65,621	27,083	0	839,146
2039	69,810	28,258	0	892,161
2040	74,239	29,485	0	981,094
2041	78,921	30,766	0	1,042,389
2042	83,869	32,101	0	1,107,157
2043	89,099	33,495	0	122,594
2044	94,624	34,949	0	129,574
Sum (2020-2044)	1,231,975	395,932	40,333	13,658,241
Avg. (2020-2044)	49,279	15,837	1,613	546,330

Year	Estrato		
	3	4	5
2020	129	1,017	716
2021	272	2,146	1,511
2022	430	3,394	2,389
2023	605	4,771	3,359
2024	797	6,288	4,427
2025	1,008	7,954	5,600
2026	1,239	9,781	6,886
2027	1,493	11,780	8,294
2028	1,769	13,965	9,832
2029	2,071	16,349	11,511
2030	2,384	19,016	13,340
2031	2,724	21,918	15,329
2032	3,093	25,073	17,492
2033	3,494	28,499	19,839
2034	3,928	32,215	22,385
2035	4,398	36,240	25,142
2036	4,906	40,598	28,125
2037	5,455	45,310	31,351
2038	6,048	50,401	34,836
2039	6,688	55,897	38,597
2040	7,299	61,990	42,906
2041	7,956	68,561	47,556
2042	8,662	75,642	52,568
2043	8,917	77,867	54,114
2044	9,179	80,156	55,705
Sum (2020-2044)	94,943	796,827	553,812
Avg. (2020-2044)	3,798	31,873	22,152

Year	Retail	Office	Hotel	Total
2020	238	0	0	2,101
2021	503	0	0	4,431
2022	796	0	0	7,009
2023	1,119	0	0	9,854
2024	1,474	0	0	12,986
2025	1,865	0	0	16,426
2026	2,293	0	0	20,199
2027	2,762	0	0	24,328
2028	3,274	0	0	28,841
2029	3,833	0	0	33,764
2030	4,442	242	0	39,423
2031	5,104	504	0	45,579
2032	5,824	784	0	52,267
2033	6,606	1,086	0	59,524
2034	7,453	1,411	0	67,391
2035	8,371	1,758	0	75,909
2036	9,365	2,131	0	85,124
2037	10,439	2,529	522	95,606
2038	11,599	2,956	537	106,377
2039	12,851	3,411	553	117,998
2040	14,202	3,898	569	130,865
2041	15,658	4,417	586	144,734
2042	17,225	4,971	603	159,671
2043	18,912	5,561	621	165,992
2044	20,727	6,189	639	172,595
Sum (2020-2044)	186,935	41,848	4,631	1,678,996
Avg. (2020-2044)	7,477	1,674	185	67,160

Table 36.

Summary of Annual Property Tax Revenue (Million COP)

Increment from			
Year	Existing Properties	New Development	Total
2020	1,069	2,101	3,169
2021	914	4,431	5,345
2022	781	7,009	7,790
2023	667	9,854	10,521
2024	570	12,986	13,556
2025	488	16,426	16,914
2026	417	20,199	20,616
2027	356	24,328	24,684
2028	304	28,841	29,145
2029	260	33,764	34,024
2030	222	39,423	39,646

2031	190	45,579	45,769
2032	162	52,267	52,429
2033	139	59,524	59,663
2034	119	67,391	67,509
2035	101	75,909	76,011
2036	87	85,124	85,211
2037	74	95,606	95,680
2038	63	106,377	106,440
2039	54	117,998	118,052
2040	46	130,865	130,912
2041	39	144,734	144,774
2042	34	159,671	159,705
2043	29	165,992	166,021
2044	25	172,595	172,620

Sum (2020-2044)	7,209	1,678,996	1,686,205
Avg. (2020-2044)	288	67,160	67,448

Table 37.

Property Value, Annualized Growth Premiums

Source: Authors West Broadway Transit Study

System					
A		B		C	
Portland Streetcar		Seattle South Lake Union		Boston Washington St. Silver Line	
Mode	Product Type	Annualized Premium	Years	End-Year Value Premium	
A	Tram	Multifamily	3.3%	11	40%
	Tram	Commercial	3.6%	11	44%
B	Tram	Multifamily	0.4%	5	2%
	Tram	Office	2.0%	5	10%
	Tram	Retail	2.1%	5	10%
C	BRT (Mixed traffic)	Condo	-0.2%	9	-2%

Source: Acuerdo 64 de 2012

Range of Assessed Values (COP)

Mil Rate

Min	Max	Estrato 1	Estrato 2	Estrato 3
-	5,000,000	5	-	-
5,000,001	10,000,000	5.4	-	-
10,000,001	15,000,000	5.8	6	-
15,000,001	30,000,000	6.3	6.5	7
30,000,001	50,000,000	6.9	7.1	7.5
50,000,001	80,000,000	7.5	7.8	8
80,000,001	120,000,000	8.2	8.5	8.7
120,000,001	180,000,000	9	9.3	9.4
180,000,001	250,000,000	9.8	10.2	10.2
250,000,001	350,000,000	10.7	11	11
350,000,001	500,000,000	11.7	12	12
500,000,001	700,000,000	12.8	13	13
700,000,001	1,000,000,000	14	14	14
1,000,000,001	-	15	15	15

Range of Assessed Values (COP)

Mil Rate

Min	Max	Estrato 4	Estrato 5	Estrato 6
-	5,000,000	-	-	-
5,000,001	10,000,000	-	-	-
10,000,001	15,000,000	-	-	-
15,000,001	30,000,000	-	-	-
30,000,001	50,000,000	8	-	-
50,000,001	80,000,000	8.4	9	-
80,000,001	120,000,000	9	9.4	10
120,000,001	180,000,000	9.6	9.9	10.4
180,000,001	250,000,000	10.3	10.5	10.8
250,000,001	350,000,000	11	11.2	11.4
350,000,001	500,000,000	12	12	12
500,000,001	700,000,000	13	13	13
700,000,001	1,000,000,000	14	14	14
1,000,000,001	-	15	15	15

Table 39.

Commercial Property Taxes

Source: Acuerdo 64 de 2012

Range of Assessed Values (COP)

Mil Rate

Min	Max	Estrato 1
-	15,000,000	0.9
15,000,001	25,000,000	0.95
25,000,001	40,000,000	10
40,000,001	60,000,000	10.7
60,000,001	90,000,000	11.5
90,000,001	130,000,000	12.3
130,000,001	190,000,000	13.1
190,000,001	270,000,000	14

