Access to Land, Local Taxes and Financing of Urban Development: The Case of Santiago, Chile

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Abstract

This document is a report on research conducted as part of the Latin America Program of the Lincoln Institute of Land Policy, intended to contribute to the production of applied research and educational materials. It is an analysis of land market dynamics in Greater Santiago in relation to the process of locating new housing, the collection of real property taxes, and public sector urban investment during the 1990s. The objective of the report is to put forward proposals for urban financing, and in particular to review the functioning of property taxes and their potential to strengthen municipal investment capacity.

It must be noted that Greater Santiago contributed decisively to the growth of the Chilean GDP during the last decade of the twentieth century, but it is also largely responsible for the country's highly concentrated income, manifested in the cities by a tendency for increased urban land prices, with serious consequences for the poor population's aspirations for housing within the urban core, and therefore for access to urban infrastructure and public facilities. During the period under study, Santiago was characterized by strong economic performance, low inflation, successful poverty reduction, record housing construction, healthy growth in public sector urban investment, and a newly vital role for urban planning.

This document has four chapters. Chapter 1 presents the conceptual framework of the study and a general overview on Chile's capital city, known in Spanish as *Santiago de Chile*. Chapter 2 presents a quantitative analysis of land valorization and its relationship to housing dynamics, land tax revenues, the evolution of fiscal valuations, and central and local government investments in urban infrastructure in Greater Santiago in the 1990s. The last part of chapter 2 presents a statistical model of determinants for real property valorization in the city.

Chapter 3 presents the results of a multi-case study based on the observation of four selected urban projects located in
two of the city's municipalities with different characteristics and urban standards and their impact on market values and fiscal valuations at the neighborhood or intra-municipal level. Chapter 4 presents the conclusions of the study and resulting proposals.

One of the study's conclusions is that five specific factors have impeded the above mentioned achievements from leading to greater equality of access by different socioeconomic groups to urban infrastructure and public facilities. These factors are:

i. persistently high levels of distributive inequality
ii. a lack of sufficient instruments for urban financing on the part of the public sector
iii. the inflationary dynamic of the land market in the absence of means for the internalization of externalities
iv. the impact of this dynamic on the housing market
v. the economic weakness of municipalities

New methods for the recovery of value increments are necessary for the future financing of urban development based on improvements to current taxation methodologies and the establishment of new value capture mechanisms.

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Access to Land, Local Taxes and Financing of Urban Development: The Case of Santiago, Chile

1. INTRODUCTION: ACCESS TO LAND, LOCAL TAXES, AND URBAN FINANCING

1.1 The Conceptual Framework

This section describes the conceptual framework for this study, presented schematically in terms of the variables considered in Appendix Table 1. As the table illustrates, the research is based on the relationships of the land market with public and private sector interventions oriented toward urban development and the implications of the resulting process for urban taxation and financing.

This research is motivated by the need to mitigate a set of correspondences between land market segmentation, social segmentation, and access to urban infrastructure and public facilities, correspondences that result directly from sociospatial segregation as a function of land price stratification. The approach to these correspondences focuses on the effect of land market processes on distribution (expressed as internal disequilibria between the provision of urban infrastructure and population) and on the implications for fiscal and urban policy instruments intended to favor equitable development.

Growth, Equity, and the Social Distribution of Urban Infrastructure

For the purposes of this study, the dynamics of the urban land market are best understood in the larger context defined by the spatial patterns of population distribution and the economic conditions and income distribution among households, each of these factors mediated by urban and economic policy. This framework is especially relevant today, when large cities are seen as determinant spaces on the national level, both in terms of material production and for the accumulation of social capital.

The process of Latin American urbanization was consolidated in the last decade of the twentieth century. After a decade of setbacks in economic growth and social spending in the 1980s, the 1990s saw renewed growth in both areas, including in the housing sector and in urban development, stimulating advances in poverty reduction and in addressing deficits in basic household infrastructure (ECLAC, 2000; UNDP, 1999). Chile has stood out as a leader in both of these achievements.

Large cities have become a leading motor of economic growth. At the same time, urban conditions have become the clearest representation of the weak link in the region's development model: distributive inequality. While the greatest per capita income is found in metropolitan areas, they also play a determinant role in national indices of income concentration.

ECLAC posits inequality as a limiting factor for increased economic growth and for the eradication of urban poverty in the region. While the labor market and educational disparities are the essential factors in structuring inequality, urbanization patterns and processes help explain the persistence of poverty. It is of particular concern today that households and businesses

unprepared to confront new competitive demands are concentrated in areas defined by their relative disadvantage with regard to infrastructure and public facilities, as compared to more integrated areas with greater economic capacity.

The persistence of this imbalance presents significant disadvantages with respect to social and economic opportunity. The presence (or absence) of urban infrastructure and public facilities affects the ability of modest communities to deploy their available resources in such a fashion as to insert themselves and their inhabitants into the fabric of increasingly complex metropolitan areas. For example, the availability of community public facilities is crucial for the accumulation of social capital, (networks of associative social relations), and the presence of green spaces affects the degree of pedestrian mobility, and therefore the levels of use of public space by different age and gender groups within the local population. This in turn affects crime levels and indices of social disintegration.

From an economic point of view, the availability of infrastructure to different socioeconomic groups affects the local potential for the supply of goods and services and determines corresponding levels of economic and productive activities (explained respectively by inhabitants with disadvantages for labor market participation and the concentration of domestic micro enterprises in areas with less developed infrastructure). Inadequate street and road infrastructure is particularly determinant, as it reduces relative physical accessibility to low income sectors, compounding inhabitants' reduced access to capital, technology, and education.

Sociospatial segregation does not by itself explain the inequalities described above, but it provides a link between socioeconomic disadvantages and urban systems. Whether or not segregation itself undermines social well-being, it is certain that its cause (land market dynamics) operates by providing less urban infrastructure to low income sectors, i.e. by limiting their access to socially produced goods, establishing a deficit that may have even more influence than unsatisfied basic needs on future social mobility.

During the 1990s there have been signs in various Latin American cities that the dynamics of the land market have diversified with regard to spatial distribution, for example by higher income groups locating in poor neighborhoods. However, this tendency does not imply greater integration, and may indicate the evolution of more complex patterns of segregation (ECLAC, 1995). Among the many relevant questions raised by the new urban structure is the growing imbalance between urban land values and salaries in a context where fiscal resources are inadequate to compensate for the social disparities with regard to urban attributes. This tendency undermines the economic capacity of new generations of low income households to stay in the urban core and may be the best reflection of the distributive tension that afflicts Latin America, now a largely urban region.

Because the complex scenarios of income concentration and sociospatial segregation are effectively considered unchangeable, they are not adequately addressed on public policy agendas. This can be discerned from the predominant application in the region of massive housing schemes that have positive results for economic activity in the construction sector but that concentrate low income human resources and low income social reproduction in urban areas

whose disadvantages must then be ameliorated through the use of fiscal resources that are inadequate to the challenge.

Land Valorization, Urban Investment, and Fiscal Processes

In this report, we understand the land market as:

i. a force that structures the way human populations and activities generate demands for infrastructure.
ii. a source of resources and wealth that may be applied to urban development.

From this perspective, our focus is on land market price formation based on urban attributes as externalities, resulting in value increments at a rate far above the profitability of typical productive investments.

In addition to the improvements to properties made by occupants, price variation and the subsequent process of income generation are fundamentally determined by four kinds of interventions or alterations to the original urban environment:

- the establishment of economic activities such as offices, factories, and business enterprises in new areas
- regulatory changes regarding the use or urban land and building requirements
- property market dynamics as expressed through the location of housing and households grouped by socioeconomic characteristics and associated with differing urban standards
- investment in urban infrastructure

This report will discuss the latter three factors in relation to land market dynamics and corresponding real property tax revenues in metropolitan Santiago de Chile.

Two important factors should be stressed regarding local taxes: their role as an instrument reflecting the process of real property valorization, and their function in generating municipal revenue in return for services provided. As ECLAC (1998) has reported, decentralization has reinforced the role of local Latin American governments in administering expenditures and investments but not in collecting their own revenues. Local taxation remains weak, exerting pressure on national budgets.

Although tax revenues are closely related to urban planning issues, the relationship is rarely considered in evaluating or rethinking existing urban dynamics. Due to the financial weakness of municipal governments, urban investment needs and inter-municipal inequalities are mitigated by central government transfers from its general budget. ECLAC (1998) has identified land taxes as an important element in policy improvements funded by direct taxation. According to the World Bank's new urban strategy, local financial sustainability, or bankability, is key to achieving the goals that cities must meet in order to promote urban competitiveness, governability, and well-being. One of the obstacles to sustainability and to more equitable and efficient access to urban infrastructure and public facilities is the limited capacity of

municipalities to collect taxes and assessments within their areas of jurisdiction (World Bank 1999).

Urban Financing and the Recovery of Value Increments

The process of urban land valorization, the government role in that process, and the challenges of reengineering urban financing are three questions that are central to the debate over urban equity in Latin America. Furtado (1997) has pointed out that the decentralization process has meant greater local responsibility and that this has placed the need for increased local revenue collection and a strengthened capacity for investment at the center of the urban agenda. Increasing urban development has emphasized the need to meet two challenges simultaneously: to increase urban competitiveness through infrastructural expansion and to attend to accumulated social inequality through the more equitable provision of needed inputs to urban human resources.

Land market processes and land valorization are held responsible for the reproduction of urban problems, and are seen as possible sources for significant resources with which to confront those problems. Policy discussions tend to lead in two complementary directions: the creation of incentives for investment in urban development in poor areas and the development of mechanisms to recover value increments resulting from public works or policy decisions. These mechanisms allow the State to collect a portion of value increments resulting from public works or zoning decisions based on the concept that the greatest part of the land value has resulted from efforts by society to improve the urban environment. (Brown & Smolka, 1999; Einsweiler & Mines, 1993, *Cámara de Diputados de Chile*, 1999)

There are a number of approaches to value capture, but two general strategies can be identified (Furtado, 1997). The modernization of traditional land tax instruments by itself can be used to recover a significant portion of socially-generated value increments and amplify their contributions to social equity. In addition, the introduction of new instruments such as assessments for improvements and other levies can complement the traditional instruments for financing urban programs, generating extra-budgetary resources and thus freeing up funds for investment in socially-prioritized urban areas. This second type of instrument is generally applied locally, either in specific areas or in conjunction with other events such as regulatory change, while general property taxes are permanent and are levied over the entire polity.

Both approaches provide spaces for reflection and policy development. Neither is detrimental to the functioning of the market; rather they permit the State to compensate for significant imperfections (externalities and regressive effects) and generate socially and economically valuable resources for use by society as a whole.

1.2 THE CASE OF SANTIAGO DE CHILE: GENERAL BACKGROUND

As an introduction and in order to provide context for the analyses presented in subsequent chapters, we will provide a general background on the case of Santiago de Chile. We will describe the general characteristics and socioeconomic tendencies that distinguish the city, as well as public policies relative to housing, local taxes, and public sector urban investment. Finally, we will analyze the present state of the discussion on urban financing.

1.2.1 General Characteristics of the Case of Santiago.

Metropolitan Santiago replicates and amplifies a number of the characteristics, achievements, and remaining challenges that characterized the socioeconomic evolution of Chile in the 1990s:

- Population: With nearly five million inhabitants in 1995, Santiago represented about 40% of the national population, constituting a significant population nucleus within a national pattern of human settlement characterized by a high degree of urbanization.

- Income: Santiago has the highest per capita income in the country. Its economic growth rate is several times that of the country as a whole. It reflects well on national economic achievements of the last thirty years in terms of growth, control of inflation, and social spending.

- Poverty: Santiago has exceeded even the significant national tendency toward the absolute and relative reduction of poverty as determined by either of two measures: the percentage of inhabitants below the poverty line, or the index of unmet basic needs (UBN). This tendency led Chile to be heralded as a model for social spending in the 1990s. UNDP data (PNUD 1999) indicate that poverty in the Greater Santiago metropolitan area was under 15% in 1998, although it exceeded 25% in certain political-administrative areas known as *comunas* or municipalities. In terms of UBN, data from the most recent housing census (Mac Donald et al., 1994) indicate that the provision of potable water from the public water system inside homes reached 90% in Greater Santiago, that sewer service reached a comparable level, and that nearly 100% of homes had access to electricity.

- Formality: Unlike most large Latin American cities, where much of the literature on local taxes focuses on problems stemming from informal housing, Santiago is characterized by a high level of formality. Informal housing units were estimated to constitute less that 1% of the total metropolitan housing stock in 1996. (MINVU/Univ. of Chile, 1997)

- Housing construction: Chilean housing construction reached record levels in the 1990s, reducing the housing deficit from 920,000 to 520,000 units between 1990 and 1998 (MIDEPLAN, 1998). A high and sustained level of State housing construction has been supported by increased social spending since 1990, and by an increased proportion of spending for social needs relative to public spending in general. Public and private housing construction activity has played an important role in economic growth, in the modernization of private financial mechanisms, and in the expansion of the real estate sector. The data

indicate that metropolitan Santiago represents a significant proportion of national housing construction, including the largest and most valuable housing units.

- Urban Development: Urban investment by the central and regional governments has increased from very low levels. At the end of the military regime in 1989, urban investment by the central government was minimal, generating a set of needs that had resulted in part from the negative impact of experiments in urban deregulation and regulatory liberalization that had been introduced, particularly with regard to public mass transit and potential urban development areas. A Metropolitan Santiago Regulatory Plan (*Plan Regulador Metropolitano de Santiago* - PRMS) was applied during the 1990s to limit urban expansion and promote the densification of those urban areas with the most highly developed infrastructure.

- Income Inequality: Despite social and economic advances, Chile is characterized by one of the highest rates of income inequality in the region. Income inequality in Metropolitan Santiago is the highest in the country; it worsened in the 1990s; and inequality in the city is sufficient to account for Chile's high degree of income inequality compared to other countries (MIDEPLAN, 1996b).

- Land Prices: The high price of urban land impacts negatively on distributive tensions as reflected in unequal access to housing within the metropolitan area. Land prices rose consistently throughout the 1990s, interrupted only by the 1998 economic crisis, and reached a point that made land unaffordable for publicly constructed low cost housing (Trivelli, 1997).

- Segregation: Spatial segregation of socioeconomic sectors is another factor closely related to the functioning of the metropolitan land market. Though this is the result of longstanding processes, it was exacerbated by the eradication of irregular settlements between 1979 and 1985, which meant the relocation to the urban periphery of about 30,000 households from areas with high land values, and by the self-segregation of economic elites in the eastern sector of the city, as well as a boom in the construction of public housing that was made possible by its location in peripheral areas.

- Throughout the 1990s, real estate developers tended to locate projects intended for middle class and upper middle class families in areas formerly inhabited exclusively by lower income sectors (Sabatini, 1999). In addition, there has been an explicit effort by the public sector to locate public housing in a more diverse set of neighborhoods. The spatial redistribution of middle and upper class sectors gives an impression of reduced segregation, and in fact social diversity is increased in the *comunas* to which they are relocating. However, the spatial redistribution of lower income sectors in the metropolitan area complicates this impression. Housing statistics show that the number of new low income public housing units in Greater Santiago has fallen in recent years, while the number of new market-rate private housing units has remained high.

1.2.2 The Policy Environment: Housing, Local Taxes, and Urban Investment

The primary public policy areas of interest for the purposes of this research are those concerned with public housing, urban development investment instruments, and the property tax system.

1.2.2.1 Access to Urban Land

The primary urban intervention in Santiago is the provision of formal sector housing.[1] Three modalities of this activity can be distinguished:

- real property activity and private sector construction aimed at fulfilling the housing demand of social sectors with purchasing power

- housing programs executed directly by the State. Under programs executed by the Housing and Urban Development Service (*Servicio de Vivienda y Urbanismo* – SERVIU), the State builds housing on publicly owned land or land belonging to development companies, thereby determining the location of low income households.

- private subsides for the purchase of housing by low and medium income households. The decision whether and where to build housing is made on the private market. This is also called the "mixed system," in which State subsidies allow for the purchase of housing on the private market.

The private sector is the primary source of investment, but the main mechanisms providing land to households have been public housing financing plans, responsible for about 70% of annual construction. As a result of this process, and of a long tradition of programs to provide tenancy, most of the metropolitan housing stock is made up of housing units on land provided by state programs.

The main proposals for public housing reform today are in response to its impact on the city. Public housing policy is said to be contrary to established urban priorities, since the patterns of public housing location have in the long term favored urban expansion and the geographic concentration of poor households. New public housing is concentrated in peripheral *comunas* that lack their own income sources, straining their ability to meet increased demands for urban infrastructure and public facilities (Cortinez, 1994; Galilea, 1996; Fundación Nacional de Superación de la Pobreza, 1999).

As a response to these problems, a series of initiatives were undertaken during the 1990s to promote densification in the most infrastructurally developed areas and to diversify the location and socioeconomic composition of public housing developments. A special subsidy was

[1] The proportion of land used for housing can be illustrated by data regarding building construction in Greater Santiago in 1993-1998, when 72% of new floor area was dedicated to housing and 28% to industrial, commercial, and service uses. Based on data published in the Bulletin of the Chilean Organization of Builders (*Boletín de la Cámara Chilena de la Construcción*).

introduced for urban renewal areas, which significantly stimulated housing construction in central areas. The modalities for private subsidies, where the user decides on housing location, were diversified and expanded, and a policy was established to develop secondary markets for public housing.

During the recent electoral campaign, additional proposals were put forward to formulate a land policy to support public housing plans and add an element of urban coherence to them. It was suggested that decisions regarding the location of housing developments be altered. The current criterion of minimum direct cost would be adjusted to take into account the secondary social costs of urban services and public facilities, and in the area of decentralization and resources, mechanisms would be established for the central government to compensate those municipalities where new tax exempt housing was located.

1.2.2.2 The Evolution of Urban Financing Sources

This report is concerned with the following three uses of investment resources:

- public facilities: neighborhood-level public facilities to complement housing, including green spaces
- social services: primary health and the physical infrastructure for basic and intermediate education
- urban streets and roads: the construction, paving, and maintenance of small and intermediate-sized streets as well as major urban thoroughfares [2]

There are three potential funding sources for the investments described above:

- Central government ministries, either providing funds directly to specific programs or through centrally generated sectoral investments assigned to specific projects by regional governments (Regionally Assigned Sectoral Investments - *Inversiones Sectoriales de Asignación Regional* - ISARs)
- Regional governments, through the National Fund for Regional Development (*Fondo Nacional de Desarrollo Regional*)
- Municipal governments, either from their own resources or from revenue sharing transfers, including both direct and horizontally redistributed land tax revenues.

The first two sources make funds available through the National Budget Law (*Ley de Presupuesto de la Nación*), financed by general taxation. This is Chile's main source of financing for urban investment.

Urban investment surged in the 1990s due to significant growth in central and regional government programs from the low levels at which they had stood in the 1980s. This growth was made possible by increased tax revenues resulting from economic growth and by a 1991 tax

[2] A more complete definition would include investments in the Santiago metro system, particularly in Line Five, and in tertiary health care infrastructure.

reform. An emphasis on direct investment in budget planning also played a role (MIDEPLAN, 1999a).

Municipal Investment

Investments by local governments reflect the powers granted them under the Organic Law on Municipalities (*Ley Orgánica Municipal*) for the establishment and maintenance of public spaces through the improvement of the urban infrastructure, including street demarcation, construction, paving, lighting, and signage, and the installation of traffic signals, green spaces, and public facilities.

Data from the Ministry of the Interior's Subsecretariat of Regional and Administrative Development (*Subsecretaría de Desarrollo Regional y Administrativo* – SUBDERE) indicate that average municipal investment in the categories mentioned above may have represented about 16% of total municipal spending in Greater Santiago in 1992-1997, which also included spending on personnel, goods, and services. While average municipal investment in the metropolitan area was significant, as will be indicated in the analysis presented below, it was concentrated in municipalities with higher per capita income and therefore greater capacity to generate their own revenues.

The geographical distribution of municipal investment and spending is determined by municipal revenues, including self-generated revenues such as land taxes, vehicle fees, business license fees, sanitation fees and municipal fines, and by transfers from the Common Municipal Fund (*Fondo Común Municipal* - FCM), a mechanism for the redistribution of resources among municipalities. Self-generated revenue averages about 78% of municipal revenues in Greater Santiago (Subdere, 1999). The land tax, which is described below, is a significant source of municipal and FCM revenues. The FCM directs resources to *comunas* where tax exempt properties are concentrated.

Since the process of municipalization was implemented in the 1980s, the ability of municipalities to meet their own needs for urban investment has been limited to those where higher income populations are concentrated. Most municipalities depend on central government investments and regional programs.

Despite horizontal redistribution by the Common Municipal Fund, urban disparities are high and persistent, reinforced as they are by the segregationist impact of land and housing markets, and despite the positive economic performance of the country in the 1990s. The evolution of municipal revenues in several Santiago *comunas* illustrates this problem. Between 1992 and 1997, revenue increased by 21% in the four poorest municipalities and by 98% in the four wealthiest municipalities, thus increasing the per capita revenue gap over that period (Rodríguez and Winchester, 1999).

It has been stated that the division of Santiago into municipalities and the nature of their revenue structure constitute, reproduce, and consolidate sociospatial segmentation. Some *comunas* coincide geographically with circuits of wealth accumulation deriving from greater economic activity and concentrations of higher-income households, while others are burdened by the need

to generate basic necessities in a context of scarce internal resources. The determinants of disparity are many and its mechanisms are complex, but the geographical concentration of tax exempt housing units is a factor in local resource insufficiency and in the dependence of local governments on central government investments and subsidies for resources to provide urban infrastructure (CED, 1990; Raposo, 1995; Rojas and Greene, 1995).

Investment by the Central and Regional Governments

Appendix Table 2 presents a typology and a description of investment mechanisms for financing urban infrastructure and public facilities during the 1990s. The goal of this table is to present a schematic overview of the different lines of urban investment in Santiago that are analyzed in the following chapters. Theses mechanisms are interventions that modify external attributes of urban land and thus have an effect on its changing value.

One important modification was the 1994 decision that new public housing developments would be provided with operative basic public facilities, in order not to increase the urban deficit carried forward and to begin its slow absorption

During the 1990s, the Ministry of Housing and Urban Affairs and the Ministry of Public Works have been responsible for most urban investment by the central government. Between 1989 and 1996, total urban investment by the former grew by 486%, being applied to parks and public facilities, city streets and secondary roads, paving, and sanitation infrastructure. Investment by the Ministry of Public Works was used in urban projects such as improvements to primary urban road systems. Investment in roads by these two ministries equaled nearly half of total capital investment in physical infrastructure by the central government (MIDEPLAN, 1999 and 1999a).

The 1990s saw not only increased investment, but a series of new urban programs, including the Urban Parks Program and the Program for Sanitation Infrastructure, the latter designed to develop sanitation macro infrastructure on land to be provided to new housing projects. Preexisting programs such as Community Public Facilities and Urban Paving were modified. The goals of the Community Public Facilities Program were expanded to increase the construction of community centers, playing fields, playgrounds, and green spaces in poor areas, and Urban Paving incorporated a modality called Participatory Paving to stimulate the cooperation of residents and municipalities in meeting paving needs in poor areas.[3]

Another notable innovation was the concept of self-financed mega projects and urban projects developed on large State properties. In exchange for financing public housing development on

[3] There were also changes in the regulation of urban development requiring the contribution of lands needed to meet infrastructural needs stemming from urban growth. For example, Law 19057 of 1991 increased the area of green space and other accommodations that developers were required to provide and a 1997 modification of the General Regulations on Urban Development increased the area of land that was to be ceded without compensation by parties establishing low income developments and subdivisions.

one sector of a property, private parties are given the right to carry out their own development activities on another sector of the same property (MINVU, 1999).

Investment by the regional government also grew during the 1990s thanks to an increased National Fund for Regional Development (*Fondo Nacional de Desarrollo Regional* - FNDR), financed under the National Budget Law and primarily intended to favorably influence the well-being of low income sectors by expanding and improving education, health, and sanitation services as well as urban streets and roads.

In the 1990s, FNDR funds have primarily been invested in education and health infrastructure. In terms of health services, the fund has been used primarily on the local level, while central government investments have been directed to much more costly projects for hospital construction and improvement. Basic and intermediate education infrastructure, on the other hand, was financed almost entirely through FNDR (MIDEPLAN, 1999a).

1.2.2.3 Land Taxes

Land in Chile is taxed through a levy on real property in proportion to its assessed value.[4]

In addition to land taxes, Chilean direct taxes include an income tax, business taxes, and taxes on foreign companies. In 1996, land taxes represented 4% of all direct and indirect taxes. They are also a component of local taxes, along with business license fees, vehicle fees, and a tax on the sale of used cars. In 1997, local taxes totaled US $709 million, or 5.2% of all taxes (www.sii.cl ; Jorrat & Barra, 1998).

Although municipal taxes comprise only a small proportion of all Chilean tax revenues, the assessment on land is one of the main revenue sources for urban local governments. Municipalities have direct access to 40% of the land taxes they collect, while 60% is passed along to the Common Municipal Fund (*Fondo Común Municipal* - FCM),[5] established in 1979 for the purpose of horizontal revenue redistribution. The goals of the Chilean tax system are not generally redistributive; it is organized to finance public spending (Serra, 1998). Nevertheless, the 60% of land tax revenues managed by the FCM do have a redistributionist function.

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[4] This tax is applied in keeping with regulations detailed in Law 17235 of 1969, as amended. This law assigns responsibility for the valuation of properties and the production of tax rolls recording those valuations to the Internal Revenue Service (*Servicio de Impuestos Internos* - SII) and responsibility for all aspects of tax collection to the General Treasury of the Republic (*Tesorería General de La República*). SII's Subdirectorate of Valuation (*Subdirección de Avaluación*) regulates and oversees the application of land taxes, administers and supervises new and revised valuations, and in cooperation with the municipalities maintains and updates the Real Property Cadastre (*Catastro de Bienes Raíces* - www.sii.cl).

[5] In addition to 60% of land taxes, the FCM receives 50% of vehicle taxes, a portion of municipal business license fees, and a portion of revenue from special fees required for businesses selling alcoholic beverages in three metropolitan municipalities (Santiago, Providencia and Las Condes).

The only aspects of land tax policy that serve urban development or planning functions are the exemption for low income housing and the surcharge paid for maintaining property vacant or undeveloped, intended as an incentive for development. This system is efficient because prolonged delinquency leads to the auctioning of the property. The most relevant features of the land tax system are the processes of property revaluation and cadastral modification.[6]

Land tax levels were long set based on a study conducted in 1977 on the basis of data collected in the recessionary year of 1975, and later readjusted only for inflation. A new study was conducted in 1987-1989 based on 1986-1988 market values, culminating in a 1990 revaluation, the application of which was postponed for social and political reasons (Daher, 1995). Law 17235 of 1995 stipulated that two successive property valuations in a single *comuna* [7] could not be conducted less than three years or more than five years apart, and exempted residential urban properties from assessment if their valuation on June 30, 1990 was less than 2,221,627 pesos, a figure that could be readjusted every six months in proportion to changes in the consumer price index. The same sum of 2,221,627 pesos was also exempted from the assessment of residential urban properties that exceeded that value.

Although the obligatory application of new property values was postponed until January 2000, the law provided municipalities with the option to put them into effect before that date, and the municipalities of the metropolitan area did so.[8]

In another administrative action, a surcharge was applied to vacant properties in 1996 for the purpose of taxing speculation. Vacant urban sites with a fiscal valuation greater than .3 Monthly Tax Units (*Unidades Tributarias Mensuales* - UTM) per square meter were subject to a surcharge of 100% on their additional value.

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[6] Cadastral modifications are necessary in the case of new properties and property expansion or subdivision. Fiscal valuation is performed to assess the value of both land and buildings. For the purposes of land valuation, the SII divides each *comuna* into zones with similar characteristics (*zonas de características similares* - ZCS), recorded on communal maps with isocost curves. Land value is determined by multiplying the value per square meter in the respective ZCS by either a unique coefficient per sector or square block, or coefficients associated with the individual corners of square blocks. Land valuations and the cadastre are brought up to date in conformity with urban development and an analysis of the land market and land prices at the level of the *comuna*. Between valuation processes, prices are adjusted semiannually according to variations in the Consumer Price Index, i.e. the rate of price inflation..

[7] The valuation of real property is conducted at times to be determined by the Chilean president, based on tables classifying land and buildings by unit values corresponding to property types. Buildings are categorized by the type and quality of construction, taking into account technical specifications, construction costs, age, use, and location by *comuna*, while land properties are classified according to a table of values factoring in location by sector and the urban facilities and infrastructure available to them. (República de Chile, 1998)

[8] Amendments to the 1995 law exempted residential urban properties from assessments if their valuation as of June 30, 1990 did not exceed 2,221,627 pesos. In cases where municipalities took advantage of the authority given them to apply the revaluation prior to 2000, housing units valued at 9.4 million pesos (about US$ 17,600) in December 1999 were exempted from the assessment for the interim.

Of a total of 3,331,300 non-agricultural properties registered nationally in 1998, 3,282,000 were revalued in a process that included nearly all the *comunas* of Greater Santiago. Both nationally and within the metropolitan area, urban properties are primarily used for housing. Of all the residential properties revalued nationally, 80% were exempt from tax assessments (see table below). [9]

Nonagricultural Lands Revalued (national figures for 1998)

Use	Number of Properties	Exempt	Non-exempt
Residential	2,682,890	2,169,531	513,539
Vacant	170,348	30,370	139,978
Other	429,269	32,468	396,621
TOTAL	3,282,507	2,232,369	1,050,138

Source: Boletín SII (1998). Data as of January 1, 1998

The current administration has proposed a new project for municipal revenue that includes changes to the real property tax system in order to address the problem of decreased municipal income. The proposal would increase FCM (Common Municipal Fund) income. It would also increase assessments on urban residential property and eliminate the exemption for properties valued at greater than 32 million pesos. The next valuation is scheduled by presidential decree for 2001.

The following critical points have been voiced in the international debate on efficiency and equity with regard to assessments levied on urban properties (Oates, 1999): [10]

- Variable tax bases generate unequal levels of per capita spending by municipalities. According to Oates, this problem weakens local government, but is not intrinsic to the tax. It results from differing fiscal and economic conditions in the various *comunas*, and the challenge is to address those differing conditions.

[9] Public properties and real properties used for religious, educational, and sports purposes are exempt from taxation. The exemption for low income housing is based on current law that maintains exemptions to permit the majority of the population to gain access to property. This affects low cost housing in keeping with the provisions of DFL (Decree with the Force of Law – *Decreto con Fuerza de Ley*) No. 2 of 1959, exempting 50% of property taxes for 10, 15, or 20 years, depending on the floor area of the structure, and residences covered by Law No. 9135 of 1948 and DFL No. 20 of 1963 in reference to cooperatives, which are completely exempt for 10 years (República de Chile, 1998).

[10] Oates (1999) has pointed out that the problem of disparities is not intrinsic to property taxes, but rather the result of variable fiscal and economic conditions of different localities, and that such disparities can be resolved through intergovernmental transfers.

- Imprecise procedures for property valuation and the updating of cadastral data have hampered the correspondence of the tax base to urban property markets. Although revenue transfers and other central government programs have long disincentivized the correction of these problems by municipalities, the latter have recently taken a new interest in addressing the problem as a result of a new consensus in favor of establishing high standards for local public infrastructure.

Referring more specifically to the case of Chile, the Inter-American Development Bank (BID, 1994) has called for better valuation and a gradual transfer of authority to determine tax policy to the municipalities in order to partially replace the system of transfers on which they depend. Chile currently has one of the more centralized systems of tax authority in Latin America. While land-based tax revenues revert to the municipalities, the central government is responsible for tax legislation, administration, and oversight, and local governments lack the power to autonomously modify tax bases or rates.

Coloma and Edwards (1993) add that as a means of financing local urban development, Chilean land taxes are hampered by global budgetary goals and by national policies mandating exemptions that undermine the effectiveness of property valuation. The high exemption rate and the undervaluing of taxed properties detract significantly from the ability of municipalities to invest in needed improvements.

Land taxes have several secondary effects on social conditions and urban structures that result from the geographical concentration of tax exempt public and low income housing and that require greater municipal expenditures with no compensating local revenues. This increases the concentration of poverty as it incentivizes residents with the means to pay taxes to move to *comunas* providing better services. The geographical concentration of exempt properties also distorts the redistributive function of low income housing since the cost of redistribution translates into inadequate access by poor households to urban services and infrastructure. It has been stated in this regard that exemptions mandated by the central government are redistributive activities utilizing resources that properly belong to municipalities. Under this logic, it is stated, municipalities should be reimbursed from the national budget for revenues from which they have been deprived, so that they may invest in meeting the needs resulting from demographic growth attributable to the population of new public housing projects (Coloma and Edwards, 1993).

Another criticism is that a significant but undetermined proportion of exemptions benefit individuals or groups who are not poor and are not unable to pay. This occurs either because exemptions are disproportionate to poverty or because of poorly focused public housing policy. In either case the resultant granting of tax exemptions amounts to an additional subsidy without any valid social justification.

1.2.3 The Debate on Urban Financing [11]

The three main factors to consider with regard to the present conjuncture or the current debate on urban administration in Chile are first, the State capacity for urban investment (which requires improvements to existing instruments and moves to address the urgent need for new programs); the ideological and technical debate resulting from value capture practices; and the discussion and criticism of the existing land taxation regime from an urban planning standpoint.

Urban Financing in Chile: the Present Conjuncture

While Chile's current capacity for urban financing is much greater than it was at the end of the 1980s, it is still insufficient to take the economic steps that would be necessary to eliminate the deficit brought forward as well as supply new public housing projects with public infrastructure and facilities, and improve the overall efficiency and equity of large cities without the use of new financial instruments.

The establishment of new mechanisms in recent years such as the awarding of contracts for large road projects and the high political priority given by the new government of President Ricardo Lagos to urban reform creates a more favorable panorama for increased resources and the diversification of financial instruments for urban development.

There are several primary weaknesses of the current urban financing system. First, the existing instruments lack diversity. In fact, there is only minimal participation on the part of the private sector. Urban financing in Chile is dependent on the National Budget Law, whose principal priorities are defined without any discussion of urban needs in relation to taxation and the political economy. As for modernization of the State, the system suffers from rigid bureaucratic controls imposed on central government urban investment processes and by a lack of strategic vision at the preinvestment stage regarding urban infrastructure and public facilities. The weaknesses of the primary investors, which are programs sponsored by MINVU and the Ministry of Public Works (*Ministerio de Obras Públicas* – MOP), are compounded by the weak financial condition of the municipalities. These, in turn, are subjected to further stress by the impact of new public housing projects and the concentration of taxation authority in the central government.

[11] This section is primarily based on interviews with academic and public sector urban planners and economists as indicated above, in addition to discussion papers generated for a Lincoln Institute seminar held at the end of 1999 (Cámara de Diputados, 1999), and preliminary Lincoln Institute research reports by Cáceres and Sabatini (1998) and Furtado (1997).

The interviews help identify proposals for the improvement of existing programs and the establishment of new instruments. The former include:

i. greater budgetary priority for the work of the Housing and Public Works Ministries
ii. the addition of new cofinancing schemes along the lines of the participatory paving program
iii. the strengthening of programming agreements as a tool for the coordination of future investments in health, education and housing construction
iv. expanding the model initiated with rural highway projects by opening new categories of urban projects to public-private partnerships. New categories of projects could include parking facilities and many other possibilities for municipal agreements with private contractors.
v. the improvement of land taxation mechanisms as instruments for the recovery of value increments, local urban financing, and inter-territorial compensation for asymmetrical demands.

There are at least three kinds of proposals for new programs and instruments to increase the resources available for the construction of urban infrastructure and public facilities.

i. the mobilization of private investment resources for improving public spaces in poor areas and the establishment of special taxes in those municipalities where the State does not locate public housing
ii. the redesign of local property and land taxes as instruments for the recovery of urban value increments (to provide new resources for investment to augment the State's existing budgetary capacity)
iii. the establishment of non-conventional taxes and levies on property development based on their urban impact, i.e. assessments on valorization such as those applied in Colombian cities, and fees applied to changes in planning instruments

The Debate on Value Capture

As indicated in the paragraph above, possible new urban financing instruments include mechanisms for the recovery of value increments resulting from public sector projects and policies. There are two possible responses to this possibility. On the one hand, value capture mechanisms can be justified ethically and practically since the behavior of actors on the property market is generally a direct function of their expectations for value increments rather than anticipated use value. Neither value increments nor their market-driven distributive consequences can be explained by productive investments. On the other hand, the fiscal recovery of urban land value increments can be criticized philosophically, as public policy, and practically (in terms of effective collection mechanisms).

The application of value capture instruments in Chile has historically been difficult due to negative responses on the part of the population. The appropriation of value increments is viewed by land owners as a "natural right." Cáceres and Sabatini (1998) point out that although value capture has long been discussed, its application has been hampered by a limited awareness among both authorities and the population of its social function and more recently by a kind of

neoliberal view in which the principle of internalizing externalities is subordinated to the doctrine of reducing or avoiding taxes. Despite these limitations, say Cáceres and Sabatini, some specific initiatives for value capture were proposed in the 1980s.[12]

In 1999, the Chilean government presented a Project for the Modification of the Urban Planning and Construction Law, the instrument that regulates real property and construction activities as well as urban planning instruments. Authorities used the draft legislation to begin a process of public consultations with professional and other associations, as well as universities, which included a proposal for the participation of the State in value increments generated by its own activities. While consensus was reached around this concept, it was not possible to agree on a mechanism for its implementation.

The political viability of such mechanisms was always questionable, as were the operative definitions prerequisite to agreement on the design of value capture instruments, the complexity and multiplicity of possible relations between project costs and value increments, and the practical application of these relations to the existing land taxation regime.

Instruments for the capture of value increments resulting from public works projects pose certain problems that are difficult to resolve, and around which it is difficult to reach consensus. First, it is difficult to qualify and quantify the value increments that can and should be taxed. It is also difficult to quantify the impact of public investment on the value of land, because both temporal and geographic factors must be considered, and it is difficult to tease out the nature of "overlapping" factors in value increments, the combined effect of different public works projects and/or other considerations. Finally, is difficult to determine what proportion of value increments should be paid by the property owner, when it should be paid, and whether the resources should revert to the municipality, the national government, or funds established to meet social goals.

The most expensive public works and those with the greatest impact are projects relating to the primary and secondary road system. However, they are inter-municipal and thus raise the practical question of whom to tax. The value increments most easily identified and taxed are those related to local projects such as paving, parks, and local services. In relation to the previous discussion, it is clear that the range of possible relations between cost and value increment is diverse, and that the specific nature of those relations will affect the efficiency and equity of value capture. Value increments may exceed the cost of a public works project, in which case, it has been stated, value capture is effectively equivalent to an additional tax. On the other hand,

[12] These initiatives were the *Proyecto Avenida Nueva Providencia* and the *Programa de Pasajes Peatonales* in the *comuna* of Providencia. The former initiative proposed that property owners obtaining benefits from a public works project return a portion of those benefits through a tax proportional to the valorization of their property. The revenue generated by this tax would have been applied to a fund for urban improvement projects, but the initiative was not approved. The second initiative did come into effect, however, and consisted of municipal negotiations with property owners applying for construction permits, based on their cession of land for the construction of pedestrian walkways (Cáceres and Sabatini, 1998).

value increments may be equal to or less than the cost of the public works project, in which case the value captured may be insufficient to finance and execute the project, which may then be considered economically unfeasible.

In sum, an investment policy conditioned on the recovery of value increments may generate self-financed development projects that are inefficient and possibly incompatible with broader development strategies. Development projects in high priority areas may not come to fruition if they lack the capacity for financing through the recovery of value increments. Thus, any system of value capture related to public works projects should balance the possibility of self financing with broader goals for urban development and socially desirable outcomes. As for when assessments on value increments should be collected, the most viable answer seems to be at the time when the property is sold and its value, including the value increment, is transformed into liquid assets.

As for capturing value increments resulting from public works projects versus value increments resulting from changes to land-use regulation, Cáceres and Sabatini (1998) assert the greater viability of the latter, since it can be designed on an ad hoc basis and there is greater consensus on the need for urban planning instruments to internalize externalities. This point of view is supported in the bibliography and in interviews carried out for this report. There is agreement that value capture on the basis of public works projects may function adequately only in areas with the capacity to pay.

Another important argument in a discussion on value capture is that the current property tax system already constitutes an assessment on value increments since land taxes are paid on the basis of updated land values and since property owners pay a tax on value increments in the process of land transactions. Both of these assertions bring up questions concerning the extent to which tax valuation reflects the real value of property.

Challenges to the Land Tax From an Urban Planning Perspective

The debate on value capture includes proposals to apply land taxes for this purpose. Analysts who support these proposals refer to certain advantages of land taxes as opposed to the use of new instruments for this purpose. The development of this function for land taxes presupposes the existence of a system for valuation closely tied to price evolution and its implementation within a series of short term time frames that allows for close adherence to that evolution. The advantage would be the determination of a synthetic price through the valuation process that derives from real values and that obviates the discussion over how to attribute specific value increments to specific projects and how to capture those increments.

There are advantages to reforming the land taxation system as opposed to establishing new and discretionary value capture instruments. Simply put, land taxes already exist and enjoy popular legitimacy. They also reflect all the past subsidies that have contributed to that value and valuation in current value. These advantages can not be reproduced through instruments tied to specific projects, where the value being taxed must be equivalent to the direct impact of the project, and must also allow for a compensatory response to value depreciation, correcting both positive and negative externalities through valuation mechanisms sensitive to real prices and the

mechanisms of their variation. Finally, land taxes have an advantage in that they permit for the capture of value increments stemming from a broad range of municipal and inter-municipal public investment typologies. In the case of mechanisms tied to the effects of specific projects straddling *comuna* boundaries, value capture within *comunas* is more complicated.

It has been pointed out that from an urban planning point of view the land taxation system has significant weaknesses that should be addressed in order to improve its capacity to reflect land value dynamics. The available bibliography refers to the situation prior to the 1995 revaluation, but points to significant discrepancies between valuations and assessments on the one hand and market prices on the other. This contrasts sharply with the private property sector, which has thoroughly internalized the concept of value increment creation and capture. Daher (1995) indicates that the results of inertia in the valuation process for two decades have been aggravated by spatial discrepancies in the extent of undervaluation, which is concentrated in the metropolitan area and more specifically in higher income sectors. This has regressive effects and weakens both the decentralizing function of the tax (as a support for municipal financing) and the deconcentration of land ownership.

2. A QUANTITATIVE ANALYSIS OF GREATER SANTIAGO

2.1 METHODOLOGY

Goals of the Quantitative Study

General Objective:

- to analyze land market dynamics in Greater Santiago in the 1990s at the level of the *comuna* in relation to the location of new housing, the collection of property taxes, and public sector urban investment.

Specific Objectives:

- to analyze the process of urban land valorization (and land price evolution) during 1992-1997 in different *comunas* stratified by their variable dynamic processes and concomitant with the spatial distribution of socioeconomic groups

- to examine the interrelationships between the urban land valorization process and public and private housing construction, investment in urban public facilities and parks, social services and roads on the one hand, and land tax revenues collected by the different levels of government on the other. It is expected that another infrequently available input will be generated as well, a set of indicators for individual *comunas* that will contribute to the study of measures for land market improvement (Dowall, 1991).

- to contribute to the future construction of an explanatory model for the influence of different urban planning interventions on the price of land within the framework of a discussion on urban financing

Study Methodology

The methodology for the analysis of urban land valorization in 1992-1997 was developed through the following stages and activities:

i. the establishment of a typology of land market strata or segments allowing for a summary analysis of the market's heterogeneous dynamics at the level of the *comuna*, considering the implications of socioeconomic and demographic factors

ii. the establishment of a set of indicators describing housing, local taxes, and public investment in urban development (including source and allocation) at the level of the *comuna*

iii. the quantification of relative and absolute elements in table form, sorted by land market strata, in order to examine the interrelationship between the valorization process and indices of housing activity, land tax revenues, and urban investment in public facilities and parks, social services, and roads

iv. the development of a simple explanatory model of the effect of different urban interventions on land price variation, based on i) simple correlation coefficients; ii) estimates of land price sensitivity; and iii) multiple regression equations to identify the best predictors of land value variation at the level of the *comuna*

- Sources

The following table presents the different variables and statistics on which the analysis is based, identifying the primary source of data in each case. The construction of *comuna*-level data is explained in more detail in the respective chapters.

DIMENSION	VARIABLES	DATA SOURCE
LAND MARKET 1992-1997	-Prices (UF/M^2)[a] -Area of supply -Overall value of supply (UF)	Our estimates based on quarterly data published in the *Boletín de Mercado de Suelo del Area Metropolitana*, (Bulletin of the Metropolitan Area Land Market) Bulletins 39-62, Table 5.
SOCIOECONOMIC LEVEL OF THE POPULATION 1998	Average income 1998 Poverty rate 1998 Percent UBN by *Comuna* Percent of heads of household with low level of education	UNDP (1999), Human Development Index (by *comuna*) Housing and Population Census 1992
ANNUAL CONSTRUCTION 1992-1997	- Number of Permits - M^2 constructed	Bulletin of the Chilean Builders Association (*Boletín de la Cámara Chilena de la Construcción*)
PUBLIC HOUSING	- Number of housing units - M^2 constructed	Our own compilation based on lists of completed projects in MINVU reports, 1992-1997
PRIVATE HOUSING 1992-1997	- Number of housing units - M^2 constructed	Our own estimates
PUBLIC INVESTMENT IN URBAN DEVELOPMENT BY *COMUNA* 1992-1997	Urban parks	Sergio León (1997)
	- Public facilities - Secondary roads - City streets - Paving	Our own compilation based on lists of completed projects in MINVU reports, 1992-1997
	Improvement to urban street and road infrastructure	Our own compilation based on lists of completed projects in MOP reports, 1992-1997 (relevant projects)
	- Local health infrastructure - Educational infrastructure	Our own compilation based on lists of FNDR projects by year undertaken
	- Municipal investment	SUBDERE database
LAND TAXES	- Municipal income	SUBDERE database
	- Valuations - Exemptions	Our own indicators based on data published in 1998 SII Bulletin

[a] Note of Translator: The Chilean UF, or *Unidad de Fomento*, is an inflation indexed unit of value or "indexed unit of account" that operates independently from the currency and its value.

2.2 LAND MARKET DYNAMICS

In this report, the urban land market is studied through its cross-municipal structures and the dynamics of valorization. We consider those dynamics to be a dependent variable of public and private interventions (regulations on building construction and uses, property dynamics, and infrastructural investment) and also a source of value and income that can be recovered by society for urban development through local taxes.

The analysis presented in this chapter refers to the differing dynamics of price variation with regard to unimproved land among the *comunas* of Greater Santiago. The analysis is based on estimated annual averages for 1992-1997, constructed on the basis of quarterly statistics published in the Bulletin of the Metropolitan Area Land Market (*Boletín del Mercado de Suelo del Área Metropolitana*), #39-62, Table 5, themselves based on press reports. The statistics refer to the number of unimproved properties offered for sale, their area by the square meter, and average prices in the different political-administrative *comunas*.

These data on unimproved land are adequate to the purposes of this study, but the following limitations affect the resulting analysis:

- The land market is described based exclusively on information regarding supply (not land prices).

- The data on land supply do not specify the degree of urban development.

- On a quarterly basis, the data source eliminates properties that have been offered repeatedly during the quarter, including only the latest offer. It was not possible to duplicate this process in producing annualized estimates.

- Averages by *comuna* are affected by significant degrees of internal price dispersion or by "islands" of price levels dissimilar to the average.

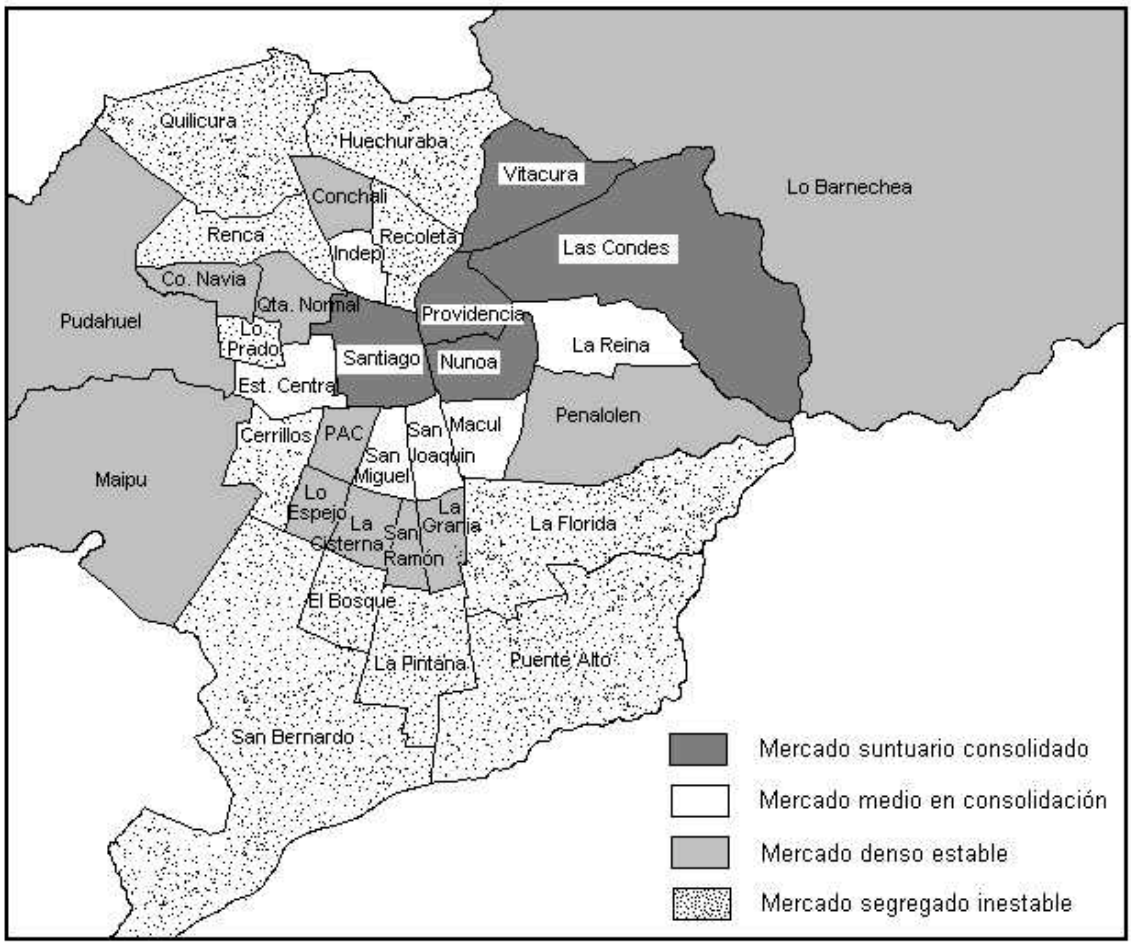
With these caveats, the results allow us to discriminate among the different inter-urban land market strata in the city and to establish relations between those strata and the differential socioeconomic conformation of the *comunas*. They also allow us to identify the spatial relations of land price variation with certain principal determinants of land market functions, thus fulfilling the exploratory goals set for this phase of the project.

3.1.1 Land Market Typology

Appendix Table 3 presents a classification of the *comunas* of Greater Santiago in relation to four land market strata. The goal of this typology is first, to establish a basic segmentation of an extremely heterogeneous market, and secondly to establish an analytical framework for the study of housing location, public investment, and local taxes. The typology identifies four groups of *comunas* based on the relationship established between average land prices in 1997 and their rate of variation from average prices in 1992. Values for the year 1997 were used as a starting point

since a theretofore sustained process of price increases was interrupted in 1998 by an economic contraction and decreased private construction activity.

Classification of *comunas* according to identified land market typologies

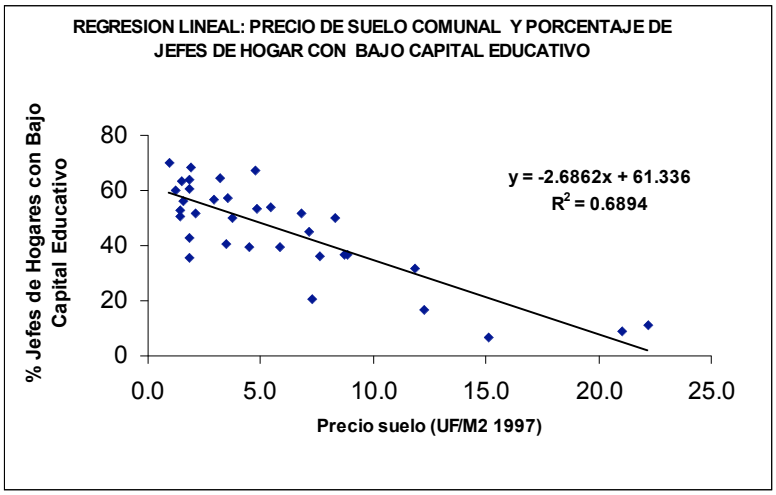


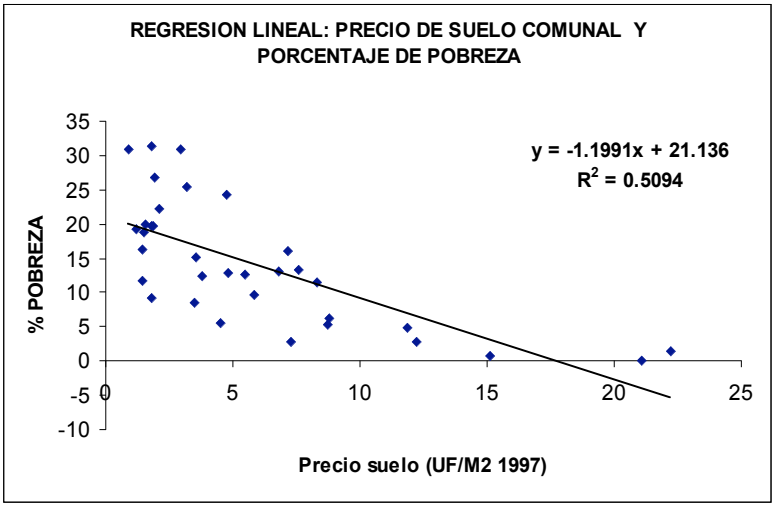
Source: The authors.

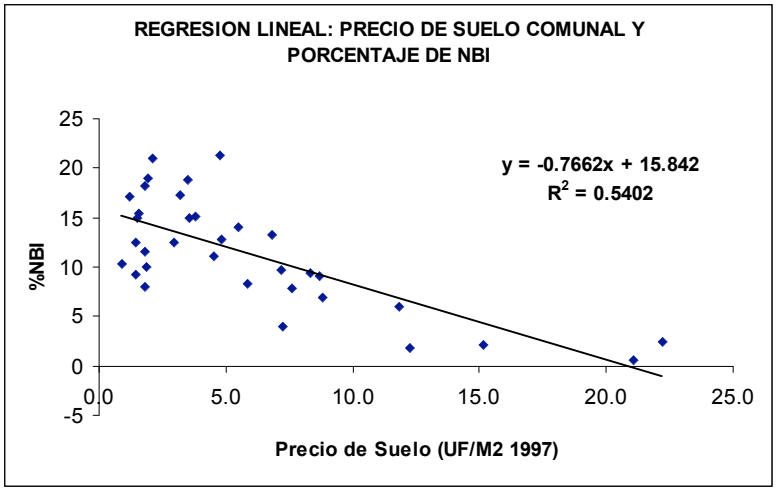
Before describing the typology and its relation to urban dynamics, we will describe the social factors that underlie metropolitan land market segmentation.

Firstly, there was a negative correlation of land price changes or relative increases in the price of land in the 1992-1997 period with respect to nominal values at the level of the *comuna*, meaning that in relative terms, prices increased more in *comunas* where land values were lower. Given the marked sociospatial fragmentation of the city, these were principally areas where low income households were located.

The following three charts, based on the data provided in Appendix Table 4, illustrate the strong correlation of land market segmentation at the level of the *comuna* with the spatial distribution of socioeconomic groups. In terms of *comuna* averages, land prices show a strong inverse correlation (R2=0.69) with the percentages by *comuna* of heads of household with limited educational capital as measured by the most recent census, and a considerable correlation with traditional parameters for measuring poverty: the percentages of UBN (measured by the connection of households to the potable water supply at the time of the census) and the percentages of poverty by *comuna* in 1998, measured by income levels in relation to the established poverty line. Although no causal relationship is posited between the functioning of the land market and the indicators mentioned above (which are the product of a large set of processes leading to poverty), the strong co-occurrence of these indicators with the price hierarchy illustrates the influential role played by the land market in the social conformation of the metropolitan area and clearly illustrates the socioeconomic implications entailed by market dynamics and segmentation.







The typology established for the segmentation of the metropolitan land market differentiates between *comunas* with land prices below and above the city average and establishes three ranges

As illustrated in Appendix Table 3, four clusters were established:

- **Group I: *Comunas* with high-priced land and little price variation (the consolidated luxury market)**

This group is made up of the *comunas* of Las Condes, Providencia, Nuñoa, Santiago, and the eastern part of Vitacura. In 1997, these municipalities reported land prices above the city average and limited variation with respect to 1992 prices (increases of 65% or less).

Fifteen percent of the city population lives in the five *comunas* that make up this group. They are all characterized by a low incidence of poverty (in 1998, less than 5% in each *comuna*) and highly developed urban infrastructure and public facilities. The three *comunas* with the highest per capita income belong to this group: Las Condes, Providencia and Vitacura. They have long had the highest land values in the city. The central-city *comuna* of Santiago experienced accelerated land price increases as a result of its residential revalorization, but this tendency has moderated recently.

- **Group II: *Comunas* with high land prices and moderate price variation (the consolidating intermediate market)**

This market stratum is made up of the *comunas* of Estación Central, Independencia, La Reina, Macul, San Joaquín, and San Miguel. In 1997, land prices in these *comunas* were higher than the city average, but increases relative to 1992 were just average (66% to 240%). We interpret this as a process of consolidation, since its rate of valorization reduces historical disparities with higher-priced *comunas*.

Twelve percent of the city population lives in this group of *comunas,* which are all centrally located, have intermediate socioeconomic profiles, and apart from La Reina, are relatively densely populated.

- **Group III: *Comunas* with low land prices and intermediate price variation (the dense and stable market)**

The following 12 *comunas* belong to this group: Cerro Navia, Conchalí, La Cisterna, La Granja, Lo Barnechea, Lo Espejo, Maipú, Pedro Aguirre Cerda, Peñalolén, Pudahuel, Quinta Normal, and San Ramón. Like the previous group, it is characterized by moderate land price variation, but land prices in these *comunas* are lower than the city average.

Thirty-four percent of the city's population lives in these *comunas*, which are diverse in terms of sociospatial distribution. Apart from Lo Barnechea, these *comunas* have a higher incidence of poverty and apart from Lo Barnechea, Pudahuel and Maipú, they are densely populated.

- **Group IV: *Comunas* with low land prices and accelerated price variation (the unstable segregated market)**

This group is made up of Cerrillos, El Bosque, Huechuraba, La Florida, La Pintana, Lo Prado, Puente Alto, Quilicura, Recoleta, Renca, and San Bernardo. In 1997, land prices in these *comunas* were lower than the city average, and they experienced the greatest price variation with respect to 1992: over 240%, and in two cases reaching as high as 600%. This elevated price variation leads to the designation of land values within the group as "unstable."

Forty percent of the population of Santiago lives in this cluster of *comunas*. Although the typology being described here does not consider the socioeconomic position of inhabitants, this group includes the *comunas* with the highest incidence of poverty in the city and other *comunas* with poverty rates higher than the city average. This is the population that requires State assistance in order to gain access to land and housing property and meet its reproductive needs. While higher income households have established themselves in La Florida and Huechuraba (since the early and late 1990s, respectively), in the longer-term the process of populating this area has more generally been related to the sociospatial segregation of low income families.

The four groups of *comunas* described above can be clearly distinguished with regard to aspects of the Santiago land market. However, any type of land market categorization by typology represents a simplification of a heterogeneous land market, and the following caveats should be kept in mind:

- There is an "empty cell" consisting of low price areas with lower than average price variation since the beginning of the decade. The *comuna* of Pudahuel, for example, approximates this condition with price variation of about 70%.

- No category was established for *comunas* with above average land prices resulting from rapid increases between 1992 and 1997 (above 240%). Land prices in Recoleta and La Florida are close to but not above the city average, and both, but particularly La Florida, experienced significant price variation between 1992 and 1997. Thus these two *comunas* are special cases within the group to which they have been assigned.

3.1.2 Land Market Evolution by Stratum

In this section we will present a general view of Greater Santiago's 1992- 1998 urban land market dynamics from the perspective of the four strata described in the typology above.

Tables 5 and 6 in the Statistical Appendix present the average urban land values for 1992-1998 within the different market strata, expressed both nominally and as multiples of the average price in the city.

Between 1992 and 1998, average land prices in the city increased from 3.2 to 6.8 *Unidades de Fomento* per square meter (UF/M2). Increases varied widely throughout the period according to location. That variation is expressed in the indicators for the different land market strata.

In 1997, the price of a square meter of land in the *comunas* of Group I (the consolidated luxury market) was 18 UFs. In Group II *comunas* (the consolidating intermediate market), that figure was 7.8 UFs, and in Groups III (the dense and stable market) and IV (the unstable segregated market), it was about 2.5 UFs.

Between 1992 and 1997, land prices increased a cumulative 111% (from 3.2 to 6.8 UF/M^2). A 84% increase in 1996-1997 was particularly notable. As has been stated, these rates of increase vary widely among *comunas*. While the most significant relative increase was in peripheral low income areas (without exceeding the city average), prices in the *comunas* with the highest land values grew more slowly in relative terms (a 33% variation with respect to 1992 prices).

While percentage price variation was notable in the *comunas* with the lowest land values, nominal value increments in the period were greater in areas with higher land prices. Appendix Table N.5 illustrates that since 1992, the average price of land (UF/M^2) has increased by 4.6 UFs in Group I (the luxury market), and by 4.9 UFs in Group II (the consolidating intermediate market). While Groups III and IV (the dense and stable market and the unstable segregated market) experienced intermediate and rapid growth *rates*, in absolute or nominal terms their average prices only increased 1.6 and 2.3 UF/M^2 respectively.

This greater stability compared to citywide price dynamics is notable, and probably indicates the existence of a price ceiling beyond which land values stabilize, despite the property market and general economic dynamism in these same areas.

When land price information is expressed as multiples of the city average (in Appendix Table 6), one gets a clear view of the significant differences in land values and of the processes taking place in the different areas of the city during the period analyzed.

In 1997, land values in Group I as a whole (the luxury market) are 2.7 times greater than the city average, and in the *comunas* of Las Condes and Providencia they are more than three times the average. In Group II (the consolidating intermediate market), they exceed the city average, but do not differ very much from it at 1.2 times the average. The other two groups of *comunas*

identified in the typology report 1997 prices less than half the metropolitan average with the exception of Conchalí, La Cisterna, and Quinta Normal in Group II and Huechuraba, La Florida, and Recoleta in Group IV.

The data provided in the paragraph above do indicate the existence of a long term intra-urban land price structure or hierarchy, but differing rates of price increase among the *comunas* have had their effect. Since the beginning of the decade, land prices in higher and lower valued *comunas* have tended to converge toward the city average. In fact, in Group I *comunas* (the consolidated luxury market), prices were 4.3 times the city average in 1992, and that ratio increased until 1994, but fell to just 2.7 times the city average in 1996. During the same period, the value of land in Group II *comunas* (the consolidating intermediate market), grew moderately from .9 to 1.2 times the city average, while land values in the Group III and IV *comunas*, particularly in Group IV, significantly increased in relation to the city average.

In the last two decades, the amount of land on the market has been relatively abundant. Although land on offer decreased during the 1990s, it continues to be sufficient for the healthy functioning of the market. Supply continues to exceed annual demand, estimated at about 1,000 hectares, in addition to transactions involving large tracts, which are not included in the statistics (Trivelli, 1992 and 1997).

Out of a total of over 16 million square meters of land on offer in Santiago in 1997, probably about 70% was located in *comunas* where land values are less than the city average, including 42% in Group IV, the "unstable segregated market," where price increases were most significant in relative terms. While less land was on the market at the end of the decade in the *comunas* with the highest land prices, the decreased supply in these *comunas* was less marked than the city average, except in 1998, when data from the land market bulletin indicate a significant contraction.

It has been noted that the functioning of the land market in the city results in a situation where the high prices of larger tracts of land (located in Groups III and IV of the typology presented in this report) leave SERVIU housing projects outside the market, creating pressure for greater household subsidies and thus for transfers to property owners (Trivelli, 1997).

Table 7 in the Statistical Appendix is an attempt to summarize the distributive consequences of land market dynamics in Greater Santiago during the 1990s. The average price of land per square meter is provided in different years as a multiple of the monthly autonomous income of Chilean households classified by quintiles.

As the table illustrates, land prices have increased more rapidly than monetary income for every socioeconomic group, and between 1992 and 1997 the price of a square meter of land increased in relation to salaries in every quintile as measured through CASEN, a survey conducted by the Planning Ministry (*MIDEPLAN*). Nonetheless, the impact has been far from equal, since the price of land has doubled as a proportion of the autonomous income of the poorest quintile (from .6 in 1992 to 1.15), and increased only slightly for the wealthiest quintile (from .05 to .07).

2.3 ACCESS TO LAND THROUGH HOUSING

In this section we will examine the relationship between urban land market dynamics and housing activity. Of course activity on these two markets is closely related. The following variables will be considered in this analysis:

- total housing construction measured by the number of housing permits issued between 1992 and 1997, in terms of both housing units and floor area, according to data published in the Bulletin of the Chilean Builders Association (*Cámara Chilena de Construcción*)

- general patterns of public versus private housing construction

2.3.1 1992-1997 Housing Construction by Land Market Stratum

In 1992, there were 1.2 million housing units in the city. By 1997, 260,000 permits had been issued for the construction of new housing units, representing an increase of 23% in the city's housing stock. The significance of this level of housing construction becomes clear when we consider that the National Institute of Statistics projected a population growth of under 11% for the same period of time.

While demographic growth in Santiago decreased significantly in the 1990s and access to housing improved in comparison to previous decades, as a result of household dynamics the demand for housing has not declined. Housing demand continued to climb at an undiminished rate as a result of the aging of the population and increased incomes that stimulated the formation of independent families (Mac Donald et al, 1994).

Table 8 in the Statistical Appendix summarizes 1992-1997 housing dynamics by year and *comuna* for the four land market strata, expressed in terms of the relative and absolute increase of housing stock.

Between 1992 and 1997, 73% of the increase in housing units took place in *comunas* with land prices below the city average, due to the lower land prices and greater availability of land in these *comunas* at the beginning of the decade. Thirty-two percent of the additional housing units (82,000 units) correspond to the "dense and stable market" group of *comunas*, the *comunas* where values had grown moderately, while 41% of the growth in housing stock (105,000 housing units) took place in *comunas* within the "unstable segregated market" group, parallel to the rapid relative increase in land prices.

As for the distribution of new housing by floor area (square meters built), other analysts have reported on inter-*comunal* disparities and more marked concentration as compared to the analysis in the paragraph above by the number of housing units (Rodríguez and Winchester, 1999). The data indicate that the greatest concentrations of construction measured by floor area took place at the two extremes of the typology. By this measure, 40% of new housing was built in the

comunas of the "consolidated luxury market," the group of *comunas* with the highest land values and the most moderate price increases, since each new housing unit built in these areas was relatively larger in area than those built elsewhere. Thirty percent of new housing by floor area was built at the other extreme of the land price continuum, in the "segregated market," 11% less than the percentage as measured by the number of housing units. Although a significant percentage of new housing floor area was built within the stratum that we call "the dense and stable market," this is proportionate to the percentage of new housing as measured by individual units, and is strongly influenced or explained by the fact that the *comuna* of Maipú alone accounts for about 13% of new housing floor area in the city as a whole.

2.3.2 The Structure of Housing Construction Activity by Land Market Stratum

Table 9 in the Statistical Appendix provides estimates of 1992-1997 housing construction in terms of the proportion between SERVIU and private projects. The purpose of this analysis is to differentiate the relationship between land valorization and direct public sector projects on the one hand (primarily executed on State property or property belonging to construction companies that specialize in such projects), from the relationship of valorization with private sector housing construction (on land belonging to private individuals or property companies).

The number of SERVIU housing units per *comuna* has been determined through statistics regarding completed construction projects per year by the Basic Housing Programs (*Programas de Vivienda Básica*), Progressive SERVIU (*Progresiva* SERVIU), and the Special Workers' Program (*Programa Especial de Trabajadores*), compiled from data on completed construction projects in the MINVU annual review. Figures on private sector housing were reached by subtracting the number of SERVIU projects from the total number of building permits.

The figure for private housing is only an estimate, comprising both purely private sector housing and housing units that were purchased with the help of State subsidies, including the Unified Subsidy (*Subsidio Unificado*), Basic Housing (*Vivienda Básica*), and the Progressive Private Modality (*Progresiva Modalidad Privada*), which according to the MINVU Statistical Report add up to 90,000 units.

As illustrated by Table 9 in the Appendix, out of 48,608 SERVIU housing units completed in 1992-1997, less than 400 units (under 1% of total construction in the stratum) were located in *comunas* with land values above those of the city average. In contrast, the stratum that we call "the dense and stable market," with prices below the Santiago average and with moderate price increases, absorbed 12,111 new housing units, or 15% of total building permits, while the "unstable segregated market" stratum of *comunas*, which experienced the most rapid price increases, absorbed more than 36,000 public housing units, 34% of total housing construction activity.

To disaggregate the data somewhat, half of all SERVIU housing units constructed during 1992-1997 were concentrated in four municipalities: Maipú, Pudahuel, Puente Alto, and Quilicura. An analysis of public versus private housing construction adds an important perspective to the

absolute figures for housing units constructed in each *comuna*. As the table in the Appendix illustrates, housing construction in the *comunas* with higher-priced land, with the exception of Nuñoa, Santiago, and San Joaquín, was 100% private. At the other extreme of the price continuum, SERVIU units represent more than 90% of new housing in the *comunas* of El Bosque, La Pintana, Lo Prado, and Renca. A significant number of *comunas* fell in between these two extremes, reporting different proportions of SERVIU and private housing construction during the period. Some of these data serve to explain the most accelerated cases of relative price variation.

Chapter Conclusions

It should be noted that this analysis of residential construction in relation to the land market concerns a period in which a record level of housing was built in Greater Santiago, which contributed to an accelerated pace of land consumption and stimulated demand for new urban infrastructure.

At the macro level, this situation constitutes a significant explanatory factor for increased land prices in the city with respect to 1992 (a 113% increase). More specifically in reference to inter-*comunal* dynamics, it is clear that the consumption of land as a result of locating new housing in lower-priced *comunas* was an important factor contributing to land price increases in these areas. While these land prices remain below the city average, they have reached levels that inhibit the continued construction of public or low income housing.

The location of new public housing can not by itself explain the relative land price increases that are so significant at the level of the individual *comuna.* The location of public housing operates to increase prices, however, in combination with another phenomenon: the location of private sector housing in more diverse areas, including more moderately priced parts of the city. Paradoxically, this combination of public and private housing construction in *comunas* once exclusively inhabited by lower income populations favors social heterogeneity but is also the factor most strongly associated with increased prices that exclude low income households from the housing market.

It is notable that with the exception of the wealthiest *comunas* (the consolidated luxury market), the price of land in the city has been markedly elastic despite the relative expansion of housing stock. In the stratum that we call "the consolidating intermediate market," made up of centrally located *comunas* with well-developed public facilities and infrastructure, limited growth of housing stock was associated with a disproportionately greater percentile increase of land prices. We will see below that this tendency is apparently better explained by road infrastructure improvement projects executed during the decade. In the "unstable segregated market" (with greater construction activity and relative land price increases), housing stock expanded by 27% while the price of land grew by 460%, i.e. every percent of growth in housing supply was matched by a 17% increase in land values.

To summarize, the period was marked by a dispersion of private housing (including subsidized private housing) and a spatial dynamic of price variation that pushed low income housing to peripheral areas of the city, diminishing the possibilities for new generations of low income

families to locate in areas with less developed urban infrastructure. It must be remembered, however, that despite the worrisome prospects deriving from this picture, more than the 50,000 directly executed and 90,000 subsidized housing units were added during the same period, representing a substantial increase in access by low and middle income sectors to land and housing property.

2.4 PUBLIC INVESTMENT IN URBAN INFRASTRUCTURE

In this chapter we will analyze investment in urban infrastructure, public facilities, and social services by the central government (through its ministries), the regional government (FNDR), and the municipalities.

As was pointed out in the background chapter, during the 1990s urban investment increased strongly compared to the very low levels of the 1980s. Central government programs (by the Housing and Public Works Ministries) and regional investment, primarily in educational infrastructure, played an especially significant role in this increased investment; referring in both cases to investments funded through the National Budget Law rather than local taxes.

Before presenting our analysis, we should state that we arrived at the investment statistics on which this chapter is based (disaggregated for the 34 *comunas*), in spite of the following significant gaps in information and methodological complexities:

i. The fact that no publication contains a consolidated record of different investment sources and programs referring to urban infrastructure and public facilities required us to gather data from various institutional records and lists.

ii. Statistics have not been previously disaggregated by *comuna*. Data is most frequently collected at a regional level, requiring us compile investment data expressed at the level of public works projects.

iii. Investments recorded for individual projects present temporal disparities. Data may be recorded on the basis of expenditures within a given year, or the total investment may be recorded in the year of project initiation or in the year of project completion. Our preference in this study has been to assign total investment to the year of project completion. This was possible with regard to central government investments but not with regard to FNDR investments, where available data assigned total cost to the year of project initiation, and not with regard to municipal investments, for which the data recorded expenditures per year.

iv. Finally, certain projects, such as a road construction, are inter-*comunal*, which required us to estimate the per-*comuna* cost of the project by prorating the total.

With regard to data sources, the table below describes the statistics used in the study, providing information for each typology, the programs covered, the investing institution, the basis for the data utilized (see point 3 above), and the respective source of information.

Investment in Urban Infrastructure: source and database for each type of investment

Purpose	Programs	Institution	Data basis	Source
Public facilities	Community public facilities	MINVU	Total cost recorded by year of completion	MINVU records
	Public facilities	FNDR	Total cost recorded by year of initiation	FNDR and SUBDERE project lists
	Urban parks	MINVU	Total cost recorded by year of disbursement	Sergio León (1997)
Social services	Primary health	FNDR	Total cost recorded by year of initiation	Project lists of FNDR, SUBDERE
	Education (primary and secondary schools)	FNDR	Total cost recorded by year of initiation	Project lists of FNDR, SUBDERE
Urban street and road infrastructure, paving	Secondary roads	MINVU	Total cost recorded by year of completion	MINVU records
	Participatory paving	MINVU	Total cost recorded by year of completion (Sectoral Regional Investment - ISAR)	MINVU records
	Repair and maintenance	MINVU	Total cost recorded by year of completion	MINVU records
	Streets and roads	FNDR	Total cost recorded by year of initiation	FNDR and SUBDERE project lists
	Urban streets and roads	MINVU	Total cost recorded by year of termination	MINVU records
	Improvement of urban street and road infrastructure	MOP	Total cost recorded by year of completion ("relevant projects")	MOP records
Municipal investment	All purposes	Municipalities	Actual investment in respective year	SUBDERE revenue and expenditure records

Note: These programs are described in Appendix Table 2.

The final figures should be understood as estimations of the scale of investment and not as exact. It should also be remembered that this is not an attempt to provide an exhaustive total of all investments that could possibly be categorized as directed toward "urban development." In the

case of the central government, the MOP investments considered in the study appear on a list of "relevant projects." Substantial government investments in hospitals and in Line 5 of the Santiago metro are not included. Also excluded are the significant urban investments made by builders of public and private housing projects due to the urban impact of their projects and demands for complementary public facilities. In the case of municipal investment, investment in physical capital is somewhat overestimated since the available data do not distinguish between direct capital investment and expenditures on project studies and design.

Despite these limitations, the statistics we have compiled enable us to make a reasonably accurate estimate of the spatial distribution of public investments that impact land values. This information allows us to establish correlations with other land market variables and to generate a comprehensive diagnostic of the dynamics in the metropolitan area. With the exception of municipal investment, we have structured the information according to investment purpose or typology as opposed to institutional source. Since our analysis refers to investments within the city itself, interurban roads are not considered. It should be noted that these interurban roads represent the public investment most responsible for land value increments due to its impact on changing patterns of land use from rural to urban purposes.

The following investment characteristics will be analyzed below:

- total investment in urban development by *comuna* and subtotals of urban development investment according to land market strata
- estimate of overall per capita investment by *comuna*
- estimate of average overall and per capita annual investment in 1992-1997 by *comuna*
- estimate of relative variation in urban investment by *comuna*, measured as the percentage difference of average annual investment by *comuna* from investment in base year 1992
- estimate of relative distribution of urban investment by *comuna* in 1992-1997 according to goal or typology (streets and roads, urban public facilities, social services, or municipal investment)
- estimate of per capita investment in urban development according to origin or source of financing (central, regional, or municipal government investment)

As in the previous chapter, the analysis will be based on tables that organize statistics gathered in individual *comunas* into groups of *comunas* comprising land market strata.

2.4.1 Total and Per Capita Urban Investment by Land Market Strata

Table 10 in the Statistical Appendix provides an estimate of global investment in urban infrastructure and public facilities between 1992 and 1997 by *comuna* and land market stratum expressed as a total for the period, annual average investment, investment per capita, and relative tendencies by *comuna*.

When all sources and purposes are considered, estimated investment between 1992 and 1997 in Greater Santiago reached 26.7 million UFs. Average annual investment in the city was 4.5 million UFs during the same period, an increase of about 14% from 1992.

Twenty-six percent of total investment in the period was directed toward Group I (the consolidated luxury market) and 15% toward the stratum of *comunas* called "the consolidating intermediate market." Investment was particularly strong in the *comunas* of Santiago, Providencia, and Las Condes. These are *comunas* where the price of land has grown little in percentage terms, but where nominal increases in land prices exceeded those in any other part of the city.

The remaining 58% of urban investment, that is the majority, has benefited *comunas* with below average land values. Thirty-one percent of investment went to the "dense and stable market," which experienced average price variation, and the other 28% (7.5 million UFs) went to Group IV, "the segregated market," where land prices increased most rapidly in terms of percentage. As will be seen below, investment was directed differentially depending on its source. Central and regional government investment was directed to middle and low income *comunas*, while municipal investment was much more significant in high income *comunas*.

While overall urban investment was relatively balanced among the different land market strata, there were significant differences by *comuna* in per capita terms, primarily due to the relative lack of resources available for investment by the municipalities responsible for the majority of the metropolitan population.

Although urban investment grew on average more rapidly than population between 1992 and 1997, and generated an increased per capita rate of investment, there were considerable variations among the different *comunas* and strata. Investment in the "consolidated luxury market" can be estimated at 8.6 UFs per inhabitant, while in the strata with lower than average land values, per capita investment was 4.6 UFs in Group III and 3.7 UFs in Group IV.

In order to examine increases and decreases in urban investment during the period, and because increases in investment were neither constant nor linear but variable according to the year analyzed, we have measured their variation by tracking the percentage difference in average annual investment by *comuna* as compared to 1992.

This indicator of investment variation refers to the flow of investment without regard to the baseline presence of urban infrastructure and public facilities in the *comunas*, which can only be inferred from the different *comunas'* classifications in the urban land price hierarchy. *Comunas* with high and intermediate land values had lower deficits, while those with lower than average land prices were least developed infrastructurally at the beginning of the decade.

Urban investment for the period increased 14% relative to investment in the base year of 1992. The most significant change took place in Group II (the consolidated intermediate market), primarily as a result of important road projects executed in the *comunas* of Estación Central and Macul. It is interesting to note that the greatest increase in average annual investment as compared with 1992 was in *comunas* with lower land prices (a 4% increase in Groups III and

IV), while in the luxury market, total urban investment was greater than in the rest of the city, but it grew by only 2%, since investment was already high in the base year. The one exception in this group of *comunas* was Vitacura, which reported a significant investment increase in both nominal and percentage terms.

As mentioned above, there was a tendency for areas with the most urban investment in nominal terms to have not experienced percentage increases in relation to the beginning of the decade. This may be related to another more general tendency in Greater Santiago, in which municipal investment is playing a smaller role within the total municipal budget, which explains the situation of *comunas* in the "luxury market," where urban investment can only increase if the municipality itself increases investment. As we shall see in the next chapter, that possibility has been precluded by the patterns of financial management in these *comunas*. Expenditures have increased while funds budgeted for investment have not.

2.4.2 The Structure of Urban Investment by Land Market Strata

Table 11 in the Statistical Appendix provides an estimate of the relative distribution of four categories of urban investment in 1992-1997 by *comuna* and stratum:[13]

i. urban streets, roads, and paving
ii. parks and public facilities
iii. social services
iv. municipal investment

The table also provides an estimate of per capita investment for the period in two large aggregate financing categories: central government programs and municipal investments.

- *Urban streets and roads*:

This item and includes investment in highways and secondary roads, maintenance and repair of existing roads, and local paving projects carried out by the central and regional governments. About 50% of total investment in this category was for major thoroughfares, i.e. projects that improved accessibility.

In 1992-1997, the central government invested about 10.2 million UFs in streets and roads, including paving, an expenditure of 1.9 UFs per inhabitant. Most of this (70%) was invested in land market strata III and IV, *comunas* with lower than average land values for the city and where those values rose moderately or rapidly.

[13] The three uses of investment analyzed are "public assets" provided by the State to improve the well-being of the population and not subject to private pricing. In the case of streets, roads, paving, public facilities, and parks, public access is free and nonexclusive, and they do not compete with private-sector goods and services.

- *Parks and public facilities*:

This item is made up of investment in plazas, parks, and community, recreational, and sports facilities built by central and regional governments, a form of investment that had substantial relative growth compared to the previous decade. Total investment in this area for 1992-1997 is estimated to have been about 638,000 UFs.

In keeping with the manner in which central government programs are generally targeted, this investment (more than 80% of the city total) was primarily directed to *comunas* with land values lower than the city average. Several *comunas* with high rates of poverty stand out as recipients of these expenditures: Cerro Navia, Pedro Aguirre Cerda, San Ramón, and La Pintana.

- *Local services*:

Between 1992 and 1997, the regional government (through the FNDR) is estimated to have invested about 1.6 million UFs in projects for the construction, expansion, and replacement of public primary health care clinics and primary and secondary schools. Investment in schools was greater than that in public health care facilities.

Given the significant deficits in less prosperous *comunas* at the beginning of the decade, almost 90% of FNDR investment in local social services has benefited *comunas* with lower than average land values, those of the "dense and stable" and "segregated" strata. The primary recipient of this kind of investment, representing 52% of the total, was Group IV, "the unstable segregated market," made up of the *comunas* that house the majority of those city residents living under the poverty line and where land prices rose most rapidly.

- *Municipal investment*:

This component includes investments by local governments for all purposes, financed by transfers and municipal revenues, including land taxes. Total investments in this category between 1992 and 1997 were 14.3 million UFs.

Unlike the other categories of investment included in this study, investment by municipalities was concentrated in Group 1, the luxury market, which received 6.5 million UFs, or 45% of the city total. This disparity in municipal investment was such that almost every *comuna* in the other three strata received less than the city average for municipal investment per capita. The exceptions were Lo Barnechea, Maipú, Huechuraba, and Quilicura.

The distribution of municipal investment by *comuna* was highly correlated with per capita income to the extent that it was an accurate predictor of the autonomy, real investment potential, and as will be seen in the next chapter, the magnitude of resources generated by property taxes.

Chapter Conclusions

Urban investment strongly increased in the 1990s from its low levels of the previous decade. Increased central government programs have been especially significant. These programs are financed by the National Budget Law, not by local taxes.

Although statistics in this chapter referring to *comuna*s should be understood as estimates of the order of magnitude of investment, and not as exact figures, they do allow us to reach certain clear conclusions with regard to the spatial distribution of public investment in development projects and the relationship of that spatial distribution to urban land prices.

The substantial flow of urban investment in the period was distributed in a fairly balanced way among the different land market strata, but per capita investment differed among the *comuna*s. Although urban investment grew more rapidly than the population, producing an overall increase in per capita investment as compared to the beginning of the decade, investments reached 8.6 UFs per person in the "luxury market" but less then 4 UFs per person in Group IV, the segregated market. In addition, the differences in urban standards at the beginning of the decade were serious indeed if one considers the proportion of the population that was underserved.

Average annual investment increased compared to 1992, particularly in *comunas* with lower land prices (4%), where the majority of the population lives. While urban investment continued to be greater in the luxury market than in the rest of the city, its percentage increase was only 2%.

In keeping with the central government policy of focusing its programs on areas with the largest deficits, the largest part of investment in urban public facilities (more than 80% of the city total) has gone to *comunas* with land values below the city average, home to most of the city's moderate income population. The same tendency is evident in the case of social service projects such as primary health care and primary and secondary education. Unlike the other three categories of investment considered, municipal investment was concentrated in Group 1 *comunas* (the luxury market), representing 45% of the city total.

The tendencies discussed in the previous paragraph have three important implications in the attempt to determine the relationship between urban investment and the dynamics of urban land valorization. First, higher nominal value increments, i.e. increased absolute land prices, independent of their proportionality to prices at the beginning of the decade, were found in the *comunas* of the luxury market, where urban investment was greater in per capita terms and was almost completely the result of municipal projects. As for the percentage variation of land price with respect to 1992, the *comunas* reporting the highest relative price increases were in poor and underserved *comunas* that were the focus of central government investments intended to compensate for the limited investment capacity of municipalities in these areas and the greater deficits that affected them at the beginning of the decade. Finally, the dynamics noted in the "consolidating intermediate market" reflect a third type of relationship between land values and urban investment. Land values here were affected by investment in major urban roads, and land price increases here were the city's highest in nominal terms, although in relative or percentage terms they were not very different from the city average.

2.5. THE EVOLUTION OF PROPERTY TAX REVENUES

In this section we will analyze property tax revenues in the *comunas* of Greater Santiago from 1992 to 1997.

For the purposes of this study, the importance of the property tax is its potential to internalize externalities, and therefore to generate resources that can be applied to local urban development. The property tax generates revenues on the basis of land value variations primarily generated by urban land dynamics, including the effects of investment in public works. Value increments that are not captured as tax assessments constitute private income. Both the portion of land taxes retained as local revenue (40% of the taxes paid to each municipality) and the portion that is redistributed through the Common Municipal Fund (60%) are resources available to local governments for reinvestment in urban infrastructure and public facilities. While land taxes are an important source of revenue, however, they are neither the only nor even the most significant source of locally generated resources. Other local tax revenues are also strongly affected by urban dynamics but are not considered in this study.

2.5.1 Land Tax Revenues by Land Market Stratum

Table 12 in the Statistical Appendix illustrates the evolution of four variables:

- total valuation per municipality and per land market stratum for 1993 and 1998 and its percentage variation
- total exempt valuation for the same years and its relative variation
- revenues from land taxes by municipality in 1992 and 1997, stratified by the land market typology presented in this report, and the revenue total for all six years

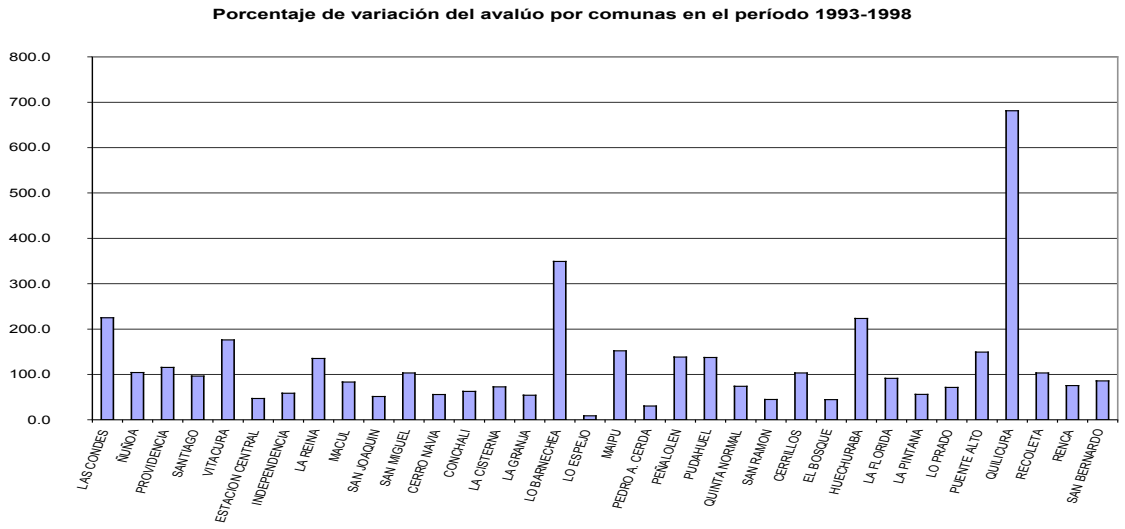
The figures are expressed as *Unidades de Fomento* (UFs), the inflation indexed units of value that operate independently from the currency. The source of information is the municipal revenue and expenditure database provided by SUBDERE (1999). It should be stressed that the data include land taxes paid on all types of real property, not just residential properties, and that they represent the total taxes generated in each municipality, of which 40% are retained as direct income by the respective *comuna* and the other 60% are redistributed inter-locally.

Table 13 in the Statistical Appendix contains data on the total valuation of exempt properties in 1998 by *comuna* and by land market stratum. The spatial distribution of the total valuation of properties registered in Greater Santiago did not change significantly between the two years considered. The percentages represented by each stratum indicate that in 1998 “the luxury market” represented 56.7% of total property evaluation in the city, somewhat higher than the 52.7% that it represented in 1993.

By 1998, the total valuation of property in the city had grown by 125% compared to 1993. The most significant growth took place in Group I of the metropolitan land market typology. As illustrated in the chart below, the percentage variation of property valuation has been relatively

balanced among the *comunas* in relative terms, with the exception of the *comunas* of Quilicura and Lo Barnechea, which strongly diverged from the city average. [14]

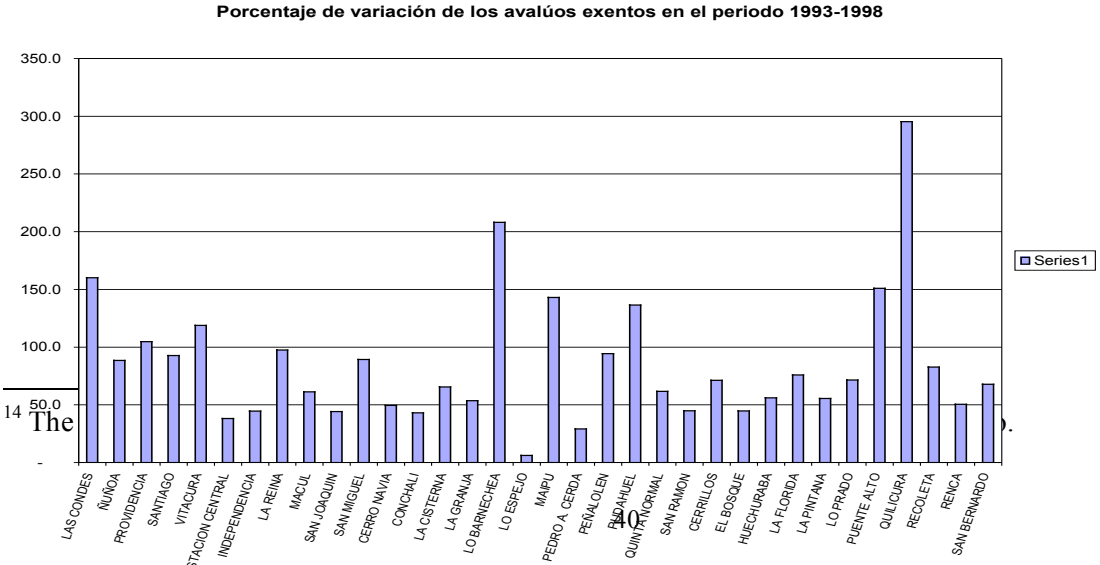
Chart



Source: Appendix Table 12

Taken together, the *comunas* of Group I had a value increment of 142.8%, which was above the metropolitan average, while variation in the *comunas* of Group II, the consolidating market, was the lowest among the four strata. Variations in the *comunas* of Group III and IV were closest to the citywide average, at 120.9% and 109.6% respectively (Table 12).

In 1998, about 47% of total land value in Santiago was tax exempt, a decrease from 52% in 1993 due to a 1995 revaluation. Although exemptions decreased as a percentage of value, the absolute or nominal value of exemptions almost doubled in the *comunas* of Greater Santiago in 5 years, from 301 million UFs in 1993, to more then 600 UFs in 1998. The nominal increase in the *comunas* of the luxury market was greater than average at about 115%. This contrasted with the



[14] The

low 13.3% of properties that were exempt in this stratum in 1998 versus a metropolitan average of 61.6%.[15] This is explained by two factors: an active property market and an increased number of properties in this sector, and the universal exemption for all taxpayers and every kind of housing for the first 9.4 million pesos of value.

Citywide, revenue from land taxes increased by 84% from 4.9 million UFs in 1992 to 9 million UFs in 1997. This was partially due to the 1995 revaluation and to the fact that these revenues increase each year as a result of numerous cadastral modifications reflecting changes such as new and expanded properties and property subdivisions. Between 1992 and 1997, land tax revenues totaled 37.5 million UFs, equivalent to over one billion 1999 US dollars. While this is a significant amount of revenue, it is notable that in the two market strata with the highest land values, the annual relative variation of land tax revenues was slower than the variation in property valuation. This contrasts with the other two strata, where land tax revenues grew relatively faster than property valuations (Table 12).

Table 13 clearly illustrates the strong geographic concentration of land tax revenues in the 5 *comunas* of the "luxury market." Although these *comunas* represented 55% of land valuation in the city, they contributed 70% of all land taxes in 1992-1997. All the other *comunas* put together, which are home to 85% of the metropolitan population, generated only 30% of land taxes.

The "consolidated luxury market" increased its contributions from 3.5 million UFs in 1992 to 6.3 million in 1997. In the same period of time, the "dense and stable market," with land values below the city average and growing at an average rate, increased its contribution of revenues from 461,000 to 1.1 million UFs. The other two strata increased their contributions to 708,000 UFs (the consolidating market) and 836,000 UFs (the unstable segregated market).

The relationship between the relative variation of municipal revenues from land taxes and the relative variation of fiscal valuation varies distinctly among the different land market strata. In the *comunas* of the "luxury market," the land value increment was 142% but revenue from land taxes grew only 79%. In Group II, tax revenues increased 30% while the land value increment was 85%. In contrast, land tax revenues in the *comunas* of the "dense and stable market" and the "unstable segregated market" increased at a rate greater than that of valuation, as can be noted in the table below.

Market Stratum	% Variation of property valuation	% Variation of land tax revenues
Group I	142.8	79.4
Group II	84.2	29.7
Group III	120.9	139.9
Group IV	109.6	136.5

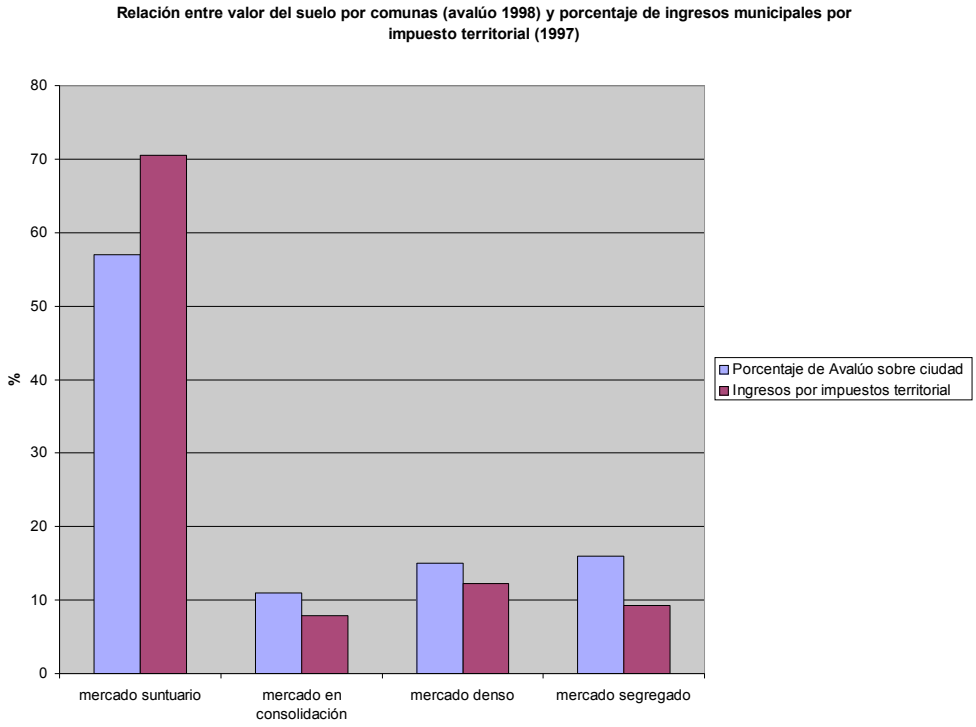
Source: Appendix Table 12

[15] Appendix Table 13

As we stated in the background chapter, the number of exempt properties is a factor in total land tax revenue, but legally mandated universal exemptions have a greater effect on nominal revenue evolution.

On the one hand, the total amount of land tax revenue is inversely related to the number of exempt properties, which are concentrated in the *comunas* with low land values, and represent more than 80% of properties located in those *comunas*, the site of many public housing projects. The *comuna* of Lo Barnechea is an exception, however. Construction there is predominantly private and the proportion of exempt properties is much lower. In Group II, "the consolidating intermediate market," an average of 60% of all properties are tax exempt, with higher percentages of 80% or more in the *comunas* of San Joaquín and Estación Central. In Groups III and IV, however, the average number of exempt properties reaches 86% and 90% respectively. These figures contrast with those describing overall exempt valuation. From this perspective, the greatest loss of potential tax revenue is in the stratum where the highest income households and the greatest nominal property value increments are concentrated (42% of exempt valuation citywide).

The chart below presents a comparison of the four land market strata and the proportion that each one represents with regard to total land valuation and total land tax revenue in Greater Santiago.



As the chart illustrates, the *comunas* of the "luxury market" are making a greater relative contribution to the land tax revenues of Greater Santiago than their proportion of property valuation (70% and 57% of the city totals, respectively). The percentages of total property

valuation in the three remaining strata exceed their participation in land tax revenues by several percentage points. Since 60% of all revenues generated by each *comuna* are redistributed to the other municipalities in Chile, the latter are beneficiaries of a significant proportion of the value increments generated in the first group of *comunas*.

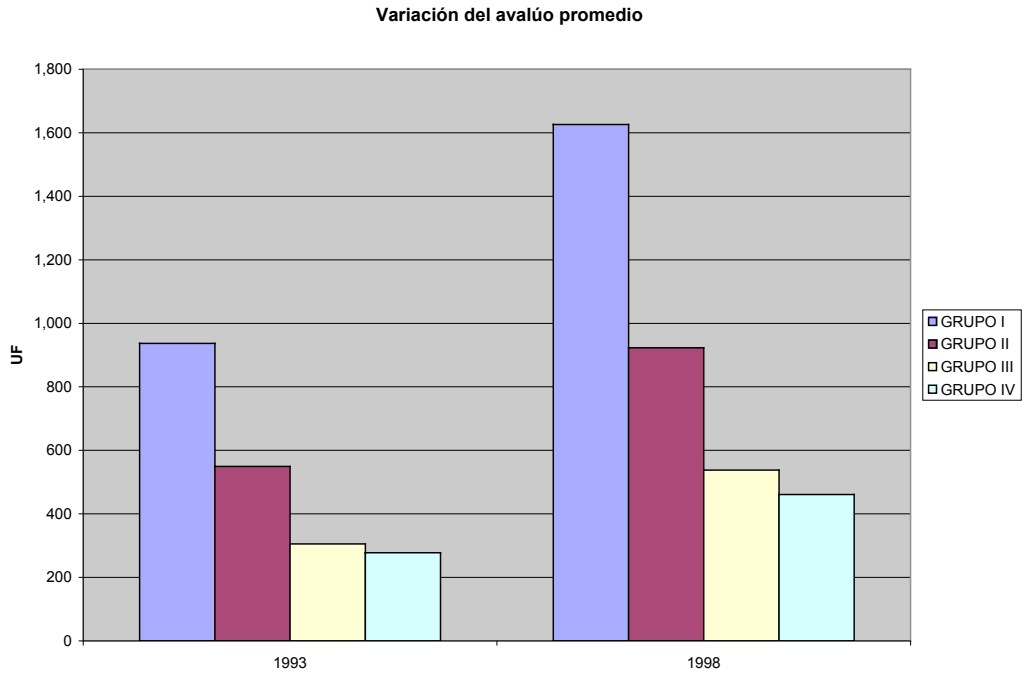


Table 13 also illustrates the evolution of average property valuation by *comuna* and stratum. The average for Greater Santiago in 1993 was 507 UFs and increased to 894 UFs in 1998. It is notable that property value increments were general and were significant in all *comunas* and strata as a result of the 1995 SII revaluation process. The relative gap between the average valuation in the group of *comunas* that make up the "luxury market" and those of Group IV, the "unstable segregated market" did not change during this period; the chart below illustrates that the average for Group I was three times higher than the average for Group IV.

A closer look at the percentage of exempt properties by *comuna* reveals that such properties are concentrated in the *comunas* of Groups III and IV, which have the lowest priced land in the city, and that they make up more then 80% of all the properties in those strata, which encompass the *comunas* where public housing programs are most common (with the exception of Lo Barnechea, which has very few exempt properties and where construction is primarily private).

How have the changes described above impacted on municipal finances and investment? Data provided in Table 14 of the Statistical Appendix include the percentage and rate of variation of land tax revenues as participation in total municipal revenues based on the 40% of land taxes retained by the municipality in keeping with legal requirements, and disregarding the remaining 60% redistributed through the Common Municipal Fund (FCM).

In 1998, land tax revenue represented 22.9% of all self-generated municipal revenues in Greater Santiago, having increased from 18.9% in 1992. This increase in the relative importance of land tax revenues with regard to all municipal revenues varied by stratum and varied among the *comunas* within the different strata. In the "luxury market" stratum, revenue from land taxes grew more quickly than other categories of self-generated income, increasing from 31.2 to 38.4 percent. In the *comuna* of Vitacura in particular, the percentage of self-generated municipal income attributable to land taxes doubled.

While the variation of land taxes as a proportion of self-generated income in the *comunas* of Greater Santiago has generally been positive, there have been significant differences among municipalities and strata.

In order to evaluate the contribution of municipal revenues from land taxes to the financing of investments in urban development, we constructed the following instrument to measure efficiency in each *comuna*:

$$\frac{\text{Municipal revenues from land taxes (40\%)}}{\text{Municipal investment}} * 100$$

The tendency demonstrated by this instrument is that real property taxes provide revenues greater than total municipal investment, and that this disparity increased during the period being analyzed.

The results obtained through this instrument vary greatly among the land market strata. In 1992, groups I and II, with land prices higher than the metropolitan average and with slow or medium land price variation, channeled only part of their land tax revenues into investment. The gap between revenue and investment widened in 1992-1997.

This practice means that land tax revenues were being used for spending increases rather than investment, which undermined the positive concept of the property assessment as a tax providing for visible community improvements.

In Groups III and IV land tax revenues were lower than municipal investment, but government transfers augmented the inadequate municipal investment capacity.

Chapter Conclusions

The importance of the land tax rests on three potential functions:

i. to generate resources for local urban development
ii. to internalize externalities
iii. to regulate or disincentivize speculative land market price increases

In this chapter we have analyzed the variation in land tax revenues during 1992-1997 and their relationship with investments for urban development. Revenue from land taxes increased

throughout Greater Santiago in those years. This was largely attributable to the 1995 tax revaluation, to new private sector tax payments, and to changing land uses. While revenue increases were substantial, however, they were slower than changes in valuation.

What was the impact on local investment capacity? Of a total of about 37.5 million UFs 1992-1997 land tax revenues in Greater Santiago, only about 15 million UFs were retained by the municipality where they were generated and about 22.5 million UFs were horizontally redistributed, including to *comunas* outside the metropolitan area. Since the 5 *comunas* of the "luxury market" stratum were responsible for 70% of total land tax revenues, or about 26.5 million UFs, they retained 10.6 million UFs for their own use and redistributed about 16 million UFs. The remaining 29 *comunas* of the city retained only 4.4 million UFs of the revenue they generated from the tax.

In an analysis of the importance of land taxes for financing urban development, one finds a tendency for *comunas* in the highest price strata to use only some of their land tax revenues for investment. This is particularly true in the *comunas* of the "luxury market" and the "consolidating market." The practice is particularly significant in these strata due to the high volume of their land tax revenues and the subsequent strong potential for redistribution for investment in areas lacking such revenues, a more productive use than expenditures in the areas where the revenues are actually generated. This tendency is also evident in the *comunas* of other land market strata, where the proportion of self-generated land tax revenue is lower, and suggests the need to better focus public spending on the uses for which the tax was conceived.

The redistribution of 60% of municipal property tax revenues through the Common Municipal Fund (FCM), while accomplishing the transfer of significant resources generated by properties in the luxury market, also seriously calls into question the potential of most municipalities to generate revenue, and with it the impact that land taxes as currently applied can have on urban development.

With regard to the property tax as an instrument for the recovery of value increments, a mechanism for the internalization of externalities, the fact is that the *comunas* of the "luxury market" stratum are contributing to property tax revenues at a rate greater than the proportion of their property valuation in the city as a whole. In the other three strata, however, where the central and regional governments concentrated their 1990s investments in urban development (as illustrated in the previous chapter), high levels of tax exemption deprive the *comunas* of access to self-generated income for municipal investment, as value increments are not well represented in property tax revenues.

Due to the rapidity of urbanization and land valorization, the evolution of tax assessments did not appear to keep pace with the increasing value of properties benefiting from urban investment by the central and regional governments. It can thus be postulated on a relatively strong evidentiary basis that the property tax fails to capture value increments from all the *comunas*, that it does not always provide resources for investment, and even more so, that its redistributionist effect is not proportional to the unequal standards of urban development that contribute to the formation of urban land prices.

2.6 THE DETERMINANTS OF LAND PRICE DYNAMICS

The average price of land increased 111% between 1992 and 1997. During this period, overall land values experienced constant and sustained growth until the 1998 economic crisis. Prices rose fastest in low priced Groups III and IV, pushing their prices closer to the citywide average. The greatest nominal value increments, in contrast, were in the *comunas* of Groups I and II, the "luxury market" and the "consolidating intermediate market," with respective increases of 4.6 and 4.9 UFs per square meter, compared with a citywide nominal price increase of 3.6 UFs per square meter.

This tendency suggests the following questions: How sensitive were land prices to the different urban interventions employed during the period in question? Which of the factors considered in our analysis had the most impact on land price evolution? Do these variables coincide with the predictors of land tax valuation and revenue?

In order to address these questions, the following three analyses are presented in this section:

- estimated land price elasticity coefficients for the four metropolitan area market strata
- a calculation of simple correlation coefficients based on observations at the level of the *comuna* between indicators of housing dynamics and urban investment with respect to market price variation on the one hand, and real property tax revenues and valuations on the other
- multiple regression equations intended to identify, within the analytical methodology of this study, the best combinations of variables in order to predict the relative and nominal evolution of land prices at the level of the *comuna*

It must be stressed that while this analysis provides us with a certain level of interpretive synthesis, it requires the introduction of some simplifications concerning causal relations between the urban interventions that are considered and the dynamics of metropolitan land valuation. In particular, neither disparities in urban consolidation nor *comuna*-level urban standards are controlled for, nor are disparate regulations regarding urban planning and construction permitting standards.

2.6.1 Land Price Elasticity by Stratum, 1992-1997

We can reach a preliminary analysis of relative land price variations by estimating land price sensitivity at the level of land market strata as a function of the coefficient of relative land price variation versus the parameters of housing dynamics and urban investment.

The following table compares the relative increase of housing stock, annual investment in urban development, and the price of land at the beginning of the decade (1992-1997) by urban land market stratum.

Estimated Coefficients of Land Price Elasticity 1992-1997

Stratum	Nominal Change in Land Prices 1992-1997	Percent Change in Land Prices 1992-1997	Nominal Growth in Housing Stock	Percent Growth In Housing Stock	Urban Investment	Percent Variation In Avg. Annual Investment	Land Price Elasticity	
	UF	% (A)	Housing units	% (B)	UF	%(C)	A housing. A/B*100	A Urban. Inv. A/C *100
GROUP I	+4.6	33%	62,402	29.5%	7,051,612	(-) 2%	1.1	-16.5
GROUP II	+4.9	169%	8,476	5.8%	3,973,485	236%	29.1	71.6
GROUP III	+1.6	177%	83,234	22.5%	8,188,601	4%	7.9	44.2
GROUP IV	+2.3	460%	105,656	27.0%	7,472,804	4%	17.0	115.0
CITY	+3.6	112%	259,768	23.2%	26,686,503	14%	4.8	7.9

As the table illustrates, housing stock in Greater Santiago grew by 25% between 1992 and 1997, making the 1990s the most dynamic decade for housing growth that the country had known. Assuming a direct influence of housing construction over land price evolution, we find that for every percentage point of growth in private housing stock, land values grew by 4.8%.

While the *comunas* with the highest land values (those of the "consolidated luxury market") were more stable, or more independent from the process described above, housing stock grew slowly in relative terms in the intermediate to high priced stratum, or "consolidating intermediate market," (except in the *comuna* of La Reina) such that land values in this intermediate stratum appeared to react disproportionately to housing construction. The clearest cases were in the central and infrastructurally well-developed *comunas* of Independencia and San Joaquín, where housing stock grew by less than 2% in the period but land prices grew by more than 150%. The "unstable segregated market" was another case where land price elasticity was apparently elevated in comparison with housing construction, but in this case combining high levels of construction and accelerated land price variation. In this group of *comunas*, each percentage point growth of housing stock was accompanied by a 17% increase in land prices. As the decade progressed, this process was accompanied by a reduction of land on offer, since the introduction of so much new housing had increased population density.

With regard to the sensitivity of land prices to urban investment, it should be noted that these indices are not comparable to those regarding the growth of housing stock, since the percentage variation of urban investment simply expresses the relationship between annual average investment in the period compared to investment in the year 1992. Nevertheless, a vertical comparison within the columns provides information on distinctions among the land market strata.

On average, urban investment in Santiago had grown by 14% in 1997, while land prices had risen by 111%. However, the measurement of sensitivity derived from this ratio strongly differs among the land market strata, indicating that the same quantity or typology of urban investment

was associated with different degrees of relative variation in land market values depending on underlying conditions in targeted sectors.

At one extreme is the "consolidated luxury market," which had a higher rate of urban investment per capita, but where land prices operated more independently from investment than in the rest of the city, explained by the preexisting consolidation of services and infrastructure and higher baseline land prices that tended to obscure the high nominal value of lower percentage price increases. Most of the city lies at the other extreme, particularly notable in the case of the "unstable segregated market," reflecting its more recent urbanization. In this stratum, urban investments by the public sector made possible through central government subsidies have led to more substantial improvements over the course of the 1992-1997 period, and have translated into more substantial percentage increases in land prices.

One important variant to the duality described above is found in the pericentral *comunas* of Group III, the "consolidating intermediate market." These *comuna*s had the highest nominal land price increases, explained by a certain amount of housing construction activity and significant investment in road infrastructure. These factors translate into a considerable sensitivity of relative growth in land prices with respect to both variables.

2.6.2 Variables Correlated with Land Price Increases at the Level of the *Comuna*

Table 15 in the Statistical Appendix presents a series of simple correlation coefficients (R2) that operate between *comuna*-level housing indicators (the type and intensity of development) and urban investment indicators, on the one hand, and nominal and percentage *comuna*-level land price variation on the other.

It is possible to identify significant correlations with the relative variation of land prices that are different from the variables associated with the magnitude of nominal increases in the same period.

While relative land price variation analyzed by *comuna* for 1992-1997 does not correlate with the total number of housing units built during period, other more important correlations can be revealed by disaggregating public and private construction activity and/or considering the floor area and value of buildings. One preliminary correlation is that relative price increases in a *comuna* were more closely tied to SERVIU housing construction activity than to the construction of private housing.

Although this correlation means that the location of public housing is associated with more rapid land price variation, this is conditioned on a certain diversity of housing construction. If we consult the housing data for individual *comuna*s, we see that the greatest percentage land price increases were not in the *comunas* where SERVIU housing represented the majority of construction during the period, but rather where it was more balanced with private housing construction. In Maipú, Pudahuel, Puente Alto, and Quilicura, for example, there was considerable SERVIU housing construction (between 3,000 and 13,000 units in the different *comunas*), but there was even more private sector construction activity in the same areas.

In terms of urban investment, the most significant percentage variations in land price by *comuna* correlate negatively with overall investment by *comuna* and with per capita municipal investment but correlate positively with certain focused central government investments.

The pattern of correlations with nominal increases in land price by *comuna* is the inverse of the pattern with relative increases. The latter are positively associated with private sector housing construction and negatively or inversely associated with the most progressive aspects of urban investment by the central government. Consistent with the latter association, they are negatively correlated with the poverty rate.

In short, municipal investment, financed with self-generated revenue and inter-municipal transfers, had a strong positive association with *comunas* reporting greater nominal value increments and greater relative stability at the beginning of the decade. Central government investments were greater in *comunas* with lower land values. In keeping with this tendency, central government investments were associated with *comunas* with more rapid percentage increases, with more significant housing construction activity, and with processes of housing diversification.

Table 16 presents the simple correlation coefficients of the same group of housing and urban development indicators, now with respect to the flow of property tax payments in 1992 to 1997 and the percentage variations of average fiscal valuation per property.

These coefficients make it clear, in the first place, that when analyzed by *comunas,* high volumes of fiscal revenues generated by property tax assessments in the 1992 to 1997 period were most strongly correlated with private construction. The *comunas* reporting these high revenues also had greater capacity for municipal urban investment. The percentage variation of land prices is not associated with the level of fiscal revenue per *comuna* because the *comunas* where land values increased at the highest percentage rate were those with low income populations where most housing construction qualified for tax exemption.

As was stated in the relevant chapter above, the evolution of tax revenues lags behind the evolution of property valuations, particularly in the *comunas* with the highest land prices. For this reason, the variation of average valuation by *comuna* from 1993 to 1998 is most closely correlated (R2=.63) with relative growth of housing stock, an indicator associated with the *comunas* with low land prices.

Multiple Regression Analysis of Changes in Land Value

In previous sections we have investigated the bivariate relations of the land market with housing dynamics, i.e. the construction and location of new housing by the public and private sectors, with State investment in public works (analyzed within a typology of public sector investments), and with certain indicators of property tax evolution. These analyses have provided an empirical basis for certain observations and hypotheses concerning the production of value increments in different sectors of the city.

In this section we will seek to determine which of the variables within our research model have the greatest explanatory power regarding changes in land value at the level of the *comuna* throughout the period in question. We have calculated two multiple regression equations for this purpose, in order to identify the best predictors of i) the relative variation of average prices by *comuna* from 1992 to 1997, and ii) the nominal increase of average land price by *comuna* between 1992 and 1997.

Methodological Considerations

We have conducted a stepwise multiple regression analysis. This technique is employed when an explanatory model postulates various independent variables and the analyst seeks to identify the subgroup of variables that best predicts the observed phenomenon, in this case the changing values of urban land and of land taxes by *comuna*. Multiple regression analysis presupposes linear relations, which is to say that each fixed value of the independent variable (x) determines a certain distribution of the dependent variable (y), expressed as an estimate of the trajectory of the mean resulting from all combinations of independent variables x1, x2, etc.

The analysis was conducted using the STATA (Statistics Data Analysis) program. Stepwise multiple regression analysis progressively eliminates a list of independent variables (x1...xn) that have the least explanatory power for the heterogeneity or the variation of the phenomenon being examined. Thus the procedure successively identifies those variables that most efficiently explain the behavior of the dependent variable (Blalock, 1983). It should be remembered that as a group, the selected variables determine a certain proportion of Y's variability, but that each independent variable among the group both allows the remaining variables to act and explains another group of events or points that they can not explain. In simple terms, the independent variables that are selected operate together to explain a margin of variability within a unified conceptual frame.

Since the goal of this analytical exercise is to identify causal relationships, the identification of the most relevant independent variables allows researchers to focus their attention on a limited number of factors whose modification would affect the values of the dependent variable.

The 16 independent variables used in our research model are identified on the following table. These 16 variables were entered into the regression equations in order to identify the best predictors of two different features of land value formation, the two dependent variables in complex urban processes that take place prior to or parallel with their own manifestation:

i. the relative variation of average prices by *comuna* with respect to 1992 prices (the percent difference of the average price of land by *comuna* in 1997 compared to 1992)

ii. the nominal increase, expressed as a number of *Unidades de Fomento* (UFs) in the average price of land by *comuna* from 1992 to 1997 (the nominal change in average land price by *comuna* from 1992 to 1997).

Independent Variables Entered into the Multiple Regression

Component	Variables Entered into the Equation
Housing Dynamics	• the number of construction permits per *comuna* 1992-1997 • % growth in housing stock 1992-1997 • private sector housing construction in square meters 1992-1997 • public sector housing construction in square meters 1992-1997 • the number of private sector housing units built 1992-1997 • the number of public sector housing units built 1992-1997 • private housing construction as percent of total housing construction by *comuna* 1992-1997
Urban Investment	• total urban investment in UF per capita, 1992-1997 • average annual percentage variation in investment, 1992-1997 • investment in road construction and paving in UF, 1992-1997 • investment in urban public facilities and parks in UF, 1992-1997 • investment in social services in UF, 1992-1997 • per capita urban investment by central government in UF • per capita urban investment by municipalities in UF
Sociodemographics	• population growth by *comuna*, 1992-1997 • poverty rate by *comuna* as percentage of population, 1998

The independent variables examined can be sorted into three broad categories: housing dynamics, investment in urban public works (interventions posited in the conceptual model of this study as determining urban land values), and sociodemographics. The latter refers to indicators of population dynamics and poverty levels in individual *comunas*. We consider these to be factors that affect or modify the relations of causality associated with the two forms of intervention being considered for their effect on urban land markets.

Predictors of the Percentage Change in Average Land Price by Comuna

As indicated above, the average price of land in Greater Santiago increased by 111% between 1992 and 1997. However, price increases varied from less than 15% in the *comuna* of

Providencia to more than 600% in La Florida and Puente Alto. It has also been noted that this indicator is inverse to that of nominal land price increases. In *comunas* where relative urban land values grew most rapidly, nominal increases were the lowest, and vice versa. This is a result of the divergent baseline prices recorded in 1992, and should be kept in mind when examining the data on the table below. The table presents the results of the multiple regression equation performed with regard to the percentage increase in land values.

Dependent Variable: Percent Variation of Average Land Price by *Comuna*

Component	Variables	Beta coefficient	T student	Associated probability P > T
Housing dynamics	• percent growth in housing stock	-3.59	-2.36	.027
	• number of SERVIU housing units	-0.39	-1.89	.071
	• % private housing in *comuna*	+1.90	1.90	.069
	• square meters of SERVIU housing	+0.01	1.90	.069
Urban investment	• UF per capita of investment	+20.3	1.85	.076
Sociodemographics	• population growth	+0.007	4.20	**.000**
	• 1998 poverty rate	+8.80	2.61	**.016**
			Total R2:	**.70**
			Adjusted R2:	**.59**

Notes:
Beta coefficient: indicator of variation in Y resulting from changes in X
Associated probability: inverse to the explanatory power of X1...Xn

Through this procedure, seven variables were identified that taken together explain 70% of the percentage change in land values at the level of the *comuna,* leaving only 30% of such change unexplained by the controlled variables in the model.

As can be seen from the table, the two sociodemographic variables, population growth and poverty rate by *comuna*, were the most significant predictors for a subset of regression points, displaying a positive or proportional correlation with relative growth. This means that those *comunas* where land prices were most stable in relative terms can best be defined as those with the slowest population growth and the absence of poor households, while those with the least stable prices or where prices grew at the fastest rate are identifiable as those with the largest populations and the highest rates of poverty. Other subsets of phenomena or variability tied to dependent variables can be explained, in order of probability, by the rate of growth in housing stock (inverse to the percentage change in land price in the *comuna*), the location of new private

sector housing (a positive association), the number of SERVIU housing units, and per capita investment in urban development during the period studied.

Predictors of Nominal Change in Average Land Price by Comuna

The average price of land in Greater Santiago in 1997 was about 7 UFs per square meter, with a price structure or hierarchy that reflected significant differences among *comunas*, from a minimum of 1.2 to more than 20 UFs per square meter. The nominal change in average land price between 1992 and 1997 was 3.6 UFs per square meter, while nominal changes in average land prices in different *comunas* ranged from less that one to more than eight UFs per square meter.

In order to maximize an empirical understanding of the influence of these variables on land valorization dynamics within metropolitan Santiago, the following table presents the results of the multiple regression equation performed as a function of the nominal land value increase:

Dependent Variable: Nominal Increase in Average Land Price by *Comuna*

Component	Y variables	Beta coefficient		T student	Probability P > T
Housing dynamics	• percent growth in housing stock • square meters of housing • number of private housing units	-.30 +2.03 +.0009		-2.14 **+2.97** -1.82	.041 **.006** .079
Urban investment	• central government urban investment per capita	+.21		1.95	.060
Sociodemographics	• 1998 poverty rate	**-.10**		**-3.50**	**.002**
				Total R2: **Adjusted R2:**	**.55** **.47**

Notes:
Beta coefficient: indicator of variation in Y resulting from changes in X
Associated probability: inverse to the explanatory power of X1...Xn

Five variables were identified that as a group explain 55% of the variability of the dependent variable. A comparison with the previous regression indicates that the investigative model adopted has more explanatory power with regard to percentage changes in land value than with regard to nominal changes or value increments. Among the indicators selected for use in this equation, the best predictors were the poverty rate by *comuna*, in inverse relation to land value increments, and in a proportional and positive correlation, the total floor area of housing built during the period. The latter variable was concentrated in wealthy *comunas* and emerging markets.

It can be inferred that the greatest value increments by *comuna* result from the absence of poor inhabitants and the concentration of larger housing units. The increments unexplained by these two factors respond to the following variables, in descending order of explanatory power: the relative growth of housing stock (inverse to the nominal change in average land price by *comuna*), per capita central government investment, positively associated and probably resulting from the wide ranging influence of road construction on land values in pericentral *comunas*, and finally, the total number of housing units constructed per *comuna*. The number of public versus private sector housing units constructed was discounted by the regression as a meaningful variable, as were almost all urban investment indicators. Thus it can be deduced that the *comunas* unaffected by significant variables were areas that lacked housing activity or where housing activity was almost exclusively performed by the State.

Based on this regression, the absolute quantity of land value increments is decisively explained by the socioeconomic conformation of the *comunas*, and in particular by the degree of "social exclusiveness" and the concentration of housing resulting from the location in the *comuna* of construction projects with high unit costs. It is logical to conclude, however, that the degree of sociospatial segregation does not mechanically determine value increments, and that behind the explanatory power of these variables lies their relationship with differences among the urban standards in the *comunas* of the city, differences that could not be controlled for in this study. Another cluster of *comunas* where value increments can not be explained by the factors described above have experienced significant public sector construction but an even greater amount of private sector construction. This has taken place in markets such as the *comuna* of Maipu, where private housing construction has recently taken off.

Chapter Conclusions

The purpose of this chapter has been to provide three analyses that complement the bivariate land market analysis provided in the preceding chapter. More conclusive answers were sought to two questions:

i. How sensitive were land prices to urban planning and housing interventions?
ii. Which of the factors analyzed best explain the evolution of land values?

First we estimated the coefficients of land price elasticity in the four strata of the metropolitan area segmentation typology. There is no claim that these are exact indicators or are horizontally comparable, simply that they facilitate vertical discrimination, or discrimination by stratum, of land price sensitivity to housing dynamism and to investment in urban development.

The resulting indices showed that the *comunas* with the highest land values (those of the consolidated luxury market) were the most stable in the metropolitan area, while the pericentral *comunas* (the consolidating intermediate market) reacted more intensely to changes in housing and urban investment. The *comunas* of the "unstable segregated market" which experienced high levels of construction, focused urban investment, and accelerated land price increases, also displayed price elasticity. It is notable that the significant differences among strata with regard to indicators of elasticity as a result of urban investment indicate that the same level of urban

investment may be associated with varying relative changes in land value depending on the baseline situation of the area benefiting from investment, including its socioeconomic conformation. At one extreme, the "consolidated luxury market" had the greatest per capita urban investment but was not highly sensitive to it, while the "unstable segregated market" was highly elastic in reaction to the impact of urban development projects in areas that had more recently undergone a transition from rural to urban characteristics.

The determination of simple correlation coefficients at the level of the *comuna* tells us that the phenomena associated with the relative variation of land prices are distinct from those associated with nominal increases. Greater percentage variations of the price of land do not correlate directly with *comunas* where the construction of public housing dominated, but rather with those where housing was mixed, specifically where there was significant SERVIU housing but there was even more private housing construction. In terms of urban investment, the most significant percentage variations in land price by *comuna* were associated with socially motivated and progressive central government investments. In contrast, the largest nominal value increments correlated with municipal investments.

Finally, the results of the multiple regression equations leave many nominal value increments unexplained, indicating the strong influence of variables not considered in the research model. This contrasts with the more successful explanatory model concerning relative land price variation by *comuna*.

In general, land price evolution in a *comuna* is best explained by its socioeconomic conformation, evidenced in this study by the explanatory power of demographic growth and poverty rates. This contrasts with physical explanations offered in traditional analyses of value increment formation. The one physical variable that did hold up in our model was the geographic pattern of private sector housing activity, indicating new patterns of occupancy by middle and upper income sectors, which also had explanatory power in relation to the variability of land value by *comuna* and of course was related to the evolving socioeconomic profile of the *comunas*.

Projecting the results of our statistical analysis into the future, it is worrisome that there is little chance that the city will be able to accommodate the demands of new generations of low income households for land and housing in the sectors where they are currently living if those areas continue to experience the most rapid price increases. It is striking that the absence of low income households is the factor most closely associated with relative land price stability. This statistically significant variable is a predictor of urban standards, which could not be included among the independent variables in the model.

The increased inclination of higher socioeconomic sectors to move into *comunas* theretofore populated by moderate income populations is among the reasons that the greatest price increases occurred in those *comunas*. If there is no regulatory response to this trend, it could result in a process of property market-driven gentrification, which would be a paradoxical and disappointing outcome of the central and regional governments' compensatory investment in areas with infrastructural deficits at the beginning of the decade.

CHAPTER 3: MICRO-URBAN CASE STUDIES

In this chapter we will discuss a micro-urban study of the impact of urban investment projects in the evolution of land prices and fiscal values. Tables and maps describing the four projects and the neighborhoods analyzed are found in the Appendix.

3.1 Methodology

In this section we will present the methodological aspects of the case studies, which had the following goals:

- to analyze the impact of different public sector urban investment typologies on land value variation at the neighborhood (micro) level in various municipal urban development contexts
- to compare the evolution of market and fiscal land values at a micro level in order to further analyze the efficiency of the land tax as a tool to reflect the dynamics of land price formation
- to gain practical experience in measuring value increments generated by public works and to draw methodological lessons relevant to urban development financing policy

The methodology of the research was designed to best estimate, based on available information, the impact of four kinds of projects on urban land value increments. The four kinds of projects are representative of different modes of public sector urban intervention: parks, road projects, and urban renewal. The cases analyzed are four concrete experiences applied in two *comunas*, and the two *comunas* themselves represent distinct situations and dynamics with regard to residential patterns and development. They differ greatly in terms of socioeconomic realities and geographic centrality. The *comuna* of Santiago is the historical center of the city and Puente Alto, on the southern periphery, has been populated only over the last 15 years.

Before describing the projects, neighborhoods and information sources in more detail, we would like to present some conceptual considerations regarding the measurement of value increments resulting from public works projects. Most importantly, the quantification of these value increments is very much a developing field. In order to analyze them, the researcher must decide on a series of methodological practices that are as yet far from universally accepted. Not only does the quantification of urban land value increments lack set formulas and technical conventions, but it requires the researcher to manipulate a series of variables that make the task rather complex, including the type of public works project, the environment where it takes place, and the need to arrive at conclusions that suggest public policies and procedures for public sector value capture.

A series of unanswered questions hinder the effective quantification of value increments and thus the implementation of value capture mechanisms. With regard to public works projects, these are how to determine the geographical range of project influence, the duration of project impact, and the kind of data and analysis needed to isolate and quantify the effect of individual interventions so that at least their direct costs may be recovered. Any approach to this problem must respond a priori to these methodological questions.

One set of relevant sources on the practical criteria for these matters is the body of work involving environmental impact assessments (EIAs) [16] (Leal, 1997; *Ministerio de Obras Públicas, Transportes y Medio Ambiente de España*; 1995). The experience accumulated in EIA analyses indicates that each project and environment produce a unique dynamic with its own possible impacts. There frequently is no impact at all on certain variables of interest, or there may be significant impacts generalized within an area of influence. Another concept that may be borrowed from the EIA experience is the "before and after" model of evaluation that identifies values of interest within the area of influence at two moments (with and without the project), imputing those differences to the project when it is reasonable to do so.

3.2 Description of Projects and their Areas of Influence

The goal at this phase of the study was to select projects and determine their geographical areas of impact. These topics will be discussed in the present section.

3.2.1 The Selection of *Comunas* and Projects

In keeping with the goals of the study, we selected urban investment projects large enough to have an impact on land values in their respective neighborhoods, and that were located in areas that represented different dynamics of *comuna*-level land supply and different categories and volumes of urban investment activities, local finances, and socioeconomic conditions. Both the investment project and the characteristics of its location were defining factors for each case studied.

In order to select advantageous areas for the micro portion of the study, we considered several of the *comuna*-level factors generated at the macro stage. We sought to include both municipal and central government projects, so we considered the spatial behavior of urban financing sources. We sought to include both poor areas and those with higher average income so we considered the territorial distribution of poverty. We sought to include areas with both public and private housing construction, so we considered the type of housing development. Finally, we considered *comunas* with differing magnitudes and speed of valorization during the 1990s.

In order to select appropriate projects for study, we reviewed the following factors: the inventory of park, street and road, and municipal investment projects in 1992-1997, the availability of information regarding land on the market before and after project completion (a criterion that eliminated many projects and *comunas* from consideration), and the different levels of urban standards and consolidation at the level of the *comuna*.

[16] The analogy with EIA systems is quite pertinent. Several countries consider changes in property valuation to be an environmental impact that must be considered in the evaluation of urban street and road projects.

The table below describes the projects, analyzed in terms of investment typology, location by *comuna*, and other defining characteristics that lend the selected cases special significance within the metropolitan context.

Case Study Projects: Typology, *Comuna*, Market Characteristics

Typology	**Project**	***Comuna***	***Relevance of the Case***
Recovery of public space (paving and urban architecture)	Construction of pedestrian mall in the República neighborhood	Santiago	• High land prices with slow variation • High per capita urban investment • Mostly municipal investment • Low poverty rate • Subsidized private sector construction • High tax revenues • Few exemptions
	Neighborhood urban renewal in Concha y Toro	Santiago	
Major road work	Widening of *Avenida* La Florida	Puente Alto	• Low land prices with rapid variation • Low per capita urban investment • Mostly central government investment • Above average poverty rate • High rate of public housing • Low tax revenues • High exemption rate
Neighborhood public facilities	Construction of Cañamera Park	Puente Alto	

As the table illustrates, four projects were selected in two *comunas* dissimilar in terms of local land market dynamics, the volume and nature of public investment in urban development, socioeconomic conditions, and revenues from property taxes.

3.2.2 Characteristics of the Projects Studied

Four public sector urban investment projects were studied for their impact on land values.

Two projects were studied in the *comuna* of Santiago, the central zone of the metropolitan area. These were neighborhood renewal in Concha y Toro and the construction of a pedestrian mall on *Calle* República, both carried out in 1994 and 1995 before the fiscal revaluation. Eighty million pesos were invested in the Concha y Toro project for paving and for the construction of a small city plaza. In the República neighborhood mall project, 416 million pesos were invested in widening sidewalks, paving, and the improvement of various architectural features to support increased pedestrian traffic. Both projects were part of a municipal program for the revitalization

of central areas with features of architectural interest, and both benefited from additional private support.

In the *comuna* of Puente Alto on the metropolitan periphery, we analyzed the widening of the inter-municipal *Avenida* La Florida, a project that was completed in 1997. It was executed by the Ministry of Public Works as part of a program for the improvement of macro road infrastructure in two of the city's most populous *comunas* at a total cost of 4 billion pesos.

We also analyzed the impact of the construction of La Cañamera Park in Puente Alto by the Ministry of Housing and Urban Affairs for about 200 million pesos. The first phase of construction was completed in early 1998, involving the replacement of a garbage dump that had attracted criminal activity with one hectare of green space outfitted with playground equipment and other park infrastructure. The new park is contiguous to a large sector of public housing.

The boxes on the following pages contain more detailed descriptions of the projects analyzed for their impact on land values, including project costs, their dates of initiation and completion (used to determine the timing of evaluations), and general descriptions of their execution.

The Appendix also includes photographs of the four projects analyzed for their impact on fiscal and market land values.

CONCHA Y TORO NEIGHBORHOOD RENEWAL PROJECT
1. NAME OF PROJECT: Concha Y Toro Neighborhood Renewal Project
2. INVESTMENT: 80,000,000 pesos
3. WORK PERFORMED: General neighborhood renewal including the paving of Concha y Toro and other nearby streets along with the construction of rain gutters; the construction of Libertad de Prensa Plaza, the painting of building façades, and the installation of public lighting.
4. FINANCING: Municipal budget and private contributions
5. INITIATION OF PROJECT EXECUTION: 1994
6. COMPLETION OF PROJECT EXECUTION: 1994
7. PROJECT DESCRIPTION: This project is part of a larger municipal effort to revitalize the neighborhoods of the city's central *comuna*. A Neighborhood Advancement Committee *(Comité de Adelanto del Barrio*) was established in conjunction with the Corporation for the Development of the *Comuna* of Santiago (*Corporación de Desarrollo de la Comuna de Santiago*) in 1993, in order to reorient area uses and revitalize neighborhood life. The new community-scale plaza and the conversion of the area to pedestrian use were part of this process.

REPUBLICA NEIGHBORHOOD PEDESTRIAN MALL
1. NAME OF THE PROJECT: República Neighborhood Pedestrian Mall Project
2. INVESTMENT: 416,000,000 pesos
3. WORK PERFORMED: Neighborhood renewal through the rehabilitation of public space with an emphasis on improving public facilities, increasing pedestrian traffic, and providing for parking away from areas of public use. The work consisted of paving *Calle* República, installing public lighting, planters, benches , and kiosks, planting additional trees, and providing telephone booths between *Calles* Alameda and Gorbea.
4. FINANCING: Municipality and private contributions
5. INITIATION OF PROJECT EXECUTION: 1994
6. COMPLETION OF PROJECT EXECUTION: March 1995
7. PROJECT DESCRIPTION: The project grew out of the need to increase areas for pedestrian traffic and leisure areas due to the increasing presence in the area of universities, professional institutes, and their students. The eastern sidewalk was widened and the road surface for motor traffic was narrowed. The project was promoted by the Neighborhood Advancement Committee and the Corporation for the Development of the *Comuna* of Santiago in order to consolidate the university and service orientation of the neighborhood.

PROJECT TO WIDEN *AVENIDA* LA FLORIDA IN THE WALKER MARTINEZ – LAS VIZCACHAS SECTOR
1. INVESTMENT: 707,487,283 pesos (the tranche pertaining to the area of influence); 2,200,000,000 pesos (complete project)
2. WORK PERFORMED: construction of a new two lane road surface from the area of *Avenida* Walker Martínez in the *comuna* of La Florida to the area of Las Vizcachas in the *comuna* of Puente Alto, a distance of about 10.34 kilometers. Work also included improvements to lighting and landscaping. The phases of the project were the construction of the two lane road surface with asphalt concrete, the installation of public lighting, and the implementation of natural landscaping elements in keeping with the characteristics of surrounding areas.
3. FINANCING: Ministry of Public Works
4. INITIATION OF PROJECT EXECUTION: 1995
5. COMPLETION OF PROJECT EXECUTION: 1997
6. PROJECT DESCRIPTION: The project grew out of the need to maintain an efficient high speed (between 65 and 80 kph) road connecting the area within the Américo Vespucio ring road with areas in the peripheral *comunas* of La Florida and Puente Alto, to serve as an alternate route to the high volume *Avenida* Vicuña Mackenna. The project also provides a road connection with recreational areas (Cajón del Maipo) and with recently urbanized but not yet densely populated areas.

LA CAÑAMERA COMMUNAL PARK PROJECT
1. INVESTMENT: 185,000,000 pesos
2. WORK PERFORMED: Decontamination activities and construction of the first phase (one hectare) of a park in the area of the former La Cañamera dump. Work included the construction of green spaces and pedestrian access and the installation of playground equipment and other park amenities in the area.
3. FINANCING: Ministry of Housing and Urban Affairs
4. INITIATION OF PROJECT EXECUTION: Second half of 1998
5. COMPLETION OF PROJECT EXECUTION: March 1999
6. PROJECT DESCRIPTION: The park on the site of the former La Cañamera dump responds to the need for recreational areas in the southern sector of Puente Alto *comuna* and the need to eliminate land uses incompatible with the residential character of the zone. The first phase of the park has an area of one hectare, and thirteen additional hectares of park development are projected. The park is currently being maintained awaiting the completion of the second phase and its opening to public use at the end of 2000.

3.2.3 Baseline Conditions in the Areas of Influence

In this section we will describe the different characteristics and levels of urban consolidation of the respective areas of influence immediately before the execution of projects. We refer to these characteristics and levels of urban consolidation as baseline conditions.

This diagnostic is important in order to contextualize project impact measurements since it takes into consideration the preexisting factors upon which projects were to be superimposed, what Battele (quoted in Leal, 1997) calls the environmental sensitivity of the zone where work is performed. Extrapolating this concept to our research on value increments, we evaluate relative urban quality as measured by the existence or lack of urban infrastructure and therefore the set of attributes to be potentially modified by investment projects.

In general terms, the two projects in the *comuna* of Santiago were located in neighborhoods with high standards of urban infrastructure in relation to population, while Puente Alto, the site of the park project and the macro road infrastructure project, suffered from significant deficits of green space and social services.

For the purposes of this research, the radius of influence in Puente Alto was defined as 500 meters or 5 blocks around both the park and the road project. In the *comuna* of Santiago, on the other hand, where projects were related to the improvement of already well-defined neighborhoods, we analyzed the projects' effects on only those blocks located within the boundaries of those neighborhoods.

The features of the areas of project influence immediately before the initiation of project work are described in more detail in the following boxes with regard to their geographical boundaries, population figures, the general nature of their regulatory regimes for urban planning and construction, the predominant land uses, and their principal urban and residential characteristics.

Maps of the market and fiscal land values in the four neighborhoods analyzed are found in the Appendix.

CONCHA Y TORO NEIGHBORHOOD	
1	**NAME**: CONCHA Y TORO NEIGHBORHOOD
2	**BOUNDRIES**: **North:** Erasmo Escala; **South:** Alameda; **West:** Ricardo Cumming; **East:** Avenida Brasil
3	**POPULATION:** 830
4	**REGULATORY INSTRUMENT:** Avenida Brasil Neighborhood Plan (*Plan Seccional Avenida Brasil*)
5	**ZONING:** Expansion of the downtown zoning area
6	**MINIMUM AREA OF PROPERTY:** 500 square meters
7	**MAXIMUM PERCENTAGE OF LAND OCCUPATION:** 100%
8	**LAND USES:** In 1992, the neighborhood consisted of 8 square blocks primarily used for residential purposes (60%) followed by commercial uses (auto parts and hardware, 21%). There were also a number of educational institutions and a few vacant properties.
9	**DESCRIPTION OF AREA OF INFLUENCE:** Known for its architectural value and historical tradition, the neighborhood was declared a historical preservation zone (*zona típica*) in 1989. It contains a number of churches, secondary schools, and theaters built in the early twentieth century. It is notable for its irregular plan, winding streets, and the historical façades of its houses. The aesthetic value of these features compensated for the deterioration of the neighborhood.

REPUBLICA NEIGHBORHOOD	
1	**NAME**: República Neighborhood
2	**BOUNDRIES**: **North**: Alameda, **South:** Blanco Encalada, **West:** Calle Molina, **East:** Almirante Latorre
3	**POPULATION:** 12,123
4	**REGULATORY INSTRUMENT:** Avenida República España Sectional Plan (*Plan Seccional Avenida República España*)
5	**ZONING:** Expansion of the downtown zoning area
6	**MINIMUM AREA OF PROPERTY:** 500 square meters
7	**MAXIMUM PERCENTAGE LAND OCCUPATION:** 100%
8	**USES OF LAND BEFORE PROJECT:** In 1992, the neighborhood consisted of 12 square blocks. Its predominant use was residential (44%), followed by commercial (25%). Nevertheless, the character of the neighborhood is now highly influenced by the presence of universities and other educational institutions. The *comuna*-wide planning instrument (*Plan Regulador Comunal*) categorizes the neighborhood as a historical preservation area.
9	**DESCRIPTION OF AREA OF INFLUENCE:** The area has undergone a transformation since the arrival of a number of educational institutions in the 1980s. Although still largely residential, commercial activity is increasing, contributing to the usefulness of the pedestrian area. The presence of a number of buildings with early twentieth century architectural features led to the neighborhood's designation as a historical preservation area.

	AREA OF INFLUENCE OF THE AVENIDA LA FLORIDA PROJECT
1	**NAMES**: Villas Los Industriales; Ciudad del Este; La Frontera; Plazuela Los Toros Phase I, II and V; Andes del Sur VII, VIII and IX; Villa Lomas de Tobalaba
2	**BOUNDRIES:** North: Avenida Bahía Inglesa and Avenida Diego Portales; South: Avenida El Peral; East: Canal Las Perdices; West: Avenida México
3	**POPULATION:** 50,000 at a density of approximately 200 inhabitants per hectare
4	**REGULATORY INSTRUMENT:** *Comuna* of Puente Alto Regulatory Plan (*Plan Regulador Comunal de Puente Alto*), in process of development
5	**ZONING:** Zone 18F for residential and recreational/educational public facilities
7	**MINIMUM AREA OF PROPERTY:** 200 square meters
8	**MAXIMUM PERCENTAGE LAND OCCUPATION:** Unavailable
9	**USES OF LAND BEFORE PROJECT:** The predominant uses before the project were residential, consisting of basic housing constructed at the beginning of the 1990s, and agricultural, particularly for vineyards and grape trellises. Agricultural areas have been subject to attrition by residential developments of varying sizes.
10	**DESCRIPTION OF THE AREA OF INFLUENCE:** The area of influence is a piedmont and presents no physical obstacles to the development of infrastructural projects such as roads, a potable water treatment facility, and irrigation canals. The development of commercial infrastructure has led to middle class and upper middle class housing development.
	AREA OF INFLUENCE OF LA CAÑAMERA PARK
1	**NAMES**: the residential areas of Sargento Menadier, Volcán San José I, II and III, Caleuche, Santa Elvira, Estaciones Ferroviarias, La Construcción, and Santa Catalina
2	**BOUNDRIES**: North: Avenida Eyzaguirre; South: Avenida San Pedro; East: San Guillermo; West: Quitalmahue
3	**POPULATION:** about 150,000 at a density of between 200 and 600 inhabitants per hectare, varying by sector
4	**REGULATORY INSTRUMENT:** *Comuna* of Puente Alto Regulatory Plan (*Plan Regulador Comunal de Puente Alto*), in process of development.
5	**ZONING:** Zone 18F for residential and recreational/educational public facilities
6	**MINIMUM AREA OF PROPERTY:** 200 square meters
7	**MAXIMUM LAND OCCUPATION:** 90%
8	**LAND USES BEFORE PROJECT:** Before the project the surrounding area was home to a population of public housing residents and contained large agricultural properties. There was also significant extraction of sand and gravel for construction use. A garbage dump in the immediate area of the project was used for the disposal of waste from around the *comuna*.
9	**DESCRIP**TION **OF THE AREA OF INFLUENCE:** This is an area of public housing in developments established by MINVU, including apartment blocks and two story units, encircled by high volume thoroughfares that facilitate transportation to and from other points both within the *comuna* and outside it (central Puente Alto, Pirque, southern La Pintana). Population density is over 250 inhabitants per hectare.

3.3 Impact on Fiscal and Market Land Values

3.3.1 Information Sources

The impact of these projects on land values was measured through the use of market and fiscal data on the value of properties within their respective areas of influence. In each of the four cases, information was compiled on land values before and immediately after the completion of project execution and that information was organized at the level of the neighborhood.

Information on fiscal valuation was obtained from Internal Revenue Service (*SII*) records, which are organized by the square block at the Thirteenth and Fourteenth SII Regional Directorates. Information on market values was obtained through property offers recorded in the Greater Santiago Urban Land Market Bulletin (*Boletín del Mercado de Suelo Urbano del Gran Santiago*).

In the case of fiscal land values in the *comuna* of Santiago, information was obtained on the square blocks that make up both neighborhoods covering an area of one block around each side of the project, comprising seven square blocks in the case of the Concha y Toro neighborhood and ten square blocks in the case of the República neighborhood. The cadastral values used were those of 1995, the year when the city's current fiscal valuation was conducted, while 1992 fiscal values were determined on the basis of the 1975 valuation with projections for values immediately prior to project execution determined on the basis of the Consumer Price Index, which is the legally mandated basis for value readjustments (Law 17235 on property taxes). Information on the market value of properties contemporary with previous fiscal value was obtained from the data registered for Zones 4, 15, and 16 in the Urban Land Market Bulletin, which coincide with the areas of influence of the projects in Concha y Toro and República.

In the case of the widening of Avenida La Florida and the work at La Cañamera Park, fiscal information was gathered from the land values registered in the first half of 1996 and 1998, respectively, subsequent to the most recent SII revaluation. Land valuations after project completions were projected on the basis of the Consumer Price Index for the first half of 1998 in the case of the road projects, and for the first half of 1999 in the case of the park. Data on market land values correspond to recorded land offers within a 500 meter radius of influence, or five blocks around the project.

In addition to compiling and analyzing statistics, we interviewed four individuals in the municipalities of Puente Alto and Santiago. They were architects at the municipality of Puente Alto's Urban Planning Directorate (*Direcciones de Urbanismo de la Municipalidad de Puente Alto*) and two institutions in Santiago, the Department of Technical Documentation and the Communal Planning Secretariat (*Departamento de Documentación Técnica* and *Secretaria Comunal de Planificación* - SECPLAC). These interviews focused on the interviewees' perceptions of the urban impact of the projects studied and of public sector urban investment in general; on municipal maintenance and updating of the cadastre; and on the interviewees' evaluation of the cadastre as an instrument of fiscal valuation.

3.3.2 Measurement: Variables and Indicators

The controlled variables for our empirical findings are fiscal land values and the price of properties offered on the land market. The following definitions apply:

FISCAL VALUATION:

Each square block was studied along with the sometimes multiple uses of all its properties. However, in order to perform a comparative analysis it was necessary to assess values at the level of the property unit. In most cases, each property unit corresponded to one use and user. Nevertheless, where there was more than one use and user per property they were conflated in order to establish homogeneous units for comparison. This was the case for apartment buildings, public buildings, and tenements.

The following data were recorded:

- Land valuation**:** total value in UFs as calculated by the SII - Internal Revenue Service

- Valuation of buildings: unit value as defined by the construction materials, quality, and condition of buildings. Use of multiple building materials sometimes required a further calculation of value. These materials included steel, lumber, and concrete, brick and stone masonry.

- Total valuation: the sum of the land and building valuations. Buildings with multiple users, such as office buildings, apartments, or tenements were considered to be held in common.

- Square meters**:** the area corresponding to the land surface

- Annual assessment**:** the value in UFs recorded on SII tax rolls

- Use**:** use of the property. Recorded uses are residential, commercial, educational, retail, office, hotel, public building, industrial, warehouse, church or place of worship, sports, and vacant.

MARKET VALUE:

The data were compiled by the quarter, considering the number of properties on the market, their area, and their value in *Unidades de Fomento* - UFs.

Project impacts were analyzed by generating indicators of average land value by neighborhood or area of influence, and by land uses in the case of fiscal valuations before and after project execution. This data provided the basis for calculating indicators of temporal variation and the degree of discrepancy between fiscal and market values.

3.3.3 Study Hypothesis and Assumptions

Before discussing the results of this study, a series of hypotheses and assumptions should be made explicit:

Hypothesis:

The price of land is directly related to the attributes of its environment.

The changes brought about by projects involving new urban infrastructure and public facilities will affect the value of properties located within their areas of influence. Those effects will decrease with properties' distance from project locations.

The impact of a project on land values increases with the size of the project and diminishes as the greater overall presence and higher overall quality of urban attributes increases.

The impact on land values is reflected automatically in the prices of vacant land (if there are no additional urban attributes in its immediate environment) and in the price of housing (houses and apartments), unlike land with other uses.

Assumptions:

The singular impact of a project is registered as a change between the value of a property one year before and one year after the completion of project execution.

There is no concomitance or interaction with other parallel projects.

3.3.4 Impact on Fiscal and Market Values

Before discussing the results of this research, it must be reiterated that the imputation of direct effects on value increments to individual projects is a simplification of the impact on the functioning of local land, real property, and housing markets of changes in local and micro-level standards of urban infrastructure and services. This is why we are making explicit the presuppositions of our empirical analysis.

In this sense, while the results stated below establish indicators for the impact of individual projects on land values with different orders of magnitude, it must be remembered that each project has its own set of characteristics and that it interacts with a unique set of variables present in its environment. Not all the information relating to these variables is available for the analysis performed in this study. It must also be remembered that land market dynamics in the areas of project influence are explained in this study on the basis of variations produced by the project being analyzed. In reality this influence is never "pure." On the contrary, land value variation responds to a diverse set of factors affecting local urban dynamics in different ways and at different levels.

Each project is analyzed below in two tables. The first table presents the fiscal value of properties registered with the SII before and after project execution, specifying the number of properties and the overall surface area and value of different categories of land as defined by their uses. An indicator of value in UFs per square meter unit is also provided for each land use category. The annual change in value is also provided for each land use category and expressed in terms of average nominal and average percentage variation.

The second table for each project area is temporally parallel to the first and provides average semi-annual values for properties on offer, taken from the Land Market Bulletin produced by Pablo Trivelli. The controlled variables are the number of registered properties on the market for each quarter during the period (with no way to know if there are duplications), the total surface area on offer, the average price of land measured in UFs per square meter, and the ranges of variation of land prices. For the purpose of comparison with fiscal values, the same measurements of nominal and percentage variation are included.

The Concha y Toro Project

Between 1992 and 1995, the nominal market value of land in the area impacted by the renewal project increased a total of 8.2%, an annual nominal growth rate of .8 UF per square meter. When the project was completed, land was being offered on the market for up to 24 UFs per square meter. This was several times higher than the land's fiscal valuation, despite the evolution of the latter and despite the intervening 1995 revaluation. In relative terms, fiscal values had varied more than market prices during the period, but this change did not compensate for the notable price differential. The average market price in the area was three times greater than the fiscal valuation in the case of vacant land and four times the valuation of land used for residential purposes.

Interviews with municipal officials on their perception of the project and its impact revealed that neither the quality of project design nor the available resources were adequate to compensate for preexisting social problems and negative changes to the neighborhood. They indicated that a broader strategy would have been warranted in order to address the level of neighborhood blight existent in Concha y Toro, and that neither the level of investment nor the measures taken were sufficient. In addition, the Council on National Monuments has declared the area a Historical Preservation Zone (*Zona Típica*), which imposes a series of legal limitations and restrictions on investment. It is proposed to grant permission to anyone who wants to improve or rehabilitate a property within a Historical Preservation Zone, for example, and to forgive certain annual taxes and assessments in proportion to the size or extent of the rehabilitation project.

This analysis, however, contrasts with the significant increases in land values. It can not be established whether these increases took place because the improvement of areas where progress had been stalled stimulated price increases or whether those increases simply reflected the dynamics of urban land speculation. Given the limited size of the project, the latter seems more likely.

FISCAL VALUE BY USE IN CONCHA Y TORO PROJECT AREA OF INFLUENCE

	NUMBER OF PROPERTIES		VALUE IN UFs		SQUARE METERS		UF PER SQUARE METER		DIFFERENCE IN UF PER SQUARE METER	
	1992	1995	1992	1995	1992	1995	1992	1995	UF annual	% annual
RETAIL	31	36	48,856	197,605	20,860	23,322	2.34	8.47	2.0	87.3
EDUCATIONAL	3	3	3,122	4,060	2,712	2,712	1.15	1.50	0.1	5.4
HOTEL-MOTEL	3	3	771	3,317	555	595	1.39	5.57	1.4	100.4
RESIDENTIAL	41	40	7,770	18,526	6,724	6,199	1.16	2.99	0.6	52.9
WAREHOUSE	2	2	473	1,799	418	418	1.13	4.30	1.1	93.4
OFFICE	16	18	5,839	14,156	4,045	4,548	1.44	3.11	0.6	38.5
VACANT	4	3	267	979	380	295	0.70	3.32	0.9	124.2
UNCLASSIFIED	2	0	4,982	0	1,868	0	2.67	-		
TOTAL	102	105	72,079	240,441	37,562	38,089	1.92	6.31	1.5	76.3

MARKET VALUE OF LAND ON OFFER IN CONCHA Y TORO PROJECT AREA OF INFLUENCE

	NUMBER OF PROPERTIES		VALUE IN UFs		TOTAL SQUARE METERS		UFs PER SQUARE METER		DIFFERENCE IN UF PER SQUARE METER		NUMBER OF PROPERTIES	
	1992	1995	1992	1995	1992	1995	1992	1995	1992	1995	UF annual	% annual
CONCHA Y TORO	7	13	10,704	11,014	9.72	12.1	12.5	24.0	2.29	5.04	0.8	8.2

República Pedestrian Mall Project

In the area of this significantly larger project, the average annual increase in market prices was .8 UF per square meter, an increase of 8% in relation to the estimated value before the project in 1992. While fiscal values increased considerably in the same period, (56% for the average vacant property and 65% for residential properties), the gap was persistent. In 1995, market value was 10 UFs per square meter, five times higher than the fiscal value of both vacant and residential land.

It is notable that this project, although quite a bit larger than the one in Concha y Toro, did not seem to have any great impact on the creation of value increments, which may be due to the more consolidated baseline conditions in the area. Likewise, interviews with municipal officials indicate that while the project was beneficial, developing a large thoroughfare dedicated to the needs of the university community and improving a public space, the neighborhood was already consolidated as a university-oriented area. Rather than bringing a stagnant neighborhood to life, the investments served to consolidate the trajectory of a neighborhood that was already experiencing its own particular development dynamics.

FISCAL VALUE BY LAND USE IN REPUBLICA PROJECT AREA OF INFLUENCE

	NUMBER OF PROPERTIES		VALUE IN UFs		SQUARE METERS		UF PER SQUARE METER		DIFFERENCE IN UF PER SQUARE METER	
	1992	**1995**	**1992**	**1995**	**1992**	**1995**	**1992**	**1995**	**UF** annual	**%** annual
RETAIL	60	60	40,782	190,932	28,716	30,374	1.42	6.29	1.6	114.2
EDUCATIONAL	23	21	20,073	107,724	22,363	21,047	0.90	5.12	1.4	6.9
HOTEL-MOTEL	2	2	2,117	13,327	1,752	1,752	1.21	7.61	2.1	176.5
RESIDENTIAL	105	105	21,688	81,973	26,137	33,582	0.83	2.44	0.5	64.7
INDUSTRIAL	2	2	899	3,826	1,051	2,168	0.86	1.76	0.3	35.4
WAREHOUSE	3	4	1,942	1,668	2,215	643	0.88	2.59	0.6	65.3
OFFICE	22	32	9,325	30,896	9,067	12,523	1.03	2.47	0.5	46.6
PUBLIC BUILDINGS	1	2	1,291	4,756	1,549	1,736	0.83	2.74	0.6	76.2
VACANT	1	1	2,027	1,173	2,113	797	0.96	1.47	0.2	17.8
UNCLASSIFIED	9	13	3,901	14,499	3,275	4,539	1.19	3.19	0.7	56.1
TOTAL	**228**	**242**	**104,045**	**450,773**	**98,238**	**109,130**	**1.06**	**4.13**	**1.0**	**96.7**

MARKET VALUE OF LAND ON OFFER IN REPUBLICA PROJECT AREA OF INFLUENCE

	NUMBER OF PROPERTIES		TOTAL AREA IN SQUARE METERS		UF PER SQUARE METER		MAXIMUM		MINIMUM		DIFFERENCE IN UF PER SQUARE METER	
	'92	**'95**	**'92**	**'95**	**'92**	**'95**	**'92**	**'95**	**'92**	**'95**	ANNUAL IN UF	ANNUAL %
REPUBLICA	8	3	8,640	7,500	8.0	10.1	11.8	14.0	1.13	3.25	0.7	8.6

Avenida La Florida and La Cañamera Park:

The projects analyzed in Puente Alto conform to the dynamics found in peripheral areas, where the main impact of public investment was urbanization in the sense of added housing, but with a notable dearth of associated services.

The data indicate that the widening of Avenida La Florida led to a significant increase in land prices. Land on offer increased from a value of 1 UF per square meter in 1996 to more than 5.5 UFs in 1998 (after project completion). Fiscal values, on the other hand, were practically unchanged, so that in 1998 land was being offered at prices five times their fiscal valuation. The impact of the project is hard to separate from that of increased private investment in the area, notably the construction of the Plaza Tobalaba mall, which was associated in turn with the increased construction of housing complexes primarily intended for middle class inhabitants.

FISCAL VALUES BY LAND USE IN THE AVENIDA LA FLORIDA PROJECT AREA OF INFLUENCE

USE	NUMBER OF PROPERTIES		TOTAL VALUE IN UFs		SQUARE METERS		UF PER SQUARE METER		DIFERENCE IN UFs PER SQUARE METER	
	1996	**1998**	**1996**	**1998**	**1996**	**1998**	**1996**	**1998**	UF annual	% annual
AGRICULTURAL	4	4	10,128	10,530	1,462,600	1,294,400	0.0069	0.0081	0.00	8.7
RETAIL	0	1	0	31,200	0	168,196	-	0.1855	0.19	
RESIDENTIAL	2,659	2,660	158,049	164,316	263,960	263,960	0.5988	0.6225	0.02	2.0
WAREHOUSE	1	1	973	1,012	5,538	5,538	0.1758	0.1827	0.01	2.0
RELIGIOUS AND EDUCATIONAL	1	1	2,164	2,249	3,496	3,496	0.6189	0.6434	0.02	2.0
UNKNOWN	1		201	209	8,900	8,900	0.0226	0.0235	0.00	2.0
TOTAL	**2,666**	**2,667**	**171,516**	**209,517**	**1,744,494**	**1,744,490**	**0.0983**	**0.1201**	0.02	11.1

MARKET VALUE OF LAND ON OFFER IN AVENIDA LA FLORIDA PROJECT AREA OF INFLUENCE

	NUMBER OF PROPERTIES		TOTAL SQUARE METERS		UF PER SQUARE METER		MAXIMUM		MINIMUM		DIFFERENCE IN UFs PER SQUARE METER	
	1996	**1999**	**1996**	**1999**	**1996**	**1999**	**1996**	**1999**	**1996**	**1999**	UF ANNUAL	PERCENT ANNUAL
AVENIDA LA FLORIDA	3	4	131,110	57,140	1.023	5.750	2.54	6.5	0.3	5	1.6	154.1

The construction of La Cañamera Park was an important environmental improvement for the zone, but it did not have any significant impact on urban development or land values due to the area's large enclave of public housing and consequent social homogeneity, associated with negative social processes. The data indicate that because of the neighborhood environment and the baseline situation into which the new park was inserted, this was an investment that did not produce value increments. In fact, any positive effect it may have had was diluted in a neighborhood dynamic of diminishing values. Few properties were on the market in the area, but their market value decreased from 2.9 UFs to 1.3 UFs per square meter during the period examined, when the green space was being developed. Fiscal values differed from market values, but this discrepancy was the least here among all the project areas studied in this research.

FISCAL VALUES BY LAND USE IN LA CAÑAMERA PARK AREA OF INFLUENCE

USE	NUMBER OF PROPERTIES		TOTAL VALUE IN UFs		SQUARE METERS		UF PER SQUARE METER		DIFFERENCE IN UFs PER SQUARE METER	
	1998	1999	1998	1999	1998	1999	1998	1999	UF annual	percent annual
AGRICULTURAL	6	6	14,388	14,860	882,800	882,800	0.0163	0.0168	0.00	3.3
AGRICULTURAL / RETAIL	1	1	1,012	1,045	110,000	110,000	0.0092	0.0095	0.00	3.3
RETAIL	5	5	6,429	6,639	420,000	420,000	0.0153	0.0158	0.00	3.3
SPORTS	1	1	817	844	2,314	2,314	0.3531	0.3646	0.01	3.3
RESIDENTIAL	5592	5592	153,033	158,050	404,723	404,723	0.3781	0.3905	0.01	3.3
RESIDENTIAL AND WAREHOUSE	1	1	1,962	2,026	13,890	13,890	0.1412	0.1459	0.00	3.3
WAREHOUSE	1	1	133	138	378	378	0.3531	0.3646	0.01	3.3
VACANT	4	4	3,913	4,042	11,085	11,085	0.3530	0.3646	0.01	3.3
UNCLASSIFIED	0	1	0	1,528	0	108,500	-	0.0141	0.00	
TOTAL		**5,612**	**181,687**	**189,172**	**1,845,190**	**1,953,690**	**0.0985**	**0.0968**	0.00	-1.7

MARKET VALUE OF LAND ON OFFER IN THE LA CAÑAMERA PARK AREA OF INFLUENCE

	NUMBER OF PROPERTIES		TOTAL SQUARE METERS		UFs PER SQUARE METER		MAXIMUM		MINIMUM		DIFERENCE IN UFs PER SQUARE METER	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	UF annual	% annual
LA CAÑAMERA PARK	1	1	2,000	31,000	2.95	1.3	2.95	1.3	2.95	1.3	-1.65	-55.9

4. CONCLUSIONS

The goals of this research were to refine our understanding of the effects of different urban interventions on land values during the 1990s in the metropolitan area of Greater Santiago, and with this understanding to evaluate the strengths and weaknesses of land taxes as a sustainable financing mechanism for decentralized urban development.

In order to meet these goals, we analyzed the structure and dynamics of valorization in the urban land market, first in the 34 political-administrative *comunas* of the city, and then at a micro scale. Within this study's research model, land values are both a dependent variable affected by a wide range of public-private interventions, and a source of income that may be recovered for society through local taxes or through a complementary set of regulations for the recovery of value increments.

In order to study these questions empirically, we first established a typology of the land market, defining four market strata into which different *comuna*s were categorized. These four strata were established as a framework for the study of market dynamics, investment by the different levels of government in urban infrastructure and public facilities, and land tax revenues. We also analyzed the impact of housing dynamics and investment in urban development projects on percentage and nominal variations in the average value of land by *comuna*. In a second element of the research, we studied the impact of four individual urban investment projects on the fiscal and market value of properties at a micro or neighborhood level.

In this chapter we will provide a synthesis of the quantitative analysis mentioned above, based on the profiles of each of the four strata that comprise the land market typology, in terms of the relation between land market dynamics and changes in the quantity and characteristics of housing stock, public investments in urban services and infrastructure, and the evolution of land tax revenues and exemptions. We will also provide the principal conclusions of the case studies, and finally we will establish the principal tendencies that should be of interest with regard to the city as a whole and some of the most important policy implications suggested by our research results.

4.1 A SYNTHESIS OF THE QUANTITATIVE RESEARCH

Profile of the Metropolitan Land Market

The land market typology developed in this study identifies four groups of *comunas* based on average land price in 1997 and the percentage variation in land prices from 1992 to that time. The first group, called "the consolidated luxury market," was characterized by high land prices and modest price variation. The second group, called "the consolidating intermediate market," is made up of *comunas* with land values higher than the city average that had evolved moderately, increasing between 66 and 240%. The third group, "the dense and stable market," is made up of other municipalities where value had increased moderately, but where prices continued to be lower than average for the metropolitan area. The fourth group was the "unstable segregated

market," a group of *comunas* with land prices lower than average for the city, that had experienced sharp increases of over 240%, in some cases reaching 600%.

- **Consolidated Luxury Market (high prices / slow valorization)**

Socioeconomic characteristics: This group of five *comunas* contains 15% of the population of Greater Santiago, has the highest income levels in the city, and is home to only 5% of the poor population.

Land and construction market: In 1997, land in this stratum was worth more than 250% of the city average. Twenty-four percent of all land on offer in the city was located in this stratum and although individual properties were smaller than the city average, they had above average values. Between 1992 and 1997, prices increased little in relative terms (less than 35%), but very significantly in absolute or nominal terms. Housing stock increased significantly, as new construction in this stratum represented 40% of all new construction in the city as measured by floor area, far exceeding the stratum's demographic weight. Property market dynamics were almost entirely attributable to the housing sector.

Investments in urban development: Per capita urban investments in 1992-1997 for this group of *comunas* were 8.6 UFs, well above the Santiago average of 5.1 UFs. Almost all of these investments were municipal expenditures funded by land tax revenues. Forty-five percent of all municipal investments were concentrated in this group of *comunas*, where per capita municipal investment was 8 UFs, three times the rate for Greater Santiago as a whole.

Land price elasticity: Our analysis of this stratum led to the conclusion that relative land value variation in these *comunas* was less sensitive to investments than in the rest of the city during the period in question. This was attributed to the fact that the urban infrastructure was consolidated long before 1992, partially by hidden public subsidies that land owners and the property market sector were able to capitalize on before that time.

Land tax revenues: Seventy percent of the city's accumulated land tax revenue was collected from this group of *comunas* in the 1992-1997 period, although the total value of properties in the area corresponds to just 57% of the city total. During the period, tax payments in the stratum grew by 79% while land valuation grew by 143%. Land taxes grew as a proportion of total self-generated municipal revenue, but the nominal growth in tax revenue was slower than the growth in municipal investments.

- **Consolidating Intermediate Market (high prices / intermediate valorization)**

Socioeconomic Characteristics: Twelve percent of the population lives in this group of six *comunas.* The poverty rate is low and urban infrastructure is more developed here than in the city as a whole.

Land and construction market: Average land values in this stratum are above the city average. Increases during the period were moderate relative to their levels in 1992, but very significant in

absolute or nominal terms. Land on the market in this stratum constituted 7% of the city total, with smaller than average properties and little change in the volume on offer throughout the period. There was only a minimal increase in housing stock (5.6%), ninety-nine percent of which resulted from activity by the private construction sector.

Investments in urban development: Fifteen percent of all urban investment takes place in these *comunas* and between 1992 and 1997 per capita investments were 6.4 UFs. One fourth of all street and road investment is concentrated in this stratum. Accumulated per capita municipal investment was 1.6 UFs over the period.

Land price elasticity: A moderate rate of housing construction in this area disproportionately affected land prices and of the four market strata that were studied, this group of *comunas* experienced the greatest price elasticity in relation to public investment in urban development.

Land tax revenues: Municipal revenues from land taxes increased at a slower rate than that of Greater Santiago as a whole, and at a slower rate than the increase of land valuations measured up to 1998. Sixty percent of properties in the group were exempt from taxation, with up to an 80% exemption rate in some *comunas*. Of the four strata, this one reported the least variation or growth of both land tax revenue and valuations.

- **The Dense and Stable Market (low prices / intermediate valorization)**

Socioeconomic Characteristics: The twelve *comunas* in the group are home to 34% of Greater Santiago's population. The population density and the poverty rate are both higher in this group of *comunas* than in the others.

Land and construction market: Land values are half the city average. Relative price increases were moderate in 1992-1997 and the volume of land on the market was stable. In 1997, the value of land in this group was 10% of the city total and land on offer was 27% of the city total. Housing stock increased by 32% between 1992 and 1997, representing 25% of all new housing construction in Greater Santiago. Most was private sector construction, but there was also a considerable volume of directly executed public housing built under SERVIU programs.

Investments in urban development: Thirty one percent of public investment in urban development took place in this group of *comunas*. More specifically, this included 36% of street and road investment, 44% of investment in urban public facilities, and 35% of investment in health and education services as a result of territorially-focused central and regional government programs. At 4.7 UFs, per capita investment was below the city average during the period, and per capita municipal investments were only 2.2 UFs.

Land price elasticity: Housing construction had an important impact in this area, as did public investment, in both cases mostly by the central and regional governments.

Land tax revenues: While tax revenues increased in this group of *comunas*, only in four of them was that increase considerable. Per capita revenues doubled, but from a very low baseline point.

Land tax revenues increased less than land values. In 1998, eighty-six percent of properties in the stratum were exempt from taxes.

- **The Unstable Segregated Market (low prices / high valorization)**

Socioeconomic Characteristics: This group holds 40% of the population in 11 *comunas* with a higher poverty rate than the average for the rest of the city.

Land and construction market: Between 1992 and 1997, land values in this group of *comunas* experienced the fastest relative growth in the city, more than 200%. Nevertheless, average nominal land price increases were much lower than those in *comunas* with higher values, and in 1997 land values were still just half the city average.

Until 1996, land on offer in these comunas represented up to 64% of all land on the market, but that figure later dropped to 42% and its value is just 16% of global value. Housing stock grew by 27% during the period. The stratum's construction activity in 1992-1997 accounted for 30% of all new floor space. An average 34% of new housing was affiliated with SERVIU programs, but in some comunas (El Bosque, La Pintana, Lo Prado, and Renca) more than 85% of new housing was public and tax exempt.

Investments in urban development: Twenty-eight percent of all public investment in urban development was directed at this stratum of *comunas*, mostly provided by the central and regional governments. Total accumulated investment in 1992-1997 was 3.7 UFs per capita. This was half of per capita investment in Group 1 and less than the average for Greater Santiago. These *comunas* received 1.9 UFs per capita in investment for street & road projects, 32% of the total, as well as 38% of investment in urban public facilities and more than half of all investment in local services, in particular 1.6 UFs per capita for schools and public health clinics.

Land price elasticity: Rapid land price variation illustrates a high degree of elasticity with the sustained increase of housing stock and an even higher rate of regional and national public investment in infrastructure oriented toward basic services.

Land tax revenues: Municipal revenues from land taxes grew in these *comunas* but with great disparities among them, probably due to different administrative approaches that are beyond the scope of this phase of the research. Per capita revenue doubled, but only from levels that were very low at the beginning of the decade. Variation of municipal revenues from land taxes was slower than increases in land values, since almost 90% of properties were exempt. Unlike in areas with higher land prices, total tax revenues grew more rapidly than total valuation and that portion of it that was tax exempt.

It can be hypothesized that the four typologies identified in this study represent four stages of the metropolitan land market. The *comunas* of the "consolidated luxury market" can be interpreted as a modern market experiencing stable growth, primarily operating on the basis of market mechanisms. Its price dynamics, characterized by high nominal value increments, were less dependent on new public investments than the rest of the city, and were relatively more stable

over the long term. According to the hypothesis, this would be because "hidden" subsidies and value transfers to private parties took place long ago. The value increments generated were recovered at the level of the *comuna* but were not reinvested at the same rate.

The *comunas* of the "consolidating market" were at an earlier stage of development, receiving public investment in order to resolve a deficit of street and road infrastructure. The private sector was motivated to capitalize on the resulting land value increments and the improved urban environment by investing in local construction projects. The private appropriation of value increments was notable in this area with poverty rates below the city average, land values above average, and significant nominal land price increases.

The other two groups of *comunas,* the "dense and stable" and "segregated" markets, largely reflected patterns of growth on the city periphery and the socio-spatial segregation of the low income population where state interventions in the form of public housing construction and subsequent urban investments drove development. As a result of their lower land values, and despite deficits of infrastructure and public facilities, these *comunas* absorbed the greatest part of the city's demographic growth in the 1980s. More recently, they have been the focus of central government investments intended to mitigate the deficit of public facilities and compensate for the limited capacity for municipal development resulting from the *comuna*'s socioeconomic profile. Although land price increases here generated more modest nominal value increments than those in wealthier *comunas*, they reflected the more recent transformation of the area into a truly urban zone brought about by investment in urban planning, housing, and infrastructural development during the 1990s.

4.2 A SYNTHESIS OF THE CASE STUDIES

These case studies highlight some of the important questions that must be considered for the design of instruments to capture value increments resulting from public works projects and for the modernization of the land tax instrument.

With regard to the former, it still seems that existing or baseline standards at the time of urban interventions influence land price dynamics more than the characteristics of the projects themselves. The improvement of the Avenida La Florida, a major thoroughfare, was an exception, since as an inter-*comunal* project it was not susceptible to municipal taxation. As for the need to reform the land tax, the case studies only confirm the existence of significant fiscal undervaluations and the fact that the improvements introduced by periodic revaluations quickly fall behind ongoing market dynamics.

4.3 GENERAL TENDENCIES

1. Between 1992 and 1997, the following factors that defined the dynamic in the city of Santiago as a whole where a 30% relative growth in housing stock, a 14% variation in public investment in urban infrastructure, and an 84% increase in land tax revenues. The price of land grew by 111%. The global value of land underwent constant and sustained growth, particularly strong in the *comunas* of Groups III and IV, producing a convergence of prices

toward the average for Greater Santiago as a whole. Land values in the *comunas* of Group II also rose, reducing their distance from land values in the "consolidated luxury market."

2. Public investments in urban development were very significant in nominal terms.[17] Investment by the central and regional governments focused on the *comunas* of Groups II, III and IV, while municipal investments were strongly concentrated in the five *comunas* of the "consolidated luxury market," where land values were most stable.

3. Our analysis of land price variation has shown that it is sensitive to the number and location of housing units, but that value increments are best explained by a combination of public and private construction. Limited housing activity in the "consolidating intermediate market" had a significant effect on price variation. In the "dense and stable" and "unstable segregated" markets as well, the mostly central and regional investments in urban development positively affected relative value increments. While the peripheral *comunas* registered the greatest relative increases as a result of low land prices at the beginning of the decade, high priced *comunas* had low relative increases in reaction to new investments but these increases were nominally several times those in the rest of the city's *comunas*.

4. During the period, land value variation was sensitive to the combined net effects of central and regional government public investment from the general budget, including SERVIU housing construction, subsidized private housing construction, and public investment in urban development. Increased municipal revenue from land taxes, however, did not reach the same level of relative variation displayed by land values.

5. The positive externalities of public interventions for the improvement of the urban environment and the quality of life were reflected as price increases on the land market. While the State stimulates the city's land market through its urban investments, it is negatively impacted by resulting price increases if it is unable to utilize the fiscal valuation process to fully capture the value increments that have been created and use them to fund additional urban or housing development projects.

6. The public sector, especially municipal government, is not able to fully finance the necessary or desirable urban interventions to reduce imbalances in services, public facilities, and infrastructure in different parts of the city. The advantages of land taxes as a source of investment resources have been noted. They are its progressivity and therefore its fairness, its visibility to taxpayers, and its potential as a source of financing goods and services. Significant changes in the design of the system are necessary in order to fully take advantage of these positive characteristics and to improve and focus the application of the resources it generates to investment rather than spending.

7. The *comunas* associated with the most rapid land price increases are heavily populated and have high rates of poverty, a combination that is worrisome for the future, i) in terms of value increments and the prospect that they can be recovered for society, the high rate of tax

[17] It is estimated that during the period public investments in urban development totaled about one billion US dollars.

exemption in *comunas* with accelerated valorization and the impact of concentrated areas of exempt properties on municipal finances. ii) because of the weakened ability of the city to continue to meet the demand for low income housing, and iii) when accelerated price increases result from the decision of populations at higher socioeconomic levels to locate in once-modest areas, a process of gentrification may result in the very areas where the government has concentrated its investment efforts to correct disequilibria in the provision of public infrastructure and services.

4.4 POSSIBLE STRATEGIES

This study is limited in a number of ways. As a result, our first recommendation would be stress the need for more focused research and analysis of price information, for example that provided by the Real Property Registry (*Conservador de Bienes Raíces*), which provides information not only on investment patterns, but also on the standards or cumulative levels of urban infrastructure and public facilities. This research should be able to throw light on the differing value increments that are generated due to the uneven quality of local valuation and assessment systems and differing urban dynamics and environments. On these issues, the present study has suggested hypotheses and areas for research and discussion rather than presented any definitive conclusions.

Another important study would seek to define and quantify common per capita or per household sets of basic urban attributes for the many *comunas* of this city that would guide the long term horizontal redistribution of resources generated by assessments for the equal opportunity of citizens to access urban benefits more efficiently than the current system of per-*comuna* indices of poverty and property exemption.

With regard to the possibility that land taxes would constitute a means of financing urban development, it should be said that this will not supplant an effort to mobilize private sector resources for the construction of urban infrastructure through concessionary mechanisms. That said, land taxes are among the instruments that are underutilized in financing urban projects. They are not fulfilling their significant potential to complement the expenditure of general tax funds from the national budget. This is evidenced by the persistently differing levels of municipal investment and the origin of that disequilibrium in the uneven spatial distribution of land valuation levels, exemptions, and revenues.

Only a minority of value increments were collected, and those were from properties geographically concentrated in certain municipalities. In addition, increased revenues as a result of revaluation did not translate into a proportional increase in municipal investment. This weakened the principal virtue of the tax, which is its visibility to the community. While we do not have an estimate of the volume of value increments that are not collected and therefore do not help low income sectors, the results of this study indicate that it may be significant.

Greater local involvement in urban financing supposes, in addition to other measures relating to local revenue sources, a valuation system more closely tied to price evolution. The advantage of such a system for value capture would be to establish a synthesis of prices or values deriving

from real values and would go beyond current methodological and doctrinal discussions on the collection of new revenues based on the value increments resulting from public works projects. Supposing the perfect assessment of land values, the current value of properties would be represented in valuations and tax payments reflecting all value increments and externalities (public and private, recent and historical).

In order to move in this direction, the following would be required:

a) the development of information systems to support valuation and rate setting processes tied as closely as possible to the sequence made up of investment, market dynamics, and valorization

b) the strengthening of municipal and regional capacities in order to avoid the distortions caused by different qualities of political-administrative and territorial information

c) more frequent valuations. Our analysis of the data indicates that improving the capacity of the system to collect revenue (by increasing collections) is one thing, but that assuring that revenues are reinvested in urban development is another. This in itself is a major challenge which if met, would to a great extent justify improving the mechanisms.

Another area for research would be a study of the number and values of exempt properties and the spatial distortions that they create with regard to landowning by different socioeconomic groups, measured in quintiles. This would open a possibly important discussion on the burden borne by tax exemptions granted to meet social goals, such as the exemption for low income or for public housing. Should that burden be borne by the central government or the municipality? The bibliography at the end of this study includes proposals for compensatory central government mechanisms that would make explicit the resources that go uncollected as a result of exemptions. According to the views expressed by some technical experts interviewed, a compensatory mechanism similar to subsidies on potable water could be applied. Poor households' right to public housing could be delinked from an increased economic burden on the municipalities responsible for providing urban services and public facilities.

Another important line of research would be to study the potential of land taxes as an instrument for land-use planning through the use of special exemptions and surcharges tied to immediate urban development goals. This would take place within an operative framework that did not conflict with the principle of generating resources corresponding to property valuation and prices and reinvesting those resources in a circular process of improving the urban environment for all the social sectors that populate the metropolitan area. This alternative could be applied to the financing of public works projects and under certain circumstances it could be used as a tax-based instrument for land-use planning by incentivizing desirable developments and disincentivizing developments detrimental to urban planning goals. The economic principle of collecting more taxes where living is more expensive could be advanced by such an instrument as long as it is applied in equilibrium with the fundamental principle of land taxation based on real prices.

From an operational point of view, there are a number of possible strategies that could be followed in order to increase the use of tax revenues for urban financing purposes. There is a

certain “deformation” within the municipal financing paradigm that tends to channel land tax revenues toward operational expenditures and consequently away from investment. This tendency could be mitigated by incentives for investment and/or by regulations to establish minimum proportions of tax revenues that must be used for investment purposes.

Improving the correspondence of valuations to real values and increasing the frequency of revaluation would require preliminary investment in the development of information systems better attuned to the complex relations and influences produced in the sequence of investments, price dynamics and valorization. There is a need to better understand the distortions produced by the varying quality of information in different areas and in the context of informal markets. Programs to improve cadastre efficiency and increase the frequency of updating need support, including the development of modern georeferenced information systems, i.e. the tools required to link the land registry and revenue collection operations with urban planning and planning to anticipate future demands for land.

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