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Journal

Urban Studies, 50(10)

ISSN

0042-0980

Authors

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Publication Date

2013-08-01

DOI

10.1177/0042098012471982

Peer reviewed

Urban Studies

<http://usj.sagepub.com/>

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Urban Stud published online 25 January 2013

DOI: 10.1177/0042098012471982

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Land Use Regulations, Compliance and Land Markets in Argentina

Paavo Monkkonen and Lucas Ronconi

[Paper first received, September 2011; in final form, August 2012]

Abstract

Empirical evidence on the impact of stringent land use regulations on the price of land and housing in urban areas is growing, yet most research has been carried out in countries where ordinances are enforced. If enforcement is lax, the ultimate impact of strict rules on land and housing prices is unclear. Lower levels of compliance with rules can result in negative externalities and thereby exert downward pressure on the price of formal land. This paper presents an empirical analysis of the relationship between land use regulations, compliance and land prices in the three major metropolitan areas of Argentina, the country with the most stringent land use and urban development regulations in Latin America, using an original dataset gathered from parcel- and municipal-level surveys. Results show that municipalities with higher levels of regulation have lower rates of compliance with property laws, and lots selling legally in these municipalities have lower land prices.

1. Introduction

There is growing public concern that low-income households cannot access serviced land for housing in cities in Argentina. The average price of a 250 square metre lot with a legal title and access to sewerage is 19 times larger than the annual disposable income of a low-income family.¹ Since access to formal loans for housing is limited,² a low-income family would need to save during 19 years in order to purchase a legal, serviced lot. If the

lot were to include a modest dwelling, then it would take more than three decades of savings. Not surprisingly then, roughly one-fifth of the households living in periphery of large Argentine cities have illegally occupied land for housing, almost half do not have a full legal title and only a third have access to sewerage.³

A number of factors are likely to explain the housing affordability problems facing

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low-income families. By definition, their wages are low. They have limited access to the banking system or credit for housing. In addition, do land use regulations such as large minimum lot size, low floor area ratios (FAR) and significant infrastructure requirements limit the supply of serviced land and push formally developed housing out of their reach? This paper focuses on this question.

Argentina has the most highly regulated construction permitting and property registration system in Latin America according to recent survey data (World Bank, 2010). In spite of its importance, the topic has received scant attention by academics thus far. One exception is work by Goytia and Lanfranchi (2009), who argue that urban development regulations, especially requirements by developers to provide several components of infrastructure in new housing developments, are a major driver of the growth of informal settlements in the periphery of Buenos Aires. The regulations make formally developed housing too costly for lower-income groups. Libertun de Duren (2006) also argues that the decentralisation of planning authority in Argentina since the late 1970s has led to variation in implementation of regulations, adversely impacting the development of low-cost housing.

Assessing the impact of urban development regulations on land and housing markets is challenging. First, there is thought to be an endogenous relationship between the two. In some circumstances, places with higher housing prices will regulate development strongly in order to maintain the high prices (Saiz, 2010; Kok *et al.*, 2011).

Secondly, the effects of regulations on prices are likely to depend on the level of analysis. The price of a lot with a stringent regulation is likely to be lower compared with an almost identical lot except for

having a less stringent regulation because the owner of the latter has more options for profitable development (Ohls *et al.*, 1974). At a more aggregate level, however, the effect could become positive because cities with more stringent regulations will tend to have lower supply elasticities (Rose, 1989).

Thirdly, effects are also likely to depend on the level of compliance with regulations. Research in the US has found strong empirical evidence that cities with strict land use regulation tend to have higher prices for land and housing (Saiz, 2010; Kok *et al.*, 2011). A similar relationship has been argued to exist in the cities of developing countries (Bertaud and Malpezzi, 2001; Brueckner and Selod, 2009), yet data limitations have made empirical analyses in developing countries less common and less conclusive. One missing consideration in these analyses is the question of enforcement. In countries where urban development regulations are loosely enforced, then jurisdictions with stricter rules may simply have lower levels of compliance and more informal housing development. This complicates the impact of regulatory stringency of regulations on prices. Over time, a higher prevalence of informally built housing might actually reduce the value of formally developed land due to negative externalities, such as a perception of a low quality of neighbourhood development and pollution resulting from limited infrastructure (UN-HABITAT, 2003).

Fourthly, in many countries, analysis is also hindered by a lack of data on prices or regulations systematically collected by public bodies. Yet an understanding of the market impacts of regulations concerning property rights, land use and residential infrastructure, is important for policy reform, thus independent efforts in this regard are necessary.

This paper analyses the relationship between strict land use regulations, compliance and land prices in Argentina across both parcels and municipalities. Two sets of hypotheses are tested using an original dataset collected from land brokers, municipal officials and housing developers in the periphery of the country's three largest metropolitan areas; Greater Buenos Aires (GBA), Córdoba and Rosario. The focus is on the urban periphery because this is where the majority of land transactions are realised and where regulations are argued to limit access to housing for low-income households. Three cities are studied in order to consider variation in state-level land use regulations as well as those at the municipal level.

The first set of hypotheses concerns the determinants of land prices at the lot level and the relative importance of legal title, lot zoning and access to infrastructure. Lots with full legal title are approximately 15 per cent more expensive than those without; higher floor area ratios (FARs) are associated with higher prices; and access to infrastructure also has a large impact. The second set of hypotheses addresses the relationship between land use regulations, compliance and land prices at a municipal

level. Findings suggest that municipalities with more stringent land use regulation have lower prices for legally developed land, which is accounted for by the fact that higher levels of regulation are associated with more illegal occupations.

The paper is organised as follows. A summary of the urban and regulatory context of the three largest cities in Argentina is followed by a review of literature on land use regulations. Then, the data collection methodology and the measures used are described. The fifth section presents the econometric analysis and results; we conclude with policy recommendations.

2. Urban Development and Land Use Regulation in Argentina

Argentina is one of the most urbanised countries in Latin America; over 90 per cent of its 40 million people lived in cities in 2010. This study covers the three largest metropolitan areas in the country, which together have 15 million inhabitants. The majority of these live in GBA. Table 1 reports the population and growth rates of these three metropolitan areas from 1991 to 2010, along with those of the provinces in which they are located. Population growth rates are

Table 1. Population growth in Argentine metropolitan areas and provinces, 1991–2010

<i>Administrative unit</i>	<i>Population (million)</i>			<i>CAGR^a (percentage)</i>	
	<i>1991</i>	<i>2001</i>	<i>2010</i>	<i>1991–2001</i>	<i>2001–10</i>
City of Buenos Aires	2.97	2.78	2.89	−0.7	0.4
Greater Buenos Aires (excluding City of Buenos Aires)	7.95	8.68	9.91	0.9	1.5
Gran Córdoba	1.18	1.28	1.33	0.8	0.4
Province of Córdoba	2.77	3.07	3.30	1.0	0.8
Gran Rosario	1.08	1.12	1.20	0.4	0.8
Province of Santa Fe	2.80	3.00	3.20	0.7	0.7
Argentina	32.62	36.26	40.09	1.1	1.1

^aCompound annual growth rate.

Source: Instituto Nacional de Estadísticas y Censos (1991, 2001, 2010).

generally low, as Argentina experienced its major period of urban growth earlier in the 20th century.

Until the end of the 20th century, urbanisation in Argentina was characterised by three simultaneous processes: low-density expansion at the periphery; consolidation of interstitial zones and transport corridors; and densification of the central urban area and sub centres (Gilbert *et al.*, 1982). The low-density urban expansion occurred through *loteo popular*, a system of land sub-division and sale that supported an incremental, owner-managed housing production system. Incremental housing construction is often referred to as self-help or self-build and is common throughout Latin America (Ward, 1982).

More recently, patterns of urban development in Argentina, like much of South America, have changed. Land use in the urban periphery has become more heterogeneous, with projects like gated communities for the wealthy and shopping malls being built alongside incrementally built neighbourhoods and agricultural land (Janoschka, 2002; Rios, 2006). Although this trend appeared somewhat later in Argentina than other countries in the region, it has been argued that it was more rapid and more intense, especially during the 1990s (Torres, 2001). The change in urban growth patterns resulted in part from the improvement and expansion of the highway system which allowed for the profitable development of new tracts of rural land (Libertun de Duren, 2006).

2.1 Land Use Regulation in Argentina

Argentina is a federalist country with three levels of government: national or federal, provincial and municipal. There are 24 federated units with constitutions—23 provinces and the capital city, the City of Buenos Aires. Each of these jurisdictions elects its

own government and ratifies a constitution. Provincial governments also have the authority to impose taxes. Spatial planning has not historically been a large concern of national or provincial governments, although their policies and actions have impacted urban development significantly. Public investments have modified territorial development and altered the physical and socioeconomic organisation of cities and regions, especially in recent decades.

Argentina does not have a national urban policy, nor a national land or spatial planning law as do other countries in Latin America (Jimenez, 2006). Municipalities have traditionally overseen the regulation of land use, implementing laws on behalf of provincial governments. This might change shortly, as several proposals towards a national spatial planning law have been initiated (Ronconi *et al.*, 2011). Until these changes occur, land use regulation in Argentina occurs in a mostly uncoordinated fashion, under a network of agencies in different levels of government.⁴

Differences in land use regulation in the three cities studied exemplify the variation across jurisdictions. Rosario, for example, has a long tradition of urban planning and a different approach from that of GBA or Córdoba, focusing on action programmes rather than the classification of land and definition of conditions for development. The first regulatory plan dates to 1935. In 1968, a new plan of the city was approved and was valid (with some updating and modifications) until the recent introduction of the Directive Plan by the municipality in 2007.⁵ This Directive Plan was developed through an iterative process that was important in establishing guidelines for public works and municipal actions. One of the central principles of this new plan is to restrict the extensive growth of the periphery of the city and, simultaneously, to restructure and improve the quality of the existing city.

The most important regulatory instrument in Rosario is the Ordinance of Urbanisation (6294/97), which regulates decisions about land use and sub-division. It permits the municipality to devise appropriate regulations for the development of land with a goal of implementing integrated urban development projects. Integrated projects are those that can absorb the costs of urban infrastructure and facilities necessary to generate an urban environment of high quality, although this latter point is not specifically defined. Integrated development projects require landowners and/or developers to undertake public works for networks of household services and donate land for parks, transport, pedestrian spaces and community facilities, increasing the final costs of the housing built.

Strict regulations governing land and urban development in the City of Córdoba were not adopted until the 1980s. Currently, four ordinances control spatial planning: Ordinance 8060/85 regulates land sub-division and is the most important of the four; Ordinance 8057/86 regulates land occupation in the central area; Ordinance 8256/86 regulates land occupation in intermediary and peripheral areas; and Ordinance 8133/85 regulates the location of economic activities. Due to changes in urban growth in the 1990s, the municipality has approved some modifications to these ordinances. The permitting process for housing projects in Córdoba requires 15 seals of approval from different agencies. According to interviews with public officials, standards of development have also increased over the years.⁴ Currently, developers are required to provide complete infrastructure when developing housing and to donate large areas of land for green space and community facilities. Regulations favour construction of individual housing units on lots of 300 square metres at the periphery.

The case of GBA differs structurally from that of Córdoba or Rosario because ordinances concerning use, ownership, sub-division and provision of infrastructure at the municipal level have been governed by a provincial law since 1977; the Decree/Law 8912 was enacted and continues to govern land use regulation in the province today.⁷ Until this law, the production of lots for housing and other urban uses in the province of Buenos Aires was minimally regulated. In the 1960s, after a series of serious floods, provincial laws were enacted to prohibit the sub-division of land inside the floodplain and, near the end of the decade, the provincial government required the provision of water and sewage in new residential sub-divisions.

Yet it was the Decree/Law 8912 that first established standards for municipal actions. Municipalities are the primary party responsible for spatial planning, but many aspects of spatial planning are defined in detail and all local regulations must be approved by the provincial government. Decree/Law 8912 emphasises the preservation of the natural environment and the establishment of social-spatial conditions for the satisfaction of the needs of the community in terms of housing, industrial activity, commerce, recreation and infrastructure. This is to be carried out through an appropriate spatial organisation of activities, to be achieved both through legal, administrative and financial mechanisms on the part of the municipal government with the participation of the community.

The most important section of the Decree/Law is Title III of Chapter 3, which contains the rules for classifying land into different categories and their corresponding regulations. It sets the minimum widths for different classes of roads, regulates FARs, sets maximum population densities, establishes minimum dimensions for city blocks and parcels, and imposes environmental

considerations for urban expansion. The availability of sufficient water and sewage for the new potential population is a concern and development is only permitted at a low density if these are not available.

Although there is variation between cities and municipalities in terms of regulation, a review of provincial and municipal ordinances in the three cities revealed that minimum lot sizes are generally large, land donations are substantial and all cities require developers to provide most services. Table 2 shows a comparison of statutory regulations. Córdoba leads the way in terms of a functional low-income housing policy, granting a waiver on some of the requirements—such as a lot size of about 160 square metres—if housing is being built for low-income groups. Although Rosario and GBA have a similar regulation on the books, in interviews it was reported as being very hard to apply and not often used.

3. Land Use Regulation and Land Markets in Developing Countries

The present study benefits from recent advances in the measurement of land use regulation and assessment of its impacts on land and housing markets in the US (Gyourko *et al.*, 2008; Quigley *et al.*, 2009; Saiz, 2010). The generally accepted theory posits that less housing development occurs in jurisdictions with strict regulation, *ceteris paribus*, and that the housing that is built will be more expensive due to delays, higher construction standards and the limitation in supply elasticity imposed by the regulations (Mayer and Somerville, 2000). This theory has not been refuted by a number of empirical tests (Mayer and Somerville, 2000; Glaeser and Ward, 2009; Saiz, 2010) and land prices have also been found to be impacted in a similar way (Kok *et al.*, 2011).

Table 2. City-level sub-division regulations

<i>Sub-division regulation</i>	<i>Buenos Aires</i>	<i>Córdoba</i>	<i>Rosario</i>
Minimum lot size	300 square metres	250 square metres	300 square metres
Minimum street width	15 metres	12 metres	18 metres
Minimum share of plot for green areas	10 per cent	10 per cent	10 per cent
Minimum share of plot for social areas	4 per cent	5 per cent	5 per cent
Maximum floor to area ratio (FAR)	0.60	NA	Only in some areas
Minimum provision of infrastructure	Running water Sewerage Drainage system Street lighting Paved street Electricity	Running water Sewerage Drainage system Street lighting Paved street Electricity Town gas	Running water Sewerage Drainage system Street lighting Paved street
Does the law include exceptions when the sub-division is for low-income people?	Yes, but hard to obtain	Yes, easy to obtain; allows lots of 162 square metres and less infrastructure	Yes, but hard to obtain

Sources: Provincial and municipal ordinances and decrees.

Yet the empirical studies have been carried out in an environment where regulations are binding. Lax or inconsistent enforcement of regulations is likely to change their impact on land and housing markets. In countries where enforcement of regulations is not strict, housing can be built in heavily regulated jurisdictions in violation of legal requirements. Moreover, it is also likely that strict regulations without sufficient enforcement will lead to lower levels of compliance. This argument—regulation leading to informality—is not new (Dowall, 1992; Duranton, 2008; Brueckner and Selod, 2009) and was the central premise of de Soto's work on the topic in Peru (1986).

It should be recognised that informality in urban development is a complex concept. While it is often used to refer simply to incomplete property rights claims, as in the work by de Soto (1986), it can include a vast number of manifestations—from small violations of construction ordinances to outright illegal squatting. Thus, as Varley (2002) points out, the idea that formal/informal and legal/illegal are dichotomies is false. Other theorists have also rightfully argued that the formal and informal sectors are actually dynamically intertwined and that the relation between state regulation and informality is more complex than simply regulation causing informality (Portes and Schauffler, 1993). In many cases, state actors are complicit with informal housing development.

A further complication is that informal housing is often conflated with incremental house building and slums. However, informality describes a legal status rather than a production process or the quality of housing stock. High-income housing can be built informally. Nevertheless, houses without legal title are more likely to be built incrementally and at a lower standard than those built according to rules and regulations. In spite of its complexity,

informality in housing is an important component of the relationship between regulations and land markets in the cities of developing countries. In this paper, we use an indicator of property law compliance as a blunt, but measurable, proxy for informality in housing development. Other research has used more multidimensional indicators (Kim, 2004); however, these were not available in Argentina.

What, then, is the expected impact of stringent urban development regulations and informal housing development on land and housing markets in the cities of developing countries? A common argument is that squatting and informal development will 'squeeze' the formal land market by removing potential land, thus raising prices (Brueckner and Selod, 2009). Based on this hypothesis, a greater prevalence of informal housing in a city will lead to higher formal land prices. This hypothesis has yet to be tested, however, and focuses exclusively on squatter settlements, which have become relatively less common in Latin American cities (Varley, 2002).

A further complication to the relationship is the consideration of interurban household mobility. For example, Lall *et al.* (2007) argue that the impact of strict land use regulation depends on how it affects the migration decisions of potential residents of informal neighbourhoods and that stringent regulations may deter them from moving to a given city, thereby reducing informality. The evidence they provide from Brazil contrasts with the Argentine case, as low-income migration to high-regulation cities in Argentina has continued. During the past decade, the population grew at an annual rate of 2.6 per cent in the outer municipalities of GBA, for example, compared with 1.1 per cent in other urban areas.

In addition to recognising the mobility of households between jurisdictions, another

important component missing from existing models is the negative externalities that can be generated by informality and incremental housing development. In many cases, low construction standards and uncoordinated neighbourhood development can reduce local environmental quality (UN-HABITAT, 2003; Feler and Henderson, 2008), which in turn can lead to a negative neighbourhood image and socioeconomic segregation (Lungo and Baires, 2001). Given land markets' strong sensitivity to spatial externalities, lower levels of compliance with regulations may reduce the value of adjacent land.

Thus, we will test two hypotheses. First, that strict regulation at the municipal level in Argentina will be negatively correlated with compliance (positively correlated with informality). Secondly, but following from this, that strict regulations will lead to lower prices for formal land. This hypothesis runs contrary to empirical evidence from the US, where analyses across and within metropolitan areas (Saiz, 2010; Kok *et al.*, 2011) have demonstrated that places with stricter land use regulations have higher land and housing prices, *ceteris paribus*. Argentina, like the US, is a federalist country in which local authorities have control over land use regulation. Thus, there is variation in regulatory stringency within a metropolitan area, as many are composed of multiple municipalities. This variation is an important component of the research advances in the US.

4. Data, Measurement and Indices

In order to test the hypothesised impacts of regulations on compliance and land prices in Argentina, we collect data through three surveys: a parcel-level survey of prices and other characteristics of vacant lots; a survey of housing developers to assess the constraints to the production of housing

affordable to low-income groups; and a survey of public officials to gather data on land use regulations. The last was complemented by a review of legal documentation related to land use regulation for the municipalities and provinces in question.

The focus of the three surveys was the areas of urban expansion in the three largest cities in Argentina. In Rosario and Córdoba, these areas lie within the jurisdiction of municipal and provincial governments. The organisation of GBA is more complex, including the city of Buenos Aires and 24 municipalities in the Province of Buenos Aires; thus the study is limited to the nine peripheral municipalities of GBA. These municipalities have grown rapidly in their overall importance in GBA; their population was roughly one-fifth of the metropolitan area in 1980, but had grown to one-third by 2010 (Instituto Nacional de Estadísticas y Censos, 1980, 2010).

The peripheral municipalities of GBA vary widely in population size and density, but share a number of traits that distinguish them from the central jurisdictions, such as higher population growth rates, mostly residential land use, large variation in the level of physical consolidation of neighbourhoods and heterogeneous land use with country clubs, distribution centres and sports facilities sitting alongside large swaths of vacant land or housing in early stages of incremental building.

4.1 Parcel Survey

A survey⁸ of real estate brokers to find out prices of vacant lots for sale legally was carried out in the peri-urban areas of GBA, Rosario and Córdoba, defined using satellite imagery as land within 10 km of the edge of the contiguous urban area. We then used 2001 census data to characterise tracks in this area as low socioeconomic status if 15 per cent or more of the population had

‘unsatisfied basic needs’ (NBI), an indicator developed by the census bureau that is the main definition of poverty in Argentina.

Real estate brokers provide the ‘asked price’ of the lots—that is, what the seller is asking for the land. Although ‘asked prices’ are usually higher than the real transaction price (Kaserman *et al.*, 1989), this is the only information that real estate brokers can reliably provide. Moreover, the difference is unlikely to bias the estimates obtained in the econometric analysis because the measurement error in the dependent variable (price per square metre) should not be correlated with the explanatory variables.

Data were collected between August and October 2010 for 431 parcels (236 in GBA, 118 in Córdoba and 77 in Rosario)—all of the vacant lots in the low socioeconomic status, peri-urban areas of the three cities. More than half of the land parcels are smaller than 500 square metres, although they range in size to over 10 000 square metres.

4.2 Lot Characteristics

For each lot, we also collected data on access to infrastructure, property rights, the zoned land use and FAR. Access to seven types of infrastructure was assessed: running water, town gas, sewerage, drainage system, electricity, street lighting and a paved street. As expected, lots with access to services are more expensive than those without. An index of infrastructure was created through a simple sum of the number of services to which a lot has access.

The legal status of lots also affects price. A legal title that complies with all regulations is costly to obtain in Argentina, as the owner must hire an *escribano* (like a notary) who charges high fees to certify the title. The supply of *escribanos* is restricted by their professional association, and thus their participation in regularisation of land can lead

to lengthy delays (Almansi, 2009). In GBA, slightly over 70 per cent of lots have a full legal title, while in the whole sample, 81 per cent do.

It is important to note that, in the sample, none of the owners of lots lacking full legal title has illegally occupied the land. They all have some legal documents justifying their rights over the property, such as a receipt of sale or some document giving possession rights. However, since these documents are not a full title in optimal conditions, we categorize them as incomplete.⁹ The average price per square metre of lots with a full legal title is US\$43, compared with US\$30 among lots without it.

Zoning regulations establish allowable land use and the maximum FAR for each lot. FAR values for the parcels surveyed range from 0.07 to 2. The difference in FAR values between cities is significant: in GBA and Rosario, average FARs are 0.7 and 0.6; while in Córdoba, the average is 1.12. The allowed use for parcels also affects their price and varies between jurisdictions. Roughly 80 per cent of lots were zoned for housing in GBA, whereas this share was about 60 per cent in Rosario and Córdoba.

4.3 Characteristics of the Local Environment

The quality of the local environment of any piece of land has a large impact on value, as does its proximity to amenities, disamenities and the city centre. For each lot, data were gathered on its distance to the nearest police station, bus stop, park, hospital, school, garbage dump and *villas miseria* (shantytown). Measures of disamenity are created with the final two measures and an index of access to amenities is created through the simple summation of the first five distances.

Each lot is also matched to a census tract in order to describe the socioeconomic conditions of the neighbourhood using the

NBI indicator. Households are classified as having NBI if they live in housing that has more than three people per room, is considered substandard or does not have a toilet, or if they have a school-aged child that does not attend school, or a household head who did not complete primary school. In 2001, Córdoba had the lowest share of households with NBI, only 10 per cent, whereas Rosario had slightly more, 11 per cent, and the peripheral municipalities of GBA the most, 13 per cent.

4.4 Developer and Public Official Surveys

An index of regulatory strictness was created following previous research in the area (Gyourko *et al.*, 2008; Quigley *et al.*, 2009) and building on the measurement of property rights and residential infrastructure provision proposed by the UN-HABITAT/World Bank Housing Indicators Program (Angel *et al.*, 1993). We gathered data on several aspects of regulation through surveys of public officials and developers¹⁰ and analysis of legislation pertaining to urban development. Then we created three indices at the municipal level and two at the metropolitan level.

Regulatory stringency can refer to rules, such as minimum lot sizes or land donations, and procedures, including the direct costs of obtaining permits, delays and uncertainty. When developers were asked about factors that impact private investment in developing housing for low-income groups, obtaining a legal permit to convert a large rural lot into small urban lots was stated as the most important bottleneck in both GBA and Córdoba. This is in part because of a slow, costly and uncertain bureaucratic process, and also the requirements for infrastructure provision.

The importance of infrastructure requirements and the complexity of the bureaucratic process are underscored by their large

share of a housing project's cost. According to the developers surveyed, obtaining subdivision permits represents 9 per cent of project cost and infrastructure 27 per cent. These estimates of permitting costs do not include the time spent to obtain permits. According to local officials, it takes an average of 19 months to obtain a permit in Córdoba and 14 months in Rosario. In several of the municipalities of Buenos Aires it was reported to take around one year and up to 29 months in others.

Table 3 presents a summary of components of the five indices. All indices are created through the summation of the standardised values of components. In spite of its simplicity, this is the state of the art (Gyourko *et al.*, 2008; Quigley *et al.*, 2009).

The first, the Property Law Compliance Index, is a combination of two variables that were gathered through surveys of public officials: the share of land that is illegally occupied in a municipality according to public officials and the share of households that do not have full legal title of their property according to public officials. This index does not capture the complete picture of regulatory compliance, yet it is a straightforward measure.

The overall measure of the strictness of development regulations at the municipal level is the Sub-division Regulation Index, which is a combination of three sub-indices; the Bureaucratic Complexity Index, which combines responses from developers and public officials regarding the length, cost and complexity of obtaining a sub-division permit; the Infrastructure Provision Index, based on the responses of developers and public officials to questions about infrastructure requirements, their costs and an analysis of the relevant laws; and the Urban Ordinance Index, which combines responses from developers and an analysis of the legislation regarding requirements such as minimum lot size and required public space donations.

Table 3. Components and data sources for indices

<i>Index</i>	<i>Component</i>	<i>Source</i>
Property law compliance	Share of land that is illegally occupied in the municipality	Public officials survey
	Share of households without full legal title of their property in the municipality	Public officials survey
Infrastructure provision	Minimum provision of infrastructure in sub-divisions	Legislation
	Importance of minimum provision of infrastructure as a barrier to private development targeted at low-income people	Developers survey
	Cost of providing infrastructure as a share of total development cost	Developers survey
Bureaucratic complexity	Months it takes to obtain a sub-division permit	Public officials survey
	Rank of complexity to obtain a sub-division permit	Developers survey
	Importance of procedures to obtain a legal permit in sub-divisions as a barrier to private development targeted at low-income people	Developers survey
	Cost of obtaining a sub-division permit as a share of total development cost	Developers survey
Urban ordinance	Minimum lot size, space donations and existence of waivers when sub-divisions are for low-income people	Legislation
	Importance of urban ordinances as barriers to private development targeted at low-income people	Developers survey
Sub-division regulation	Combination of three sub-indices: infrastructure provision, bureaucratic complexity and urban ordinance	See above

5. Econometric Analysis

The approach to testing the hypothesised impact of strict regulations on compliance and land prices is to exploit their variation

between cities and municipalities. One impact of strict regulations is predicted to be low levels of compliance. In turn, this is thought to generate negative externalities in the local

Figure 1.

environment and reduce the value of formal land nearby. Thus, indices of regulatory stringency should have *negative* associations with both compliance and land prices.

Before modelling the relationships, we present scatterplots depicting the relationship between the Property Law Compliance Index, the Sub-division Regulation Index and the price of land per square metre in Figure 1. There are separate graphs for all 11 jurisdictions surveyed (nine municipalities

in GBA, and Rosario and Córdoba) and for the jurisdictions in GBA only.

As hypothesised, the average price of land located in municipalities with greater levels of compliance is higher. There is also a negative correlation between the Sub-division Regulation Index and both the Property Law Compliance Index and land price per square metre. Although we collect data on a substantial number of lots, the small number of municipalities in the cities studied implies

Table 4. Characteristics of lots, local environment and municipality

<i>Variable</i>	<i>Description</i>	<i>Mean</i>	<i>S.D.</i>
Price	Log price of lot in US dollars	10.62	1.68
Size	Log size of lot in square metres	7.40	2.11
Distance to CBD	Sum of distance to district centre and commercial area (metres)	95.82	52.46
Distance to amenities	Sum of distance to hospital, school, park, bus, police (metres)	108.28	55.76
Distance to shantytown	Distance to nearest slum (in metres)	16.39	14.78
Garbage	Prevalence of garbage (None = 0, High = 4)	0.43	0.76
NBI	Unsatisfied basic needs index	15.57	5.76
Gated communities	Number of gated communities in municipality	21.34	20.30
Infrastructure index	Sum of access to services (0–7)	3.46	1.74
Property law compliance index	See section 4	0	1.75
Full legal title	Does the lot have full legal title? (Yes = 1)	0.81	0.39
FAR	Floor to area ratio (FAR)	0.70	0.21
Median FAR vicinity	Median FAR in district	0.64	0.08
Zoned housing	Yes = 1	0.71	0.45
Zoned commercial	Yes = 1	0.40	0.49
Zoned industrial	Yes = 1	0.19	0.39
Infrastructure provision index	See section 4	0	1.52
Bureaucratic complexity index	See section 4	0	1.99
Urban ordinance index	See section 4	0	0.74
Sub-division regulation index	See section 4	0	2.19

low statistical power to any test. Furthermore, the cross-sectional nature of the data does not allow for testing of dynamic processes. Yet we can test hypotheses using regression analysis. First, we examine the determinants of individual land prices by estimating several versions of the following model

$$\begin{aligned}
 Price/m^2_{ijc} = & \beta LegalTitle_{ijc} + \alpha FAR_{ijc} \\
 & + \gamma Zoning_{ijc} + \delta X_{ijc} + \varepsilon_{ijc}, \quad (1)
 \end{aligned}$$

where, the dependent variable, $Price/m^2_{ijc}$, is the (log) price of land per square metre in metropolitan area i , municipality j and lot c . X is a vector of controls including the hedonic characteristics of the lot. The main objective is to estimate β , α and γ . All models are estimated by OLS with White robust standard errors. Table 4 presents variable definitions and basic statistics for the variables used.

Column 1 of Table 5 reports results from the first simple model, which is limited to a

Table 5. OLS results for regressions of log price per square metre ($N = 431$)

<i>Variable</i>	(1)	(2)	(3)	(4)
<i>Size, location and amenities</i>				
Size	−0.418 [0.026]	−0.487 [0.066]	−0.476 [0.065]	−0.483 [0.066]
Distance CBD	−0.005 [0.001]	−0.006 [0.001]	−0.006 [0.001]	−0.005 [0.001]
Distance amenities	−0.003 [0.001]	−0.001 [0.001]	−0.001 [0.001]	−0.001 [0.001]
Distance shantytown	0.006 [0.003]	0.003 [0.003]	0.002 [0.003]	0.001 [0.003]
Presence of garbage	−0.207 [0.050]	−0.172 [0.050]	−0.174 [0.051]	−0.147 [0.049]
NBI	−0.083 [0.007]	−0.080 [0.012]	−0.072 [0.014]	−0.054 [0.015]
Gated communities	0.014 [0.003]	0.011 [0.004]	0.010 [0.003]	0.009 [0.004]
<i>Infrastructure, property rights and land use regulations</i>				
Infrastructure index	—	0.111 [0.029]	0.112 [0.029]	0.119 [0.031]
Legal title	—	0.162 [0.096]	—	0.241 [0.100]
Property law compliance index	—	—	0.074 [0.039]	0.115 [0.040]
FAR of lot	—	0.126 [0.072]	0.123 [0.072]	0.093 [0.076]
Median FAR vicinity	—	−0.158 [0.075]	−0.179 [0.074]	−0.172 [0.073]
Zoned housing	—	—	—	−0.374 [0.122]
Zoned commercial	—	—	—	0.120 [0.081]
Zoned industrial	—	—	—	0.064 [0.149]
R^2	0.583	0.606	0.608	0.628

Note: White robust standard errors are in brackets.

test of the size of the lot and its proximity to amenities and disamenities. All coefficients have the expected signs and are statistically significant. The price per square metre is lower in larger lots. Distance to the CBD and to amenities (i.e. school, hospital, bus stop, park, police) is negatively correlated with prices and distance to disamenities (i.e.

shantytowns and garbage) is positively correlated with prices. Finally, lots located in areas with higher socioeconomic status are more expensive. These variables explain more than half of the variation in price.

Columns 2–4 of Table 5 report results of models that include explanatory variables of greater interest. The Infrastructure Index

Table 6. OLS results of sub-division regulations and land market outcomes

<i>Panel A: DV is Property Law Compliance Index</i>				
Sub-division Regulation Index	−0.316 [0.077]	—	—	—
Bureaucratic Complexity Index	—	−0.202 [0.205]	—	—
Urban Ordinance Index	—	—	−0.662 [0.285]	—
Infrastructure Provision Index	—	—	—	−0.471 [0.126]
<i>Panel B: DV is Price per square metre in municipality</i>				
Sub-division Regulation Index	−0.090 [0.035]	—	—	—
Bureaucratic Complexity Index	—	−0.050 [0.064]	—	—
Urban Ordinance Index	—	—	−0.317 [0.032]	—
Infrastructure Provision Index	—	—	—	−0.085 [0.095]

Notes: All models control for socioeconomic characteristics of the jurisdiction. There are 11 municipal-level observations. White robust standard errors are in brackets.

(the sum of a lot's access to running water, sewerage, drainage system, electricity, street lighting and paved street) is positively correlated with land prices as expected. Each additional element of infrastructure leads to a price increase of roughly 10 per cent. The price per square metre of a lot with a full legal title is approximately 15 per cent higher than a lot without and lots located in municipalities where compliance with regulations is higher are also more expensive.

Finally, we find that a higher FAR is associated with a higher price. A 10 per cent increase in the FAR leads to a 1–2 per cent increase in land price per square metre.¹¹ That is, stricter regulations act as disamenities at the individual level even in countries with substantial non-compliance.

In a second set of regressions, we explore the impact of sub-division regulations on land market outcomes at the municipal level using the following model

$$Y_{ij} = \pi \text{SubdivisionRegulations}_{ij} + \delta Z_{ij} + \varepsilon_{ij} \quad (2)$$

where, Y_{ij} is the dependent variable (either the Property Law Compliance Index or the average land price) in metropolitan area i and municipality j ; Sub-division Regulations is one of the indices described previously; and we control for the socioeconomic characteristics of the district (i.e. NBI and presence of gated communities).

In spite of the low number of observations in the sample (11), the results reported in panels A and B of Table 6 fail to reject both hypotheses. Municipalities with higher values on the Sub-division Regulation Index have lower levels of compliance with property laws and lower land prices on average. The Urban Ordinance Index is the strongest component of the Sub-division Regulation Index. We theorise that, due to negative externalities and sorting tendencies, higher-income

households dislike residing in these areas and thus they have lower prices. The limited test does not reject the hypothesis conclusively, but provides compelling evidence.

6. Conclusion: Enabling Incremental Development of Housing

This paper presents an empirical analysis of the impacts of land use regulation on land markets in Argentina, the most highly regulated country in Latin America in terms of urban development but with substantial levels of non-compliance. The analysis at the micro level shows that, *ceteris paribus*, lots with more stringent regulation cost less, supporting the hypothesis that options are valuable even in countries with incomplete compliance. At a more aggregate level, however, the results demonstrate that the impacts of strict regulation in the Latin American context are counter-intuitive, differing from theory and evidence on the relationship from the US. Stringent land use regulations in Argentine municipalities are associated with lower rates of compliance, at least with property rights rules, and lower land prices.

The topic is important, given problems with housing affordability in Argentina. Additionally, it is understudied, in part due to the difficulty in gathering data in countries such as Argentina, as well as the challenge of statistically testing claims. This dearth of empirical work implies that much debate about the effects of land use regulations is ill-informed. The policy implications of these findings are not deregulation. As scholars have argued, land use regulations are not bad *per se* (Bertaud and Malpezzi, 2001; Henderson, 2009). Dowall (1992) described how land use regulations must be appropriate to the economic situation of a city if they are to

function as a guiding framework for development.

As demonstrated by the analysis, infrastructure requirements, bureaucratic delays and costly legal fees related to title transfers contribute to prices of land for housing that makes it unaffordable to most families in Argentina. Regulations should be modified such that they make the development of housing affordable to lower-income households, reducing minimum lot sizes and infrastructure requirements, for example. Additionally, programs that provide exemptions to some requirements for permitting or for fast-tracking applications for housing targeting low-income households should be expanded upon. Higher levels of government could provide subsidies or other forms of assistance to developers if municipal authorities do not take these steps.

One concern with reducing infrastructure requirements is the efficiency gains of co-ordinated infrastructure provision in early stages of urban growth. As Siddiqui and Khan (1994) describe, the incremental development process that is generally associated with incremental housing construction is inefficient in that infrastructure is installed after houses are built, which can lead to unproductive *ex post* modifications to houses and neighbourhoods. Moreover, as Ward (1999) points out, the low housing unit densities associated with this type of urban growth can greatly increase the per unit costs of infrastructure. One further option then is for infrastructure subsidies to be considered when housing is being developed for low-income households. A system of value capture could be used as a possible financing mechanism (Shoup, 1994).

Finally, it seems clear that there is a need for housing policy that enables incremental housing development in Argentina and across Latin America (Greene and Rojas, 2008). Governments should support the

way housing is actually accessed by most lower-income households, as housing policy focused only on developing financial systems and enabling private-sector companies has not been able to assist a significant share of the population. Greene and Rojas (2008) provide a comprehensive outline of the areas and interventions necessary to enable the incremental development of housing, ranging from access to land through readjustment or inclusionary housing laws, to support for housing micro finance. They also document some of the operational challenges for these policies and suggest, among other things, the need for higher levels of government to get involved in making the changes.

Acknowledgements

The authors wish to thank their collaborators, Juan Casazza and Eduardo Reese.

Funding

This research was supported by a grant from the Inter-American Development Bank.

Notes

1. This ratio is computed combining information on income obtained from the *Encuesta Permanente de Hogares* (EPH), the main Argentine household survey (Instituto Nacional de Estadísticas y Censos, 2009) and land price information collected for the purpose of this study, which is described later.
2. The mortgage market in Argentina is underdeveloped (for example, the mortgage debt to GDP ratio was less than 1 per cent in 2010) due to inflation and the disruptions during the 2001–02 economic crisis such as the freezing of evictions and renegotiation of contracts (Cristini et al., 2011).
3. Again, measures obtained from EPH and data collected as part of the present study.
4. For greater details on the guidelines described here, see Ronconi et al. (2011).
5. The municipality of Rosario has the power to adopt regulatory decisions related to

urban land as expressly detailed in the Implementing Law of Municipalities of the Province of Santa Fe Number 2756/86.

6. More information on the interviews is in the following section.
7. The original regulatory body was reformed more than once by Laws 9116 and 10128. A new text of the law was approved by Decree 3389 in 1987 and, later, modifying amendment Laws 10653 and 10764 were approved in 1988 and 1989.
8. The questionnaire used can be found in Ronconi et al. (2011). Between 5 and 10 brokers were surveyed for each municipality.
9. The sample we study only includes parcels with no dwelling. Squatters usually reside in lots they have illegally occupied.
10. A total of 17 public officials—one for each municipality of Buenos Aires and several in both Rosario and Córdoba—and 15 developers—six in Buenos Aires, two in Rosario and seven in Córdoba—were interviewed. The public officials interviewed were those with the highest rank in the relevant agency, whereas developers were chosen so as to have a range of company sizes.
11. Additionally, lots are more expensive if neighbouring lots have a restrictive FAR (a low value of the variable *Median FAR vicinity*).

References

- Almansi, F. (2009) Regularizing land tenure within upgrading programmes in Argentina: the cases of Promeba and Rosario Hábitat, *Environment and Urbanization*, 21, pp. 389–413.
- Angel, S., Mayo, S. K. and Stephens, W. L. (1993) The housing indicators program: a report on progress and plans for the future, *Journal of Housing and the Built Environment*, 8, pp. 1566–1580.
- Bertaudo, A. and Malpezzi, S. (2001) Measuring the costs and benefits of urban land use regulation: a simple model with an application to Malaysia, *Journal of Urban Economics*, 10, pp. 393–418.
- Brueckner, J. K. and Selod, H. (2009) A theory of squatting and land-tenure formalization

- in developing countries, *American Economic Journal*, 1, pp. 28–51.
- Cristini, M., Moya, R. and Bermúdez, G. (2011) *Argentina's housing market in the 2000s*. Working Paper Series No. 262, Inter-American Development Bank.
- Dowall, D. (1992) Benefits of minimal land-use regulations in developing countries, *Cato Journal*, 12, pp. 431–444.
- Duranton, G. (2008) Viewpoint: from cities to productivity and growth in developing countries, *Canadian Journal of Economics*, 41, pp. 689–736.
- Feler, L. and Henderson, V. (2008) *The effects of exclusionary housing policies on urban development: evidence from Brazil*. Paper presented at the United Nations Expert Group Meeting on Population Distribution, Urbanization, Internal Migration and Development, United Nations Secretariat, New York, January.
- Gilbert, A., Hardoy, J. and Ramirez, R. (Eds) (1982) *Urbanization in Contemporary Latin America: Critical Approaches to the Analysis of Urban Issues*. Chichester: John Wiley & Sons.
- Glaeser, E. L. and Ward, B. A. (2009) The causes and consequences of land use regulation: evidence from Greater Boston, *Journal of Urban Economics*, 65, pp. 265–278.
- Goytia, C. and Lanfranchi, G. (2009) Informal neighborhoods in the Buenos Aires metropolitan region: understanding the effects of land regulation on the welfare of the poor, in: S. V. Lall, M. Freire, B. Yuen, R. Rajack and J. J. Helluin (Eds) *Urban Land Markets Improving Land Management for Successful Urbanization*, pp. 162–190. Dordrecht: Springer.
- Greene, M. and Rojas, E. (2008) Incremental construction: a strategy to facilitate access to housing, *Environment and Urbanization*, 20, pp. 89–108.
- Gyourko, J., Saiz, A. and Summers, A. (2008) A new measure of the local regulatory environment for housing markets: the Wharton residential land use regulatory index, *Urban Studies*, 45, pp. 693–729.
- Henderson, J. V. (2009) The effect of residential land market regulations on urban welfare, in: S. V. Lall, M. Freire, B. Yuen, R. Rajack and J.-J. Helluin (Eds) *Urban Land Markets: Improving Land Management for Successful Urbanization*, ch. 3. Dordrecht: Springer.
- Instituto Nacional de Estadísticas y Censos (1980) *National census of population, households and housing*. INDEC, Buenos Aires.
- Instituto Nacional de Estadísticas y Censos (1991) *National census of population, households and housing*. INDEC, Buenos Aires.
- Instituto Nacional de Estadísticas y Censos (2001) *National census of population, households and housing*. INDEC, Buenos Aires.
- Instituto Nacional de Estadísticas y Censos (2009) *Encuesta Permanente de Hogares* [Permanent household survey]. INDEC, Buenos Aires.
- Instituto Nacional de Estadísticas y Censos (2010) *National census of population, households and housing*. INDEC, Buenos Aires.
- Janoschka, M. (2002) Urbanizaciones privadas en Buenos Aires: hacia un nuevo modelo de ciudad latinoamericana? [Privatised urbanisation in Buenos Aires: towards a new model of the Latin American city?], in: C. Barajas (Ed.) *Latinoamérica: países abiertos, ciudades cerradas* [Latin America: Open Countries, Closed Cities]. Guadalajara: Pandora.
- Jimenez, E. (2006) Las políticas regionales en América Latina y los países andinos: un análisis comparativo [Regional policy in Latin America and the Andes countries: a comparative analysis], *Cuadernos de Cendes*, 23, pp. 99–125.
- Kaserman, D. L., Trimble, J. L. and Johnson, R. C. (1989) Equilibrium in a negotiated market: evidence from housing, *Journal of Urban Economics*, 26, pp. 30–42.
- Kim, A. (2004) A market without the 'right' property rights, *Economics of Transition*, 12, pp. 275–305.
- Kok, N., Monkkonen, P. and Quigley, J. M. (2011) *Economic geography, jobs, and regulations: the value of land and housing*. Paper presented at the American Real Estate and Urban Economics Conference, Denver, CO, January.
- Lall, S. V., Wang, H. G. and Mata, D. da (2007) Do urban land regulations influence slum formation? Evidence from Brazilian cities, *Anais do XXXV Encontro Nacional de Economia* [Proceedings of the 35th Brazilian Economics Meeting], 119, ANPEC - Associação Nacional dos Centros de Pósgraduação em Economia [Brazilian Association of Graduate Programmes in Economics].

- Libertun de Duren, N. (2006) Planning à la carte: the location patterns of gated communities in a decentralized planning context, *International Journal of Urban and Regional Research*, 30, pp. 308–327.
- Lungo, M. and Baires, S. (2001) *Socio-spatial segregation and urban land regulation in Latin American cities*. Paper presented at the *International Seminar on Segregation in the City*, Lincoln Institute of Land Policy, Cambridge, MA, July.
- Mayer, C. J. and Somerville, C. T. (2000) Land use regulation and new construction, *Regional Science and Urban Economics*, 30, pp. 639–662.
- Ohls, J. C., Weisburg, R. C. and White, M. J. (1974) The effect of zoning on land value, *Journal of Urban Economics*, 1, pp. 428–444.
- Portes, A. and Schauffler, R. (1993) Competing perspectives on the Latin American informal sector, *Population and Development Review*, 19, pp. 33–60.
- Quigley, J. M., Raphael, S. and Rosenthal, L. A. (2009) Measuring land use regulations and their effects in the housing market, in: E. L. Glaeser and J. M. Quigley (Eds) *Housing Markets and the Economy: Risk, Regulation and Policy*, pp. 271–300. Cambridge, MA: Lincoln Institute of Land Policy.
- Rios, D. M. (2006) Cambios en la producción del espacio urbano residencial en la periferia de la ciudad metropolitana de Buenos Aires: un estudio de caso en el municipio de Tigre [Changes in the production of urban space on the periphery of the metropolitan area of Buenos Aires: a case study of the municipality of Tigre], *Estudios Demográficos y Urbanos* [Demographic and Urban Studies], 21, pp. 701–729.
- Ronconi, L., Casazza, J., Monkkonen, P. and Reese, E. (2011) *Mercado de suelo y regulaciones en la periferia de tres ciudades Argentinas: Buenos Aires, Córdoba y Rosario* [Land markets and regulations in the peripheries of three Argentine cities: Buenos Aires, Córdoba and Rosario]. Working paper, Centre for the Implementation of Public Policies Promoting Equity and Growth, Buenos Aires.
- Rose, L. A. (1989) Urban land supply: natural and contrived restrictions, *Journal of Urban Economics*, 25, pp. 325–345.
- Saiz, A. (2010) The geographic determinants of housing supply, *Quarterly Journal of Economics*, 125, pp. 1253–1296.
- Shoup, D. (1994) Is under-investment in public infrastructure an anomaly?, in: G. A. Jones and P. Ward (Eds) *Methodology for Land and Housing Market Analysis*, pp. 236–250. London: University College London Press.
- Siddiqui, T. and Khan, M. (1994) The incremental development scheme, *Third World Planning Review*, 16, pp. 277–291.
- Soto, H. de (1986) *El Otro Sendero* [The Other Path]. Instituto Libertad y Democracia, Lima, Peru.
- Torres, H. (2001) Cambios socioterritoriales en Buenos Aires durante la década de 1990 [Socio-spatial changes in Buenos Aires during the 1990s], *Revista EURE*, 27, pp. 80–100.
- UN-HABITAT (2003) *Slums of the world: the face of urban poverty in the new millennium?* UN-HABITAT, Nairobi.
- Varley, A. (2002) Private or public: debating the meaning of tenure legalization, *International Journal of Urban and Regional Research*, 26(3), pp. 449–461.
- Ward, P. M. (1982) *Self-help Housing: A Critique*. London: Mansell Publishing.
- Ward, P. M. (1999) *Colonias and Public Policy in Texas and Mexico: Urbanization by Stealth*. Austin, TX: The University of Texas Press.
- World Bank (2010) *Doing business surveys: 2010*. World Bank, Washington, DC.