

Evolution of the Proportion of Squatter Settlements

in Lima and Callao from 2007 to 2017

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### Abstract

Squatter settlements have been becoming the majoritarian way of housing access by poor people in Metropolitan Lima since the last ten years. For this reason, the aim of this study is to estimate the proportion of squatter settlements and the population living there from 2007 to 2017 in Lima and Callao. To achieve it, this study uses the National Household Survey and an adaptation for squatter settlements of UN-Habitat operational definition of slums to qualify observation as squatters settlements or not. The main findings of this research was a decrease in the proportion of squatter settlements but at the same time an increase in the number of people living there. However, these findings are not a local phenomenon, this is a phenomenon that occurs worldwide. Additionally, Callao, the north, south, and east of Lima have higher rates of squatters while the center of Lima has the lowest. Finally, based on the architect John Turner and the economist Hernando de Soto, it was developed an alternative of solution of these problem that suggest to change the role of the government from housing provider to housing enabler, and to simplify the titling process to ensure the security of tenure and promote the self-improvement of squatters settlements.

*Keywords: barriadas, squatter settlements, slums, self-help housing, migration, property rights, Metropolitan Lima*

## Evolution of Squatter Settlements in Lima and Callao

from 2007 to 2017

Since the last seventy years, Lima has been experiencing enormous demographic growth thanks to internal migrations (Instituto Nacional de Estadística e Informática [INEI], 2018a). This huge migration generated a great demand for housing that was initially satisfied by the center of Lima, but it continued to grow and ended overflowing. While some privileged group of people could get access to government housing projects, the majority of the population, usually poor, found in a squatter settlement (SS) a way of housing access. This is how the periphery of Lima began to be populated principally by SSs since the last 10 years. However, now empty lands were exhausted and the new SSs began to occupy less suitable sites like steep slopes, valleys subject to flooding or areas reserved for public projects (Riofrío, 1996). In addition, they are more precarious, smaller and it takes more time to improve their houses and get access to basic services (Maquet, as cited in Mendoza, 2002).

The aim of this study is to estimate the proportion of SS and the population living there. To achieve it, this paper processed data from the National Household Survey from 2007 to 2017 related to Metropolitan Lima. Then, the observations were qualified as squatter settlements or not using an adaptation of the UN-Habitat operational definition of slums. Finally, all the result were tabulated or charted by region, districts, and geographic zones.

This paper was divided into three parts. The first one introduces a historical background and a definition of SS. The second one explains the methodology applied and show the results obtained. Finally, in the last part, an alternative to solve squatter settlement was explained and the discussion of the results.

## Background Information

### Historical Background

The population distribution by regions of Peru has been suffering great changes since the last seventy years. This changed from being predominantly highlands in 1940 to being mostly coastal in 2017 (INEI, 2018a). From 2007 to 2017, the coast population growth around 206 403 inhabitants per year, while in the highlands decreased by 495 418 (INEI, 2018a). Lima was the principal destination for the new migrants as a consequence of natural disasters, rural poverty —associated with land tenure— and its association to more employment and cultural opportunities (Chambers, 2005). Since 1980, another cause for migrations was the guerrilla movement Sendero Luminoso and coke trade (Chambers, 2005).

Migrants used to be young single people, which traveled by steps migrations from small villages to towns and then cities, but now most of them migrate in just one step, joining family members and neighbors in Lima (Chambers, 2005). Initially, in 1960, migrants used to live in the city center in slums. Most of them in tenements called *callejones*, small dilapidated departments called *quintas* or small rented plots called *corralones*, because they were near the employment centers and also the cheapest solution for housing (Chambers, 2005; Henry, 1977 & Turner, 1965).

The alternatives to slums were fewer, government and private housing projects were rare and restricted to some privileged group of employees (Chambers, 2005). As a result of the high demand for housing, the housing rentals were beyond the reach of the low-income groups, and many workers moved to the periphery of the city occupying urban and semi-urban areas on squatter settlements called *barriadas* (Cole, 1956).

*Barriadas* often start through the unauthorized unplanned physical invasion of public or private lands in the periphery of the city, rarely with facilities like electricity, water or

sanitation (Dietz, 1969). According to Sakay, Sanoni, and Deng (2011), from the urban planning point of view, *barriadas* are a simple informal process of urbanization in which households settle in the land before the neighborhood is developed. Despite the classical urbanization process (urbanization, parcellation, building, and settlement) *barriadas* urbanization process was the opposite: population first lives, then construct and finally install services and facilities (Sakay, Sanoni & Deng, 2011).

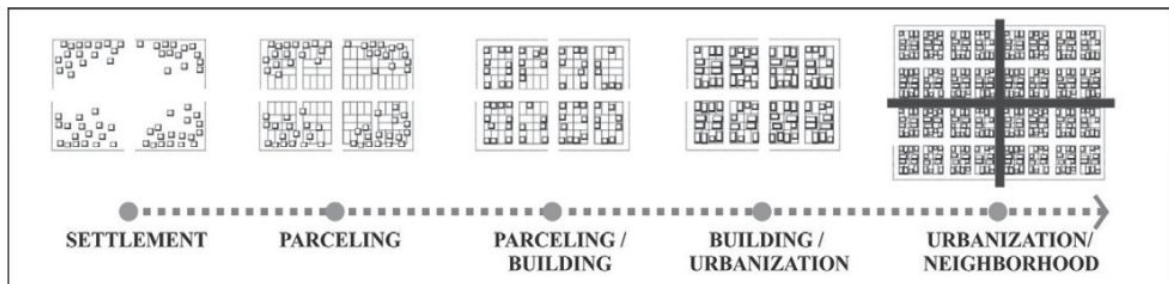


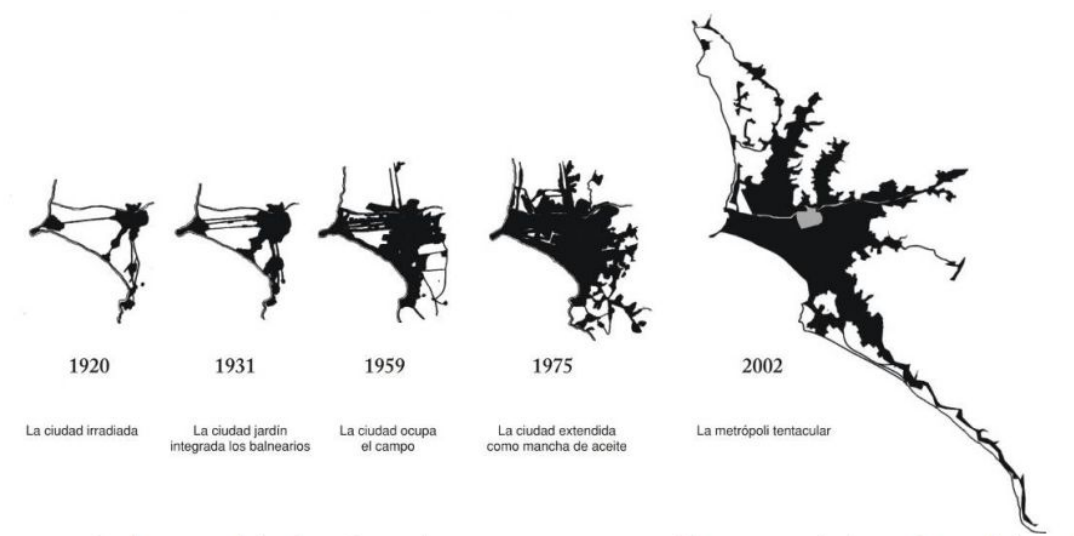
Figure 1. Diagram of the ascendant development in squatter settlements in Lima, Peru. From Sakay, Sanoni & Deng, 2011.

The housing policy for the poor became simply a matter of providing a plot of land (Riofrío, 1996). In 1961, the occupation of peripheral lands was officially accepted with the law of marginal neighborhoods. This law was developed with the aim to regularize and provide technical assistant to the old *barriadas*, at the same time the formation new *barriadas* were prohibited with the creation of Popular Urbanizations of Social Interest (Riofrío, as cited in Fernandez, 2015). However, this legislation did not stop the growth of *barriadas*; on the contrary, new and bigger *barriadas* were created (Fernández, 2015).

As the empty lands were exhausted, the new *barriadas* began to occupy less suitable sites like steep slopes, valleys subject to flooding or areas reserved for public projects, increasing the difficulty and cost of obtaining services (Riofrío, 1996). On the other hand, the old *barriadas* started a process of densification which increases problems of service provision and overcrowding (Riofrío, 1996).

While on one side, land liberation was a way of housing access for the poor, in the other it also has been increasing land trafficking since 1990 (Calderón, as cited in Fache, 2018). Some of the people, without economic problems, just invade lands to afterward rent to other people and generate income. Likewise, some of the first dwellers of *barriadas* rent or sell their houses to new migrants and move to another district with better infrastructure. According to a study made by the sociologist Arturo Huaytalla, more than half of the inhabitants of the San Cosme -one of the first *barriadas*- are rental dwellers (Chicoma, 2017).

Thanks to migration, the current population of Lima became twenty times bigger than 1945 (INEI, 2018). This demographic explosion changes enormously the urban model of Lima (see Figure 2) and *barriadas* became the majoritarian way of urban growth. Nowadays, more than 60% of the lands in Lima are occupied by *barriadas* (Sáenz, García & Roch, 2010).



*Figure 2.* The irradiated city: 1920; The garden city integrated to the spas: 1931; The city occupies the countryside: 1959; The city spread out like oil stain: 1975 and The tentacular metropolis: 2002. From *Evolution of Lima in the 20th century* by Sáez, García & Roch, 2010.

### Squatter Settlements

Squatter settlements can be defined as low-quality housing, illegally occupied by poor people in the periphery of cities in emerging countries (Willis, 2009). This type of housing have different names depending on their location. In Peru, are called as young towns, *barriadas* or, in official documents, marginal urban neighborhoods. According to the Dirección Nacional de Urbanismo (2012), they are urban nucleus characterized to present high rates of monetary and non-monetary poverty with partial or total lack of equipment and infrastructure services.

According to the architect and urban planner Hari Srinivas (2015), there are three defining characteristics of SS: Physical, Social and Legal. In the physical characteristics are the inadequate services and social infrastructures, such as water supply, sanitation, electricity, roads, drainage, schools, health centers, and markets. In the social characteristics, SS belong to the lower income group, predominantly rural or urban migrants —some of then they are also second or third generation of migrants— that working as wage labor or in various informal sector enterprises. Finally, the legal characteristics are their lack of ownership of the land where they build their dwellings.

### **Methodology**

Squatter settlements and slums have some similarities and differences, both are deprived of basic services and people who live in are usually poor. But while slum is a legally authorized settlement, SSs are an unauthorized settlement (Gouri, 2005). According to UN-Habitat (2003), squatter settlements are a type of slums. For this reason, two methodologies applied for slums measurements were adopted for SSs in this study.

The first methodology developed by Mahabir et al. (2016) suggests that we first need to arrive a consensus about what is a SS, as we made before in the background information.

After this, a set of measures can then be formulated in order to quantify the various aspects of squatters. These measurements are going to be based on the methodology developed by Patel, Koizumi, and Crooks (2014) to measure slum severity in Mumbai and Kolkata. They suggest to use National Census as a data source and an operational definition of slums to classify this data. However, in this study instead of the National Census, the National Household Survey (ENAHU) were used, and the operational definition of slums of UN-Habitat were adapted to SSs to i) identify the number of observation that qualifies as squatter settlements, ii) estimate the squatter proportion, and finally iii) estimate the squatter population. The number of observation taken by province and year are in Table 1.

### **The operational definition of squatter settlements**

The same characteristics of slums were adopted to SS and added one more, the way of housing access such as by invasion, purchase or inheritance. Is like this how squatter settlements are those places who lack one or more of the following items: access to drinking water, access to sanitation, adequate housing space, adequate housing structure, security of tenure or legal housing access.

- (a) Inadequate access to drinking water: When less than 50% of households have a water supply from a household connection, public standpipe, well or spring in not polluted areas (UN-Habitat, 2003). According to a WHO study in 2016 Lima has the worst polluted air in all Latin American cities (Torres, 2016). For this reason, well and spring will be considered inadequate.
- (b) Inadequate access to sanitation: When less than 50% have improved sanitation like public sewer, septic tank, pour-flush latrine or ventilated improved pip latrine (UN-Habitat, 2003). For this reason, inadequate sanitation will be considered blind cell, river, ditch, canal or not having access to sanitation.



- (c) Inadequate housing space: When there are more than two people per room (UN-Habitat, 2003). But for this paper living or not living with overcrowding will be the criteria.
- (d) Inadequate housing structure: When households live in temporary and/or dilapidated structures and do not have a good quality of material in the dwelling construction (UN-Habitat, 2003). According to this and the background information, the *quintas*, *callejones*, *corralones*, *solares* and *azoteas* qualified as inadequate, and the use of concrete will be considered as a good quality of construction material.
- (e) Security of tenure: If the household has title deeds to land and resident. For the paper, having a property title will be enough.
- (f) The way of housing access: As it was shown in the background information, the *barriadas* often start as lands invasion. For this reason, if the home was getting by invasion and lack of security of tenure it will be considered as a SS.

### **Estimation of the proportion and population living in SS**

The proportion of SS was obtained as the number of observations, by districts and year, that qualifies as a squatter divided by the total number of observations. The formula will look like this:

$$p_{sqt} = \frac{n_{sqt}}{n_t}$$

Where  $p_{sqt}$  is the squatter proportion,  $n_{sqt}$  is the number of squatter observations and  $n_t$  is the total number of observations.

In a similar way, we estimated the population living in SSs just multiplying  $p_{sqt}$  by the total population  $t_{pop}$ . It is because of the proportion of SSs its equivalent to the proportion of people living in squatter settlements. The formula will look like this:

$$P_{sqt} = p_{sqt} \times t_{pop}$$

### Results

Table 2, shows us that squatter settlements have become the majoritarian way of housing in Metropolitan Lima for the last ten years. Now the population living in SSs is 43 times bigger than the beginning of *barriadas* in 1955 and 10 times bigger than in 1967. However, from 2007 to 2017 the percentage of household qualify as squatter settlements decreased from 56.57% to 51.94%, but the number of people living in SSs growth of 36, 368 inhabitants per year.

In the other hand, if we plot the proportion of SSs from 2007 to 2017 (see Figure 3), we find that *barriadas* have his maximum point (62.80%) in 2010, and since this year it has been decreasing 70, 484 inhabitants per year until 2017, when it increased again to 5,302,710 inhabitants (see Figure 4). In a similar way, from 1970 to 1972 (during the military government of General Juan Velasco Alvarado) SSs proportion had a decrease and then an increase, but just 21,681 inhabitants per year (see Table 2).

Now, if we plot the proportion of squatter by province (see Figure 5). We can see that Callao has high rates of SSs than Lima with 61.90 % in 2017, and despite its increasing and decreasing, the current proportion of SSs is almost the same. A different case happened in Lima, where in general words has been a great decreased from 2007 to 2017.

Furthermore, if we look at the proportion of squatter by geographic zone (see Figure 6), we can find that Callao —as it was shown above— has high rates of SSs. Similarly, the south of Lima where the biggest *barriadas* (Villa El Salvador, Villa María del Triunfo, and San Juan de Miraflores) are located, has the highest rates of Metropolitan Lima. Contrary to the south, the center of Lima has the lowest proportion of SSs, it could be because the textile

industries, banking, and high-income people are located in La Victoria, Miraflores, San Borja, and San Isidro.

Finally, in Figure 7 it is possible to see that Carabayllo, Comas, and Chosica increased their percentages of SSs; while other districts like Pachacamac, Lurin, and Chorrillos have been decreasing their corresponding rates. However, districts like San Martín de Porres, Los Olivos, Rimac Callao, Independencia, El Agustino, and Santa Anita have almost the same proportions or a little few changes. Besides, in Table 3 is the estimation of SSs by districts during the whole 10 years of the study. This table shows that the ancient *barriadas* like San Martín de Porres, San Juan de Miraflores, Independencia, Comas, Carmen de la Legua Reynoso, and Callao have around 50% of their dwelling as SSs. Additionally, the most higher rates were in the new districts like San Bartolo (66.67%), Punta Hermosa (65.71%), and Chaclacayo (61.75%); and the bigger contemporary *barriadas* like Carabayllo (61.75%), Villa El Salvador (61.77%), Villa María del Triunfo (65.60%), Ventanilla (82.21%), and Puente Piedra (83.38%). On the other hand, the districts with the low percentages of SSs were San Borja (13.46%), La Molina (14.47%), Bellavista (14.53%), Pueblo Libre (20.51%), Miraflores (21.43%), Magdalena del Mar (23.23%), San Miguel (23.35%), and Jesús María (25.93%).

### **Body Paragraphs**

The first findings, the decrease in the proportion of squatter and the increase of the population living in it, agree with the UN-Habitat World Cities Report of 2016. In this study, the proportion of the urban population residing in slums is lower than it was two decades ago, but the absolute number of slum dwellers continues to increase (UN-Habitat, 2016). This findings clearly demonstrate the decline of housing as a political priority. Now, the housing policy is just providing a plot of land instead of the promotion of low-cost housing projects

for poor people. Additionally, the formalization process is usually troublesome, expensive and take a lot of time to achieve. As De Soto show in his book, *El Otro Sendero*, just to formalized the urbanization and home-building of an empty plot could take to a family around six years and 2,156 dollars (De Soto, as cited in Vargas, 1986). This is why formalization is out of reach for low resources people.

However, as Turner said the *barrial* movement is a vehicle for local development, community integration and personal fulfillment (Turner, as cited in Fernández, 2015). Adding the Mangin ideas, they are also well organized, politically sophisticated, strongly patriotic and comparatively conservative in their sociopolitical views (Mangin, 1967). Nowadays, most of the housing provision in *barriadas* was thanks to community organization instead of government labor. As an example, the district of Villa El Salvador is quite different from the first squatter settlement of 1970 thanks to a long and constant process of self-upgrading and highly participative planning. However, the success of this process will continue to be dependent on the persistence and desire for self-improvement of their settlers (Bartesaghi, 2014). Also squatters settlers were more productive than government. For example, between 1960 to 1984, the government invested 173.6 million dollars in the construction of social buildings, while in the same period of time squatters settlers spent 47 times more (8, 319.8 million dollars) in their buildings construction (De Soto, as cited in Vargas, 1996). The main reason for this is because people find in their building a way of future investment for their children (Mangin, 1967).

Policies to reduce squatter settlement like eviction, demolition or relocation are not effective (Bartesaghi, 2014). This kind of policies just generates more poverty and force displaced squatters to invade new vacant land and start from zero once again (UN Millennium Project, as cited in Bartesaghi, 2014). However, the decrease of the SS

proportion and the desire of self-improvement by their settlers show us that this problem has a solution. One way of solving was proposed by the architect John Turner in 1967. He suggests that we need to change the government role from housing provider to housing enabler (Turner, as cited in Fernández, 2015). This proposal allows the self-improvement of the settlers and their city incorporation thanks to the combination of community integration, and the technical and economic support of government and private partners (Bartesaghi, 2014). In this model, the state is responsible for the provision of sites, services, credit, security of tenure and technical assistant; while the settlers are responsible for the dwelling building (Chambers, 2003).

A similar proposal was developed by the economist Hernando de Soto but emphasizing the property rights as a way of self-improvement of the settlers. He argues that the huge real-estate capital invested by residents of *barriadas* is a "dead capital" which cannot enter to the formal market due to the lack of adequate legal mechanisms (De Soto, as cited in Fernández, 2015). However, if the government facilitate the titling process, *barriadas* residents could use their properties to get access to finance. Additionally, the security of tenure would encourage residents to improve their homes and neighborhoods, make business and eventually improve their economic situation by itself (De Soto, as cited in Fernández, 2015).

### **Discussion**

Using the methodology aforementioned the main findings was a decrease in the proportion of squatters and an increase in population living there from 2007 to 2017. One reason for the first finding could be the increase of government projects such as *Agua para todos*, *Crédito Mi Vivienda* and *Techo Propio* that enable people to improve their dwellings or to get access to better quality housing. On the other hand, the increase of the population

living in squatters settlements could be because of population growth, and the offspring of the first migrants start squatting new settlements.

Furthermore, as it was mentioned in the background information, the periphery of Lima (north, south, and east) have the highest proportion of squatters settlements, because their degree of consolidation is still small in comparison with the older districts of the Lima center. Additionally, in the comparison between Lima and Callao squatters is logical that Callao has the highest rates because it has less population than Lima and has one of the biggest *barriadas* (Ventanilla, and Mi Perú). Finally, in the study by districts, it was predictable that the higher-income districts have the lowest percentage of squatters, while the lower-income ones have the highest.

Usually, one limitation of the use of census data in the slums measurement is the long temporal gaps between collection events and the release of statistics (Martínez, as cited in Mahabir et al., 2016). However, as the data source of this study was a survey made quarterly it was not a big problem. Nevertheless, limitations of using ENAHO survey was the number of observation per districts, because they were fewer or incomplete during the whole years of study. This could introduce bias in the study because of the representativity of the sample. Also, their quality varies from one dataset to another. For example, some variables and observation have different names, instead of they represent the same value.

Finally, though the two solutions aforementioned in the body paragraphs we can add a new one with the combination of both and the addition of new ideas. This proposal has two targets: Upgrade the current squatters settlements and prevent the formation of new ones.

To address the first target, as De Soto and Turner suggest above, the provision of basic services and infrastructures with the simplification of the titling process need to be accomplished by the government. However, as Lima has been growing horizontally and

nowadays scarce vacant lands, a densification process needs to be started. Some dwelling in plain areas do not have the minimal requirements for construction. So, the government with the help of private partners could negotiate the expropriation of those lands and create social vertical housing project to replace the current dwelling, but with the evolving of their settler. For example, some criteria that need to be considered could be the average number of children and adults per family, living patterns or socio-cultural background, because migrants come from different parts of Peru and different style of life. In addition, this proposal could provide a house to the same quantity of families but in less space and some extra houses could be built for sale. Nevertheless, the way people could pay to get access to this kind of projects could be supplied with the value of the lands expropriated, government grant or private credit depending on the economic status of the beneficiary. Finally, this first proposal could solve other problems like the lack of public spaces, parks, transportation, enough space for roads, health centers, school and the impact on the environment.

For the second target, its necessary to decrease the number of migrations. To achieve it, we need to solve the main reasons why people still migrating to Lima. Some of these reasons are poverty, inequalities, land tenure, unemployment, health, and education quality. So, if the government generate more employment opportunities, diversifies economic activities, generate more wealth, reduce inequalities, and improve the quality of education and health in all regions, the people will not have more reasons to migrate. Additionally, it is necessary to promote the sense of roots and the return of migrants to their places of origin with government projects and facilities. Finally, it is necessary to improve the communication routes between regions and the cooperation between them and the central government.

### **Conclusion**

Despite the increase of people living in squatter settlements, the decrease of its proportion show as that this problem has a solution if the government continue, and increase, the number of housing improvement projects. However, to have more updated and accurate measures of squatters it is necessary to use another more sophisticated methodology like remote sensing technology or Global Positioning Systems (GIS). In the other hand, as it was argued for the solution of this problem the role of government needs to change from housing provider to housing enabler, but accomplish with a simplification of the titling process to ensure the security of tenure of settlers. Nonetheless, as the squatter settlements upgrading is necessary, prevent the formation of new ones is necessary too.



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### Appendix

Table 1			
<i>Observation used of The National Household Survey by province.</i>			
<u>Year</u>	<u>Observations</u>		
	<u>Callao</u>	<u>Lima</u>	<u>Total</u>
2007	285	1011	1296
2008	244	875	1119
2009	317	1083	1400
2010	241	864	1105
2011	283	598	881
2012	295	850	1145
2013	348	891	1239
2014	372	981	1353
2015	373	1018	1391
2016	307	881	1188
2017	194	627	821

Table 2

*Estimation of squatter settlements (SS) proportion and population from 1955 to 2017*

<u>Year</u>	<u>SS Proportion (%)</u>	<u>SS Population</u>
1955	9.93	119,140
1959	14.42	236,716
1961	17.16	316,829
1967	18.69	491,340
1970	25.48	761,755
1972	24.38	805,117
1976	27.31	1,113,000
1984	28.85	1,329,600
1993	34.49	2,188,445
2007	48.46	4,105,884
2007*	56.57	4,939,025
2008	54.32	4,827,135
2009	56.61	5,055,267
2010	62.80	5,633,164
2011	61.00	5,5136,33
2012	58.63	5,472,982
2013	57.69	5,328,788
2014	52.26	5,077,242
2015	52.02	5,000,462
2016	49.91	4,951,424
2017	51.94	5,123,302

Notes. The rows from 1955 to 2007 were extracted from Riofrío (1978) and National Census of 1984, 1993 and 2007.

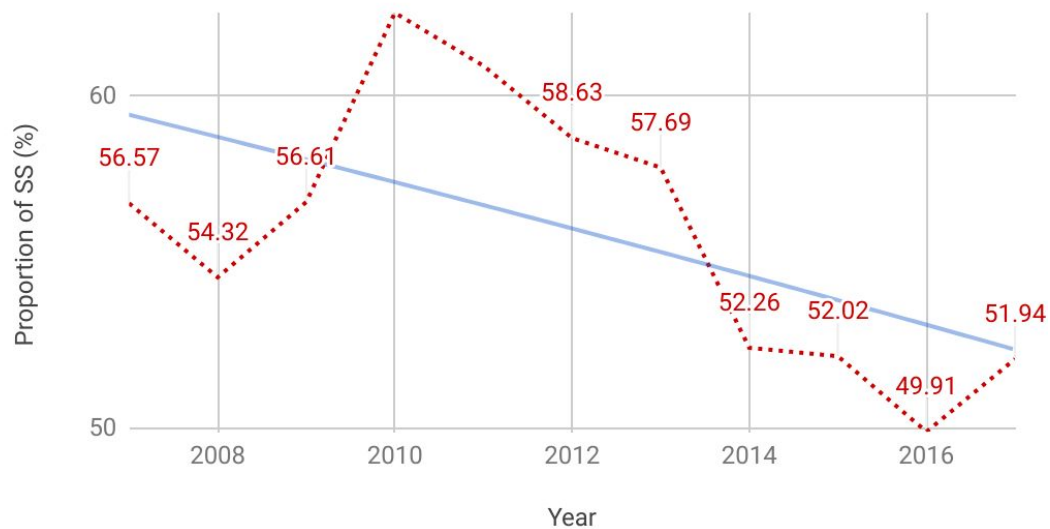
\*Since this row starts the estimations of this study.

Table 3

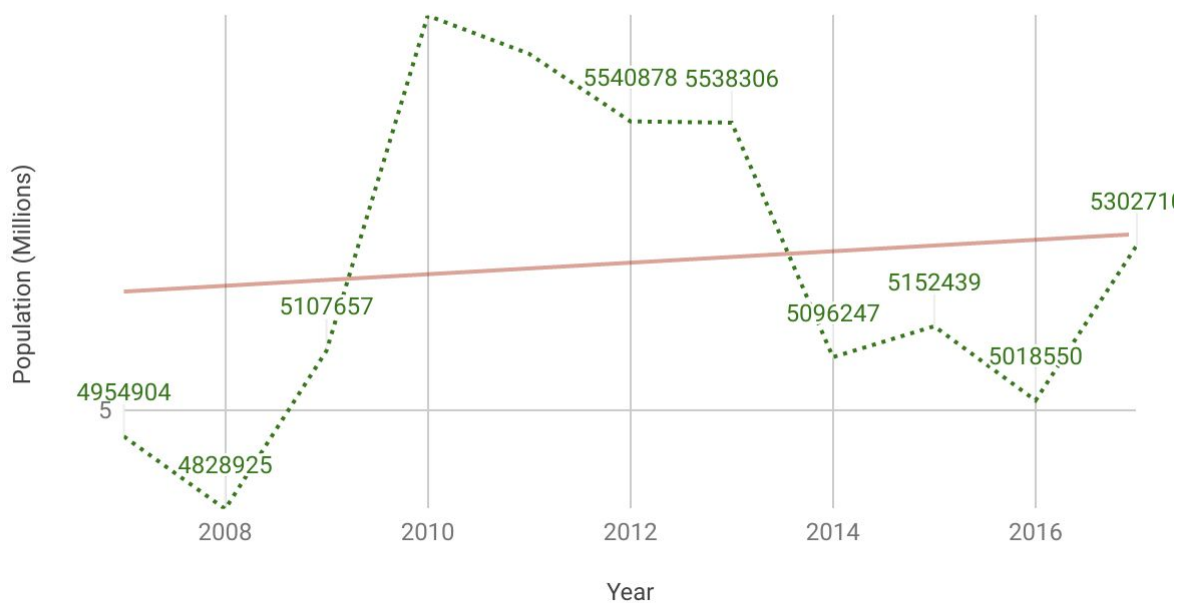
*Estimation of squatter settlements proportion from 2007-2017 by districts.*

<u>District</u>	<u>SS Proportion (%)</u>	<u>District</u>	<u>SS Proportion (%)</u>
San Borja	13.46	Comas	47.14
La Molina	14.47	El Agustino	47.31
Bellavista	14.53	Carmen de la Legua	47.79
Pueblo Libre	20.51	Reynoso	
Miraflores	21.43	Callao	51.15
Magdalena del Mar	23.23	San Martin de Porres	51.39
San Miguel	23.35	Chorrillos	58.17
Jesus Maria	25.93	San Juan de Lurigancho	58.85
La Perla	27.10	Rimac	59.75
Lince	27.47	Chaclacayo	60.53
Santa Anita	38.05	Carabayllo	61.75
Santiago de Surco	38.16	Villa el Salvador	61.77
La Victoria	38.35	Villa Maria del Triunfo	65.60
Lima	42.15	Punta Hermosa	65.71
Surquillo	42.53	San Bartolo	66.67
Independencia	43.14	Chosica	76.76
Los Olivos	46.49	Ventanilla	82.21
San Juan de		Puente Piedra	83.38
Miraflores	47.12		

Notes. There are not estimations from some districts because they have not complete observations during the time of study.

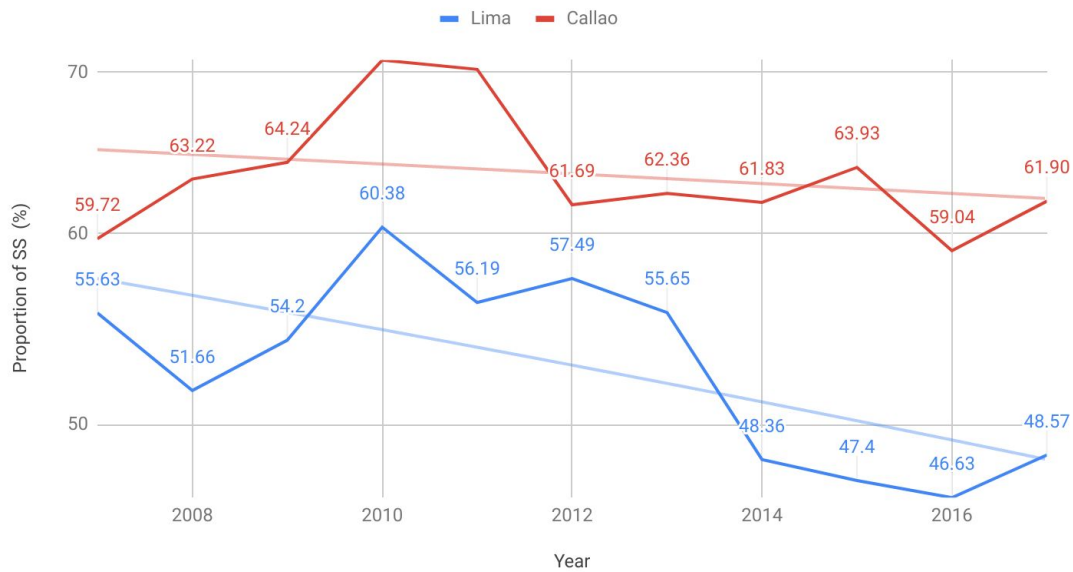


*Figure 3.* Estimation of the proportion of squatter settlements in Metropolitan Lima from 2007 to 2017. The blue line is the trend line and it shows that the proportion of SS has been decreasing during the last years.

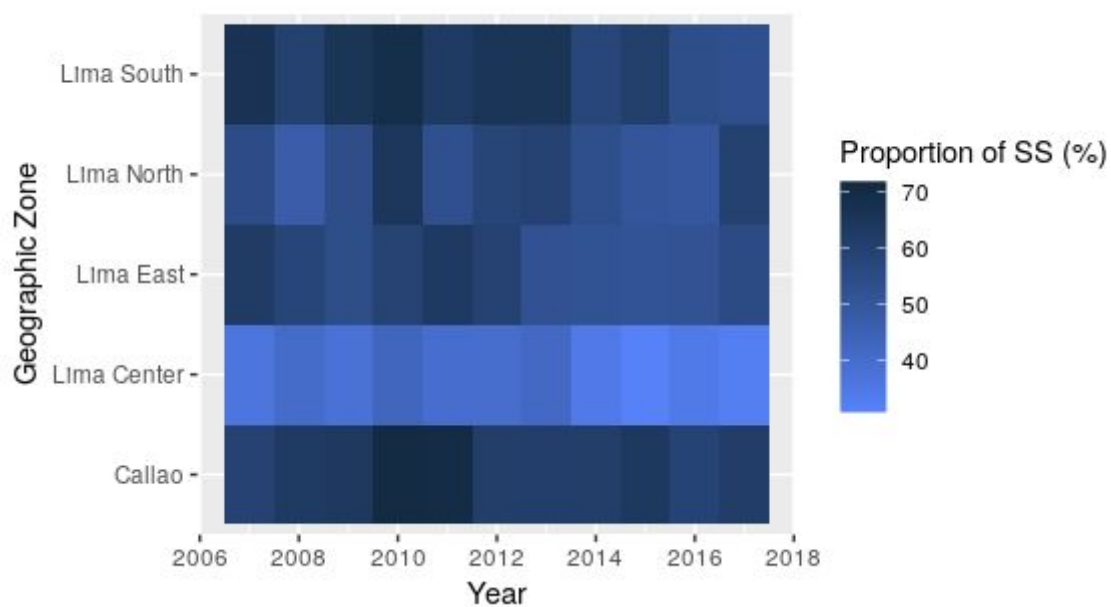


*Figure 4.* Estimation of the quantity of population living in squatter settlements in Metropolitan Lima from 2007 to 2017. The red line is the trend line and it shows an increase during the last years.

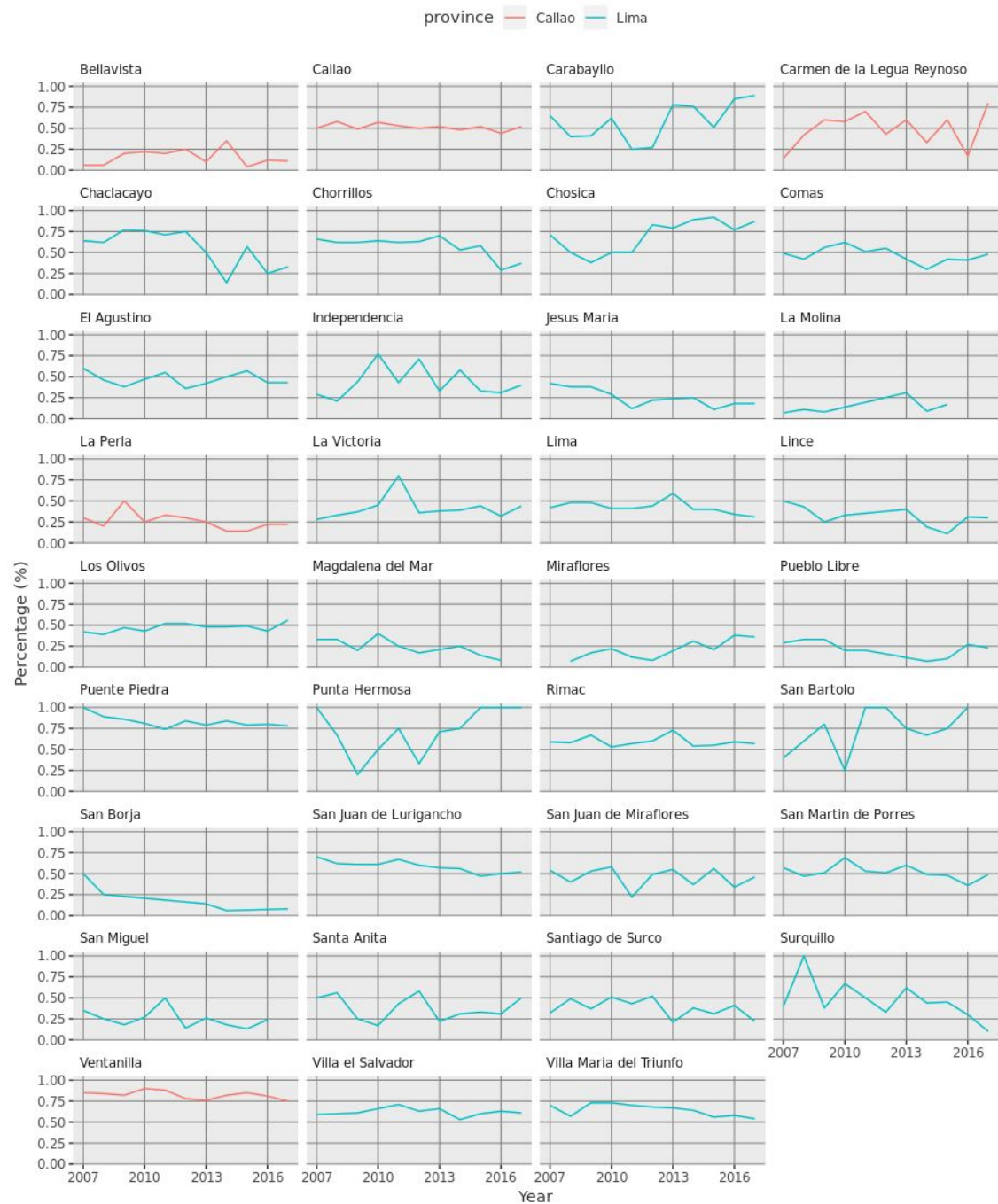




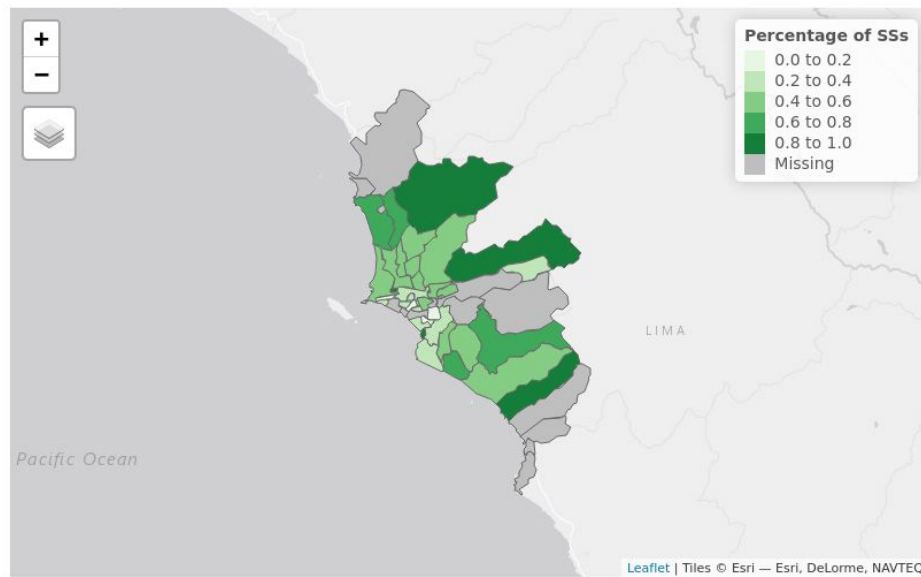
*Figure 5.* Estimation of the proportion of squatter settlements by province (Lima and Callao) from 2007 to 2017. The trend lines show that Lima has been decreasing its proportion of SSs more than Callao.



*Figure 6.* Estimation of the proportion of squatter settlements by geographic zone from 2007 to 2017. On Lima, the south has higher rates of squatter settlements, while the center has the lowest.



*Figure 7.* Evolution of the proportion of squatter settlements by districts of Lima and Callao from 2007 to 2017. Puente Piedra and Ventanilla have higher rates of SSs of Lima and Callao respectively.



*Figure 8.* Map of the proportion of squatter settlements in Metropolitan Lima in 2017.