



Evaluation of Slum Upgrading Programs

Literature Review and Methodological Approaches

Laura Jaitman and José Brakarz

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Laura Jaitman, jaitman.laura@gmail.com

José Brakarz, josebraka@gmail.org

Abstract

This technical note analyzes the methodologies used to evaluate neighborhood upgrading programs, describes their results, and suggests approaches for future evaluations. Local and central governments are increasingly utilizing slum or neighborhood upgrading programs to deal with the multiple problems of urban poverty. These programs employ a methodology of integral interventions, combining of both infrastructure works and social services targeted to specific neighborhoods. Due to this variety of interventions the assessment of their impact is complicated and requires a comprehensive approach. This document analyzes the methods used in the evaluation of a number of upgrading programs either looking at individual interventions or their combined outcomes. It proposes a methodological approach for their assessment based on three categories of outcomes: housing, neighborhood, and individual. For each type of outcome, the authors present a literature review of common interventions and their evaluation results. The document also suggests relevant indicators for evaluating slum upgrading programs according to these three types of outcomes, and finally, it presents methodological issues to take into consideration when designing the evaluations of integral programs.

JEL Codes: H43, O22

Keywords: slum upgrading; project evaluation; integrated urban projects

1. Introduction

1.1 Urbanization and Urban Poverty

The natural growth of the urban population combined with the addition of rural migration to cities produced a rapid urbanization in the developing world over the last several decades (Henderson, 2002). In fact, the urban populations in the developing world grew at a 3.35 percent rate annually between 1975 and 2007, while the growth rate of the rural population stayed constant at around one percent. As a consequence of this trend, in 2007 the world's urban population surpassed the rural population (United Nations, 2008).

Rural to urban migration is driven by the better labor opportunities and higher standards of living that are available in the cities (Glaeser, 2011). Cities let people and firms enjoy the benefits that come from the agglomeration of resources. The benefits of agglomeration arise from economies of scale and network effects, which reduce the per capita cost of providing services, such as transportation and sanitation, and increase labor productivity. Even though cities provide many economic opportunities and access to better services and amenities, these benefits do not reach all urban citizens. Glaeser (2011) identifies the three great scourges of urban life: crime, disease, and congestion. Inadequate housing and impoverished neighborhoods are key factors that explain these scourges. They worsen the quality of life for city dwellers and negatively impact the development of children, which, in turn, limits the potential that cities offer to the poor for overcoming poverty.

A large proportion of the urban poor in developing countries live in urban or peri-urban areas, under conditions of overcrowding, deficient urban and social services, poverty, high exposure to crime and violence, and other social problems. Consequently, migration to urban areas shifted the location of global poverty to the cities, triggering the process known as the urbanization of poverty (UN-Habitat, 2003). The rapid expansion of population in cities throughout the world is accompanied by the equally rapid growth of informal and impoverished migrant settlements, which develop because local governments are unable to provide the required services and the formal housing market is unable to offer affordable solutions.

The United Nations (UN) estimates that nearly one billion people worldwide currently live in slums (one-sixth of the planet's population). By 2030, nearly five billion people will live in urban areas, compared to 3.2 billion in 2007. This rapid and unplanned urbanization raises the prospect of a proportional increase in informal urban settlements,¹ which will significantly increase the number of slum dwellers and the social and environmental problems that typically follow these influxes.

So far, efforts toward achieving the Millennium Development Goals (MDGs) in the area of slum improvement have resulted in approximately 200 million additional city dwellers to gaining access to clean water, adequate sanitation, and durable housing.² As a consequence, from 2000 to 2010, the proportion of urban residents in developing countries living in slums decreased from 46 to 36 percent. However, currently the number of people moving into slums is increasing (UN-Habitat, 2011).

The Latin American and Caribbean (LAC) region is the second most highly urbanized region in the world. Three-quarters of its population now reportedly live in towns and cities ranging from small towns to megacities, such as São Paulo and Mexico City. Most urban dwellers in the region live in medium and large-sized cities. Approximately 60 percent of the poor and half of the extreme poor live in urban environments. The urbanization of poverty is projected to continue throughout the region, particularly in Central America, a trend that is of particular concern because this is an area of the world that is already vulnerable to natural disasters that disproportionately affect the urban poor (Fay, 2005).

¹ According to UN-Habitat, a **slum household** is a group of individuals living under the same roof, lacking one or more of the following conditions (UN-Habitat, 2003): (i) access to safe water: sufficient amount of it (20 liters/person/day), at an affordable price (less than 10 percent of the total household income), available without being subject to extreme effort (less than one hour a day of walking time); (ii) access to improved sanitation: access to an excreta disposal system, either in the form of a private toilet or a public toilet shared with a reasonable number of people; (iii) sufficient living area: fewer than three people per habitable room; (iv) structural quality/durability of dwellings: a house built on a non-hazardous location and with a permanent structure adequate enough to protect its inhabitants from the extremes of climatic conditions; and (v) security of tenure: the right to effective protection by the State against arbitrary unlawful evictions.

² The 11th target progresses towards a goal of “Cities Without Slums” (within the 7th Goal of “Ensuring Environmental Sustainability”), establishing a target of improving the lives of at least 100 million slum dwellers by 2020.

1.2 Interventions to Aid the Urban Poor

Given the high growth projections for most cities in developing countries, improving the quality of life in informal settlements represents one of the greatest challenges that city governments face. Governments have undertaken several approaches to deal with this problem. The first approach was the eradication strategy. This method proved to be expensive (assuming that governments were able to provide homes for the displaced population) and socially disruptive, but it is still practiced in some countries. A popular approach in the 1970s was to provide urban lots for families that were removed from slums, so they could build their homes “progressively.” Many criticized this so called “site-and-services” approach for being incomplete and for leaving families in generally worse conditions than they were in the original slums. Since the 1980s, local and central government have increasingly practiced the concept of *in-situ slum upgrading*, which is based on the notion that it is both socially and economically more effective to allow residents to remain in their communities. In-situ upgrading and improvement programs have the goal of integrating low-income communities into their larger urban contexts. The main advantage of in-situ slum upgrading is that it keeps the social networks of the dwellers and the cohesiveness of the community intact while improving their living standards of (Abdenur, 2009). Additionally, the investments already made by the families in their homes are capitalized and incentivized, leaving them in better economic positions. The success of this approach led to the implementation of a variety of programs, starting with those that dealt only with land tenure and ranging all the way to fully integrated programs in more complete versions, which include the provision of infrastructure, urban services, housing improvement, and other attributes (Brakarz et al., 2002).

Interventions to help alleviate urban poverty include: (i) programs aimed at improving living conditions, mainly through slum upgrading but also through public housing and sites and services projects, providing access to credit and housing finance, land-titling, infrastructure improvements, and utility subsidies; and (ii) programs aimed at improving the income of the poor, such as job training and microenterprise development.

Integrated slum upgrading programs combine these types of interventions. However, due to the complexity of implementing multiple interventions simultaneously, these combinations tend to be implemented gradually or progressively.

Several countries have achieved, or are in the process of achieving, reduction or stabilization of slum growth rates. In Brazil, Egypt, Mexico, South Africa, Thailand, and Tunisia, success is attributed to the political commitment to large-scale slum upgrading and urbanization programs, including legal and regulatory reforms in land policy and land regularization programs (UN-Habitat, 2006).

Slums represent a major challenge to development. Urban expansion and the growth of informal settlements place great pressure on already struggling municipal services and the natural environment. Despite the programs that are currently applied and ongoing interventions, it is not yet clear what the best practices are for these upgrades, which range from small, single-sector interventions to integral, multisector slum upgrading programs.

1.3 Outcomes of Slum Upgrading Programs

This technical note reviews the empirical evidence of the results of different slum upgrading programs and their components through the perspective of their effects on three groups of outcomes: (i) housing outcomes (housing investments by owners, increases in housing values, access to credit, access to housing infrastructure, ownership and titling, household density, etc.); (ii) neighborhood outcomes (improvements in urban services, impacts on security and violence, and social and urban integration); and (iii) individual outcomes (income gains, health improvements, human capital, child development, labor market insertion, etc.). The studies included in this review provide empirical evidence on the effectiveness of the different types of interventions. The interventions analyzed herein are representative of the most common approaches to slum and urban poverty problems, and they are intended to profile their outcomes and illustrate common practices in the field.

The study focuses on the empirical evidence and the results of evaluations of programs that aim at making improvements in the three types of outcomes. For each

group of outcomes, the study provides a review of empirical papers for the purpose of evaluating programs targeted directly at those outcomes. Most of the programs that are reviewed are implemented in developing countries. However, when there is no information available from those regions, the study also reviews relevant papers from disadvantaged areas in developed countries.

One of the goals of this technical note is to understand the causal effect of interventions within slum upgrading programs on housing, neighborhood, and individual variables. Therefore, identification issues are of the first order of relevance. The review primarily includes papers that exploit experimental or quasi-experimental settings.³ Such methods are the most effective in reconstructing the counterfactual needed to study the problems of causality, which is so important in determining the effectiveness of planned interventions.

The remainder of the document is structured as follows. Section 2 details the methodology employed in the selection of studies to include in the review and also states some concerns regarding identification of the causal effects of slum upgrading programs. Section 3 analyzes interventions affecting the three groups of outcomes of interest: housing, neighborhood, and individual. Finally, Section 4 discusses the salient conclusions and provides recommendations for future policy and evaluation.

2. Methodological Issues

There is a wide range of historic and present-day slum upgrading programs worldwide. They vary from local, specific policies focused in one problem area (such as replacing the floor material of a house or providing adequate sanitation) to integral programs comprising many activities and targeting various problems at the same time (such as the Favela-Bairro upgrading program). However, there are very few studies designed to facilitate the identification of the causal effects of a program.

Assessing the causal effects of slum upgrading interventions on different outcomes is a complex task. Ideally, one could compare what happened to the treated

³ In experimental settings, the treated and control groups are randomly selected. In quasi-experimental designs a variety of statistical methods are employed to choose a control group that can recreate the counterfactual for the non-randomly selected treatment group.

households or neighborhoods with what would have happened to them in the absence of the program (the counterfactual situation). To overcome this problem—the fundamental problem of causal inference (Holland, 1986)—there are different techniques that attempt to recreate the most accurate counterfactual to use as a comparison benchmark. Experimental or quasi-experimental settings are the most accurate in reconstructing the counterfactual, but they are not always possible to implement.

2.1 Selection of Target Slums

Among slum upgrading programs, there are very few that were implemented in an experimental mode in which some units (e.g., neighborhoods, slums, schools, or households) are randomly given the program while others are randomly allocated to the control group. In fact, the programs usually take place in specific locations targeting certain populations. The grounds for choosing those locations can be administrative, political, technical, due to strategic planning, or due to other factors. Placement of programs reflects both regional needs and complicated decision-making processes (Gramlich, 1994). This makes the identification of causal effects very challenging because the change in the outcomes of interest can be correlated with the placement of the treatment itself, thus causing endogeneity problems. For example, one can think that infrastructure is normally allocated to places that provide the highest returns to investment, either political or economic.⁴

If one compares the outcomes after the intervention in places where the infrastructure investment took place with those of the neighboring slums, the estimate of the effect of infrastructure will be inconsistent because of baseline differences between the slums and the other neighborhoods. This problem of endogenous placement is central to the evaluation of any large infrastructure project. For instance, to evaluate the effect of microcredits for slum dwellers, if one compares clients of microfinance institutions with non-clients, the outcome will be a biased estimate of the effect of the program. This is because clients and non-clients are not comparable groups of people; they possess

⁴ For example, Duflo and Pande (2007) study the effects of dams. The locations in which the dams are built on depends both on the wealth of different regions and the expected returns from dam construction. They claim that this endogeneity problem is common to all large infrastructure projects.

different entrepreneurial skills and probably different income trajectories, even in the absence of the program. Therefore, to identify the effect of slum upgrading interventions on different outcomes, it is necessary to exploit a credible source of exogenous variation in its provision.

2.2. Generalization of Results

The last methodological issue regarding the experiments that are reviewed is related to the generalization of their results. Even though experimental studies are internally valid (i.e., it is possible to identify causal effects), they do not necessarily have external validity (e.g., when it is possible to generalize these causal effects to others settings or populations, slums, or countries). Furthermore, external validity issues are even more difficult to assess when the effects of the interventions are heterogeneous across populations (for example, the effect of land titling on the use of collateral credit will not be the same if citizens in different program locations have differing levels of access to the financial system).

There are few evaluations of slum upgrading interventions that exploit experimental or quasi-experimental designs, although randomized evaluations are feasible and can be implemented in many more contexts today than was possible in the past (Field and Kremer, 2005). The set is even smaller if considering programs in the LAC region. Therefore, this study includes all of the quantitative evaluations affecting housing, neighborhood, and individual outcomes that have a credible identification strategy and relevant qualitative evaluations. It especially includes evaluations using the qualitative framework approach (Field and Kremer, 2005), which compares initial ambitions with actual outcomes by defining concepts and describing actors and institutions. Qualitative evaluation and descriptive results were included when the intervention itself (its goals or policy implications) was relevant. The Annex herein includes a summary of the findings of the main evaluations that were reviewed for the programs that exploit experimental or quasi-experimental designs and natural experiments.

3. Housing, Neighborhood, and Individual Outcomes

Slum upgrading programs comprise a wide range of interventions. On the one hand, there are integral programs, in which combined interventions take place to improve the living conditions of slum dwellers (the so-called integral approach). These interventions usually include infrastructure works, provision of urban services, activities in education and health, and community development. Relevant integral programs that progressively aggregate social components into their basic infrastructure design include the Favela-Bairro program in Brazil, in existence since 1994, and the Programa Urbano Integral (integral urban program) in Medellin, Colombia, in effect since 2002, among others. On the other hand, some local governments opt for small-scale programs that address, at the neighborhood level, specific deficiencies in water, sewage, drainage, or other deficits. Other interventions include land titling programs, which provide property rights to irregular settlers.

In the case of the integral programs, not only the evaluation techniques are more complex (see previous section), but the range of outcomes that are directly or indirectly affected by the programs is very wide. The complementary relationships that may exist between different interventions within a program make it very difficult to determine which of the components is more efficient at achieving the observed results. The evaluation of integral programs requires a careful design to allow the isolation of at least some of the components or their gradual or phased-in introduction. In contrast to the integral programs, single intervention programs are easier to assess because there are specific indicators that they are intended to affect. In such cases, one can attribute the changes that have been observed in the slums to the specific interventions promoted by the program.

For methodological purposes, this literature review is structured according to a broad classification of outcomes potentially affected by slum upgrading interventions: housing, neighborhood, and individual outcomes. Table 1 presents a summary of the frequently employed indicators used to measure these groups of outcomes in the context of slum upgrading programs. The classification is intended to provide a framework within which to describe the programs in some established order. Of course, the three

groups of outcomes are closely related and many of the issues affecting them overlap. For example, substandard housing conditions are usually found in marginal neighborhoods that have certain characteristics that affect individual outcomes. Also, neighborhood characteristics, both physical and socioeconomic, play a key role in defining the opportunities available to individuals and their families (individual outcomes). Housing and neighborhood conditions strongly influence the health, nutrition, education, and environment of the residents. All of these factors combine to determine their access to economic opportunities and their vulnerability to social ills (Bouillion, 2012).

The first section details the main problems regarding each group of outcomes in the context of slums. First, housing variables perform very poorly in slums because a household with inadequate housing facilities is primarily defined as belonging to a slum. This includes the hazardous and disadvantaged locations of slums and also the deficient housing services and precarious tenure conditions. Second, the neighborhood environment in slums is problematic due to physical and social issues. Lack of neighborhood infrastructure and community services drive many problems that affect other outcomes. Regarding social concerns, unsafe conditions (including crime, gangs, and domestic violence) are frequently cited among the problems that are common to slums. Finally, individual outcomes of the slum dwellers are lower than those of the other urban poor due to low skill levels. Informality and unemployment are more common in slums. Also, the social stigma of being a slum dweller may decrease one's employment opportunities.

After outlining the main problems related to each group of outcomes, this study provides a detailed list of slum upgrading interventions that target problems related to those outcomes. Of course, some studies report the effects of other types of outcomes; these effects are described when the programs are included. For example, land titling programs are included in the housing section, though they may also have impacts on individual outcomes such as income and health.

3.1. Frequently Employed Indicators

There is a wide range of indicators employed in different studies to measure housing, neighborhood, and individual outcomes, according to the objectives of the programs and the aim of the research analysis. The indicators are either simple or composite (comprising multiple indicators). This study classifies the indicators according to which of the three types of outcomes they measure (housing, neighborhood, and individual). As mentioned previously, this grouping has overlaps and some indicators are useful for studying more than one category.

Table 1 summarizes the main variables usually measured in households or community surveys that evaluate slum upgrading programs. Housing outcomes comprise mainly indicators of the state of the dwelling's infrastructure, its services and assets, property rights, location, exposure to hazards, household size, and the valuation of the house. Also, access to the banking systems is closely associated with housing, such as when the programs provide property rights for the land, and there is the possibility of using land titles as collateral for credit. Neighborhood outcomes include indicators measuring the availability of urban services (e.g., education and health), infrastructure (e.g., paving, street lighting, roads, parks, and community centers), integration with the formal city (transport links), and crime related variables. Finally, the most frequently studied indicators for individual outcomes include income gains, access to labor markets, human development (e.g., health, education), and wellbeing measures.

Table 1. Summary of Frequently Used Indicators By Main Type of Outcomes

Housing Outcomes		
Outcomes measured		Frequently used indicators
Housing	Assets	Value of the dwelling (value per square meter, rent price, estimated sale price); goods possessed (cars, televisions, computers, etc.)
	Infrastructure / materials	Access to safe water; sanitation facilities; electricity connection; and paved access. Materials of roof, floor and walls; area of dwelling.
	Investment in house	Money/time/material spent on upgrading the dwelling in the last year. Sources of funds for housing improvements (credit, savings, etc.)
	Property rights	Types of land titles (individual or communal titles) and the degree of formality of titles.
	Location	Vulnerability to natural disasters or other hazards (flooding, earthquakes, landfills, and landslides).
	Household size	Number of members in the household and their ages. Persons per room (e.g., living area is considered to be sufficient if there are fewer than three people per habitable room).
Financial system	Access to banking	Members of households have bank accounts, savings accounts, and loans, including mortgage loans (or microcredit for home improvement). Can they use property as collateral to secure loans (if yes, documentation is requested and interest rates charged).

Neighborhood Outcomes		
Outcomes measured		Frequently used indicators
Transport	Links	Availability of transport links between neighborhood and city center (or formal city).
	Commuting	Time spent commuting from neighborhood to city center or individuals places of work.
Infrastructure /services	Urban services	Availability of: street paving, street lighting, garbage collection; health centers/clinics, daycare centers, communal amenities, police stations, education facilities, public schools, etc.
Safety	Perception	Perception of security in the neighborhood/home. How often children are left home alone.
	Crime	Self-reported incidents (frequency of house robberies, domestic violence, etc.). Official crime statistics.
Mobility		Time lived in the neighborhood; plans to leave.
Integration to the formal city (composite)	Integration into city	Marginality Index (level of services available to neighborhood compared to other areas) Isolation/integration, Moran's Index.
Infrastructure deficits	Unmet basic needs	Combines measures of accessibility of households to housing, basic infrastructure, social services, and income.

Individual Outcomes		
Outcomes measured		Frequently used indicators
Income	Amount	Money earned per week/month from all sources. Number of weeks/months worked per year by each family member (with the focus on household income)
	Sources	Sources of income (work at home, work away, type /place of work).
Labor market	Labor supply Formality	Members of household who work. Hours worked per week/month. Members of household working in formal/informal sector.
Human capital	Formal education	School attendance of children. School enrollment of children.
	Nonformal education	Years of education of adults. Highest education level achieved. Other non-formal education: <u>job-training programs, workshops.</u>
Health	Children	Infections: prevalence of acute respiratory diseases and diarrhea, among other waterborne diseases. Nutrition: Anthropometric measures of children (height/length for age; weight for age; weight for height/length). Incidence of anemia. Cognitive Development: Cognitive development for children (mobility, communication skills).
	All	Mortality in the last year and causes of mortality Behavioral questions (e.g., aggressive reactions).
	Youth/adults	Consumption of drugs/alcohol.
Wellbeing (composite indicator)	Life satisfaction/happiness	Life satisfaction index: level of happiness/satisfaction with all aspects of life (e.g., housing, neighborhood, economic situation, prospects)

3.2. Simple and Composite Indicators

Both simple and composite indicators have their advantages and disadvantages, and are better used as complements rather than as substitutes. A composite indicator aggregates a set of simple indicators to construct a single measurement of a complex phenomenon. The composite indicator ideally measures multidimensional concepts that cannot be captured by a single indicator alone (e.g., competitiveness, human development, or sustainability) (Nardo et al. 2005). This tool is often used to summarize socioeconomic situations or economic assessments. A common composite index in social sciences is the Human Development Index (HDI), which was developed by the United Nations in 1990 to complement the gross domestic product (GDP) as a benchmark for comparing countries. The HDI measures a country's average achievements in three basic aspects of human development: health (life expectancy), education (expected years of schooling and mean years of schooling), and income (gross national income per capita).

The composite indicator summarizes many dimensions in a single number. The advantage of using this approach rather than a set of individual indicators is that a composite indicator provides a more tractable big picture of complex issues and simplifies the rankings and comparisons of units (villages, communities, and neighborhoods). It is much easier to track a composite indicator over time than it is to study the separate trends of the multiple dimensions of interest. Saisana and Tarantole (2002) also point out that composite indicators are advantageous in that they facilitate the task of ranking countries according to how they perform on complex issues in a benchmarking exercise and facilitate communication with the general public (i.e. citizens, media, etc.) and promote accountability.

The careful construction of composite indicators is very important. If the construction is not transparent and statistically sound, the composite indicators can be used to support a desired (inaccurate) policy (Saisana and Tarantola, 2002). Also, composite indicators can send misleading policy messages if they are misinterpreted. It is often the case that simplistic conclusions are drawn from the big picture of the overall situation that is illustrated by these indicators. For example, if an Unmet Basic Needs index for a certain area of the city shows improvement after a slum upgrading intervention, the conclusion that the program is successful can be misleading, since some variables that comprise the index may have improved and others not. Further analysis is needed to understand the separate effects of the program.

Statistical methods of data reduction are usually employed to construct composite indicators. To build a composite indicator is necessary to: (i) establish the theoretical framework defining the primary phenomenon and the subphenomena being measured; (ii) detect groups of indicators whose evolution is driven by the same underlying factors; (iii) select the indicators and give them proportional weights that reflect their relative importance within the overall composite index (Nardo et al., 2005). For example, the most important composite index is GDP, where the weights are estimated based on economic theory in a given country and reflect the relative prices of goods and services. However, the methodology and statistical framework for measuring GDP were developed over the last 50 years (Nardo et al. 2005), which is not the case for most composite indicators that can be used in individual slum upgrading evaluations.

In the context of these programs, it should be understood that statistically sound composite indicators summarize information and show the big picture. However, composite indicators should be used to complement the study of single indicators, because aggregation can lead to oversimplification of the results and misinterpretation of the specific effects of the program.

3.3. Housing Outcomes

3.3.1. Housing Issues

Although LAC countries have the highest rates of urbanization among the developing countries, and comparable average family incomes, many of its inhabitants are still poorly housed. Of the 130 million urban families in the region, 34 million live in homes that lack safe drinking water, sewer systems, adequate flooring, sufficient living space, and formal tenure, 5 million rely on another family for shelter, and another 3 million live in houses that are beyond repair (Bouillon, 2012). Lack of adequate water and sanitation facilities constitutes one of the main housing deficits in the urban areas of the region: approximately 21 million households live in dwellings lacking at least one of these basic services. Inadequate sanitation is the main infrastructure problem, affecting 13 percent of households (almost 17 million). Approximately 8 million households (6 percent) lack access to piped water, and the quality of the water received by the majority of others is not optimal.

The urban poor are the most affected. In 2009, the percentage of poor households lacking infrastructure was six times higher than that of high-income households. Overcrowding and building materials of poor quality are almost nonexistent in high-income households, but affect 16 percent of poor households. According to Bouillon (2012), even though the poor suffer the highest incidence of housing shortages, most households that experience housing deficits, paradoxically, are not poor (34 million households that are not poor compared to 10 million that are poor).

The concept of inadequate housing refers not only to a precarious dwelling without adequate facilities, but relates also to its location. Many slums are built on

unsecured land, without adequate infrastructure and are often located in areas exposed to natural disasters (such as flooding, earthquakes, and landslides) or environmental risks, such as landfills, which pose many health hazards. Over the past several decades, numerous natural disasters have caused major destruction in areas that house the urban poor. Recovering from these disasters is difficult, as the poor do not have resources or adequate safety nets, and public policies often prioritize rebuilding in other parts of the city (Fay, 2005). Their inhabitants do not usually possess formal land titles or property rights to the public or private land that they occupy and their housing and employment situations are precarious.

The lack of adequate sanitation is the cause of infections and several vector borne diseases (e.g., tuberculosis, hepatitis, dengue fever, pneumonia, cholera, and malaria), according to Lubby et al. (2004.) Inadequate housing facilities negatively affect children in a disproportionate measure⁵.

Adequate housing provides security and acts as a defense against crime, by increasing its sense of security and also freeing up time previously spent protecting assets to engage in more productive activities (Field, 2007). Conversely, the lack of formal land tenure is often stated as a reason that households refrain from investing in housing upgrades, as they feel at risk of eviction (Galiani and Schargrodsky, 2010).

For all of these reasons, adequate housing is very important for health, personal development, and household productivity, which, in turn, contribute to a better quality of life. It is natural that the houses in which people live and the neighborhoods in which they reside are major factors that influence their sense of life satisfaction. Surveys and studies in the LAC region reveal that people's satisfaction with their homes and the cities in which they live is a primary determinant of their overall life satisfaction (Lora et al., 2010).

Bouillon (2012) analyzes the most common reasons that cause people to live in substandard housing. The foremost reason is that their incomes are so low that they cannot afford a better house. Credit for mortgage financing is unattainable for them due to their low or informal income. The supply of affordable housing is clearly inadequate

⁵ Galiani et al. (2005) show that clean water reduces child mortality.

for the demand of the urban poor, given the high cost and insufficient availability of land, and regulation costs. All these factors significantly affect the ability developers to produce housing affordable to the lowest segment of the urban population.

Additionally, the high price of land drives the urban poor to areas that are undesirable to others, distant from central areas or forbidden to settlement due to environmental restrictions. The trade-off between the location in central in poor quality housing and more distant locations (with better housing) is a complex issue, which is closely related to transport facilities available to the urban poor (World Bank, 2002).

Many programs are implemented to improve housing quality and affordability. This inquiry explores the ones that combine urban upgrading with elements of housing improvement and land titling. These interventions encourage housing investment and aim to improve the quality of life of the urban poor.

3.3.2 Interventions to Improve Housing Outcomes

Land Titling and Property Rights

One of the common characteristics of slum dwellers is that they live in houses without formal property rights. Besley and Ghatak (2009) classify property rights into two types: the *use rights* (the owner's right to use a good or asset for consumption and income generation) and the *transfer rights* (the owner's right to transfer it to another party as a sale, gift, or bequest). In addition to these rights, a property right also implies the right to contract with other parties either by pledging, renting, or mortgaging the good or asset, or allowing other parties to use it. When property rights are effective, it means that the ownership structures are well defined.

There are two main channels through which property rights affect economic development (De Soto, 2001). The first channel is through the promotion of private housing investments by owners who feel secure about their property rights, and are encouraged to make long-term capital investments or plans for the future. Secured tenure is sometimes a precursor to public investment, since government agencies are more likely to invest in extending public services (e.g., water, drainage, or sewerage networks) once the dwellers formalize their situation and no longer live under temporary or illegal

conditions (Gulyani and Talukdar, 2008). The second channel is related to the income generation interpretation of use rights. Property rights enable owners to use their property as collateral to secure loans or as proof of assets ownership. This credit can be invested in productive projects, increasing productivity and income. It can also be invested in housing upgrades. The lack of formal property rights makes capital investments in untitled parcels highly illiquid—the assets represented by the investments cannot be recouped easily because assets without clear title are difficult to sell or use as collateral. Moreover, the lack of formal property rights denies poor families formal titles to their homes, which is a valuable insurance and savings tool that provides protection during challenging economic times and security for retirement. Without clear access to home ownership via secure property rights, people are forced to rely on informal market mechanisms, which not always offer security of ownership.

In the last several years, many governments throughout the developing world launched land-titling programs as part of their poverty alleviation and urbanization policies. Typically these interventions consist of titling public (and sometimes private) tracts of land to their current occupants (Galiani and Schargrodsky, 2011). The evaluation of the causal effects of allocating property rights is a difficult task, since the establishment of counterfactual is difficult. This is because the allocation of property rights is not random but based on income, family characteristics, individual effort, previous investment levels, or other mechanisms that make the groups that acquire those rights different than those that do not. Some studies address this identification problem by exploiting quasi-experimental designs or natural experiments involving property rights allocation.

Galiani and Schargrodsky (2010) exploit a natural experiment in the allocation of land titles in Argentina. In 1981, squatters occupied a piece of land in a poor suburban area of Buenos Aires. In 1984, a law was passed expropriating the land of the former owners and formally granting title to the occupants at the time. While some original owners accepted the government compensation, there were others who disputed the compensation payment in the Argentine courts. Both groups shared the same household pre-treatment characteristics: they lived next to each other, and the parcels they inhabited were identical. Since the decisions of the original owners to accept or dispute the

expropriation payment were orthogonal to the squatter characteristics, the decisions generated an exogenous allocation of property rights across squatters.

The authors studying the effect of land titling programs find encouraging results: entitled families substantially increase housing investment, reduce household size, and enhance the education of their children (relative to the control group). The built area of homes increased by 12 percent, while the overall index of housing quality rose 37 percent. Moreover, households in the titled parcels are smaller (an average of 5.11 members compared to 6.06 in the untitled group); this is due to the diminished presence of extended family members and a reduction in the fertility rate of the heads of households. In addition, children from the households in which the fertility rate decreased show significantly higher educational achievement, obtaining twice the completion rate of secondary education (53 percent vs. 26 percent). Finally, regarding the impact of land titles on access to credit markets, they find no effects on access to credit cards and bank accounts, nor do they find effects on access to non-mortgage, formal credit from banks, governments, labor unions, or cooperatives (less than 10 percent of these families have access to at least one type of formal credit).

According to the same study, access to informal credit from relatives, colleagues, neighbors, and friends is higher than access to formal credit from banking entities. An estimated 41 percent of families have access to informal credit and to on-trust credit that they receive from the stores in which they perform their daily purchases. Titling status, however, shows no effect on access to these informal sources of credit. Regarding mortgage credit, the authors find a very modest effect: only four percent of the entitled households had received a mortgage loan.

Another study of the effects of land titling, which uses a quasi-experimental design by Field (2005), exploits the variation in ownership status induced by a nationwide titling program in Peru, in which 1.2 million property titles were distributed to urban squatters on public land between 1996 and 2003. Field performs a difference-in-difference analysis⁶ comparing the change in housing investment in households that participated in the program to those that did not. Her results indicate that strengthening

⁶ Making use of differences across regions induced by the timing of the program and differences across target populations in the levels of pre-program ownership rights.

property rights in urban slums has a significant effect on residential investment: the rate of housing renovation rises by more than two-thirds of the baseline level.

Field also finds that greater incentives to invest are not associated with the improvements in credit access that came with the titling program, but rather are due to the decreased threat of eviction. In particular, there is a significant increase in renovations financed out-of-pocket by non-borrowing households. Field and Torero (2003) support the hypothesis that the effects of titles in the credit market are very small. They find no evidence that titles increase the likelihood of receiving credit from private sector banks, although interest rates are significantly lower for titled applicants regardless of whether collateral was requested. In public sector lending, they find that property titles are associated with approval rates that are 12 percent higher when titles are requested by lenders. They find no relationship between titles and approval decisions when lenders do not request titles. They propose that the failure of commercial banks to increase their rate of lending to households that obtain property titles is due to the perception by the bank that titling programs will make it more difficult for them to foreclose. This is supported by data from Peru indicating that individuals with title have less fear of losing property in cases of default.

Field (2007), exploiting the same quasi-experimental setting, studies the effect of land titles on the labor market. She finds that households with no legal claim to property spend an average of 13.4 hours per week maintaining informal tenure security, reflecting a 14 percent reduction in total available household work-hours for the typical squatter family. Household members are also 40 percent more likely to work inside of their homes. Thus, the net effect of property titling is a combination of an increase in the availability of labor force hours and a reallocation of work hours from inside the home to outside of the home.. Panel data available for a subset of households served by the titling program show that labor supply increased by 16 hours per household between 1997 and 2000

It is suggested that property rights might increase the value of the houses. By controlling for the investments that are induced by property rights, Galiani and Schargrotsky (forthcoming) estimate that the titling premium, which is the difference in value paid for a house of similar characteristics between titled and untitled properties, at

18.5 percent (they estimate a premium of 37.7 percent without controlling for housing investments.) Lanjouw and Levy (2002) estimate a titling premium of 24 percent for urban slums in Guayaquil, Ecuador.

In summary, land titling programs have positive effects in housing investments and negative effects in fertility. It is also clear that there are positive effects on the education of children and the head of household labor supply (these positive effects depend on the previous arrangements and intra-household allocation of the burden of protecting the unsecured land from other slum dwellers). The hypothesis that land titling has positive effects on access to credit because the dwelling can be used as collateral has little support. The reasons might be that the access of slum dwellers to the formal credit market is very limited or that the high legal costs of eviction and mortgage execution is an obstacle to mortgaged credit (Galiani and Schargrotsky, 2011).

In order for banks to profit from the sales channel enabled by land titling, banks should make it easier for the poor to access the banking system in general and credit in particular. More research is needed on the important topic of the effect of land titling on the development of land markets (land sales and rental markets).

Titling per se is not a permanent solution if it is not accompanied by regulatory changes. Galiani and Schargrotsky (2011) claim that in most of the cases, land titling interventions were not accompanied by measures to alleviate the administrative burden of registering transfers in title due to changes in ownership. Over time, as the beneficiary title holders pass away, divorce, or migrate, and if these poor households cannot afford the costs of transferring title, there will be a slow process of de-regularization leading to a new need for costly titling interventions. The authors study this process of de-regularization by exploiting a natural experiment in the allocation of land titles to very poor families in a suburban area of Buenos Aires, Argentina, which was mentioned previously. They find that almost 30 percent of the titled parcels have become de-regularized (meaning outdated or with inaccurate information) due to unregistered intra-family transactions (death, divorce, others) or inter-family transactions (informal sales, occupation, etc.) This figure seems surprisingly high given that it was very difficult initially for these families to gain legal property ownership and given the positive effects of legal titling. A plausible explanation is that the legal costs of remaining formal seem to

be quite high when compared to the low value of these parcels or the marginal gains of possessing formal documentation. Moreover, a family might incur these costs on multiple occasions over the course of time. It is possible that the repetitive costs of remaining formal are too high given the low value of the parcels and the high titling premium. Thus, to help poor families to afford legality-titling programs shall emphasize reducing the costs of legal transactions as much as providing the titles themselves.

Another important issue regarding property rights is that full land titling has proven in many cases to be expensive and difficult for governments to deliver. The provision of secure land is enough to provide the minimum necessary stability. Recently different forms of ownership or occupation rights documents have been devised as alternative to formal titles to overcome difficulties in the registration process. These range from individual or communal titles to rights of occupation of urban land that has not been claimed by formal owners or government idle land. UN-Habitat (2007), for example, advocates various interim occupancy rights, such as granting non-transferable short-term leases, collective property rights, use of community land trusts, and protection against eviction.

Regarding communal titles, descriptive evidence from Thailand and India show that the strategy of collective land tenure ensures that poor people keep the land, secure their housing, and sustain themselves as a community. In the Baan Mankong program in Thailand,⁷ the tenure solutions that communities create take many forms; for example, they purchase the land that they already occupy, buy other land nearby, or obtain long-term leases on existing land or land that is nearby from a variety of public landowning agencies. The tenure arrangements that these communities are able to negotiate include joint land ownership under their community cooperatives. They also include cooperative lease contracts that are long, medium, or short term, for lease periods of three to thirty years (Boonyabancha, 2009). In Mumbai, the house is given as property, but the land is held in community. With land being the scarcest resource in the city, the government is extremely strict in allocating land to residents. In fact, allocation of land for residents is possible only through the Slum Rehabilitation Scheme, where land is transferred to a

⁷ The Thai government launched the Baan Mankong Collective Housing Program in January 2003 as part of its efforts to address the housing problems of the country's poorest urban citizens.

society of residents instead of giving it to an individual person. Individuals become owners of their flats, but the land remains as the property of the city.

Therefore, although land titling can be the clearest and strongest instrument available to provide security of tenure, it does not have to be in the form of individual property rights. There are other forms of ensuring security of tenure besides formal land titles. It is recommended, however, that any slum upgrading program include some form of land titling to fulfill its purpose of enhancing the security of the land.

Housing Improvement

Housing and housing improvement programs have important impacts on the health and the welfare of their residents. There is a set of papers that study the impact of improvements in housing on a wide range of outcomes. These studies exploit experimental or quasi-experimental designs to identify the causal effect of the interventions. We include studies on the results of prefabricated housing interventions, on the effect of replacing dirt floors with cement floors, and on the effects of introducing piped water connection. In general, they find positive effects on the welfare of household members in terms of increased satisfaction and particularly positive health effects on children. However, none of them find effects on income outcomes or additional housing investments.

Galiani et al. (2011) assess the impact of providing better houses *in situ* to slum dwellers in El Salvador and Uruguay. The authors experimentally evaluate the impact of Un Techo Para Mi País (UTPMP) on several outcomes of interest. UTPMP is a youth-led program that provides basic pre-fabricated houses to extremely poor populations in Latin America.

The UTPMP houses are constructed of wood (Uruguay) or aluminum (El Salvador).⁸ A typical house is 18 square meters (six by three meters) in size and is built by teams of youth volunteers along with the household recipient. The UTPMP dwelling offers significant improvements in shelter in terms of flooring, roof, and walls. Though

⁸ UTPMP works in 18 Latin American countries. The evaluation performed by Galiani et al. (2011) considers the programs in El Salvador (2007-2008) and Uruguay (2007-2008).

these houses constitute a substantial improvement in the houses of the targeted poor population, it should be borne in mind that these facilities do not have water and sanitation, bathrooms and kitchens, or amenities such as plumbing, drinking water, or gas. As the UTPMP budget and personnel constraints limit the number of houses that are upgraded at any one time, the beneficiaries are selected through a lottery system, giving all of the eligible households⁹ in a pre-determined geographical neighborhood an equal opportunity to receive the housing upgrade in a given year. Thus, due to the lottery system, the authors have a randomized, controlled experiment that they use to evaluate the effects of upgrading houses in slums.

The main objective of the program is to improve household wellbeing in general and living conditions in particular. As expected, the program substantially improves the quality of the floors, walls, and roofs, as well as the share of rooms with windows. Another important aim of the UTPMP program is to give slum dwellers a sense of dignity in their lives. Living in a better house is a source of satisfaction, dignity, and pride per se, apart from other dimensions such as health, education, or labor outcomes. They find that families are significantly happier with their houses and with their lives. The gains are substantially larger in El Salvador than in Uruguay, which is consistent with the fact that the house improvements are more substantial in the former case than in the latter. The studies of Cattaneo et al. (2009) and Devoto et al. (2011), which will be reviewed later herein, also show how programs directed at the improvement of housing conditions result in increased satisfaction and mental wellbeing. However, families on the UTPMP program do not usually make further improvements to their houses: there are no significant effects on access to water, electricity, sanitation, or in the possession of assets.

The sense of security in the homes is also assessed in the study.. Information from the baseline survey of El Salvador shows that 49 percent of the head of households felt insecure frequently, much of the time, or always and 59 percent felt insecure when they left their homes unattended. In this sense, it is arguable that providing a better house potentially reduces the feeling of insecurity. The estimations show that in El Salvador all

⁹ UTPMP first selected a set of eligible settlements which meet the following criteria i) consists of more than 10 families located in public or private lands, and ii) where one or more basic services (electricity, safe water, or sewage system) are not available.

self-reported measures of security increase substantially –the increase in the index for security inside the house is approximately 30 percent. There is a 90 percent increase in the index that measures whether it is safe to leave children unattended at home. In Uruguay, however, no effect was detected. The authors do not find any effects of the program on crime, but there are no reported changes in the frequency of home robberies during the last year in either El Salvador or Uruguay.

Better housing provides a safer environment for the reproduction of human capital and, thus, has an effect on labor outcomes. The same study estimates whether having a better house directly or indirectly stimulates labor supply and earnings.¹⁰ They do not detect significant effects on any of these outcomes, nor do they find impacts on the health of children as measured by the prevalence of diarrhea and respiratory disease. Positive effects on health were expected due to children living in the clean and well-ventilated dwelling that the program provided.

In summary, it seems that providing better houses in situ to slum dwellers in El Salvador and Uruguay greatly improves the quality of housing and the satisfaction of the beneficiaries with their housing and the overall quality of life. But, the provision of better houses has virtually no other effect. Perceptions of increased security occur only in El Salvador. There is no change in Uruguay. In both countries, better housing has no effect on the possession of assets or on labor outcomes. The health of children is also unaffected by the intervention.

Cattaneo et al. (2009) investigate the impact of a large-scale program called Piso Firme, implemented by the Mexican government. This program replaces dirt floors (up to 50 square meters) with cement floors.¹¹ Dirt floors are a threat to health because they provide a vector for parasitic infestation, especially in young children due to the fact that fecal matter tends to remain on the floor (it is difficult to spot and clean). To identify the effects of this intervention, the authors take advantage of the geographic variability in the implementation of the program. At the start of the program, some states were treated and

¹⁰ Labor supply refers to the size of the household and the availability of the head of the household or spouse to work more hours. Earnings refer to per capita income of the household.

¹¹ The first large-scale Piso Firme program targeted to both rural areas and urban slums was implemented by the State of Coahuila in 2000. Subsequently, since late 2003, other states and other federally funded programs adopted Piso Firme.

others were not. The included areas were high-density, low-income urban neighborhoods. Eligible households must have dirt floors and own their homes prior to receiving Piso Firme. The households already have water and sanitation facilities. The cost of the cement is paid for by equal contributions from municipal and state sources, while households supply the labor input needed to prepare and lay the floor.

The authors find that replacing dirt floors with cement floors interrupts the transmission of parasitic infestations and reduces the incidence of both diarrhea and anemia. The reduction in anemia is expected to have positive effects on cognitive development. In fact, they find that children in treated households perform significantly better in child development tests. However, this result may be due to another benefit of the program. Piso Firme provides a benefit amount of approximately \$150, which is equivalent to about half of the monthly income of the household. If a beneficiary household had already decided to save and invest in cement floors, it could use the resources freed up by this in-kind transfer to increase consumption or to make other types of investments, such as additional housing investments that affect health outcomes, or investments in microenterprises that might increase household income. The authors rule out this channel, as they show that the program is not associated with the value of houses--treatment households did not consider their houses to be any more valuable than control households- nor with changes in income or total consumption. Also, the program did not encourage households to make further improvements to their houses.

A significant result of the Piso Firme intervention described in Cattaneo et al. (2009) is that following the implementation of the program, adults are substantially happier, as measured by their degree of satisfaction with their housing and quality of life. They have significantly lower scores in the categories of depression and perceived stress. The reasons adults are happier may be that they are living in a better environment and that their children are healthier. These results indicate that housing has a significant effect on wellbeing.

Devoto et al. (2011) study the welfare effects of a program that increases access to piped water in low-income households living in Tangiers, Morocco. Many poor urban households were living in neighborhoods that had the infrastructure needed to connect to the water system, but they could not afford the connection fee. These households

received free access to public water taps installed in their neighborhoods, and they also had sanitation facilities at home. The program provided a subsidized, interest-free loan to pay to install a water connection. The loan was repaid in regular installments with the water bill over a term of three to seven years. The subsidy did not cover the cost of installing the connection or the cost of water consumed. To pilot-test the program, a door-to-door awareness campaign was conducted in early 2008 among 434 households randomly chosen from the 845 households that needed a connection.

In this randomized experiment, the authors find that households are willing to pay a substantial amount of money to gain access to a private tap at home: within a year, 69 percent of households in the treatment group had purchased a connection (compared to 10 percent in the control group). As a result, their average monthly water bill more than doubled, from US\$9 to US\$24 a month (the previous cost of \$US9 came from households who received their water from their neighbors). The quality of water was unchanged, since public taps are properly maintained and the all of the water comes from the same source. The study finds no change in the incidence of water-borne diseases, such as child diarrhea. Having the connection generated important time gains, which did not lead to increases in labor market participation, income, or schooling attainment. The additional time was used for leisure and social activities. The program also reduced the risk of conflict or ill feelings between neighbors. In summary, consistent with Cattaneo et al. (2009) and Devoto et al. (2011), the mental wellbeing of households improves substantially when they upgrade their housing facilities.

It is important to notice that the Moroccan intervention studied by Devoto et al. (2011) provided a loan and not an in-kind subsidy. It is useful to think of their conclusions in terms of the barriers that households face in the effort to improve their housing facilities. In this case, credit constraints were the barrier because they were willing to pay for the water connection once they were offered the loan. Initiatives like this one, for which there is a willingness to pay, have a relatively low cost for the state and improve the welfare of poor urban families through investments in better housing.

In summary, the findings of these studies, which have an internally valid design, suggest that limited in situ improvements in housing are not sufficient to produce significant changes in the living conditions of the urban poor. Providing better housing

and housing facilities improves slum dwellers' wellbeing and satisfaction with life, but does not reduce the various ailments from which they suffer due to living in slums. It follows that these housing upgrades programs must be complemented with more comprehensive interventions combining infrastructure and social components that can address the other major problems affecting the lives of people in slums.

Infrastructure Upgrading

The evidence presented in the last subsection concludes that in-situ house upgrading projects are not sufficient to address the complex problems of slums. Complementary or alternative interventions are needed to have a significant impact on the quality of life of their residents. Improving the infrastructure of slum neighborhoods seems to have a significant impact in the overall quality of life in a poor neighborhood and incentivizes their residents to invest in their homes. One such intervention is street pavement. In an urban context, street pavement has multiple positive functions: it facilitates the movement of vehicles, pedestrians, and cyclists; allows commercial vehicles to deliver goods; and has a significant impact on the visual appearance of the area.

Gonzalez-Navarro and Quintana-Domeque (2010) study a randomized field experiment in Acayucan (Mexico), where the city expands its street system over time via asphaltting projects. Given that the administration could afford to pay for only 28 of the 56 projects in 2006, it was agreed to randomly select the 28 streets to be paved. The follow up period is for almost a year after the intervention; thus they capture short-term effects by focusing on households that were present both before and after the intervention. The authors find that street pavement led to a doubling in the average number of home improvements in which a household engaged over the previous six months: from 0.4 to 0.8 reforms (flooring, plumbing, electrical installations, toilets, refurbishments, and air conditioning). Furthermore, there is a 50 percent increase in the likelihood that the family purchased materials for home improvements in the previous six months (from 15 percent of households in the control group to 24 percent in the treated group). Pavement also increased the number of durable goods owned by the household by 12 percent and motor vehicle ownership by more than 40 percent. The rise in motor vehicle acquisition is also explained in part by complementarities with street pavement.

Pavement increased home prices: the authors find that residential properties abutting paved streets increased in value by 16 percent, with a corresponding gain in land value of 54 percent. The estimated impact of street pavement on housing values was an increase of 25 percent, according to the estimates of homeowners. Another market value information point in the same direction: rents rose by 31 percent on paved streets.

Pavement also increased the percentage of individuals who use collateral-based credit from approximately two percent among the control group to nearly five percent among the treated group. The increased use of collateral-based credit is also reflected in the average loan size which, on average, was 135 pesos among the control group and 1,643 pesos among the treated group (equivalent to two months per capita expenditure, which is a more than tenfold increase). However, this effect on credit is small and reduced to a limited portion of the treated population, so it is very unlikely that this channel accounts for the largest share of the boost in durable consumption. The authors cannot disentangle whether this modest increase in the use of credit is due to an increase in either the demand or the supply of credit (Field and Torero, 2004).

The combination of neighborhood infrastructures that deliver the greatest impact on housing outcomes has not been studied in experimental settings. The empirical evidence from existing programs indicates that the approach that is most effective in improving housing and habitat conditions involves a basic services package that includes sanitation infrastructure, safe access to homes, and protection from environmental disasters (including adequate drainage systems). Combined with security of tenure in the land, this approach has the indirect effect of improving housing quality by providing the basic building blocks for a safe location and security for home improvements.

3.4. Neighborhood Outcomes

3.4.1. Neighborhood Issues

Most slums are located in inadequate, unsafe or at risk areas, lack urban services, and are exposed to a number of social problems. Improving these neighborhood conditions is the focus of programs aimed at improving the local habitat, or the general living conditions

of a certain area. In this section, we focus on the salient issues regarding the slum environment and then review some programs that aim at tackling them.

Some of the most relevant issues concerning the neighborhoods as a whole are related to: (i) spatial segregation in relation to the rest of the city and (ii) the effects of this segregation (or isolation) on variables such as crime levels and domestic and social violence. These aspects motivate the design of interventions that attempt to integrate the neighborhoods with the cities. This integration is pursued by improving their transportation connections, providing the same level of services (both urban and social) found in surrounding areas, and/or reducing the physical and social risk factors that facilitate the occurrence of crime. However, the most complete approach is that of integrated upgrading, in which these different dimensions are addressed in a complementary and synergetic manner. In the next section, we review a number of programs employing cross-sectorial and community-based approaches. A comprehensive review of randomized, controlled trials, especially in the area of public health interventions, is included, although the results are not taken from the LAC region but rather from poor urban neighborhoods in the developed world. The other approaches are reviewed with descriptive and qualitative data (not with experimental methodologies), which cannot lead to firm conclusions regarding their effectiveness, but which may be helpful to consider in the formulation of future policies.

Improving the neighborhoods of the urban poor increases their living standards and their satisfaction with life. Dwellings, neighborhood characteristics, and urban amenities such as parks and cultural facilities have direct and indirect effects on life satisfaction. Health is an example of a positive, indirect effect (Lora et al. 2010). Using the life-satisfaction approach, where individuals evaluate their own perception of a neighborhood amenity, multiple studies show that surroundings and access to neighborhood amenities are important determinants of the quality of urban life (Lora et al. 2008). For example, Gandelman et al. (2012) analyze various dimensions of the quality of life in Uruguay. Their results suggest that differences in overall happiness and in domain satisfaction are partly explained by different levels of access to public goods. The authors find that the monetary equivalent value of public goods is considerable for public goods such as electricity, running water, sewage systems, drainage, waste disposal

systems, street lighting, sidewalks that are in good condition, trees in the street, and the absence of air or noise pollution.

3.4.2. Interventions to Improve Neighborhood Outcomes

Integral Urban Upgrading Programs

Because they reshape the environment of a human settlement, slum upgrading offers an incomparable opportunity to affect many neighborhood outcomes. Integral upgrading programs mobilize many different actors, and provide basic services that improve safety, welfare, and satisfaction with life for entire communities.

UN-Habitat (2011) states that integral upgrading programs can improve urban safety with the inclusion of project components that (i) redesign the morphology of the urban environment to favor self-protection, (ii) increase social links and reinforce social cohesion, and (iii) reduce inequalities by abating and reducing social segregation.

Strengthening social cohesion is considered a critical component of integral upgrade interventions. This concept refers to the network of personal, familial, professional, and neighborhood relationships that characterize urban life. It is important to design intervention plans that include all of the social, cultural, and community groups that coexist in the community. Specifically, it evokes a myriad of dimensions such as the celebration of diversity, a sense of belonging, and a shared future, as well as empathy, solidarity, and confidence between citizens (UN-Habitat, 2011).

The participation of local governments is a key aspect in the design of upgrading interventions. They tend to have more accurate information about the needs of the population, while being responsible for the provision of most services with direct impact on neighborhood quality, such as garbage collection, sanitation, street maintenance a , public transportation, policing, and others.

These recommendations derive from six case studies that were recently commissioned by the UN-Habitat's Safer Cities Program. Projects were thoroughly analyzed in Dhaka, Bangladesh; Doula, Cameroon; Medellin, Colombia; Nairobi, Kenya; Port Moresby; Papua New Guinea; and Rio de Janeiro, Brazil. The evaluation of these

programs was not performed using experimental or quasi-experimental designs of the type that allow for the attribution of causality to programs based on the changes in observed outcomes. The methods used were analyses of the projects and national documents, field visits, interviews, and focus groups with community leaders. This type of qualitative evaluation is a valuable source of information about associations between variables, but lack benchmarks to compare the progress of the variables.

One of the case studies reviewed in UN-Habitat (2011) within Safer Cities is the Programa Urbano Integral (PUI, integral urban program), implemented since 2002 by the Municipality of Medellin in Colombia. The PUI was designed upon the principles of Social Urbanism: physical planning interventions are supported from inception in processes that ensure the equitable ownership of the city by the widest range of social segments, with the overall goal of creating a more equitable and livable city. All actions are undertaken with the communities as primary supporters and promoters of the projects. Under this approach, the six elements that underpin any urban intervention are (UN-Habitat, 2011): (i) Action through integrated urban projects, promoted in areas with higher rates of exclusion and inequality; (ii) Carefully planned and efficiently implemented interventions, adopting an integrated schedule for the various interventions of municipal units, and operating through an integrated management; (iii) Cultural and educational facilities designed as symbolic references that aim to dignify the most excluded communities with high quality design and a wide range of cultural offer; (iv) New social housing and upgrading programs targeted to the most vulnerable, including specific alternatives for relocation of families living in high-risk areas; (v) Recovery of streets and public space as a fundamental value through promoting an intensive program that includes boulevards, linear parks, and emblematic streets that reconnect these areas with the city; and (vi) Safety and citizens' co-existence are assumed, more and more explicitly, as inseparable elements in upgrading and renewal projects, and are now incorporated from the earliest planning and design stages of integrated urban programs.

Two components are at the core of the PUI: first, the promotion of public spaces that allows all citizens to enjoy them and to encounter other people regardless of their race and economic position; and second, the promotion of public education and culture, conceived as tools for the development of the city and society and as key elements for

inclusion and equity. The PUI was implemented in areas of the city with low human development indexes and accentuated problems of violence and social conflicts.

The main interventions included in the PUI are the following: (i) building of public spaces to promote opportunities for people to safely meet, which includes the generation and/or improvement of 125,000 square meters of public spaces, 18 new parks (eight neighborhoods had parks for the first time); (ii) culture promotion for all citizens through the Park-Library Santo Domingo and the Zonal Center for Economic Development (CEDEZO); (iii) housing and infrastructure upgrades: slum-upgrading project in the Juan Bobo neighborhood, four pedestrian bridges, eight high level crossings in the Lineal Park Quebrada La Herrera, and four pedestrian paths; and (iv) community development activities: 11 fairs organized with micro entrepreneurs in the area and 25 community events oriented to promote peaceful co-existence with more than 300,000 participants.

The most salient impacts of the PUI are economic and social (UN-Habitat, 2011). First, the integral plan promoted the economic activity in the treated area. At the individual level, the PUI had positive effects on employment and income, as 92 percent of workers were residents of the area benefiting from the intervention (which had an unemployment rate of 40 percent). Also, the private investment and economic activities in the area increased: there was a 300 percent increase in trade in the sector and, with the creation of a commercial boulevard, the number of commercial establishments on this street rose from 18 to 239. There was a relatively high level of investment in social and cultural programs relative to physical infrastructure. The investment in social and cultural programs was four times the amount spent on the construction of the Metrocable (the main investment made in physical infrastructure). Finally, the social outcomes also improved according to the qualitative review of the PUI. Surveys showed a significant reduction in rates of violence and insecurity, mainly in intra-familial violence and burglary. The promotion of new community leadership, the strengthening of social and community organizations, and increasing levels of citizen participation was also evident.

Another important integral intervention in the region is the Favela-Bairro program in Rio de Janeiro, Brazil. This program started in 1994 and is now in its third phase. The first phase included the infrastructure upgrading of 52 favelas and improvements in 8

irregular subdivisions. The second phase began in 2000, included the upgrading of an additional 32 favelas and strengthened activities in child development, adult education, social services referral (through the Social Action and referral Centers-CRAS), as well as community development and property regularization. The third phase started in 2012 and includes the same infrastructure and social components of the previous phases and adds a component to reduce safety risks in the communities. The program has become the principal component of the municipal policy designed to upgrade all of the city's favelas.

The Favela-Bairro program is funded in part by the IDB and in part by the municipality of Rio de Janeiro. Its objective is to improve the living conditions of the urban poor by providing a comprehensive package of interventions including: urban infrastructure, social services and land tenure regularization. The program aims at reducing the risk of geological and environmental accidents (mostly landslides and floods), increasing transit access, reducing the incidence of vector-borne disease, and an increasing the coverage of public services. The basic infrastructure component included: the installation or upgrading of water, drainage and sewer systems, improving the street system, street lighting, garbage collection, and creation of parks, recreational and sport facilities. The social component included: construction of child care centers, community activities programs, and the establishment of social services referral centers (CRAS). Land titling, which included both the urban regularization (for the entire favelas and for the irregular subdivisions) and individual titling, was mostly successful in the urban aspect. The program was coordinated by the Secretaria Municipal de Habitação (SMH), but involved other municipal units. The program initially was restricted to of communities of between 500 and 2,500 households and did not included favelas that were located in areas of extreme environmental risk. The completion rate of the program was high: 62 favelas and 8 subdivisions in the first phase, and 62 favelas and 16 subdivisions in the second, with a total of 137 thousand families.

However, among the key components, the project's monitoring and evaluation was delayed. Soares and Soares (2005) performed an ex post evaluation employing quasi-experimental design, recreating a matched control group from different sources of information to circumvent the problems of not having a pre-intervention baseline. The authors report positive results from the program, especially related to an increase in the

coverage of water and garbage collection in favelas, *which* was better than in the comparison groups. The impact on sewerage was the most significant component at the aggregate level; moreover, an analysis by income quartile reveals that the poorest quartiles benefited most from sewerage, while the richest quartiles benefited to a lesser extent. This heterogeneous impact is also seen with respect to water, rubbish collection and illiteracy. The authors do not find significant effects in the reductions of mortality due to improved sanitation conditions. Effects on housing values were not detected, though this may be due to data and methodological limitations.¹² The results also do not suggest that the program successfully generated improvements in income beyond the construction phase. The authors suggest that a planned evaluation with necessary and timely data collection processes should be performed in future phases to gain a better assessment of the effect of this integral program.

Improving Access to Individual Urban Services

A more limited approach (compared to integrated urban upgrading) is to focus on the most significant infrastructure deficits within a community. To improve the living standards of the poor, it is generally agreed that water, sanitation, and hygiene interventions are the interventions with the most immediate effect on health. Diarrhea is an illness that is highly correlated with poor living conditions: a lack of clean water and proper sanitation facilities, together with poor hygiene practices, cause approximately 88 percent of all diarrhea infections worldwide (Evans, 2005). This problem is even more severe in slums as they are densely populated environments in which infections propagate easily.

Galiani et al. (2005) find that improving the quality of water through the privatization of its provision decreased child mortality in Argentina. Also, the promotion of safe hygiene practices and improved sanitation are effective in improving child health (Luby et al., 2004; Hutton and Haller, 2004).

Access to infrastructure is usually a main part of integral slum upgrading programs. Making infrastructure work for the poor requires promoting access and

¹² The program's ex post economic analysis, however, reported increases of up to 92% in the property values in the properties inside and in the surrounding areas of the upgraded favelas.

ensuring the affordability of the infrastructure. Promoting access entails providing services at a reasonable distance from homes (even installing sanitary modules), reducing connection costs, and requiring operators to promote access. Promoting affordability involves reducing actual bills, service costs, and facilitating payment. There is evidence of low demand for some services; due to a lack of information regarding the positive effects of these services, or because using the services involves making a change in habits. There is a growing literature estimating the willingness to pay for such services. For example, Ashraf et al. (2010) and Kremer et al. (2011) conducted randomized experiments, respectively, in Zambia and Kenya and showed that the willingness to pay for *improved water quality* is low (they measured willingness in terms of money spent on chlorine or time spent collecting water).

More studies are needed to determine the most effective way to increase access to better services and promote the uptake of new technologies that have direct, positive effects on health. The problem is complex because the provision of these services also faces problems of collective action, as there are usually positive or negative externalities influencing the willingness of individuals and communities to pay for services (for example, to implement a program that extends sewage or water connections, a minimum number of paying households is needed in order to obtain the service).

Crime Prevention through Environmental Design

Violence is a typical characteristic of disadvantaged neighborhoods. The level of violence is extraordinarily high in Latin America and the Caribbean. Moser et al. (2005) put the region in the world context. Worldwide, the homicide rate is 5.1 per 100,000 inhabitants and a rate of more than 10 is generally considered dangerously high (Call, 2000). In Latin America, in 2000, the homicide rate was 27.5, the highest for any region in the world (WHO, 2002). Violence is now firmly established among the top five causes of death in much of Latin America, and it is the leading cause of death in Brazil, Colombia, El Salvador, Mexico, and Venezuela (Moser et al., 2005).

Regarding criminal violence, an increasingly dominant type in the region is related to the drug trade and organized drug-related crime, particularly in the large capital cities. Moser et al. (2005) claim that the escalation of drug-related violence in low-

income urban areas is closely linked not only to trafficking but also to high levels of drug consumption. They state that, Brazil is now the second-largest consumer of cocaine and cocaine derivatives after the United States, and that in these countries the poor have become the main consumers. Drugs are integral to a variety of forms of violence, including gang warfare (to control the drug market), robberies, assaults, and domestic violence (Moser and McIlwaine, 2003).

Youth gangs (some of which are highly formalized and others which are very loosely structured) have been identified in Brazil, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Peru, and Venezuela (Moser et al. 2005). Traditionally, gangs have both social functions (related to youth identity, exclusion, and linked to territorial control or neighborhood protection) and economic functions (related to illicit economic gain from robbery). Increasingly, youth gangs have become more linked to drugs.

Regarding domestic violence: most of it is directed against women in the home (e.g., physical, psychological, or sexual abuse). However, gender-based violence also occurs outside the home (e.g., assaults and rape). Survey data cited by the WHO (2002) suggest that Latin America has the highest rates of sexual assaults against women of any region in the South. Survey data from seven studies in Latin American cities show high rates of sexual assault by a partner, ranging from 10.1 percent of respondents in São Paulo to 46.7 percent in Cusco, Peru (WHO 2002).

There are three main, common types of policy approaches used to improve neighborhood safety in particular and to improve neighborhood outcomes in general: the sector-specific (violence prevention), the cross-sectorial, and the community-based approaches. The sector-specific approach focuses on violence containment, prevention, and repression, involving criminal justice interventions, policing, and strengthening the repressive apparatus. The cross-sectorial approach includes the provision of safety in the framework of broader interventions, such as environmental design and integral urban renewal. Recent approaches focus on improvements in the physical environment and are applied via city planning to public transport systems, parks and recreational spaces, low-income housing, and downtown areas. These areas are the places where people usually feel most vulnerable to violence and crime (Mtani, 2002). The community-based

approach aims at rebuilding trust and social capital through community-led initiatives, which directly address violence problems.

An important cross-sectorial approach to urban violence reduction is Crime Prevention through Environmental Design (CPTED). The fundamental concept is that the physical environment affects criminal behavior and can be changed in a way that will reduce the incidence and fear of crime (Cooke, 2003). CPTED is a place-based strategy that argues, “the proper design and effective use of the built environment can lead to a reduction in the fear of crime and the incidence of crime, and to an improvement in the quality of life”. It builds upon strategies of territoriality (sense of ownership), surveillance, and access control, and promotes activities within urban space including high density and mixed-use development in order to optimize the number of potential *eyes on the street* (Cooke, 2003).

CPTED provides practical recommendations on how to plan, design, and manage the physical environment to reduce urban crime (Kruger et al., 2001). Planning and design measures help enhance feelings of safety in areas where people feel vulnerable. In particular, planning involves dealing with vacant land, encouraging 24-hour land use, promoting safe pedestrian infrastructure, ensuring equitable provision of facilities, and sustaining urban renewal. The design component refers to the availability or design of appropriate lighting, landscaping, and signage in soft open spaces (vacant land and parks); movement networks (intersections, taxi ranks, and train stations); hard open spaces (pedestrian subways, open parking lots, and informal trading); public facilities (communal areas and emergency contact points); and site layout and building design (facades, alleys, garages, toilets, and shopping centers). Finally, management involves establishing institutional arrangements to ensure effective management of the strategy, the support structures and vehicles for implementation, and the environment to ensure ongoing effectiveness.

CPTED has applications at the micro (building security), meso (street/neighborhood) and macro (town/city) levels, where risk assessments and community participation are vital components of the CPTED process. CPTED is best applied at the design stage, but it is also used to modify existing urban environments. Research reports positive reductions in levels of recorded crime and fear of crime for

CPTED-style developments in the United Kingdom and the United States. Crow and Bull (1975) is one of the first impact evaluations of the CPTED approach. It shows a decrease in store robberies (at the micro level) of 17.5 percent exploiting an experimental design. There is a lack of rigorous evaluation of CPTED as it is applied to cities. Descriptive evidence shows that it is effective and should be applied after a detailed assessment of the situation in a neighborhood, including crime hot spots, potentially dangerous places, availability of parks and green spaces, and their state of maintenance and surveillance, among other factors.

Regarding adoption in the developing world, recently, CPTED approaches are being adapted to African and Latin American contexts: in Chile, South Africa new initiatives are being developed in Brazil and Honduras by the World Bank (Fay, 2005). However, no evaluations are currently available.

South Africa has adopted a modified CPTED framework to respond to the extreme levels of violence in the Cape Town township of Khayelitsha through the Violence Prevention through Urban Upgrading project. The program uses urban renewal as the entry point to address violence through urban renewal strategies. These strategies provide better environmental arrangements that reduce opportunities for violence, criminal justice measures to discourage potential violators, and public health and conflict resolution interventions to support victims of violence. The range of solutions includes offender deterrence, victim support, and urban renewal strategies. One of the advantages of spatial solutions is that the implementation of physical infrastructure initiatives is relatively straightforward and increases perceptions of safety and wellbeing.

CPTED should be combined with other crime prevention and criminal justice initiatives, as CPTED focuses only on reducing criminal opportunities and may have a limited impact on the level of crime if carried out in isolation from other social programs (Kruger et al., 2001). This approach focuses on the settings of crime rather than on the perpetrators. To address this concern, second-generation CPTED stresses the need to implement the approach as part of a coordinated and participatory crime prevention strategy, including effective policing and social prevention (Fay, 2005).

3.5. Individual Outcomes

3.5.1. Individual Outcomes Issues

The review of the interventions that affect housing and neighborhood outcomes shows how these interventions can have an impact on individual outcomes - health, education, income, and employment, among others-. The housing and neighborhood characteristics of the slum dwellers play a key role in defining the opportunities available to individuals and their families. The lack of urban services such as safe water or sanitation, affects health outcomes that can affect child development and even put their life at risk, and decreases household productivity and labor supply. In a similar way, the degree of social cohesion in the neighborhood can influence the level of criminal and social violence to which individuals are exposed. This, in turn, reduces their chances of accumulating human capital and of developing their potential, thus losing income sources and job opportunities. Some of the individual characteristics of the slum dwellers (which also apply to the general case of the poor) make it difficult for them to find good jobs. They usually lack marketable skills and have little opportunity to access quality education and vocational training.

Slum dwellers also face more subtle disadvantages, such as poor integration with the rest of the city and the social stigma that comes with living in an inferior residential location. High segregation in Latin American cities makes the slum dwellers even less capable of finding a good job. Spatially discriminated communities tend to be spatially segregated as well, in terms of potential access to private and public resources and services. Perlman (2003) provides evidence from slums in Rio de Janeiro (Brazil) that suggest that the stigma of possessing a residential address in a squatter settlement adversely affects the probability of finding a job. In addition to this adverse affect, when slums are upgraded and policies to integrate the slum to the rest of the city are put in

place, the social stigma is not alleviated, but continues to persist and adversely affect the prospects for the slum dwellers (Perlman, 2003).¹³

Unemployment and informal employment rates are disproportionately high among slum dwellers, especially for youth. Most of the urban, working poor are part of the informal economy, which can account for up to 70 percent of GDP in some developing countries. Slum dwellers work in low-paid, low-productivity, and low-security jobs. Informal workers lack social security, access to markets, banking services, and other types of business and state support. In many cases the spatial location of slums, together with their negative stigma, also place constraints on the ability of their residents to find employment.

In summary, slum dwellers face great difficulties in accessing the labor market and engaging in income generating activities. Many actions were taken to improve the income and labor outcomes of slum dwellers, such as promoting productive capacity building to gain the skills and training required to find better jobs; microfinance developments to enable income generating activities; and explicit efforts to integrate slums to the cities through infrastructure projects. Also, some countries in the region have made attempts to formalize the informal economy and improve access to the financial system by the urban poor.

There are very few rigorous evaluations of the initiatives mentioned above for the developing world, especially for the urban sector. For example, more controlled experiments assessing the effects of providing microcredits for productive activities were performed in rural areas of Africa, with generally positive results (Giné and Karlan, 2006). Descriptive evidence is also reported when the program being studied might imply important changes in policy.

Finally, individual outcomes not only involve labor market variables, but they refer to health, education, quality of life, and satisfaction with life, among other indicators. This section focuses mainly on labor outcome variables, given that most of the

¹³ Perlman (2003) provides the example of the Favela-Bairro Upgrading Program in Rio, which reached hundreds of Rio's favelas with the intention of integrating them, at least physically, into the surrounding neighborhoods. However, after 10 years of "physical" integration, the favela population is still stigmatized.

other variables previously mentioned focus on interventions for housing and neighborhood outcomes.

3.5.2. Individual Outcomes Interventions

Microfinance Interventions

Microfinance is the provision of small-scale financial services to people who lack access to traditional banking services. Professor Yunus, founder of Grameen Bank in Bangladesh, conceived the strategy of microcredit as an intervention for poverty alleviation in the early 1970s. The strategy was widely adopted and gained international credibility as a way to allow poor people to engage in self-generated productive activities. However, Goldberg and Karlan (2007) point out that it is no longer exclusively institutions for the poor that offer these services. Commercial banks and insurance companies are downscaling to reach new markets. Today, apart from microcredits, many institutions offer consumer credit, stand-alone savings products and even have offices in slums. Remittances and insurance are recent, popular innovations in the suite of services that financial institutions offer to the poor.

Microfinance usually implies very small loans (microcredits) to low-income clients for small-scale projects or businesses, often with the simultaneous collection of small amounts from the clients that are deposited into personal savings accounts (Goldberg and Karlan, 2007). Microcredit loans are offered at market rates of interest high enough for the microfinance institutions (MFIs) to recover their costs, but not so high that they make supernormal profits off of the poor. According to the Microcredit Summit Campaign report, MFIs had over 150 million clients as of December 2007. Most of the microfinance programs focus on women (80 percent of microfinance clients are female). Women repay their loans more often and direct a larger share of enterprise proceeds to the needs of their families. However, the percentage of female clients varies considerably by region, with the highest percentages in Asia, followed by Africa and Latin America, with the fewest women served by MFIs in the Middle East and North Africa. This focus on the poor and on women, along with a simple application process and the provision of financial services to the clients' communities, combine together to create financial access; that is, the provision of financial services to the unbanked. The

unbanked are usually excluded from financial services because they are poor, illiterate, or live in slums or rural areas (Goldberg and Karlan, 2005).

Microfinance is an effective poverty reduction strategy. The most direct, positive effect of microcredit is that it relaxes credit constraints by lowering interest rates and allowing households that were previously completely rationed out of credit markets to engage in borrowing. In turn, relaxed credit constraints allow households to expand old businesses, set up new ones, and efficiently time the purchase of business assets and household goods (Banerjee et al. 2009). Another, more indirect effect of microcredit is the shifting of bargaining power within the household. Microcredit also affects the choice between temptation expenditure and efficient expenditure. The critics of microfinance fear that it displaces more effective anti-poverty measures, or contributes to over-borrowing and, therefore, even greater long-term poverty rates (Banerjee et al., 2009).

The causal effect of microfinance remains a controversial issue because it is difficult to identify the particular effect. Many studies compare the individual outcomes of clients and non-clients within the same village. This not a valid identification strategy for evaluating the effect of microcredits, because clients self-select into microcredit programs and are therefore different in many ways from non-clients. Approaches that use a panel of data from clients and non-clients, with client's fixed effects, also face identification problems. This is because over time, the trends of clients are likely to be different from non-clients, even in the absence of microcredits (Alexander-Tedeschi and Karlan (2007) and Banerjee et al. (2009).

To overcome this identification problem, randomized controlled experiments are performed to ensure that the only difference between the randomized in- and out-microcredit units is this financial facility. One alternative is to consider the individuals (or households) as units and randomize some individuals among eligible applicants. However, the spillover effects that may arise due to the program can also affect the outcomes of the control group and bias the estimates. The other alternative is to randomly assign microcredit to some areas and not to others, and then compare the outcomes in both sets of areas. Individual outcomes are then averaged by type of area (Goldberg and Karlan, 2007 and Banerjee et al. 2009).

Most microcredit evaluations were designed to assess small pilot programs in rural areas (Giné and Karlan, 2006). However, there is one recent experiment that studies the impact of a large-scale introduction of MFIs in slums. Banerjee et al. (2009) conduct a randomized evaluation on the community-level impact of opening new branches of a microfinance bank. Half of 104 slums in urban Hyderabad, India, were randomly selected for the opening of an MFI branch. At the beginning of the study, there was very little microlending in the sample areas, but 69 percent of households had at least one outstanding loan from a moneylender or family member. Fifteen to 18 months after the introduction of microfinance in each area, the authors conducted a comprehensive household survey. They analyzed a wide set of variables comprising all of the outcomes that directly relate to poverty (consumption, new business creation, business income, etc.) and other measures of human development outcomes (education, health and, and women's empowerment).

Banerjee et al. (2009) show that the intervention increased total MFI borrowing in treated areas 15 to 18 months after lending began. There was no effect on access to microcredit on average monthly expenditure per capita, but expenditure on durable goods increased in treated areas and the number of new businesses increased by one-third. The treated areas featured more new business openings, higher purchases of durable goods (especially business-related durables), and higher profits in existing businesses (despite presumably greater competition from the new businesses).

Households were scored on how likely they were to start a business. The effects of microcredit access are heterogeneous: households with an existing business at the time of the program invest more in durable goods, while their nondurable consumption does not change. Households with a high propensity to become new businessowners increase their durable goods spending and decrease spending on nondurable consumption, (this is consistent with the need to pay a fixed cost to enter entrepreneurship). Households with a low propensity to become business owners increase their nondurable spending. A likely explanation for this phenomenon is that for households with low returns to entrepreneurship and high rates of time preference, microcredits may facilitate borrowing against future income in order to finance current consumption. The welfare implication of these changes is ambiguous. They depend upon the profitability of the new or scaled-up

businesses and the sustainability and efficiency of the increased non-durable consumption on the part of those who did not start a business. Even in treated areas, over 70 percent of households did not take microloans, preferring to borrow from other sources. Finally, the authors find no impact on health, education, or women's empowerment outcomes. However, the study was conducted only 15 to 18 months after the opening of the new MFI branches. In the long run, if the investments are profitable, the positive impacts may be translated into other human development variables. Banerjee (2009) concludes that this microcredit intervention in India was an important financial tool for some households and was successful in promoting more economic activity, but the economic profits of the investments and the impact on broader human development measures are still unknown.

Social and Physical Integration of the Slums with the City

Segregation is a major problem affecting income opportunities for the slum dwellers. To reduce the effects of this social and physical segregation, several programs have been designed with the specific purpose of reducing both the barriers of accessibility and the physical inequality between the slums and the rest of the city. As mentioned before, in slums there are usually unsafe neighborhoods with deficient, social and economic problems, and limited employment opportunities restricted to informal jobs or illegal activities. The stigma attached to living in slums is pervasive and affects residents both psychologically and economically (by denying them job opportunities). Transport links are often deficient or nonexistent, or the slums are located in areas far from the center of the city.

In fact, one of the reasons put forth by Banerjee et al. (2008) to explain the rise of unemployment in South Africa (after the end of Apartheid in 1994) is the high search cost that the black population incurs when looking for a job. They suffer from highly persistent racial and geographical segregation, which confines the black population to areas that are far away from the urban center. They are highly isolated due to the lack of adequate public transportation.

Many slum upgrading programs include physical and social integration of the slums with the rest of the city. Medellin's upgrading programs, which are a recent case, place particular emphasis on the quality of the infrastructure that is constructed in the

city's slums. One example is the giant outdoor escalator that transports people to and from Medellín's slum Comuna 13 (a US\$6.7 million, 1,260 feet tall escalator that is expected to shorten the 35 minute hike up the hillside to a six minute ride on the escalator). Other examples include the libraries and community centers constructed by the city.

To make the slums into safer places to live, many governments combine infrastructure upgrading with the strengthening of a permanent police presence in the neighborhoods. This was implemented in many cities of the region, such as Rio de Janeiro and Sao Paulo in Brazil, and Monterrey and Ciudad Juarez in Mexico. These efforts improve immediate security. Despite evidence of their success, no evaluations of the long-term effects of this approach could be found.

In the context of slum upgrading programs, there is also scope to the implementation of social intervention components. Though there are no rigorous evaluations accounting for the effects of social interventions, two examples are worth noting: the Plan Urbano Integral in Bogota and the Favela Bairro Program in Rio (both described in Section 3.2.2). Options for future programs include cultural activities where communities mix and relate to one another and the creation of open spaces such as parks (which are effective if they are adequately surveyed and maintained). Perlman (2003) also proposes the provision of incentives to employers to encourage the hiring of slum dwellers. The intent of this policy is to break down stereotypes held by employers. All of these options should be carefully thought-out and analyzed according to the baseline situation and the barriers to social integration that are present in each case.

Several countries have used spatial segregation and integration measures or indicators to assess the differences between slums and the other parts of the cities. One example is the Marginality Index (Indice de Marginación) compiled in Honduras and used to measure the difference in an array of services and infrastructure available by neighborhoods nationally. It combines 13 variables—including housing materials, access to water and sewage, assets such as refrigerators, and others—and aggregates them by neighborhoods. This index is helpful for comparing variables according to the availability of urban services and other attributes and ranks them in a “marginality” scale. A similar index is the “urban marginality index” (Indice de Marginación Urbana) used by México

to classify urban neighborhoods according to a much larger array of housing and personal attributes. Indicators like the ones employed by Roberts and Wilson (2009) are very informative. The authors study the patterns of socioeconomic segregation in seven Latin America cities and in one city in the United States (Austin, Texas). They employ the Dissimilarity Index, which measures the proportion of the poor population that needs to be moved from one spatial unit (e.g., a neighborhood) to another in order to make the distribution of the population homogeneous. The Dissimilarity Index ranges from zero to one, and a higher value implies more segregation. They also compute the Isolation Index, which measures the probability that a poor individual shares his or her neighborhood with other poor individuals. Finally, the Moran's Index measures the degree to which the characteristics of a particular locale resemble adjacent locations (spatial autocorrelation).

Employment Programs

The employment possibilities of slum dwellers are limited. They are self-employed or employed in the informal sector. One way to improve their chances of finding employment is to provide long-term skills training, which focuses on the development of practical skills, especially for women in home-based income generating activities. This type of training raises family income and enhances the empowerment of women.

Another approach focuses on providing the means for people to complete their formal education. The job market, particularly in large cities, demands basic levels of education. Providing people with access to formal education—through complementary or abbreviated degree programs—is an effective way to improve the employment opportunities for a large segment of the poor population in the slums. That is particularly relevant for youngsters that have dropped-out of schools and for adults that could not complete their education. Providing them with diplomas gives them the qualifications required for accessing formal jobs.

Slum upgrading programs sometimes include promotional policies that encourage local, small-scale enterprise development. This involves capacity building, training, and funding (e.g., microcredits). To increase the probability of the success of these enterprises, the residents need to access the information, skills training, and the business advice (business advisory and support services) that is necessary for success.

There is positive descriptive evidence from Rayer Bazar, a slum in Bangladesh, of the effects of vocational training centers, (Bryant, 2009). The overall goal of the project was to raise the socioeconomic conditions of slum dwellers, through vocational training that can qualify them for better jobs or to become self-employed. The main target of the program was unemployed young women and men (so far, 95 percent are women). They provided six months of vocational training in different trades: sewing, tailoring, embroidery, and block and batik. Graduates start small business, mainly at their homes, and take orders from people in their neighborhoods and through the training center. They sometimes purchase machines or use the ones at the training center (paying a fee to the center). More than 80 percent of the graduates seek self-employment. The other 20 percent look for vacant jobs in the small and medium-scale garment, embroidery and tailoring shops in the local area. Since inception, the project provided vocational and skills training to approximately 900 women and men over a five year period. The project expects to extend its services to about 500 more women and men during the current phase. Along these same lines, the *certified housekeeper course* in India is a pilot project of the Department of Employment and Training under Rajiv Udyog Sri. The program serves women, ages 18-40 years, who live in different slum areas. There are many such programs led by local governments and NGOs that emphasize employment and empowerment opportunities for women.

Mensch et al. (2004) examine an experimental intervention for girls, from 14 to 19 years old, that provides reproductive health information, vocational counseling and training, and assistance with opening savings accounts in slum areas of Allahabad in Uttar Pradesh, India. A quasi-experimental, pretest and posttest design was employed. They find that although the livelihoods program was acceptable to parents and feasible to implement, the project demonstrated only a minimal impact on the behavior and attitudes of adolescent girls in the experimental slums. The greatest changes were found in those outcomes that most closely reflected the content of the intervention. Girls exposed to the intervention were significantly more likely than the control group to have knowledge of safe spaces, be a member of a group, score higher on the social skills index, be informed about reproductive health, and spend time on leisure activities. However, no effect was found on gender-role attitudes, mobility, self-esteem, and work expectations; nor was

there an effect found on the number of hours spent visiting friends, performing domestic chores, or engaging in labor-market work.

Empirical evidence on studies for the United States and Europe suggests that their impact on the labor market is limited. There is substantial heterogeneity in impacts, depending on the characteristics of the participants and the type of training. Many studies come to the following conclusions: Women benefit more from training than men; on-the-job training is often more effective than classroom training; voluntary programs are generally found to be more effective than mandatory programs; and private sector programs are found to be more effective than public sector programs (Ibarrarán and Shady, 2009). The main conclusions about these programs come from the randomized evaluations of two programs in the United States: Job Training Partnership Act (JTPA, see, among others, GAO, 1996; Heckman et al. 1999) and Job Corps (Burghart and Schochet, 2001). The findings on these programs show an interesting contrast. The short-run impacts for young women in JTPA are essentially zero, and the longer-term impacts are more positive. The short-run impacts for young men are negative (GAO, 1996). In contrast, Job Corps had a significantly more positive effect on both genders: Lee (2005) shows that within three years after completing the training program, earnings had increased by 12 percent. Although the effects of the programs seem to be very moderate in the developed world, some authors performing worldwide reviews of evaluations conclude that the impacts of training programs for youth and the unemployed are more positive in Latin America than in the United States and Europe (Ibarrarán and Shady, 2009; Ñopo and Saavedra, 2003). Ibarrarán and Shady (2009) focus on seven Latin American job-training programs funded by the IDB. They find that employment effects range from no change to a 5-percentage-point increase (higher for women in Colombia and Panama—a 6 to 12 percentage point increase in the employment rate). The authors find that in most cases there is a larger and significant impact on job quality, measured by finding a formal job, having a contract, and/or receiving health insurance as a benefit.

From the evaluations reviewed in Ibarrarán and Shady (2009), there are two that are based on randomized design. Card et al. (2007) study the Juventud y Empleo program in the Dominican Republic. They do not find impacts on the employment rate; but the effects are positive and economically significant for the youngest age group (17–19 years

old). They also find positive effects of a 17 percent increase in the monthly total labor earnings for those who are employed (though this effect was estimated with a small sample size). The second randomized evaluation in the region is analyzed in Attanasio et al. (2008), who find that selection for the training offered by *Jóvenes en Acción* had widespread and large effects on women, but fewer effects on men. The authors find that women who are provided with training are more likely to be employed and work more days and longer hours. In particular, training increases paid employment for women by approximately 14 percent and increases days and hours worked by women by approximately 11 percent. The monthly wage and salary earnings of women offered training are close to 18 percent higher than those of women who were not provided with training. Moreover, the likelihood of employment in jobs that offer non-wage benefits and a written contract is 5 percent higher for women who were provided with training. Men also benefit from being provided with training, but the effects on men are more limited (an 8 percent increase in wages). Cost-benefit analysis suggests that the program generates a large net gain, especially for women. Lower bound estimates of the internal rates of return are approximately 13.5 percent for women and 4.5 percent for men.

Another action that improves the incomes of slum dwellers is the facilitation of the shift from the informal employment sector to the formal sector. Local and national authorities should be encouraged to adjust laws and regulations to lower the costs and increase the incentives for people to formalize their enterprises. There is only anecdotal evidence on the effects of such initiatives. When municipalities in Bolivia and Peru simplified the bureaucratic steps and reduced the processing time for registration, many more entrepreneurs decided to register. As an incentive, some municipalities established business advisory offices for incoming entrepreneurs (ILO/PROMDE 2002). In Curitiba, Brazil, the local government stimulated enterprise development for the poor by creating a business incubator. The Curitiba incubator, called Employment Line, consists of warehouses and training facilities located in a low-income section of the city. Microenterprises are exempt from municipal taxes for the two years they are permitted to remain in the incubator.

The direct results of infrastructure investments include the generation of jobs, incomes, and business opportunities; this is particularly true if local, resource-based

methods are used for the development, maintenance, and operation of infrastructure that is of public and community interest. Longer lasting impacts, such as improved access to goods and services and larger production and productivity gains, contribute to sustainable poverty reduction and local development, especially if the impacts are due to the upgraded infrastructure put in place by new businesses and enterprises.

Youth Interventions: Violence Prevention and Risk Reduction

The public health approach to urban violence focuses primarily on youth violence from a prevention and risk-reduction perspective. This approach identifies risk factors related to youth (such as the use of alcohol and firearms) and proposes specific actions to address these issues. In the LAC region, there are multiple interventions that began in the Colombian cities of Cali, Medellín, and Bogotá (Moser et al., 2005). The implementation of social, preventative youth policies is accomplished mostly through local governments and community based NGOs. Interventions include training and vocational skills development; sports and sporting facilities; and recreational, artistic, and cultural activities that engage youth and promote positive behavior. An example of such a program is the work performed by Casa Alianza, an NGO in Central America that provides street children with shelter, drug counseling, and vocational training. Casa Alianza uses a *life plan* approach to rehabilitation; this approach sets attainable goals that, when achieved, foster self-respect and hope—qualities that are often lacking in children who experience prolonged violence on the streets.

Youth programs are classified into three types (which sometimes overlap): parenting programs; school-based programs; and general programs. Despite the vast number and wide range of initiatives addressing youth violence in the LAC region, there is little data analysis or monitoring of the impact of these programs on the incidence of violence (World Bank 2002). However, there are several randomized, controlled trials that target at-risk youth in other regions of the world. The findings of these trials are useful for adapting policies to the context of slum upgrading programs.

Foxcroft (2011) conducted a systematic review of controlled studies of parenting programs to prevent tobacco, alcohol, and drug abuse in children under 18. The results are encouraging with respect to the effectiveness of these programs in reducing or

preventing substance use. The most effective programs are those that share an emphasis on active parental involvement and on developing skills in social competence and self-regulation. However, the authors warn that more work is needed to further investigate the change process that is involved in such interventions and their long-term effects.

The strongest evidence found in the review is based on work with preteens and early adolescent children. We review seven studies in this category. These studies are well designed, randomized control trials focused exclusively on preteens and early adolescents. The authors find that the parenting programs result in a significant reduction in one or more of the outcome variables being measured, including the use of alcohol, drugs and tobacco (when compared to control groups).

Relevant, evaluated programs include the Iowa “Strengthening Families” program and the “Preparing for the Drug Free Years” program. This last intervention is a family competency training program with the objective of enhancing protective parent-child interactions and reducing the children’s risk of early substance use initiation. In this program, parents attend five weekly sessions and the children attend only one session. In the “Strengthening Families” program, children and parents attend together for part of each weekly meeting. Spoth et al. (1999 and 2001) shows that both of these family-based intervention programs were effective in reducing alcohol use through a four-year follow-up period that measured for several different types of alcohol use¹⁴ as compared to the control intervention (four mailed leaflets). The long-term results of this trial indicated that both of the family-based interventions significantly reduced the proportion of new alcohol users, past month mean frequency of drinking, and the alcohol use composite index.

Key features of effective parenting interventions are that they focus on developing strategies that involve adolescents in family activities, maintain good familial bonds, and manage conflict, rather than merely focusing on the issue of substance abuse. A second shared feature is an emphasis on parental engagement in an activity-based program. These family-based prevention programs promote monitoring, firm and consistent setting

¹⁴ These types are: lifetime use, past year use, past month use, lifetime drunkenness, past month frequency of drinking, alcohol use composite index, and growth curve parameters for alcohol use initiation.

of limits, and the use of nurturing communication patterns help to prevent adolescent substance use and other behavioral problems.

Although they can be an effective way to prevent adolescent substance use, the issue of low participation rates remains problematic for many such programs, particularly when they require parents to attend scheduled meetings outside of the home. Griffin, et al. (2011) study the efficacy of a newly developed substance use prevention program that is self-administered *at home* by the parents of middle school students. As part of a randomized trial, 338 parents of middle school students either received the parent prevention program or served as control group participants. The results show that one year after the intervention, at the posttest assessment, intervention parents report significant increases relative to controls in appropriate role modeling, disciplinary practices, family communication, and parental monitoring skills. This study shows that a theoretically rich prevention program is effectively self-administered by parents at home and improves key parenting skills. However, more studies are needed to assess the feasibility of this type of ex-ante, cost-effective intervention in other contexts.

One of the most extensive and rigorously tested approaches to substance abuse prevention emphasizes the teaching of generic personal and social skills, norm setting, and drug resistance skills using a program called Life Skills Training (LST). The LST program was initially developed as a smoking prevention program for junior high school students in the United States. Through a series of studies, the LST approach proved that it is effective in preventing cigarette smoking, alcohol use, marijuana use and polydrug use (Botvin et al. 1995.) LST was delivered through formal teaching, older students (peer-led), and video training (Botvin 1984; Botvin 1995). In the first trial (Botvin 1984), at four months of follow-up, the peer-led program showed a significant reduction in the frequency of drunkenness and the amount of consumption per occasion when compared to the teacher-led program and the standard curriculum. In the second trial (Botvin 1995), at six months follow-up, the LST program, when delivered either through teacher or video training, was significantly more effective in reducing the mean number of drunkenness episodes in the last month compared to the standard curriculum. Furthermore, prevention effects are both robust and durable (results of a large-scale randomized trial found that prevention effects were evident more than six years later; see

Botvin et al. 2000). Botvin et al. (2003) also adapted the LST program for elementary school students in grades three through six, finding significant improvements in the rates of substance use behavior, attitudes, knowledge, normative expectations, and self-esteem variables at the student and school level, in comparison to the control group.¹⁵

Finally, multicomponent programs (i.e., combined school, community, and family interventions) typically do not focus exclusively on the prevention of one behavior. These programs possess a psychosocial developmental orientation that is designed to impact a wide range of health and lifestyle behaviors among young people. Such programs offer an advantage over alcohol-specific prevention programs because they potentially impact on a broader set of problem behaviors, for example cannabis, tobacco, harder drugs, and antisocial behavior. Foxcroft and Tsertsvadze (2011) review 12 out of the 20 trials and report statistically significant effects of universal multi-component prevention programs across a range of outcome measures in the short-term and the longer-term. Overall existing studies conclude that the evidence supports the effectiveness of certain universal, multicomponent programs for alcohol abuse prevention among young people.

All of the studies reviewed so far measure the effect of different programs mainly on substance use and other social outcomes. Substance use and violence tend to co-occur among adolescents and appear to have similar etiologies; therefore, the same programs may be effective in reducing crime among teenagers. Botvin (2006) examines the extent to which the Life Skills Training Program—a comprehensive prevention approach targeting an array of individual-level risk and protective factors—which was found effective in preventing tobacco, alcohol, and illicit drug use, is also capable of decreasing violence and delinquency. Forty-one schools were randomly assigned to intervention and control conditions in disadvantaged urban neighborhoods throughout the United States. Participants in the 20 intervention schools received the Life Skills Training prevention program, including material focusing on violence and the media, anger management, and conflict resolution skills. Survey data were collected from 4,858 sixth grade students prior to the intervention and three months after the intervention. Findings showed significant reductions in violence and delinquency for intervention participants relative to

¹⁵ Individual-level analyses were performed, controlling for gender, race, and family structure.

control participants. These effects include decreased verbal and physical aggression, fewer fights, and less delinquency. The results of this study indicate that a school-based prevention approach previously found to prevent tobacco, alcohol, and illicit drug use also prevents violence and delinquency.

According to available evidence, the broad-based approach of the programs is the main reason for their effectiveness. The interventions that target both social and behavioral factors, and emphasize the active participation of children and parents, appear to be more important than whether the intervention was targeted specifically at parents, was school-based, or involved collaboration between school and home. An important issue in program design is the identification of the best time to deliver the intervention. The transition from primary to secondary school appears to be the most effective time to intervene (11–14 years).

More work is needed to assess the effectiveness of interventions that prevent the development of regular substance use in experimental or occasional users and that reduce crime and delinquency rates among teenagers. In addition, a large number of studies rely on self-reported measures of substance use, and it is highly possible that children under or over-report their intake. Use of more rigorous, independent measures will provide a more accurate appraisal of the effectiveness of interventions. Finally, most of the studies conducted in the United States include families with two parents. Further research is needed to assess the applicability of these findings to other social groups.

4. Conclusions and Recommendations for Future Evaluations

This technical note provides a review of the empirical evidence on the evaluation of slum upgrading programs and of frequent components of these programs, classifying the impacts into three main groups: housing outcomes, neighborhood outcomes, and individual outcomes. The studies included in this review provide a body of evidence that suggest some conclusions regarding the effectiveness of certain types of programs and/or interventions, which are summarized in this section.

There are two set of conclusions arising from this review. The first concerns the methodological issues related to the evaluation of slum upgrading programs. The second examines the effects of different programs on the outcomes of interest.

4.1 Selecting an Evaluation Methodology

As mentioned before, there are few evaluations of slum upgrading interventions that exploit experimental or quasi-experimental designs, although randomized evaluations are feasible and can be implemented in many more contexts than the ones to which they were applied in the past (Field and Kremer, 2005). There are recent, randomized evaluations of certain single-sector interventions (housing improvements, land titling, and paving). However, there is a gap in the literature when it comes to the rigorous evaluation of integral slum upgrading programs. There is, nevertheless, qualitative evidence regarding the success of programs of this type (e.g., the Programa Integral Urbano in Colombia), which are based on descriptive analysis that assesses the program's targets and its outcomes (e.g., number of households given access to sanitation). However, no causal investigation is performed in most of the integral programs. The only attempt is the evaluation of the past stages of the Favela Bairro program, which exploited quasi-experimental designs (Soares and Soares, 2005). However, the authors indicate serious data limitations (mainly, the lack of a baseline data set and the absence of an ex-ante selected control group).

Evaluation design and treatment assignment are key issues in the design of integral slum upgrading programs. There are basically three approaches for their evaluation, which should be considered in light of the evaluation's objective and the outcomes of interest.

4.2 Evaluating the Overall Program

This implies the basic comparison of the communities/neighborhoods that are assigned to treatment with other communities/neighborhoods that are not beneficiaries and that serve as the control group. The advantage of this approach is that it is easier to attain sample

sizes that allow for the statistical power necessary to estimate the causal effect of the overall program. Furthermore, it is easier to administer the program under this evaluation alternative. From a policy perspective, it is very relevant to assess whether the program as a whole *improves the living standards of the slum dwellers* and achieves the expected results. Also, it is informative to perform cost-benefit estimates of the whole program package. However, a disadvantage of such a design is that for policy reasons it is relevant to assess the effect of the different, individual components. Investigation of their individual impacts is useful for improving the design of the program. In fact, even when the overall effect of the program is positive, it may be the case that some components produce a negative effect, while other components are positive and over-compensate for the negative effects. The choice of indicators is also important. To evaluate overall impacts, the use of composite indicators is advised, since they capture the impact of a combination of interventions.

4.3 Evaluating Individual Components

This approach helps to determine which components are the real drivers of the changes in outcomes. However, it is usually very difficult to isolate the effects of individual components in an integral program. Furthermore, even if it is feasible to apply different components to different populations, the sample sizes are usually too small to detect effects of single interventions. In addition to these concerns, another drawback of this alternative is that there may be complementarities between components that are worth analyzing, but that cannot be performed with the design. The ideal design for focusing on individual components is to include treated groups with the different, single components of the program and to also include treated groups with combinations of components for which we are interested in quantifying complementarities.

4.4 Evaluating the Marginal Effects of some Individual Components

In integral slum upgrading programs, there is usually a subset of interventions that are given to most of the targeted population. Apart from this basic package of interventions, there are other components provided to some communities but not to others. For instance, there is the case in which the budget is not large enough to implement all of the

components in all of the treated locations, or when pilot projects are tested before their widespread implementation. This third alternative consists of evaluating the marginal effects of the additional interventions with respect to the results in the absence of treatment (only the “basic package”) and to untreated control groups. This strategy enables the evaluation of the basic package as a whole in comparison to the absence of treatment. It also enables the evaluation of the marginal effect of the added interventions. This last effect is not necessarily the same as the effect of those same interventions assessed individually in the second alternative; there may be complementarities between the interventions that enhance their effects if provided together. (The contrary is also possible—there can be negative effects when interventions are provided together.). Obviously, a plain control group is important in this case only if the researcher wants to evaluate the basic package as well as the marginal effect of the additional component.

To assess the causal impact of the intervention (the whole package or the individual components), experimental designs must guarantee the identification of the causal effect (provided that the randomization is correct). The experimental design of an integral slum upgrading program involves assigning communities randomly to different treatment arms and to the control group. For example, if the first evaluation alternative is chosen, the eligible neighborhoods are randomized into the treatment group (receiving the complete package) or to the control group. If this is not feasible, some components can still be randomized and then opt for the third alternative that allows for the identification of the marginal effects of the additional components. Another possibility is to randomly assign different packages of project components to several neighborhoods. If there are sufficient neighborhoods across which the intervention takes place, and it is feasible to vary the projects widely, both the separate effects and interaction effects can, in theory, be identified. This is not feasible in the case of programs with too many components and few treated neighborhoods.

Even if all the neighborhoods receive the complete package of interventions, it is unlikely that they all receive it at the same time. In these cases, project components are phased into neighborhoods with varying schedules to provide regional and time variability (i.e., at a single point in time, different communities receive different sets of treatments). Exploiting regional and time variability in a phased-in design is another way

to identify causal effects. In other cases, it is possible to vary the order of the interventions across neighborhoods, so that all the neighborhoods start treatment at the same point in time, but some with one component (such as job training programs) and others with a different component (such as paving). Then, in the second phase, the interventions are completed and analyzed using a difference-in-difference approach, which enables the estimation of the relative effect of the interventions.

Another methodological issue is the importance of baseline information prior to the program implementation. Many programs do not have it. This type of information is very useful for understanding the circumstances of the slum dwellers and can suggest adjustments that can make program components more effective. In the case of randomized experiments, it is not necessary for identification purposes; but it is useful to assess the effectiveness of the randomization in terms of the balance of the outcomes between groups. Also, the baseline survey allows the study of additional outcomes (such as the recomposition effects of the slum).

The normal practice for slum upgrading interventions is to conduct a baseline survey and an end line survey. Some of the studies reviewed here also include an intermediate, medium-term survey. The timing of the surveys is determined by the expected time for the changes in outcomes to occur. For example, access to urban services is detected in the short run, but health and child development effects take longer to manifest (if they ever occur). In the literature review, some cases are mentioned where the medium and long-term effects differ even in their direction (i.e., different time frames can show both increases and decreases in the effect of the same program component). Budget permitting, it is advisable to perform short, medium, and long-term follow-up surveys.

4.5 Effectiveness of Slum Upgrading

It is important to note that the scarcity of rigorous evaluations published for LAC prevents a conclusive assessment of the effectiveness of slum upgrading programs. Providing better housing and housing facilities improves the wellbeing of slum dwellers and increases their satisfaction with life, but none of the evaluations conclusively shows improvements in their livelihood. What might be necessary is to conduct more thorough,

large-scale evaluations of programs that combine housing upgrades with broader interventions that address other major problems affecting slum dwellers.

Land titling programs have positive effects on housing investments and negative effects on fertility. Depending on previous arrangements and the intra-household allocation of the burden of protecting the unsecured land from other slum dwellers, there can be positive effects on the education of children and head of household labor supply. The assumption that land titles are used as collateral in credit operations has weak support.

Neighborhood outcomes are affected by upgrading infrastructure interventions and also by programs addressing social programs (mainly crime). The interventions target both social and behavioral factors, and the active participation of children and parents, appears more important than whether the interventions are specifically targeted at parents, are school-based, or involve collaboration between school and home. The transition from primary to secondary school appears to be the most effective time to intervene (11–14 years).

Programs that aim at the integration of the slum with the city need to be evaluated: from the small programs that build community parks to the large infrastructure programs like the one that constructed the outdoor escalator in Colombia to convey people from poor neighborhoods to other parts of the city.

As far as *individual outcomes* (primarily for income) are concerned, the review shows that the labor market for the slum dwellers has limited opportunities for income generating activities and is very vulnerable to macroeconomic shocks. Many actions have been taken to improve the labor outcomes of the slum dwellers. The main ones are: productive capacity building to provide the training and skills that are required to obtain better jobs; microfinance development to enable income generating activities, and adult education to further enhance employment opportunities. Results of microfinance interventions are positive with respect to access to loans and the ease of starting or scaling up businesses. However, the take-up of credits is low, and the efficiency of the new entrepreneurial activities is not assessed. The combination of microcredit programs with capacity building is recommended. Job training programs are more effective in Latin America than in developed countries in terms of increasing employment rates and

earnings. There are no evaluations involving slum dwellers. A detailed set of indicators should be included in order to study the quality of the employment received by the treated groups.

It is a common conclusion of the evaluations of the many programs that there is a need to for the financial system to move down market to reach the unbanked populations. This has an effect on housing programs and also allows for the possibility of using the house as collateral for loans, which, according to the studies, is not happening. Also, interventions that stimulate savings have positive effects on consumption smoothing and on the possibility of eventually earning enough resources to move out of the slum.

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Appendix I. Examples of interventions Employing Experimental and Quasi-Experimental Designs

Housing Interventions

Reference	Type of Intervention	Program Details	Method	Outcomes measured	Results
Galiani and Schargrodsky (2010)	Land Titling	Argentina (1984). A law was passed expropriating the former owners' land to entitle the occupants.	Natural experiment	Housing investment, household size, children education, credit market access	Entitled families substantially increased housing investment, reduced household size, and enhanced the education of their children relative to the control group. No significant effect on credit market access.
Galiani and Schargrodsky (2004)				Children health	Better weight-for-height indicators but no effect on height for age in children.
Galiani and Schargrodsky (2011)				Titles premium, titling in the long run	The estimated titling premium is 18.5 percent (the difference in real estate value paid for a house of similar characteristics between titled and untitled properties, after controlling for housing investments). Almost 30 percent of the titled parcels seem to have now become de-regularized due to unregistered intra-family (death, divorce, others) or inter-family (informal sales, occupation, etc.) transactions. A plausible explanation is that the legal costs of remaining formal seem to be quite high for the low value of these parcels and the titling premium.
Field (2005)	Land Titling	Peru (1996-2003). Nationwide titling program	Quasi-experiment	Housing investment, credit market access	Significant effect on residential investment: the rate of housing renovation rises by more than two-thirds compared to baseline level. Investment attributed to lower threat of eviction and not to an improvement in credit access due to the titling program.
Field and Torero (2003)				Credit market outcomes	No effect on the likelihood of receiving credit from private sector banks, although interest rates are

					significantly lower for titled applicants regardless of whether collateral was requested. In public sector loans, property titles are associated with approval rates 12 percent higher when titles are requested by lenders and no correlation found otherwise.
Field (2007)				Labor supply	Households with no titles spend an average of 13.4 hours per week maintaining informal tenure security (14 percent reduction in total household work hours). Individuals are 40 percent more likely to work at home. Titling increases total labor force hours and reallocates work hours from home to the outside labor market.
Field (2003)				Family size	Family size of households with titles is significantly smaller. Up to a 22 percent reduction in fertility associated with the increase of the female's bargaining power derived from the ownership of land assets. Also changes in tenure security may exert an independent negative influence on desired number of offspring.
Galiani, Gertler, Martinez, Cooper, Ross and Undurraga (2011)	In-situ housing improvement in slums (replace old house with better prefabricated houses)	Un Techo Para Mi País in slums in El Salvador and Uruguay (2007-2008)	Randomized experiment	Satisfaction with housing and life, labor market outcomes, children health, household size and safety variables.	Improvement of the quality of housing greatly and the satisfaction with housing and with the quality of life. Perceptions of security improve in El Salvador, whilst there is no change in Uruguay. No effect in self-reported crime. In both countries better housing has no effect either in the possession of assets, in labor outcomes (income, labor supply) or household size. Child health is also unaffected by the intervention (measured by diarrhea and respiratory disease prevalence).
Cattaneo, Galiani, Gertler, Martinez and Titunik (2009)	Replacing dirt floors for cement floors	Piso Firme in Mexico (since 2000)	Quasi-experiment	Happiness, children health, children cognitive development, labor market outcomes, consumption.	The intervention interrupts the transmission of parasitic infestations and reduces the incidence of both diarrhea and anemia. Significant improvement in child cognitive development. Adults report to be substantially happier, as measured by their degree of satisfaction with their housing and quality of life, and have significantly lower scores on

					depression and perceived stress. No effects in consumption or labor supply.
Devoto, Duflo and Dupas (2011)	Piped water connection (without improving quality of available public taps).	Low-income households living in Tangiers, Morocco (2008).	Randomized experiment	Take up after the program, health, mental wellbeing, labor market outcomes, time use, social relationships in neighborhood.	High willingness to pay for access to a private tap at home: within a year 69 percent of households in the treatment group had purchased a connection (against 10 percent in the control group), and as a result their average monthly water bill more than doubled. No change in the incidence of water-borne diseases. Important time gains which did not lead to increases in labor market participation, income, or schooling attainment. The program reduced the risk of conflict or ill-feelings between neighbors. Households' mental wellbeing improves substantially.
Gonzalez-Navarro and Quintana-Domeque (2010)	Street pavement	Acayucan (Mexico) in 2006.	Randomized experiment	Housing improvements, household assets, consumption, labor market outcomes, satisfaction with government.	Increase in home improvements: from 0.4 to 0.8 reforms. 50 percent increase in the likelihood that the family has bought materials for home improvements in the previous six months (from 15 percent to 24 percent). Increase in the number of durable goods owned by the household by 12 percent and motor vehicle ownership by more than 40 percent. No statistically significant effect on monthly per capita expenditure (non-durable consumption). 25 percent increment in housing values. Rents rose by 31 percent in paved streets. Individuals who use collateral-based credit rose from close to 2 percent in the control group to nearly 5 percent in the treatment group. Families living along streets that were treated with pavement were between 0.35 and 0.39 points more satisfied with the local government (on a 4-point scale).

Neighborhood Interventions

Reference	Type of Intervention	Program Details	Method	Outcomes measured	Results
Botvin, Griffin and Nichols (2006)	Family Skill Training	Life Skills Training in schools in disadvantaged urban neighborhoods of the US (2004).	Randomized experiment	Delinquency, violence.	3 months after the intervention, significant reductions in violence and delinquency for intervention participants relative to controls (less verbal and physical aggression, fighting, and delinquency). The results indicate that a school-based prevention approach previously found to prevent tobacco, alcohol, and illicit drug use can also prevent violence and delinquency.
Katz, Kling and Liebman (2001)	Relocation Program. Voucher to move to low poverty neighborhood	Moving to Opportunity. Baltimore, Boston, Chicago, Los Angeles, and New York (US), 1994.	Randomized experiment	Wellbeing, safety, health, behavior, labor market outcomes.	Those offered vouchers experienced improvements in multiple measures of wellbeing relative to a control group, including safety, health, and behavioral problems among boys. There were no significant short-run impacts of vouchers on the employment, earnings, or welfare receipt of household heads.
Katz, Kling and Ludwig. (2005)				Crime	The offer to relocate reduced arrests among youth for violent crimes, reduced arrests of female youth for property crimes, but increased problematic behaviors and property crime arrests of male youth.
Galiani, Murphy and Pantano (2012)	Relocation Program. Voucher to move to low poverty neighborhood	Moving to Opportunity. Baltimore, Boston, Chicago, Los Angeles, and New York (US), 1994.	Structural model combined with randomized experiment	Neighborhood choice	Effects of counseling and poverty-based location constraints are both large and that the location constraints (poverty rate of receiving neighborhood) end up dominating. Subsidy take up is sensitive to the particular design of the location constraint, with very stringent constraints inducing very low take up. Due to reduced subsidy take-up rates, restricting subsidy use to very low (i.e. lower than the 10 percent required by the program) poverty neighborhoods would actually increase average exposure to poverty.
Soares and Soares (2005)	Integral Slum Upgrading	Favela Bairro upgrading Program	Quasi-experiment	Access to services, housing values,	Positive results of the program, especially related to an increase in the coverage of water and rubbish

	program	in Brazil, first stage (1995-2000).		mortality, literacy, income.	<p>collection in <i>favelas</i> that outpaced the comparison groups identified. The impacts on sewerage was the most significant one in the aggregate level, moreover, an analysis by income quartile reveals that the poorest quartiles did benefit from sewerage, while the richest quartiles benefited in a lesser extent. This heterogeneous impact is also seen with respect to water and rubbish collection.</p> <p>Effects on housing values were not detected, though it can be due to data and methodological limitations. The authors do not find significant effects in the reductions of mortality due to poor sanitation conditions or homicides.</p> <p>The estimated effect on illiteracy rate of head of household, income of the head of the household and population is not statistically significant.</p>
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Individual Interventions

Reference	Type of Intervention	Program Details	Method	Outcomes measured	Results
Banerjee, Duflo, Glennerster and Kinnan (2009)	Large scale introduction of Microfinance institutions in slums	Slums in urban Hyderabad, India (2005)	Randomized experiment	Economic outcomes (consumption, business creation, income), human development outcomes (education, health and women's empowerment).	<p>15 to 18 months after lending began in treated areas, the treated areas featured more new business openings, higher purchases of durable goods and especially business-related durables, and higher profits in existing businesses.</p> <p>Households with an existing business at the time of the program invest more in durable goods, while their nondurable consumption does not change. Households with high propensity to become new business owners increase their durable goods spending and see a decrease in nondurable consumption. Households with low propensity to become business owners increase their nondurable spending.</p>

					<p>Even in treated areas, over 70 percent of households do not take microloans, preferring to borrow from other sources.</p> <p>No impact on health, education, or women's empowerment outcomes after 15–18 months of the program.</p>
Card, Ibararán, Regalia, Rosas and Soares (2007)	Youth Employment Program	Juventud y Empleo program in the Dominican Republic (2001-2007)	Randomized experiment	Labor market outcomes	<p>No average significant impacts on the employment rate; but the effects are positive and economically significant for the youngest age group (17-19 years old).</p> <p>Positive effects on the monthly total labor earnings for those employed of 17 percent (though estimated with a small sample size).</p>
Attanasio, Kugler and Meghir (2008)		Jóvenes en Acción. Colombia (2005)	Randomized experiment	Labor market outcomes	<p>Widespread and large effects on women, but fewer effects on men. Women offered training are more likely to be employed and work more days and longer hours. Being offered training increases paid employment by about 14 percent and increases days and hours worked by about 11 percent. The monthly wage and salary earnings of women offered training are about 18 percent higher than those of women not offered training. The likelihood of being employed in jobs that offer non-wage benefits and of having a written contract is 5 percentage points higher for women offered training. Men also benefit from being offered training, but the effects for men are more limited (8 percent increase in wages).</p> <p>Cost-benefit analysis suggests that the program generates a large net gain, especially for women. Lower bound estimates of the internal rates of return are around 13.5 percent for women and 4.5 percent for men.</p>