

Housing Consumption and Urbanization

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Abstract

Rapid urbanization in Sub-Saharan Africa places immense pressure on urban services to meet the needs of the burgeoning urban population. Although several country- or city-level reports offer insight into the housing challenges of specific places, little is known about regional patterns affecting housing markets. This lack of clear knowledge on the relative importance of the factors influencing households' housing demand in countries in Sub-Saharan Africa inhibits policy makers, researchers, the private sector, and development partners from making informed decisions when addressing affordable housing provision and the rapid increase in and growth of informal settlements. To shed light on the contours of housing patterns and impediments impacting the region's households, this paper provides a systematic review of housing conditions in Sub-Saharan

Africa. By drilling down into the housing issues in the region from the perspective of the household, the paper analyses the trade-offs households make in allocating their budgets over time to housing and other amenities and provides a first approximation at understanding the differences in households' expenditure patterns and housing decisions across countries. The findings suggest that rather than emphasizing policies that purport to increase expenditures on housing at this stage of development, policy makers in Sub-Saharan Africa should focus on extending access to basic services and strengthening coordination between land use planning and service provision. As incomes increase, this focus would allow households the opportunity to access houses that are equipped with basic infrastructure and help countries move toward better overall quality of housing.

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1 Introduction

Urbanization and rapid population growth are transforming Sub-Saharan Africa (SSA). Currently, SSA has the lowest levels of urbanization (roughly 37 percent) of the world's geographic regions, and projections show that Africa as a whole will remain the least urbanized area in the world through 2050.¹ Despite having the lowest levels of urbanization, Africa, along with Asia, faces the highest absolute urban population growth. In fact, these two regions are set to drive global urban population growth over the next half century. With a population of nearly 900 million and an annual urbanization rate of 1.17 percent, SSA currently adds over one million people to its urban areas every year.² This urban growth sets the urban population of Africa on course to exceed the urban populations of Europe and Latin America, regions whose urban populations currently exceed 70 percent of their total population (UN-Habitat 2013: 29).

These unprecedented trends in urban growth in SSA place immense pressure on urban services to meet the needs of the burgeoning urban population. In particular, rapidly increasing demand for housing and strained urban housing supply emerges as one of the most pressing urban issues facing the region. Pressure on the urban housing market is further exacerbated by the high level of poverty in SSA. According to the World Bank's Development Indicators, the poverty head count ratio in SSA for those living under \$2 a day was 69.9 percent of the population in 2010, exceeding South Asia (66.7 percent) and more than double the rate of East Asia & Pacific, which has the third highest level of poverty (29.7 percent). The combination of rampant urbanization and globally high levels of poverty in SSA highlights the importance of focusing attention on affordable housing policy in SSA.

Currently, however, no systematic review of housing conditions exists for SSA, particularly from the point of view of households. A number of country- or city-level reports offer insight into the housing challenges of specific places,³ but do not shed light on the contours of housing patterns and impediments impacting the region's households. This lack of clear knowledge on the relative importance of the factors influencing households' housing demand in countries in SSA inhibit policy makers, researchers, the private sector, and development partners from making informed decisions when addressing affordable housing provision and the rapid increase in, and growth of, informal settlements.

This paper drills down into the housing issues in SSA from the perspective of the household, by analyzing how households make tradeoffs in allocating their budgets over time to housing and other amenities. The purpose of this work is to develop an understanding of the differences in households' expenditure patterns and housing decisions across countries in SSA. In an unconstrained environment, households choose the best house they can afford. However, when other key amenities such as transport services are costly, households may under-consume housing, and take suboptimal decisions in terms of housing quality in order to access these key services. For example, when transport systems are not available, households may choose to live in slums so they can access jobs, schools, or health care. In particular, this paper focuses on three underexplored topics facing households in SSA: 1) household spending on housing; 2) overall housing quality; and 3) the willingness to pay for housing amenities and the estimated value of a fully equipped house.

¹ United Nations World Urbanization Prospects, 2011 Revision.

² Ibid.

³ There are numerous studies on local housing markets. Some recent examples at the city level include the dynamics of slum rental markets in Nairobi (Gulyani and Talukdar 2008) and a review of housing conditions in Accra (Konadu-Agyemang 2001). At the country level, recent reports include a review of the Kenyan housing market (African Development Bank 2013) and in-depth reports by UN-Habitat for Ghana (2011b), Malawi (2010), Senegal (2012a), Uganda (2011c), and Zambia (2012b) as part of the Urban Sector Housing Profile series.

Specifically, using housing budget surveys for all SSA countries for which such data are available⁴, this paper examines the tradeoffs that households make between housing quality, housing consumption, consumption of transport services, and consumption of other goods (see Box 1 for a broad description of the data). These allow for an examination of relative spending levels between potentially competing budget items. Specifically, in the next section of this paper, consumption of housing, transportation, health and education are compared across income quintiles. As a first step, this paper follows a descriptive strategy and provides a thorough overview of housing expenditures in SSA countries, and within countries across income quintiles.

In section three, an overview of average housing characteristics for SSA countries is provided in order to explore how existing housing quality reflects expenditure levels. This section focuses on the prevalence of housing shortages and the limited availability of basic housing amenities both at regional and national levels, beginning with a broad overview before focusing exclusively on urban areas. Set against global benchmarks, critical descriptive statistics on housing characteristics and household expenditures on non-food expenses highlight the housing policy areas that deserve greater focus.

Section four delves into four capital cities from the countries studied to better understand the tradeoffs that households make in choosing their housing structures. This section uses hedonic models⁵ to obtain an estimate of the value that households assign to specific characteristics, such as the material of the walls, or having a bathroom inside the house. The paper concludes by providing estimates for the income elasticity of housing expenditures in three African cities, discussing the implications of the findings for policy design in SSA.

Box 1. The Data

The data used in this paper are from the World Bank's Africa Region—Poverty Reduction and Economic Management Statistics Practice Group's Survey-based Harmonized Indicator Program (SHIP), unless otherwise indicated. These surveys are representative, cross-sectional surveys at the country level. Annex 1 provides a full list of countries, survey years⁶ used, and the number of households included in the analysis.

Cross-country analysis of the housing data in SSA provides insight into regional patterns of housing shortages faced by households as well as the relative level of household expenditures dedicated to housing. The use of standardized data allows for the development of a clear and consistent picture of housing issues across the region and complements the localized, less generalizable knowledge on housing that currently exists.

For purposes of this paper, areas⁷ are categorized into three urbanization types: 1) the largest city; 2) other urban areas, and 3) rural areas. The largest city is identified using the smallest geographical unit available, which varied by country and could range from region to district. Using this geographical unit, urban households were identified and counted as residing in the country's largest city.⁸

⁴ The analysis uses data for a total of 20 countries. See Annex 1 for a full list of countries and years examined.

⁵ Hedonic models are a standard technique used in the literature to examine what households are "willing to pay" for different amenities.

⁶ Because the data are collected by each country's respective national governments, the survey years are not always comparable across countries or obtained at regular intervals.

⁷ This report recognizes that there is variation in national criteria used to designate urban areas. For example, in Kenya, areas are considered urban if there are more than 2,000 inhabitants residing there. Nigeria, on the other hand, an area is considered urban if it has more than 20,000 inhabitants. For a better understanding of the challenges associated with urban designation see Cohen (2004).

⁸ In many instances in Sub-Saharan African countries, large geographic units such as regions only contain one urban agglomeration so the issue of the misidentification of the largest city is minimized.

2 Housing Expenditures in SSA: Households still grappling with subsistence

This section investigates households' expenditure patterns with the aim of understanding how households make tradeoffs in allocating their budgets over time to housing and other amenities. Specifically, this section examines households' housing expenditures by income quintile, types of urban area, and explores the tradeoffs that households make between housing consumption and other types of expenditures.

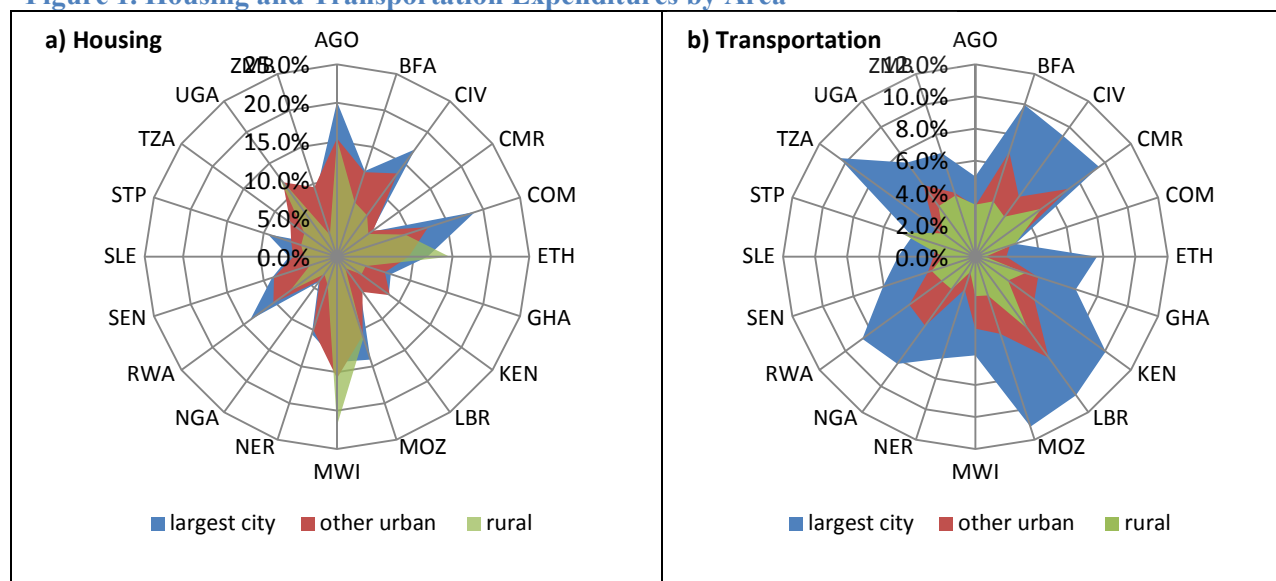
Box 2. Measuring Household Expenditures

Housing expenditures are captured in the SHIP data as total expenditures on housing. Total housing expenditures include maintenance and repairs of the dwelling, utilities (electricity and gas), water, and fuel used in the home. However, rent (neither actual nor imputed) is not included in total housing expenditures because of the high percentage of households who own their homes as well as the lack of renters in rural areas, which account for the majority of the Sub-Saharan African population. For purposes of analyzing all household expenditures, rent, when paid, is added to the total housing expenditures as well as to the overall total household expenditures. (For an analysis that also includes imputed rent, and an explanation of why imputed rent it is not used in the main analysis, see Annex 2). The household expenditure types reviewed include housing, food, and transportation in order to understand how households trade off housing expenditures with other critical expenditures. All expenditure data used in this analysis are calculations of expenditure type (housing, food, and transportation) as a percent of total expenditures.

2.1 Today, household expenditures on housing remain low throughout SSA and across rural and urban areas

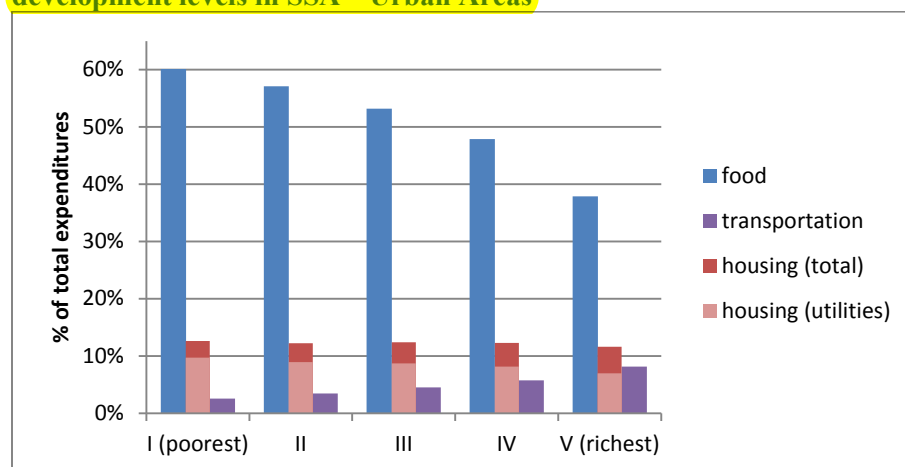
Across Sub-Saharan Africa, household expenditures on housing and transportation vary across rural and urban areas. The radar charts in Figures 1 a) and b) show the country-level housing and transportation expenditure percentages for each of three different types of areas defined: rural, largest city, and other urban areas. As expected, urban households appear to allocate a higher percentage of their expenditures to housing than rural households, except in Ethiopia, Malawi, and Uganda. In general, households residing in a nation's largest city allocate more to housing than those residing in rural or other urban areas. Aside from countries with higher percentages of housing expenditures in rural areas, Cameroon, Kenya, Liberia, Tanzania, and Zambia have households residing in other urban areas spending more on housing than their counterparts living in the largest city. Transportation expenditures are more consistent across countries and urban areas. Figure 1 b) shows the relative magnitude of transportation expenditures in the largest city compared to other urban and rural areas. In all but the island nations of Comoros and São Tomé and Príncipe, those households living in larger cities spend, on average, a greater percentage of expenditures on transportation than rural households. Likewise, households in other urban areas tend to allocate more of their household expenditures to transportation with Comoros, Angola, and São Tomé and Príncipe being the exceptions.

Figure 1. Housing and Transportation Expenditures by Area⁹



In urban areas, and across the countries studied, household expenditures on food and transport vary by income quintile, but housing expenditures are relatively flat (see Figure 2). In contrast to the flat level of total housing expenditures across quintiles, household expenditures on food start at a high of 60 percent of income for quintile I and drop more precipitously as incomes rise. Transportation expenditures rise with income, which may owe to lower income households spending more time walking instead of allocating expenditures to other modes of transit. In contrast, average households' housing expenditures range from 12.6 percent for quintile I to 11.7 percent for quintile V. The literature on housing markets, however, finds that higher income households tend to spend less of their total income on housing, which is exhibited by lower rent to income ratios (Malpezzi et al. 1986). When disaggregated from total housing expenditures, housing utilities fall faster than total housing expenditures, as a percent of total spending.

Figure 2. Lack of variation in housing expenditures across quintiles is indicative of the low development levels in SSA – Urban Areas



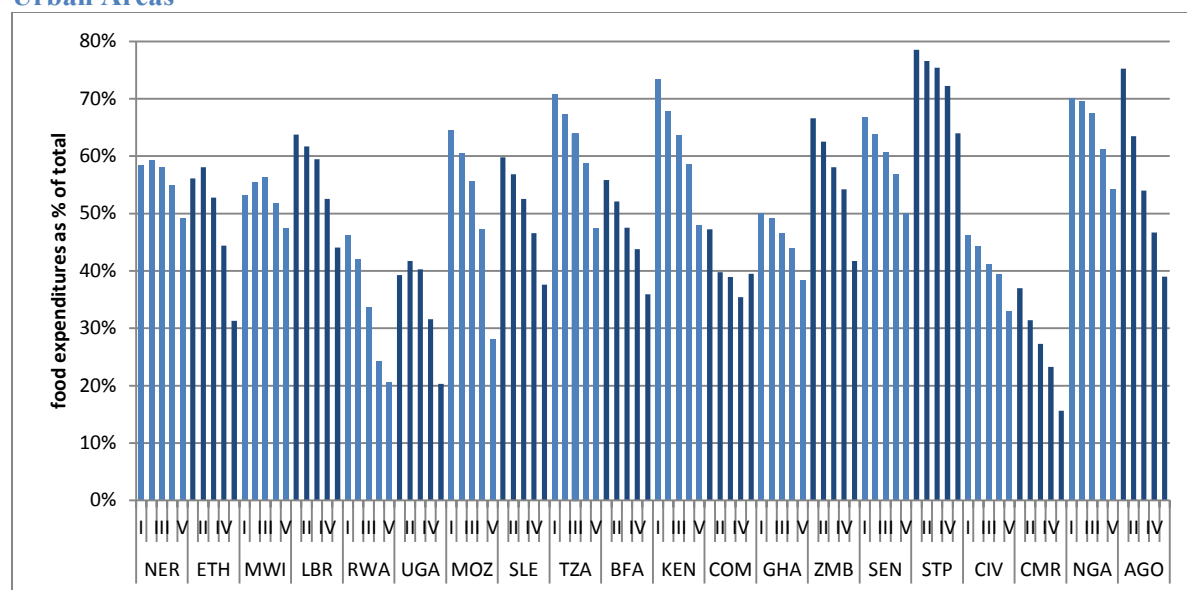
⁹ Country abbreviations in this figure are as follows (see Annex 1 for a full list): Angola (AGO); Burkina Faso (BFA); Cote D'Ivoire (CIV); Cameroon (CMR); Comoros (COM); Ethiopia (ETH); Ghana (GHA); Kenya (KEN); Liberia (LBR); Mozambique (MOZ); Malawi (MWI); Niger (NER); Nigeria (NGA); Rwanda (RWA); Senegal (SEN); Sierra Leone (SLE); São Tomé and Príncipe (STP); Tanzania (TZA); Uganda (UGA); and Zambia (ZMB).

2.2 For most countries, food expenditures remain above 50 percent of total expenditures for 60 percent of the population or more

Disaggregating expenditures by country shows great variation in spending across countries and country quintiles. Figures 3 to 5 show household expenditures by country and quintile, ordering the countries by GDP per capita.¹⁰ In terms of food expenditures (see Figure 3) most countries follow a regular pattern of declining shares of food expenditures as income quintiles increase. Country-level housing expenditures follow a less regular pattern across quintiles. In Kenya, Senegal, Tanzania, and to a lesser extent Angola (see Figure 4), shares of housing expenditures increase with quintiles, whereas in Cameroon and Malawi shares of housing expenditures fall with income quintile. The remaining countries have an irregular pattern or flat housing expenditures, which likely owes to the fact that because incomes are quite low, the percentage of income allocated towards housing may not increase substantially with income levels. This may also be linked with increases in housing quality across income quintiles, which can also affect housing expenditure allocations.

Transportation expenditures, on the other hand, are much more consistent across countries with transport expenditures increasing for the higher quintiles of the expenditure distribution (see Figure 5). The only country to betray the pattern of increasing transportation expenditures is the island nation of Comoros, which exhibits an unclear relationship between transportation expenditure and income quintiles. One explanation is that transportation costs in Comoros are nearly 2.5 times the Africa region average, making it the most expensive of any African country (African Development Bank 2012). Unlike spending patterns for food, there appears to be no relationship between GDP per capita and country-level spending patterns for housing or transportation.

Figure 3. Food Expenditures by Country and Quintile, in Ascending Order of GDP per Capita—Urban Areas



¹⁰ The sequencing of GDP is determined by income data from the World Development Indicators (WDI) 2012 and represents GDP per capita with purchasing power parity in constant USD.

Figure 4. Housing Expenditures by Country and Quintile, in Ascending Order of GDP per Capita—Urban Areas

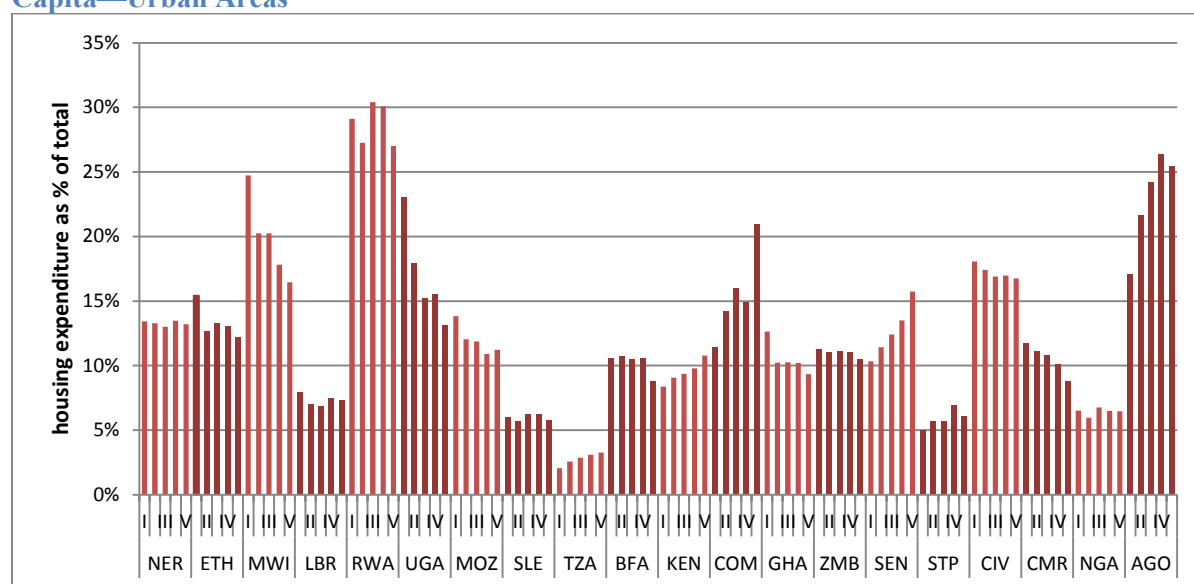
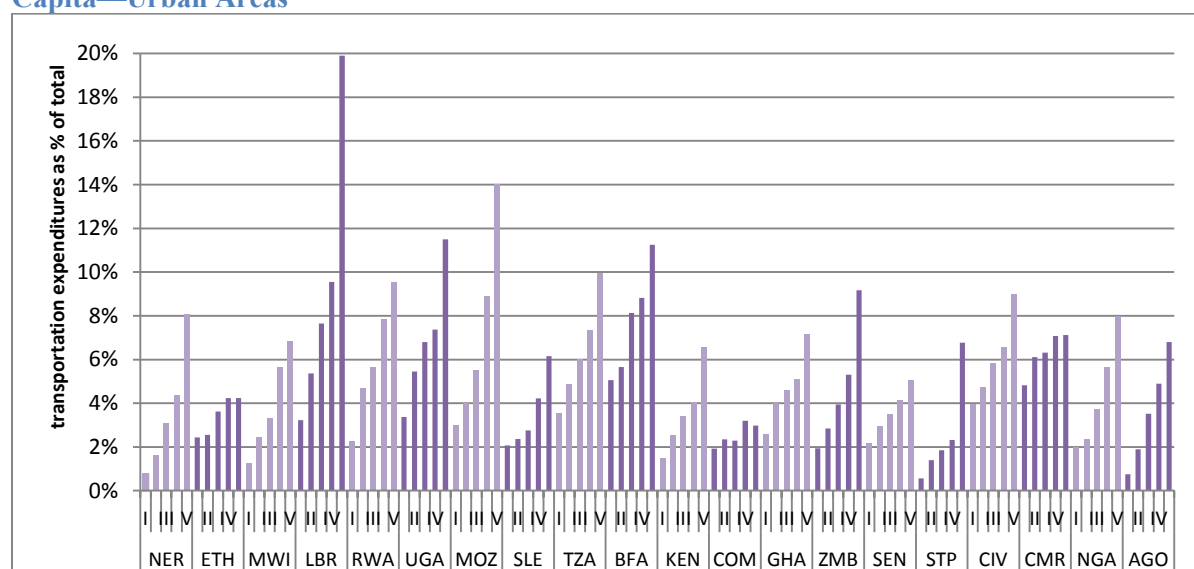


Figure 5. Transportation Expenditures by Country and Quintile, in Ascending Order of GDP per Capita—Urban Areas



2.3 Housing expenditures in SSA countries are indicative of their stage of development

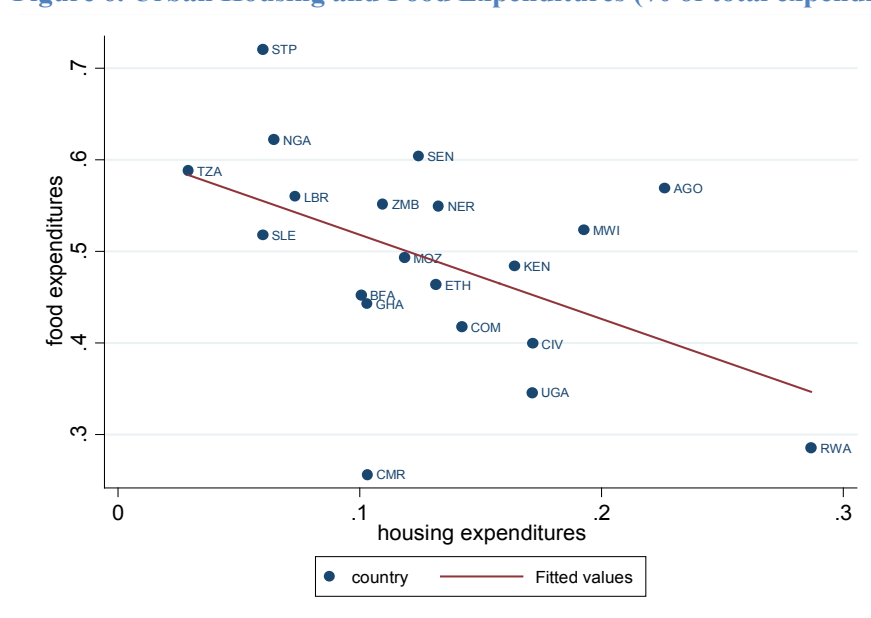
An examination of benchmarks on expenditures reveals that the explanation for the lack of consistent variation in housing expenditures across quintiles may lie in the level of development of the Sub-Saharan African countries examined. In a series of reports by the United States' Department of Agriculture (USDA), cross-country analysis of food expenditures—one of the best documented shares of expenditures across countries—reveals that lower income countries tend to spend more on food as a percentage of their

total budget. On average, households in low-income countries spend 47 percent of their total budget on food, middle income countries spend 29 percent, and high income countries spend just 13 percent (Regmi et al. 2001). Likewise, Regmi et al. (2001) find that income elasticities for food shrink as incomes grow, suggesting that lower income countries make larger expenditure adjustments on food in response to changes in income. Both of these findings suggest that lower income economies allocate larger amounts of their budgets to subsistence goods.

Decreases in food expenditures hold within countries as they develop, as well as across income groups. As countries develop, their food expenditure shares also decrease. For example, in 1975, South Koreans spent one-third of their income on food, but by 2012 that figure decreased to 12.2 percent.¹¹ Across income groups, food expenditures also decline with income. Data from the 2011 United States' Consumer Expenditure Survey shows that the lowest 20 percent of income earners spend 16.1 percent of their expenditures on food. This number decreases across income quintiles with the highest 20 percent of income earners spending on average 11.6 percent of their income on food.¹²

The relationship between household housing expenditures and other types of expenditures provides additional insight into the tradeoffs households make between housing and other expenditures. Figure 6 plots housing against food expenditures by country, which presents a stark negative relationship between the two. Countries with higher percentages of expenditures allocated to food translate to lower shares of expenditures put toward housing. This indicates that increasing housing investment at the household level will be a challenge as households face the combination of limited budgets and high levels of spending on food. An examination of the relationship between housing expenditures and transportation expenditures, on the other hand shows a slight negative relationship between the two (see Figure 7).¹³

Figure 6. Urban Housing and Food Expenditures (% of total expenditures)

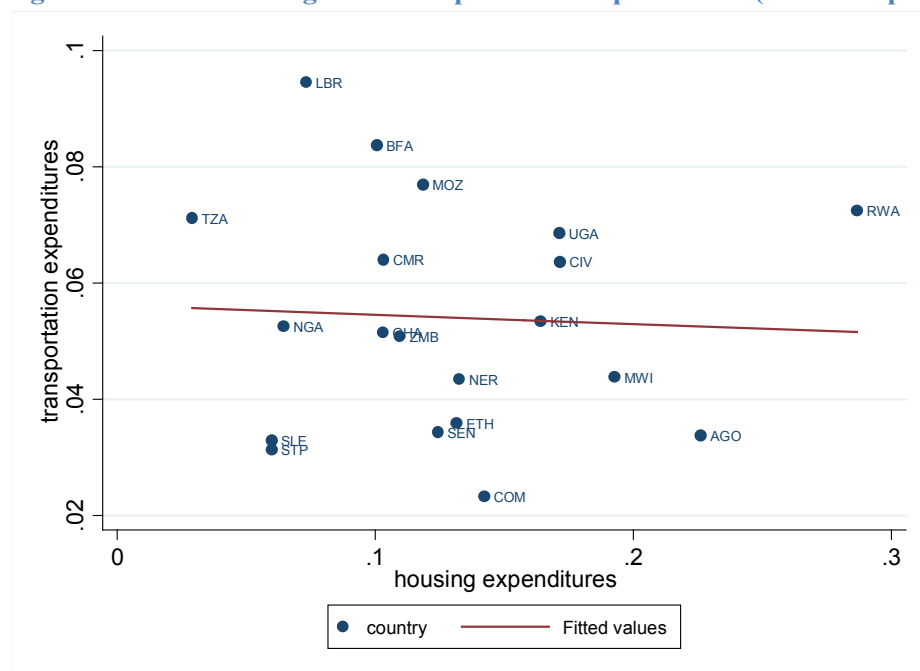


¹¹ The Economist. "Thought for Food." March 12, 2013. <http://www.economist.com/blogs/graphicdetail/2013/03/daily-chart-5>. The 2012 figure comes from 2012 USDA data on consumer expenditures on food.

¹² The United States has the lowest average spending on food as a percentage of expenditures of the 86 countries studied by the USDA. These quintile percentages were calculated from the United States' Bureau of Labor Statistics' Consumer Expenditure Survey, 2011.

¹³ Refer to Annex 3 for a discussion on the difference between housing expenditures and across housing shortage types.

Figure 7. Urban Housing and Transportation Expenditures (of total expenditures)



This section explored household expenditures on housing, food, and transportation in order to understand how households allocate spending across countries and income quintiles. The examination of expenditures found very high levels of spending on food in SSA relative to other regions, indicating a pattern consistent with lower levels of development. The highest income quintile in SSA still spends a larger percent on food than the average household in Korea did in 1975. This level of spending was evident across all country income groups, but dropped considerably in the upper two income quintiles for all countries. The clear negative relationship between food and housing expenditures by country further suggests that expenditures on housing are unlikely to increase unless high shares of food expenditures decrease and free up household spending.

3 Housing Conditions in SSA: A continental challenge with evident sub-regional variation

The previous section suggested that household expenditures in SSA are indicative of its stage of development: households in countries at initial stages of development end up spending most of their income on food. As incomes rise, household are able to shift some of their income away from food expenditures and into housing. In this section we focus instead on the quality of housing in the region and uncover challenges between urban and rural areas and across income quintiles. In particular, the analysis draws a regional picture of the presence or absence of housing amenities as well as a broader view of housing shortages. This approach unbundles the critical housing issues affecting households in SSA by identifying housing shortages and the level of deprivation in each country. This is a commonly used technique to elicit households' housing constraints. For example, the UN defines slums in terms of deprivations in order to have standard indicators and track progress for programs like the Millennium Development Goals (UN-Habitat 2009). Additionally, basic residential infrastructure coverage is often used as a way to measure housing and living conditions (Angel 2000; Gulyani and Basset 2010). While previous studies have highlighted the challenges related to adequate housing provision, stressing the problem of informality in SSA (see Box 3 for a discussion), this is the first study to calculate measures of

housing quality for a large number of SSA countries in a systematic way using standardized household surveys.

The key deprivations outlined by the UN and the lack of residential infrastructure can be identified within the SHIP data, allowing for the construction of a cross-country, qualitative index of housing shortage. This shortage is categorized according to two distinct deprivations (see Table 1): the first is attributed to shelter shortage, which comprises of variables indicating whether or not the house itself is made of permanent materials or affords enough space for its inhabitants; and the second is a shortage of housing related infrastructure which includes basic services on which households rely. Both of these shortages are measured individually through the identification of amenity variables (see Table 1), and a shelter or infrastructure shortage is noted when households face one or more deprivations of each type. For the analysis described in the discussion that follows, each household in the sample was assigned an indicator variable that took the value of 1 if the household faces the shortage and zero otherwise.¹⁴ As a result, only the presence, but not the degree of, deprivations is captured in terms of housing shortage type. A description of how deprivation is identified is noted in the table below.

Table 1. Types of Shortages and a Description of Deprivation

Type of Shortage	Amenity Variables	Description of Deprivation
Shelter (housing conditions)	Roof	Roof made out of non-permanent materials (anything other than concrete, brick, stone, cement, tiles, or shingles)
	Walls	Walls made from non-permanent materials (anything other than concrete, cement, brick, stone, or wood)
	Floor	Floors made of earth, clay, or mud
	Overcrowding	More than three people per room ¹⁵ (calculated from data)
Infrastructure (neighborhood conditions)	Electricity	Lack of a direct electricity connection
	Toilet	Lack of an improved toilet (anything other than a flush toilet or improved pit latrine)
	Water	Lack of a reliable water source (anything other than piped water or a public standpipe)
	Homeownership	Lack of ownership of home ¹⁶

Poor housing conditions, particularly slums and informal housing are inextricably linked to urban poverty. For example, the quality of a household's dwelling is one of the indicators used as a proxy means test to identify poor households when determining households most in need be eligible for welfare programs (Grosh and Baker 1995). In other words, housing quality is correlated with household welfare. The focus on living conditions and housing deprivations, moreover, are a means of determining the extent of the interaction between housing and poverty and how best to prescribe policy interventions to these

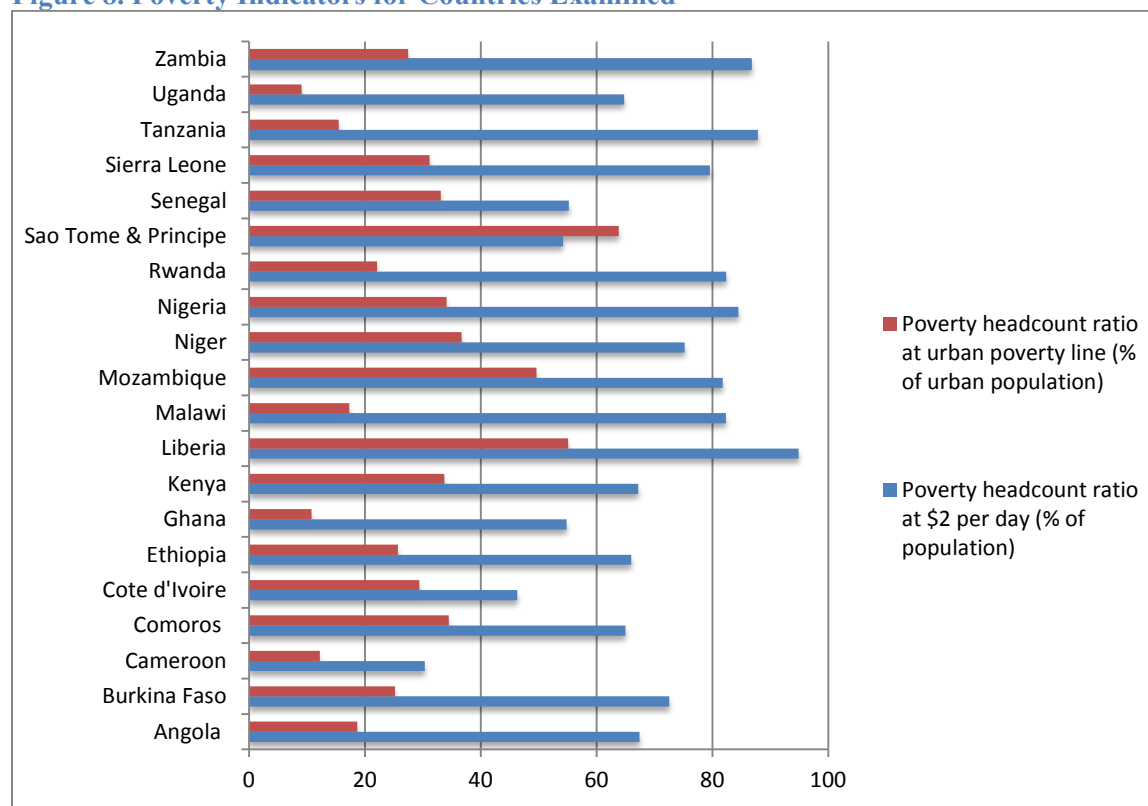
¹⁴ Variable categories of "other," for example, are counted towards households facing a deprivation. The assumption is that if permanent materials, adequate infrastructure provision or ownership were present they would fall into a defined category. Responses noted as unknown or missing are not used in the analysis. Going forward, unless noted, types of shortages are indicated by whether or not they are present.

¹⁵ This definition of overcrowding is derived from UN-HABITAT and the Millennium Development Goals' definition of a slum, which states that sufficient living space "means not more than three persons sharing a room." Thus, this calculation divides the total household size by the number of rooms in the dwelling unit.

¹⁶ It is important to note that this definition applies strictly to whether or not people own their home. The answer choice for this variable is binary. Often tenure is examined as whether or not the household has tenure security, defined as a legally binding right to occupy their home. The implications of this particular definition are twofold: 1) we know little about the various forms of tenure that households in these samples face, including "informal" tenure situations; and 2) tenure shortage should only be defined as those who do not own their own homes, in the broad sense of the definition.

two intertwined issues (UN-Habitat 2009; Gulyani and Basset 2010). When UN-Habitat developed their housing deprivations they found the region with the highest proportion of people living in slums, or suffering from one or more housing deprivations (UN-Habitat 2009). An examination of poverty indicators for the countries analyzed in this paper corroborates the descriptive relationship between poverty and housing quality. While the relationship between national income and housing conditions are examined later, poverty indicators provide insight into the extent of poverty.

Figure 8. Poverty Indicators for Countries Examined



Source: WDI Poverty Indicators Database

Note: Because poverty indicators are not consistently collected, these figures reflect the most recent year such data exist. For poverty headcount ratios at \$2 a day, this is anywhere between 2001 and 2011, whereas this range is 2005 to 2012 for urban poverty headcount ratio.

Figure 8 displays the poverty headcount ratio at \$2 per day as well as the poverty headcount ratio at the urban poverty line. All but five countries face poverty headcount ratios at \$2 per day of more than 60 percent, with Liberia having more than a 90 percent poverty headcount ratio. Poverty headcount ratios are less extreme in urban areas, but all but five countries have urban poverty headcount ratios above 20 percent, with São Tomé and Príncipe facing a nearly 64 percent urban poverty headcount ratio. These figures illustrate the extent of poverty, its potential relationship with poor housing conditions across the countries examined, and the need for a better understanding of the specific housing issues that plague these countries in order to make inroads into improving livelihoods in the region.

Box 3. Informal housing in SSA

Housing conditions in SSA are seen as the worst of any other region in the world in terms of the extent of slums and the severity of shelter deprivations. In 2012, an estimated 61.7 percent of SSA's urban population lived in slums, 27 percentage points more than Southern Asia, which has the second highest incidence of slums (UN-Habitat 2013). In addition to those living in areas defined as slums, formal sector housing is largely absent from African cities. Some

estimates place less than 10 percent of the African population in formal sector housing (Giddings 2007). The pressures of urbanization and population growth in Sub-Saharan African cities directly impact the supply and demand for urban housing in the region. A number of constraints affect housing supply in SSA. Although these issues are not unique to the region, they are exacerbated by rampant urban growth and high levels of poverty.¹⁷ As a result, the most egregious feature of the urban housing shortage is the prevalence of informal housing, specifically the proliferation of slums.

The United Nations' definition of slums identifies slums as having one or more of the following five deprivations: 1) durable housing of a permanent nature; 2) sufficient living space (not more than three people to a room); 3) easy access to sufficient amounts of safe, affordable water; 4) access to adequate sanitation facilities, and 5) security of tenure that prevents forced evictions. Even within slums, the degree of deprivations is highest in SSA, with 80 percent of the region's slums suffering from one or two deprivations, and nearly half facing two or more shelter deprivations (UN-Habitat 2007). The severity of the housing problem in SSA is thus characterized by high instances of slums as well as extremely poor conditions of informal housing. Yet despite this reality, little is known about the ways in which households seek and obtain shelter in SSA.

The under-supply of formal housing is often viewed as a market failure, reflecting a number of regulatory and policy constraints that increase the cost of business, thereby decreasing housing affordability. Collier and Venables (2013) identify five key "policy failures" that result in insufficient formal sector housing development in Africa. These include: 1) lack of affordability of housing because of inappropriate building regulations; 2) weak land titling and legal enforcement; 3) lack of innovation in housing finance to reach down market; 4) failure to supply adequate supporting infrastructure; and 5) insufficient regard for labor creation in the urban planning process. Giddings (2007) also identifies a host of constraints preventing housing and infrastructure from being supplied at scale in SSA, many of which echo those highlighted by Collier and Venables (2013). Giddings finds that these constraints are comprised of policy and institutional constraints, technical and physical constraints, and housing finance constraints. Policy and institutional constraints outline the public sector's shortcomings in prioritizing housing, partnering with the private and civil sector, developing human and institutional capacity, developing a sound legal and regulatory framework, and effective macroeconomic policies to attract private sector engagement and grow housing finance. Technical and physical constraints include land and housing shortages, lack of infrastructure provision and high construction costs. Giddings' focus on housing finance constraints reflects the most studied barrier to increasing housing supply.

Household demand for housing finance is explored through the pillars of housing affordability and market segmentation. In SSA, the analysis of housing affordability is often "crudely" undertaken by simply identifying national per capita income and estimating household income and housing costs given local prices (Tippie 1994). Similarly, more recent studies examine housing finance opportunities within country poverty headcount ratio pyramids (Centre for Affordable Housing Finance in Africa 2013). These efforts to analyze demand have a number of pitfalls, which include neglecting the underlying structure of household income and wealth by focusing on poverty headcounts. The heavy emphasis on affordability without fully understanding the current state of housing in SSA and where policy-makers should focus their efforts points to a gap in the literature which this report attempts to tease out.

3.1 Poor shelter amenities and widespread lack of infrastructure are the signature of housing in SSA

Across SSA the percentage of households who enjoy shelter and infrastructure amenities varies by type of amenity, but also by type of urban area and household income quintile. Table 2 presents the percent of households across the entire sample examined in the surveys who enjoy housing amenities (see Table 1 for full list) as well as the percentage of households that face housing or infrastructure shortages. The

¹⁷ According to the World Bank's Development Indicators, the poverty head count ratio in Sub-Saharan Africa for those living under \$2 a day was 69.9 percent of the population in 2010, exceeding South Asia (66.7 percent) and more than double the rate of East Asia & Pacific, which has the third highest level of poverty (29.7 percent).

table is further broken down into types of urban areas in order to observe the variation in housing conditions between a nation's largest city, other urban areas, and rural areas.

Table 2. Sub-Regional Housing Amenities by Type of Urban Area and High and Low Income Quintiles¹⁸

Category	Variable	Type of Urban Area				Income Quintile ¹⁹	
		All Areas	Largest City	Other Urban	Rural	QI (poorest)	QV (richest)
Shelter amenities (% of HH that have)	Roof	16.1	18.6	19.6	13.7	15.4***	18.0
	Walls	65.8	90.3	80.0	53.0	58.7***	72.1
	Floor	52.8	91.4	77.0	35.2	40.7***	65.8
	Overcrowded	17.6	17.8	16.0	18.4	30.4***	7.4
Housing infrastructure amenities (% of HH that have)	Electricity	31.6	69.4	49.5	13.4	20.1***	43.0
	Toilet	27.6	48.8	38.3	17.6	19.6***	35.5
	Water	38.2	77.3	61.0	17.8	30.5***	45.1
Homeownership (% of HH that own)	Ownership	70.6	40.8	53.0	85.5	78.1***	61.5
Shortages (% of HH lacking at least one amenity)	Shelter	92.5	85.3	87.6	96.6	94.9***	89.2
	Infrastructure	89.9	70.1	82.4	98.0	89.2***	83.7

Note: Significance of the difference in means between housing amenities and housing shortages for the 1st and 5th income quintiles: *** significant at the 1% level; ** significant at the 5% level; and * significant at the 10% level.

Across all areas and income quintiles in SSA shelter amenities are quite poor, which accords with UN-Habitat's (2009) findings. Only 16 percent of the households in the entire sample ("All Areas" in Table 2) have permanent roofs, and half have non-dirt floors. Overcrowding does not seem to be a serious issue for families with less than 20 percent facing overcrowded conditions, meanwhile more than 65 percent of households everywhere have permanent walls. Across different types of urban areas, the general trends show that as households move away from the largest city to less urbanized area, they face a greater lack of shelter amenities. With nearly 60 percent of the sample residing in rural areas, the poor housing conditions in rural areas appear to drive the low aggregate levels of housing amenities. The disparity between a country's rural areas and the largest city are most apparent for amenities such as having permanent walls or non-dirt floors. Over 90 percent of households residing in a country's largest city have permanent walls, whereas in rural areas this percentage drops to 53. Likewise, over 91 percent of households in the largest city have non-dirt floors compared to only 35 percent in rural areas. Overall, despite where households live, over 90 percent of those studied face at least one shelter shortage. The figure is highest among those living in rural areas where the percentage reaches over 96 percent.

Households are even worse off when it comes to housing infrastructure, with access to a piped water source topping the infrastructure amenity that most households have. However, less than 40 percent of all households even have access to piped water, indicating the relative dearth of infrastructure amenities available to households across the region. The scarcity of all housing infrastructure amenities is concentrated in rural areas; less than 20 percent of rural households have either access to piped water, an

¹⁸ The percentages in this table are the means taken across all countries' reported percentages of housing amenities. For example, the percentage of households that have a permanent roof was calculated by country (and further broken down by respective countries' urban areas and quintiles), and the figure shown is the mean percent of households with a roof where each observation is one country. This method prevents biasing the overall percentages towards countries with larger samples.

¹⁹ In the harmonized SHIP data, expenditure quintiles are used as proxies for income quintiles and are pre-calculated. Quintiles are numbered in ascending order of income with Quintile I representing the poorest 20 percent of a country's population, and Quintile V representing the richest 20 percent.

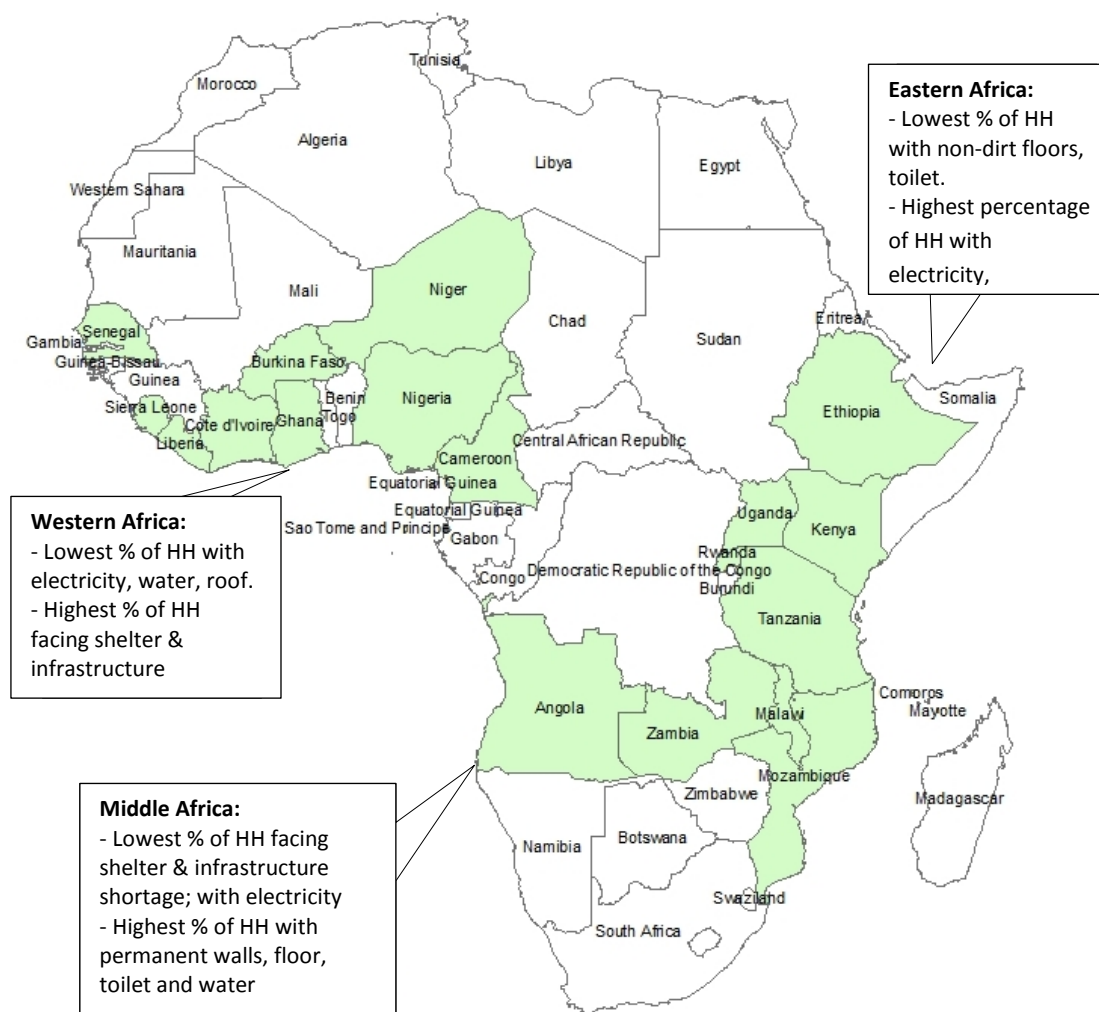
improved toilet, or an electricity connection. The majority of households lack at least one of these amenities, from 70.1 percent in the largest city to 98 percent in rural areas. Homeownership rates are quite high on average at over 70 percent, much of which is concentrated in rural areas which has upwards of 85 percent of people owning their own homes compared to about half in urban areas.

Table 2 suggests in all cases rural areas are worse off in terms of shelter and infrastructure amenities compared to urban areas. Recent research in India corroborates this by showing that access to basic services for households depends on city size. The percent of households that had access to bathroom facilities in their home or drainage increased as city size increased. Additionally, drainage access decreased as households located further from the urban core, regardless of city size (World Bank 2013). According to the 2011 Census, India's urbanization rate is 32 percent, which is comparable to the average urbanization level of the Sub-Saharan African countries studied here which averaged 36 percent across the countries examined in 2012.

The differences between the percentages of households that possess housing amenities also vary significantly across income quintiles; the difference in housing shortages between the first and fifth quintiles is especially stark. Shelter shortages disaggregated by income aids in identifying where types of housing shortages are concentrated among different population strata. Table 2 shows the average percentage of households in the first and fifth quintiles that have certain housing amenities and face shelter and infrastructure shortages. The difference between all the averages in these quintiles is significant at the 1 percent level, indicating a stark difference between housing for the richest and the poorest in SSA.

Housing conditions in SSA vary by sub-region, country, and type of urban area, with lower shortages being apparent in Middle Africa when compared to the Eastern and Western Sub-Regions. Figure 9 depicts a map of Africa with the 20 Sub-Saharan African countries analyzed highlighted in green. The UN classifies SSA into three sub-regions comprising of Western Africa, Eastern Africa, and Middle Africa. These sub-regions are characterized by a unique set of housing challenges, as summarized in Figure 9. Analysis of the SHIP data by region suggests that broadly, Eastern Africa suffers from the highest percentage of households in overcrowded conditions, and low number of households with permanent floors and access to a toilet. On the positive side, Eastern Africa has the highest percentage of households with electricity connections. Western Africa suffers from the most number of housing deficiencies and the highest percentage of households facing housing shortages. Middle Africa, on the other hand, has the least number of those facing housing shortages, but has the lowest percentage of households with electricity connections of all three sub-regions.

Figure 9. Map of Housing Conditions and Shortages by Sub-Region²⁰

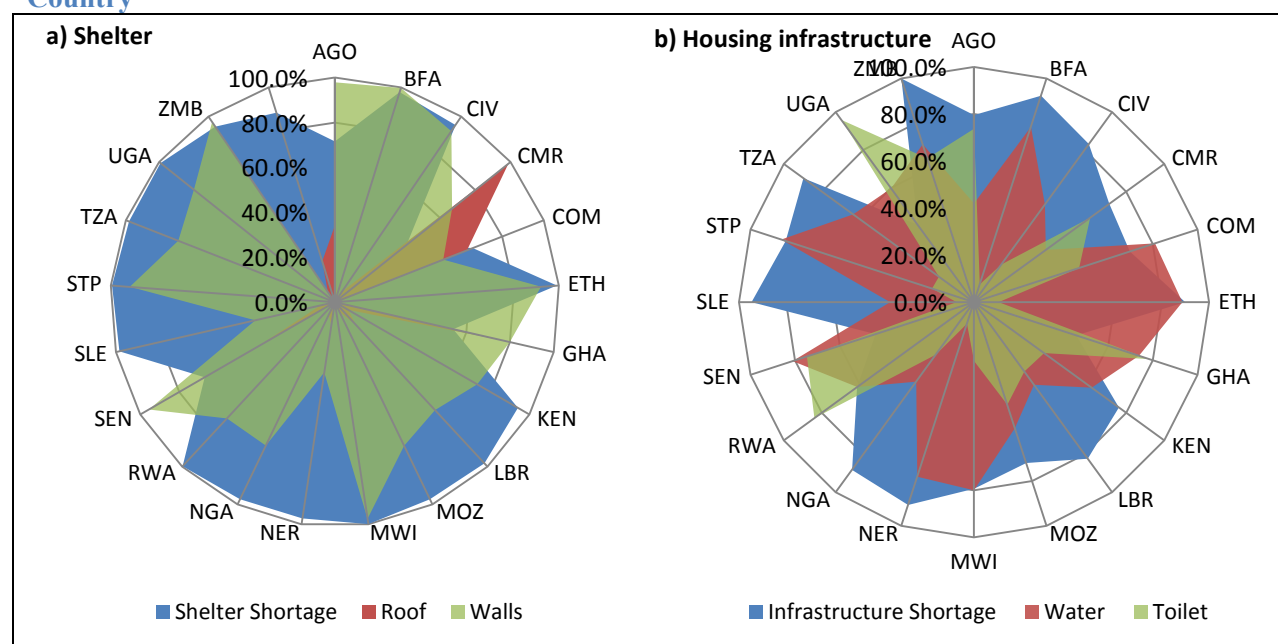


Given the significant variation of housing amenities and housing shortages in different types of urban areas, the remainder of this descriptive overview focuses exclusively on urban areas. Using the latest year of available data for each country along with urban households in the nationally representative samples, evidence of variation of the prevalence of housing amenities across countries also emerges.

Figures 10 a) and b) illustrate the differences in shelter and infrastructure shortages across countries as well as the correspondence between the lack of certain amenities and these shortages.

²⁰ Sub-regional classifications are adopted from the United Nations.

Figure 10. Urban Housing Amenities Compared to Shelter and Infrastructure Shortages by Country

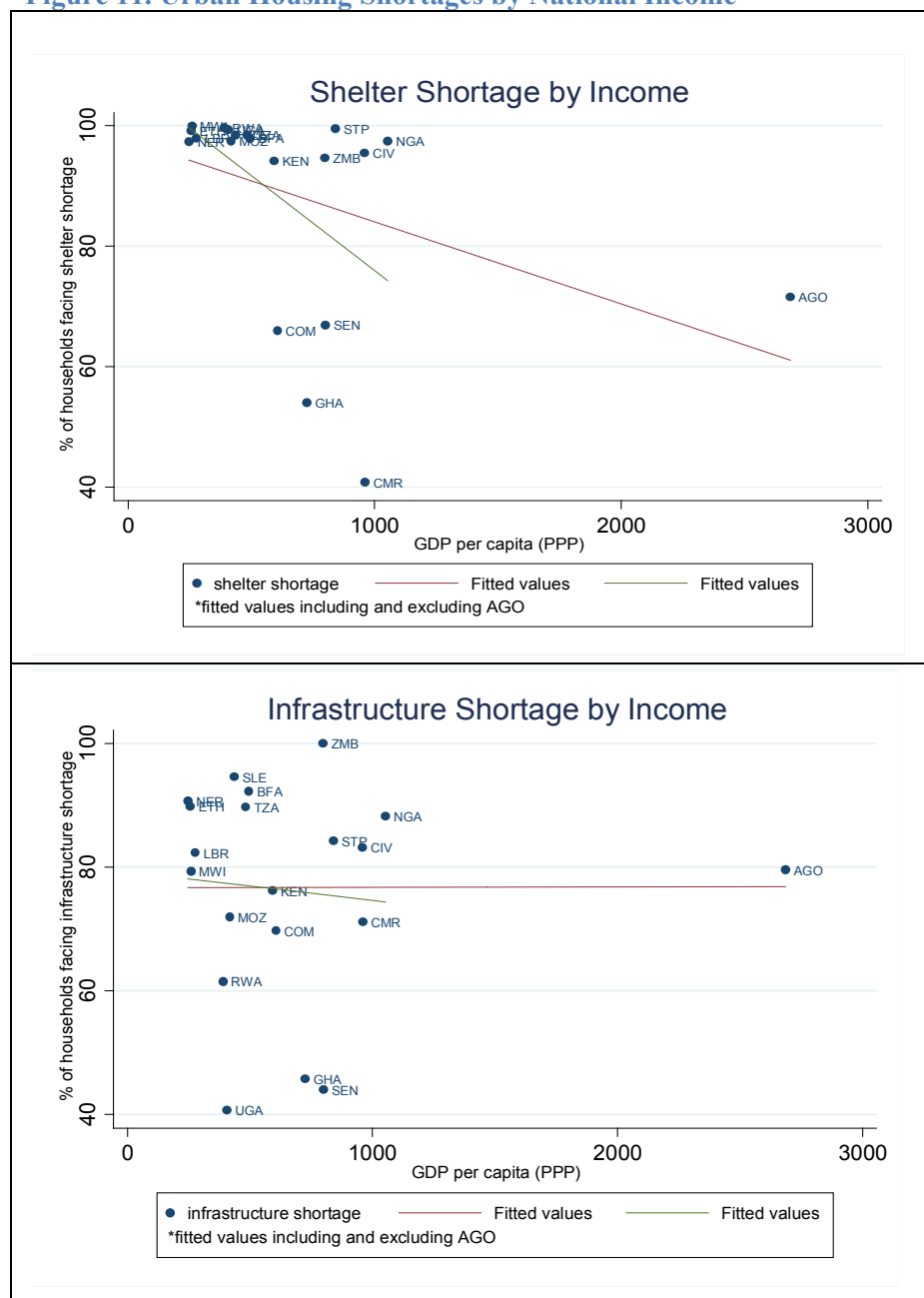


3.2 Shelter shortages appear to decrease as income rises but infrastructure shortages persist

Intuitively, higher levels of per capita income may translate into better housing conditions and higher investments in housing infrastructure, offering insight into cross-country relationships between national income and housing conditions. Figure 11 shows the relationship between GDP per capita²¹ and the housing shortage as calculated from the latest available data from each country. While it is difficult to discern a clear relationship between national income and housing shortages because of the tight range of GDP per capita across the countries studied, there is some indication that countries with low levels of GDP per capita also experience higher housing shortages. Lying below the best fit line are Comoros and Senegal which suggests that these two countries have on average shortages below what would be expected at their income level for Sub-Saharan African countries. If we exclude Angola, which appears to be an outlier based on its high income relative to other countries studied, Senegal remains below the best fit line. The relationship between infrastructure shortages and national per capita income is less clear. There does not appear to be a strong relationship between national per capital income and infrastructure shortages. However, these findings must be kept into perspective given the little variation in GDP per capita across the countries in the analysis.

²¹ The income data used are from the World Development Indicators (WDI) 2012 and represents GDP per capita with purchasing power parity in constant USD. Note that the income data are captured in the latest year available from the WDI, while the shortage data reflect the latest SHIP data available for each country (Annex 1).

Figure 11. Urban Housing Shortages by National Income



Examining housing shortages by levels of urbanization²² offers another explanation of the degree of different types of housing shortages (Figure 12). Intuitively, the degree of urbanization is generally positively correlated to intensity of infrastructure provision, suggesting a negative relationship between urbanization and infrastructure shortages. In terms of shelter shortages, however, higher levels of urbanization may also give rise to higher costs of housing and land in cities leading to squatting and informal settlements. Urbanization levels vary considerably across the Sub-Saharan African countries studied, ranging from less than 16 percent in Malawi to more than 63 percent in São Tomé and Príncipe.

²² Levels of urbanization used here are from the World Development Indicators 2012 and the percent of the country's population that resides in urban areas. Like the measure of GDP per capita used, the level of urbanization is taken for 2012 for all countries examined despite the fact that the years observed for housing shortages vary (see Annex 1).

While high levels of shelter shortage persist across different levels of urbanization, there appears to be evidence of a negative relationship between higher levels of urbanization and housing shortages. Given the higher levels of urbanization in São Tomé and Príncipe, Cote d'Ivoire, and Nigeria, these countries have very high levels of shelter shortage given how urbanized they are. However, in terms of infrastructure shortage, the relationship is less clear but shows a slight positive relationship between infrastructure shortages and levels of urbanization. This is indicative of the challenges that SSA cities face: provision of basic services is not keeping up with the urbanization pressures.

Figure 12. Urban Housing Shortages by Level of Urbanization

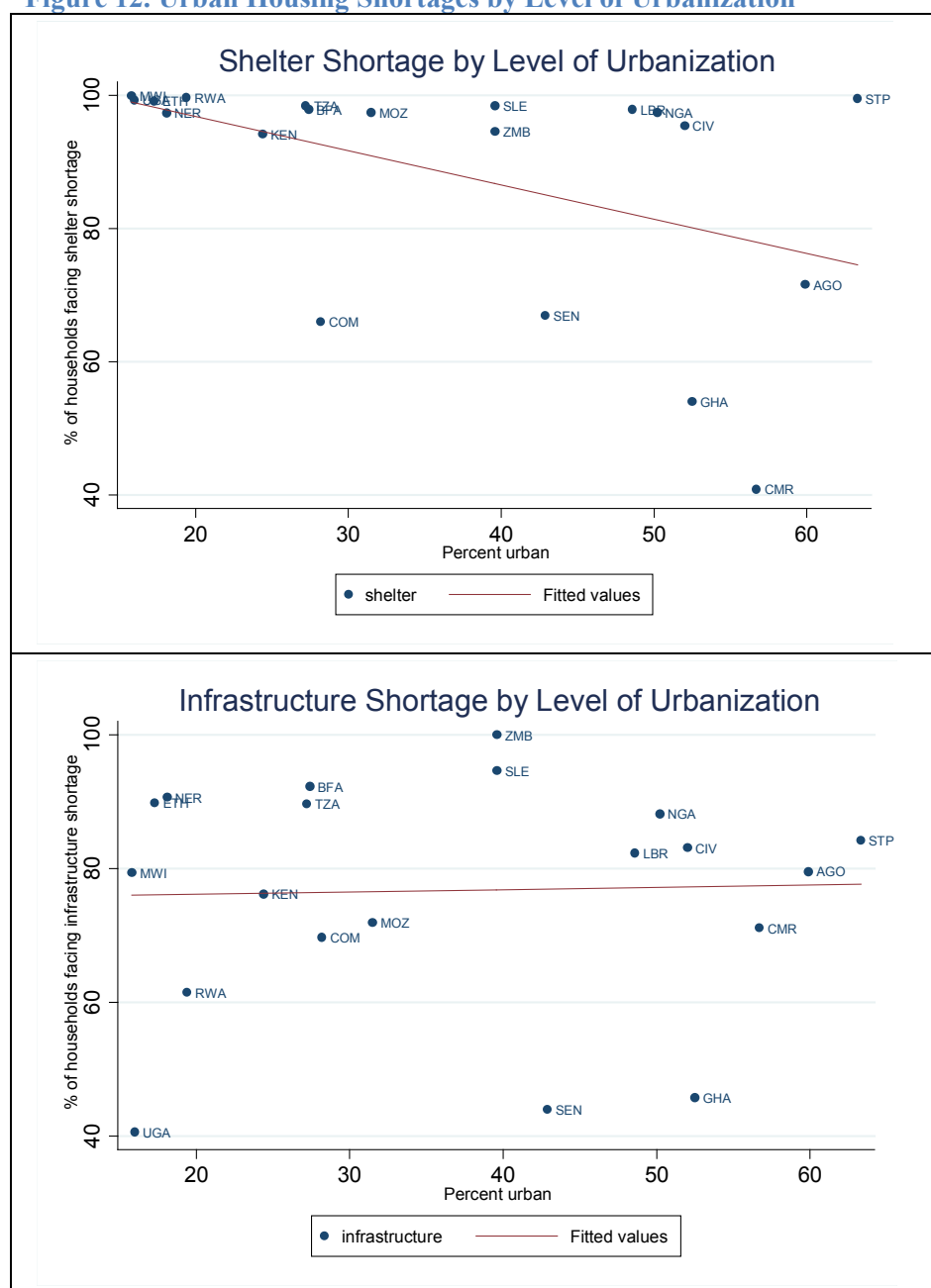


Figure 11 and 12 begin to explore the national level housing shortages in SSA. Combined with the macro indicators of GDP per capita and urbanization levels these offer both better cross-country analysis as well

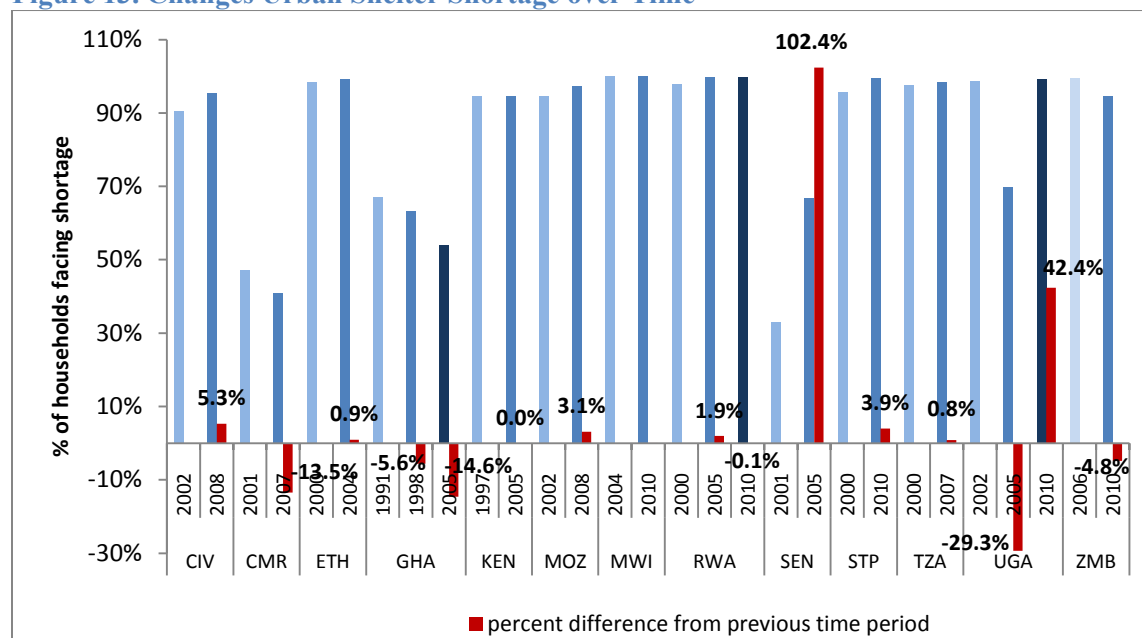
as the ability to compare housing shortages across benchmarks from other regions. Previous studies that have examined housing shortages and their relationship to GDP find some similarities to the above analysis. Rojas and Medellín (2011) find that in Latin America, for example, shelter and infrastructure shortages also have a negative relationship with GDP per capita. However, it is important to keep in mind the stark differences between urban population levels in Latin America and Africa which are nearly 80 percent and less than 40 percent, respectively (World Urbanization Prospects, 2011 Revision).

3.3 Increases in shortages over time suggest a focus on basic service provision is still relevant for most of SSA

As countries grow and urbanize, changes in housing conditions—either improvements or growing deficiencies—offer insight into the persistence of housing challenges in each country. For the countries in our sample where data are available for multiple time periods, we find that there is no consistent indication of improvements in housing shortages. The analysis reveals that in many cases the improvements have been small, or conditions have worsened with shortages increasing over time. Figures 13 and 14 show the housing shortages for countries have at least two comparison years; differences are shown using red bars. In terms of shelter shortages (see Figure 13), eight of the 13 countries saw increases in shortages between at least one time period. Senegal had the largest increase in shelter shortages from 2001 to 2005 when the inter-period change increased by a dramatic 102.4 percent from 33.1 percent to 66.9 percent of households facing shortages.

By contrast, only six countries saw at least one inter-period decrease in shelter shortages, with Uganda having the largest decrease of 29.3 percent from 2002 to 2005. Interestingly, the subsequent time period for Uganda, from 2005 to 2010 saw that decrease disappear when the shelter shortage then rose by 42.4 percent. For many countries, shelter shortages remained relatively constant between time periods. In Ethiopia, Kenya, Rwanda, São Tomé and Príncipe, Tanzania, and Zambia inter-period changes in shortages did not exceed five percent. Notably, shelter shortages in those countries were very high, exceeding 90 percent, suggesting that those countries plagued with chronic shelter shortages have a difficult time overcoming them.

Figure 13. Changes Urban Shelter Shortage over Time

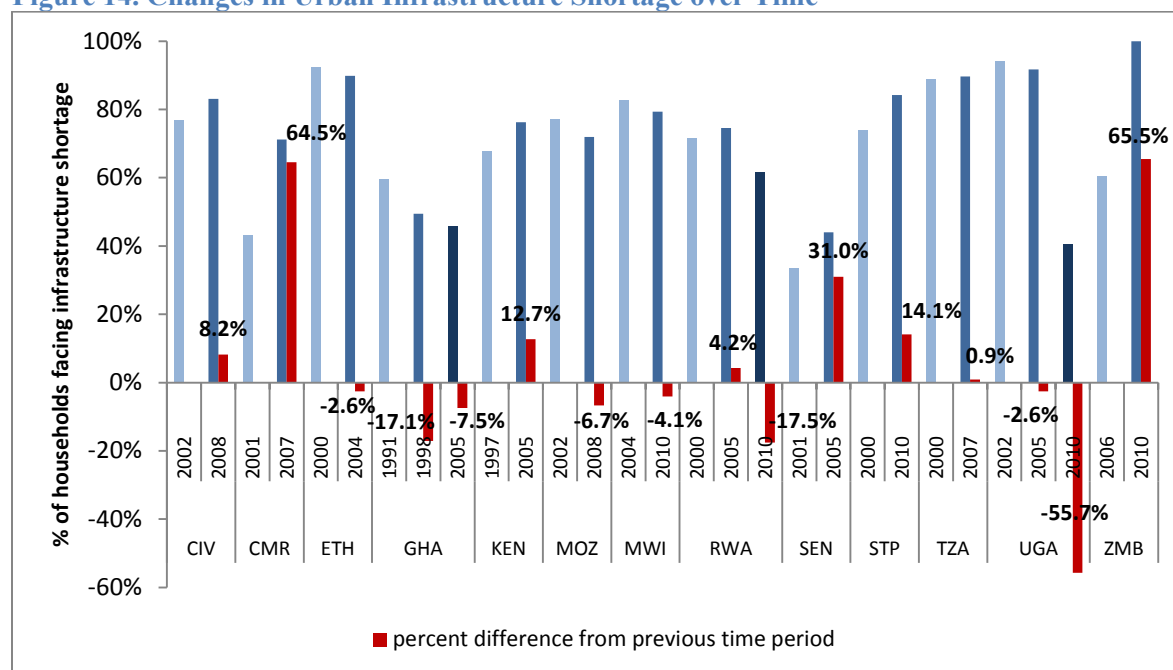


For infrastructure (see Figure 14), seven out of 13 countries saw increases in shortages between two periods, with Cameroon and Zambia exhibiting the largest inter-period increase. From 2001 to 2007, Cameroon saw a 64.5 percent increase in infrastructure shortage, and from 2006 to 2010, Zambia saw a 65.5 percent increase. During those same time periods, however, Cameroon and Zambia had decreases in shelter shortages, suggesting that changes in types of housing shortages are distinct from one another. Similarly, infrastructure shortages differed from shelter shortages by exhibiting fewer small inter-period changes overall. For example, five of 13 countries examined had at least one inter-period change in infrastructure shortages of less than five percent compared to eight in shelter shortages.

The numerous changes in infrastructure shortages may be attributable to concurrent changes in the provision of basic services, which continues to be a challenge for urban SSA. The large decrease in infrastructure shortage in Uganda, for example, occurred at the same time as vast improvements in drinking water and the toilet access. From 2002 to 2006, access to improved drinking water increased from 54 percent to 70 percent nationally.²³ This improvement is attributed to the National Water and Sewerage Corporation's explicit policy goal of providing water services to informal housing settlements. Likewise, by 2005, 88 percent of Ugandans had access to pit latrines and toilets, despite 31 percent lacking toilet and access to the sewerage system and 16 percent not having a toilet at all in 2002 (UN-Habitat 2011c). Electricity, however, remains a significant issue for Uganda with only 9 percent of the country possessing electricity connections.

Senegal, on the other hand, which saw a significant increase in housing infrastructure shortage, grappled with basic service provision during the time period analyzed. In particular, although water access has increased since 2003, the quality remains poor according to reports from UN-Habitat (2012a). Similarly, the electricity network and connections have improved greatly, but service disruptions and unmet demand remain high (UN-Habitat 2012a).

Figure 14. Changes in Urban Infrastructure Shortage over Time



²³ This figure has held steady; in 2011, 71 percent of urban areas and 70 percent in rural areas in Uganda had access to drinking water. WHO/UNICEF Joint Monitoring Program, Estimates on the Use of Water Sources and Sanitation Facilities, updated April 2013.

4 The Price of a Fully Equipped House – How high can it be?

The analysis in the previous sections suggest that given the low stage of development of most African countries, households are still struggling to secure their daily meals as they spend over 60 percent of their income in food. Low household expenditures on housing are accompanied by poor housing quality evidence by large shelter shortages. And governments have also failed in delivering basic services as is reflected in the widespread infrastructure shortages. But how expensive can a fully equipped house be?

Using the principles of hedonic estimates (see Box 4), this paper estimates the average price of a non-overcrowded home that contains all shelter and housing infrastructure amenities outlined in Table 2. Table 3 outlines the predicted price derived from a first-stage hedonic regression, along with the upper and lower bounds of the 95 percent confidence interval.

Box 4. Hedonic Regression Analysis—City Selection and Estimation

Hedonic methods are an approach to estimating housing demand by uncovering the implicit prices for housing characteristics. Rosen (1974) defined implicit prices as those revealed by analyzing how much households pay for a good given its composition of characteristics. An earlier study by Kain and Quigley (1970) used hedonics to estimate the implicit price of housing in St. Louis, Missouri based on a bundle of housing characteristics and factor analysis of housing quality. Kain and Quigley found they could identify the housing characteristics, both qualitative and quantitative, that most influenced market prices. Jimenez (1982) was the first to estimate housing prices in a squatter settlement in a developing country using hedonic pricing. His study of the Tondo area in Manila, Philippines found that housing conditions were most influential in determining value. Later Follain and Jimenez, estimated willingness to pay for disaggregated housing characteristics in developing country cities in Colombia, Korea, and the Philippines (1985). In SSA only a few studies of specific markets exist such as Megbolugbe's analysis of the housing market in Jos, Nigeria (1986) and Arimah's analysis of Ibadan, Nigeria (1992). Very few studies in SSA have been undertaken since then, largely because of the lack of quality data (Arimah 1992). Using the rich SHIP data, this paper employs a first-stage hedonic regression to estimate how the existence or lack of housing amenities affect the price households pay for housing in select Sub-Saharan African cities.

This analysis focuses on housing markets in the countries' largest urban areas, represented by its capital or primary city. To narrow down the field of cities, countries where the data are from before 2007 are eliminated in order to capture the most recent prices possible. Because the SHIP data are nationally representative samples, the largest cities with relatively large samples were selected. Finally, cities that had an excessive number of missing variables were eliminated since they prevented the estimation for more than two housing amenities. As a result, the cities that fit all of the aforementioned criteria are Kigali, Rwanda; Abidjan, Cote d'Ivoire; Dar es Salaam, Tanzania; and Maputo, Mozambique.

Using actual and imputed (an estimate of rents that homeowners estimate they would receive for their home) rents, the hedonic regression employs the following log-linear equation:

$$\ln(P) = \beta_0 + \beta_1(R) + \beta_2(X) + \varepsilon \quad (1)$$

Where:

P = rent (actual)

R = number of habitable rooms

X = vector of housing amenity dummies

In cases where respondents are homeowners or otherwise live rent free, rents are reported as imputed, meaning that respondents estimate the value they would receive in rent. The equation is similar to equation (1), but includes a homeownership dummy.

$$\ln(P) = \beta_0 + \beta_1(R) + \beta_2(O) + \beta_3(X) + \varepsilon \quad (2)$$

Where:

P = rent (imputed)

R = number of habitable rooms

O = homeownership dummy

X = vector of housing amenity dummies

Since the hedonic equations are log-linear, the estimates can be interpreted as the percent increase in rent from each additional room, controlling for all other amenities. For dummy variables, the estimates can be interpreted as the percent increase in rent associated with having that amenity, controlling for all other amenities and number of rooms.

For all four cities, in terms of estimates for actual rent, the number of rooms and having a permanent roof significantly affects the rental price of housing (see Annex 5, Tables 5 and 6 for full regression tables). All the signs for the significant coefficients appeared as expected, except for the number of rooms in Maputo, which was negative. Electricity, water, and having an improved toilet also significantly affect the rental price of housing for at least two cities examined.²⁴

The final column of Table 3 provides an annualized ratio of total expenditure to rent price, which can be interpreted as analogous to rent-to-income ratio. These ratios are significantly higher than what households currently spend on rent for the mean house size, which is around 12 percent of total expenditures for Kigali, but is as low as 2.3 percent in Maputo. These higher rent-to-income ratios are more typical of developed countries. The Housing Indicators Program found this ratio to be 18 percent for industrialized countries compared to 10 percent for Southern Africa in 1994 (Angel 2000: 235), and the Global Urban Indicators found this ratio to be 19.1 percent in 1998 for high-income countries²⁵ (UN-Habitat 2002). While these estimated rent-to-income ratios are closer to those of developed countries, they are likely beyond the affordability of households in SSA who allocate upwards of 60 percent of their expenditures on food (Figure 2).

Moreover, these estimates assume that the dwelling unit is fully equipped with amenities such as permanent building materials, a toilet, an electricity connection, etc., which this paper found are severely lacking in urban SSA. In fact, among the homes included in the sample, only one house in Kigali, 32 in Abidjan and none in Dar es Salaam and Maputo are fully equipped.²⁶ However, evidence from the regression tables in Annex 5 shows households in these cities assign significant value to the presence of these amenities in their homes. Using the coefficients estimated by log-linear equations regressing the price (rent) of houses against indicators for the presence of specific amenities (see Box 4, equations (1) and (2)) and multiplying them by average rents allows us to assign an estimated premium to the presence of amenities.²⁷ These estimates suggest that in Kigali, for example, having a permanent roof is associated

²⁴ Two of the four cities allowed for hedonic analysis from imputed rents – Kigali and Maputo. Imputed rent figures were not available in Cote d'Ivoire, and the large number of missing variables for imputed rent in Dar es Salaam prevented the ability to arrive at consistent estimates.

²⁵ Interestingly, according to the Global Urban Indicators the average rent-to-income ratio is 39.5 percent in Africa, significantly higher than that found in the Housing Indicators Program and this analysis.

²⁶ For a more detailed representation of predicted prices over several dwelling sizes, see Annex 6, which presents graphs of the annualized predicted prices of homes over the number of habitable rooms comprising the dwelling unit. The average house size for each city is denoted by a vertical blue line. While some of the data appears noisy as a result of small sample sizes for some dwelling sizes as well as large variations in actual and imputed rent, the price estimates at the room means have relatively tight confidence intervals.

²⁷ These price premiums are deflated by local Consumer Price Index (2005) and valued at constant US\$ using 2005 purchasing power parity in order to make them comparable to one another.

with a US\$523 annual rental premium, having an electricity connection commands a US\$794 annual rental premium. Access to an improved toilet is estimated to be valued at annual premiums of US\$169 and US\$125 in Kigali and Dar es Salaam, and a much higher US\$601 in Abidjan.

Table 3. The estimated price of a fully equipped house

	City	Country	Rooms (avg) ²⁸	Estimated House Price, 2005 current USD ²⁹	Lower bound (95% confidence interval) ³⁰	Upper bound (95% confidence interval)	Estimated Rent to Income Ratio (annualized)	Actual Percentage of Expenditures on Rent (city avg.)
Actual Rent	Kigali	Rwanda	3	1,757.54	1,049.44	2,943.43	21.0%	12.4%
	Abidjan	Cote d'Ivoire	2	1,661.02	1,515.17	1,820.94	20.7%	9.5%
	Dar es Salaam	Tanzania	1	823.10	587.22	1,153.74	24.4%	3.8%
	Maputo	Mozambique	3	4,101.72	1,809.71	9,297.68	35.1%	2.3%
Imputed Rent	Kigali	Rwanda	4	4,330.04	2,174.53	8,621.82	36.8%	N/A
	Maputo	Mozambique	3	3,506.82	2,491.91	4,935.09	14.1%	N/A

5 Going back to the basics – Tackling the housing challenge providing infrastructure

This paper presented findings on housing conditions, housing expenditures, and implicit prices of housing characteristics in using household survey data from 20 countries in SSA. Given the rapid urbanization in the region, and the increased pressure for affordable housing in the region, the findings fill a gap in regional, cross-country empirical data, creating a knowledge base for policy makers, researchers, the private sector, and development partners to make informed decisions when addressing affordable housing provision and the increase and growth of informal settlements. The question remains as to how policymakers can improve housing conditions in SSA, considering high levels of poverty and relatively poor housing conditions across the region.

One option may be to build programs that aim at increasing household expenditure on housing through financing schemes, or cash transfer strategies. However, strong budget constraints that have households spending over 60 percent of their total budget on food would limit the amount they can dedicate to housing even if additional financial mechanisms are in place. In fact, estimates of the income elasticity of

²⁸ The number of rooms is calculated from the sub-sample means (i.e. the average number of rooms comprising a dwelling unit occupied by a household in each city depending on whether or not they report actual or implicit rents). The mean is rounded to the nearest whole number of rooms to estimate the price of realistic dwellings.

²⁹ The estimates are the mean predicted price for the number of rooms in the dwelling unit. Predicted prices are solved using the log transformation of equations (1) and (2) and employing the transformation correction $\exp(\sigma^2/2)$.

³⁰ Confidence intervals are calculated using the delta method.

housing expenditures for three African cities (Table 4) suggest that housing expenditure is less responsive in these cities than in other developing countries (see Malpezzi and Mayo 1987).

Malpezzi and Mayo (1987) review previous housing demand studies in over a dozen developing country cities and find that income elasticities are fairly consistent across countries, and in most cases fall between 0.5 and 1, with renters generally have slightly lower income elasticities than owners.³¹ These estimates however, were mostly for Latin American and East Asian countries/cities, with little to no representation of low-income or SSA countries. Using the SHIP data to estimate income elasticity of housing expenditures in Kigali, Abidjan, and Maputo yields coefficients on log income ranging from 0.15 and 0.37 (Table 4). Interestingly, early estimates of the income elasticity for low income housing in the US are in a similar range: 0.19 for renters and 0.45 for owners (Mulford 1979). The estimated elasticities suggest that a 10 percent increase in income will only lead to increases in housing expenditures ranging between 1.5 and 3.6 percent. Cash transfers to households would not lead to increased expenditures in housing unless strongly earmarked.

Table 4. Income Elasticity (dependent variable: log actual rent)

	Kigali		Abidjan		Maputo	
Log Income	0.162 (.016)***	0.159 (.016)***	0.150 (.015)***	0.150 (.015)***	0.364 (.065)***	0.367 (.065)***
Household size	0.105 (.052)**	0.085 (.053)	0.046 (.022)**	0.052 (.023)**	-0.140 (.120)	-0.127 (.120)
Household size Squared	-0.002 (.005)	-0.003 (.005)	-0.001 (.002)	-0.001 (.002)	-0.009 (.009)	-0.008 (.009)
Log Age of household head		0.496 (.169)***		-0.089 (.089)		0.338 (.103)*
Constant	9.927 (.225)***	8.332 (.588)***	10.075 (.201)***	10.373 (.360)***	5.804 (.717)***	8.271 (1.475)***
R squared	0.218	0.230	0.107	0.105	0.190	0.204
Sample size	551	551	1251	1251	226	226

Significant at the *10%, **5%, and *1% levels.

Rather than emphasizing policies that purport to increase expenditures on housing at this stage of development, policymakers in SSA should focus on extending access to basic services and strengthening coordination between land use planning and service provision. As incomes increase, this would allow households the opportunity to access houses that are equipped with basic infrastructure and help countries move towards better overall quality of housing. Also, as incomes increase, the income elasticity of

³¹ Likewise, Struyk, et al. (1990) find a similar difference between renters and owners in Indonesia and also note that income elasticities decrease with city size.

housing expenditures is likely to rise and policies that improve housing finance and provide support for housing access and improvements will become more relevant.

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Annex 1. Description of Datasets Examined

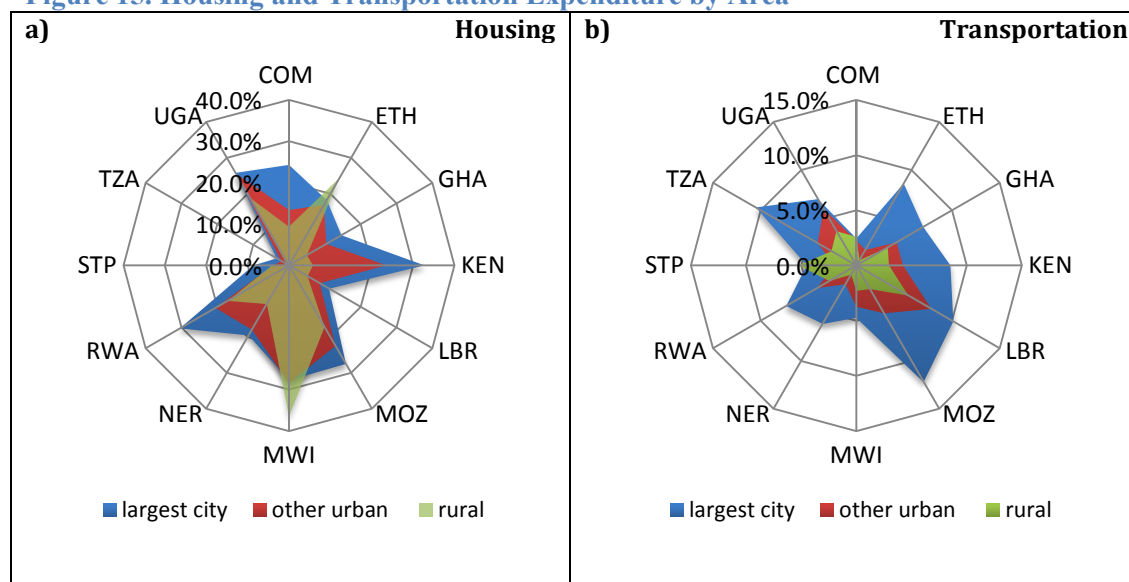
Country	Country abbreviation	Year(s)	Total Households (Urban)	Number of Observed	Largest City
Angola	AGO	2008	9,002 (4,611)		Luanda
Burkina Faso	BFA	2003	8,500 (4,600)		Ouagadougou
Cameroon	CMR	2001	10,992 (4,975)		Douala
Cameroon	CMR	2007	11,391 (6,365)		Douala
Comoros	COM	2007	2,987 (924)		Moroni
Cote d'Ivoire	CIV	2002	10,800 (4,980)		Abidjan
Cote d'Ivoire	CIV	2008	12,600 (6,600)		Abidjan
Ethiopia	ETH	2000	16,672 (8,213)		Addis Ababa
Ethiopia	ETH	2004	21,595 (12,100)		Addis Ababa
Ghana	GHA	1991	4,523 (1,578)		Accra
Ghana	GHA	1998	5,998 (2,199)		Accra
Ghana	GHA	2005	8,687 (3,588)		Accra
Kenya	KEN	1997	10,874 (1,911)		Nairobi
Kenya	KEN	2005	13,162 (4,683)		Nairobi
Liberia	LBR	2007	3,595 (1,391)		Monrovia
Malawi	MWI	2004	11,280 (1,440)		Lilongwe
Malawi	MWI	2010	12,271 (2,233)		Lilongwe
Mozambique	MOZ	2002	8,700 (4,005)		Maputo
Mozambique	MOZ	2008	10,832 (5,223)		Maputo
Niger	NER	2005	6,690 (2,020)		Niamey
Nigeria	NGA	2004	19,158 (4,646)		Lagos
Rwanda	RWA	2000	6,420 (1,149)		Kigali
Rwanda	RWA	2005	6,900 (1,620)		Kigali
Rwanda	RWA	2010	14,308 (2,149)		Kigali
São Tomé and Príncipe	STP	2001	2,417 (1,263)		São Tomé
São Tomé and Príncipe	STP	2010	3,231 (1,400)		São Tomé
Senegal	SEN	2001	6,598 (3,398)		Dakar
Senegal	SEN	2005	13,568 (8,576)		Dakar
Sierra Leone	SLE	2003	3,720 (1,320)		Freetown
Tanzania	TZA	2000	22,178 (14,551)		Dar es Salaam
Tanzania	TZA	2007	10,463 (7,120)		Dar es Salaam
Uganda	UGA	2002	9,710 (4,062)		Kampala
Uganda	UGA	2005	7,426 (1,699)		Kampala
Uganda	UGA	2010	2,975 (769)		Kampala
Zambia	ZMB	2006	18,650 (9,521)		Lusaka
Zambia	ZMB	2010	19,239 (10,850)		Lusaka

Annex 2. Housing Expenditures Including Imputed Rent

In Section 2, the analysis on household expenditures used actual rent to calculate housing as well as total expenses. Imputed rent, or the value of rent homeowners estimated they could collect for their property, is omitted for a number of reasons. The first is that combining actual and imputed rent confuses two distinct markets: one represents renters and reflects prices determined by the market, and the other represents owners and reflects perceived value. Section 4 clearly shows that predicted house prices calculated from marginal implicit prices of housing characteristics vary significantly from those calculated from imputed rents. The second reason is that eight countries did not collect data on imputed rent in the latest year of data collection; these countries include Angola, Burkina Faso, Cote d'Ivoire, Cameroon, Nigeria, Senegal, Sierra Leone, and Zambia. Finally, imputed prices are not actual expenditures paid by households and thus the analysis of the following expenditure calculations are only meant to be descriptive.

The following figures recalculate Figures 1 to 5, which appear in the body of this paper, and include imputed rents in the final calculation of total housing expenditure as well as in the calculation of housing expenditures.

Figure 15. Housing and Transportation Expenditure by Area



As shown in Figure 15a, urban households allocate a higher percentage of their expenditures to housing than rural households. Ethiopia and Malawi remain the exceptions. In terms of transportation (Figure 15b), the largest cities command greater shares of expenditure for transportation than other urban areas and rural areas. The exceptions of Comoros and São Tomé and Príncipe remain, both of which are island nations.

The following figure shows that omitting the imputed rent will underestimate spending on housing, and slightly overestimates expenditures on food. Moreover, the spread between housing overall and housing utilities is larger when imputed rent is included. The final three figures show how food, housing, and transportation expenditures break down by country and quintile. The patterns of expenditures are relatively similar to those found using only actual rent, but percentages of expenditures differ slightly.

Figure 16. Housing Expenditures as Percent of Total (including imputed rent)--Urban Areas

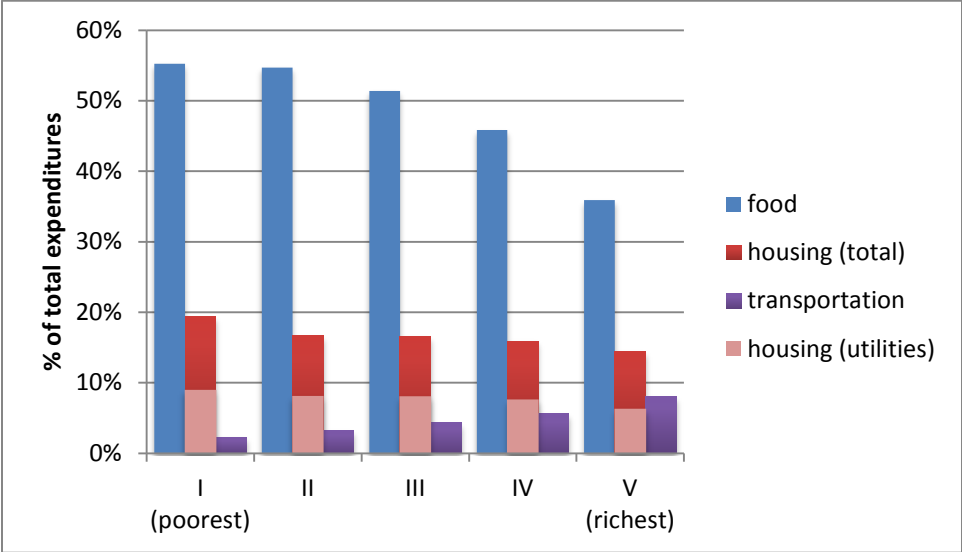


Figure 17. Food Expenditures by Country and Quintile, in Ascending Order of GDP per Capita--Urban Areas

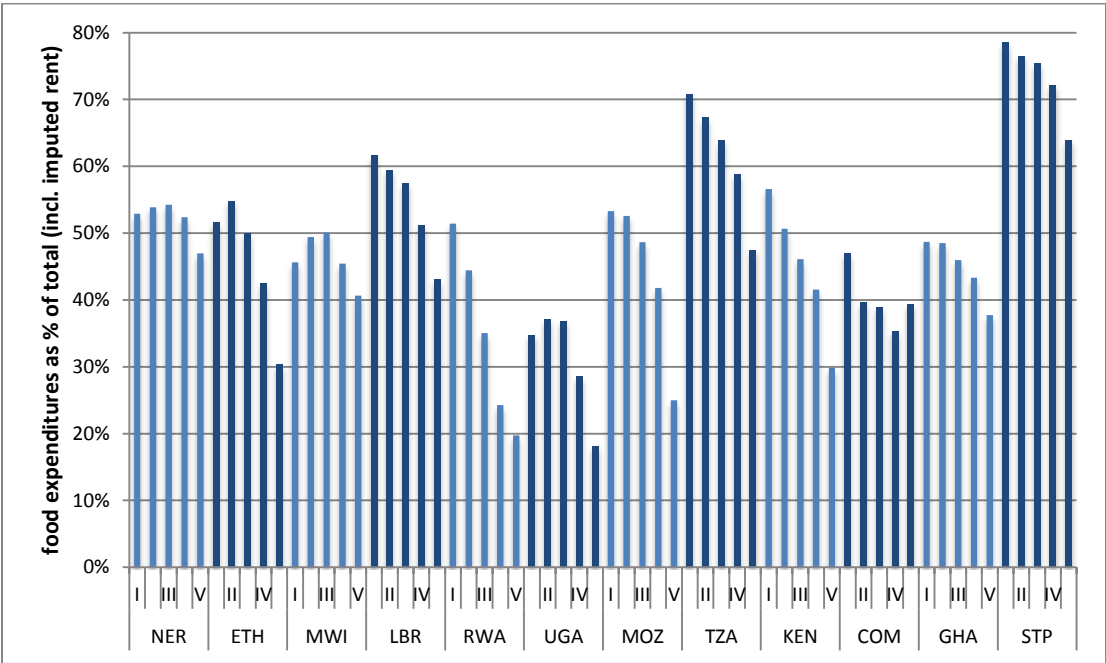


Figure 18. Housing Expenditures by Country and Quintile, in Ascending Order of GDP per Capita--Urban Areas

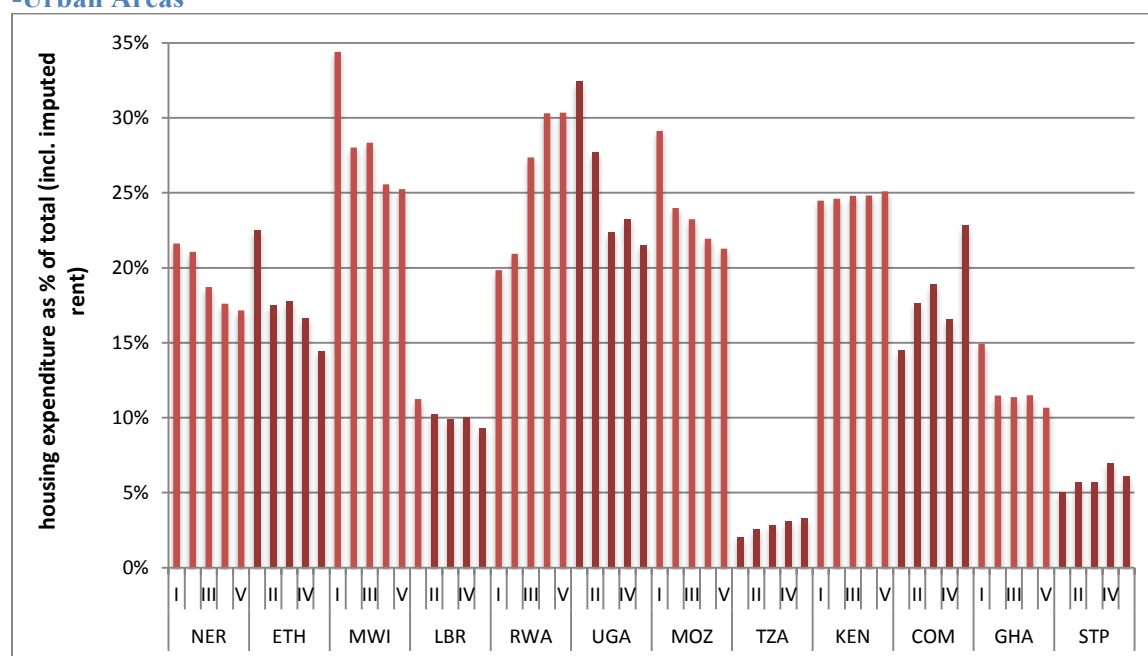
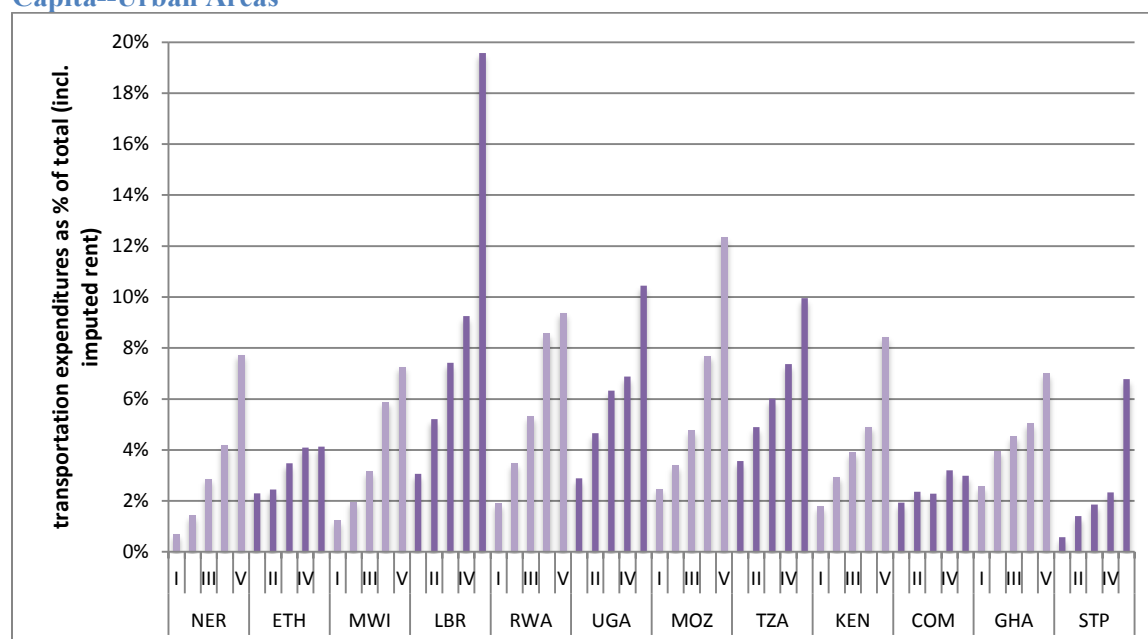


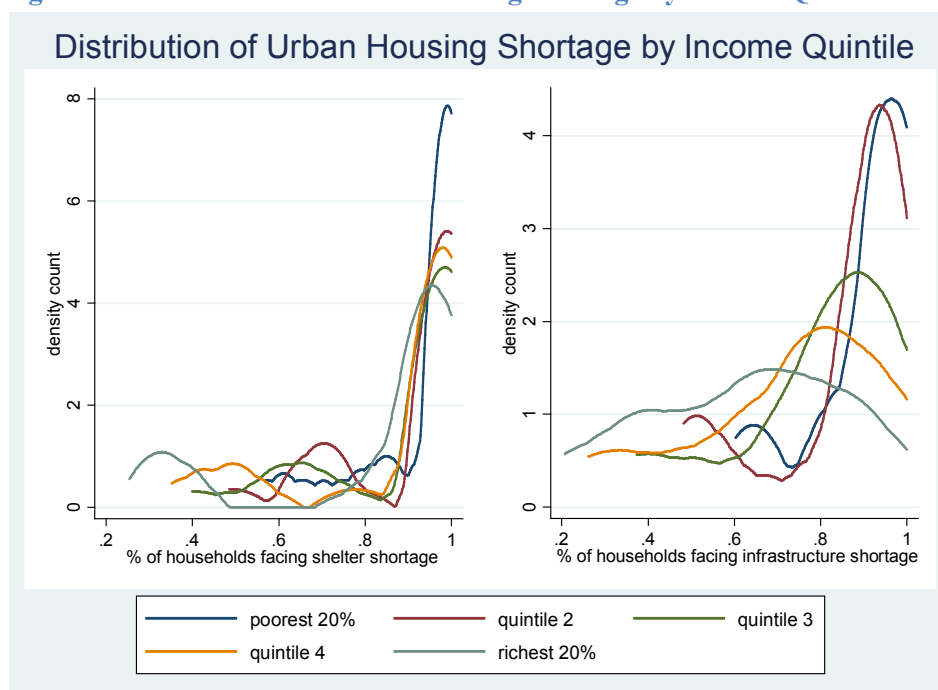
Figure 19. Transportation Expenditures by Country and Quintile, in Ascending Order of GDP per Capita--Urban Areas



Annex 3. Urban Housing Shortages by Income Quintile

The results of comparing urban housing shortages across income quintiles reveal a clear pattern. Similar to the results of Figure 3 that showed that housing shortages rose with a decline in income quintiles, the pattern holds for only urban areas. The distribution for urban-only areas, however, has a distribution that skews less at near 100 percent shelter and infrastructure shortage. Shelter shortages peak around 90 percent, but on closer examination, the occurrence of these shortages is more frequent with higher income quintiles. A similar picture emerges for infrastructure shortages where the occurrence of shortages peaks above 80 percent for quintiles 1 to 3, but is less severe for quintiles 4 and 5, where the peaks drop below 80 percent and have a much flatter distribution.

Figure 20. Distribution of Urban Housing Shortage by Income Quintile

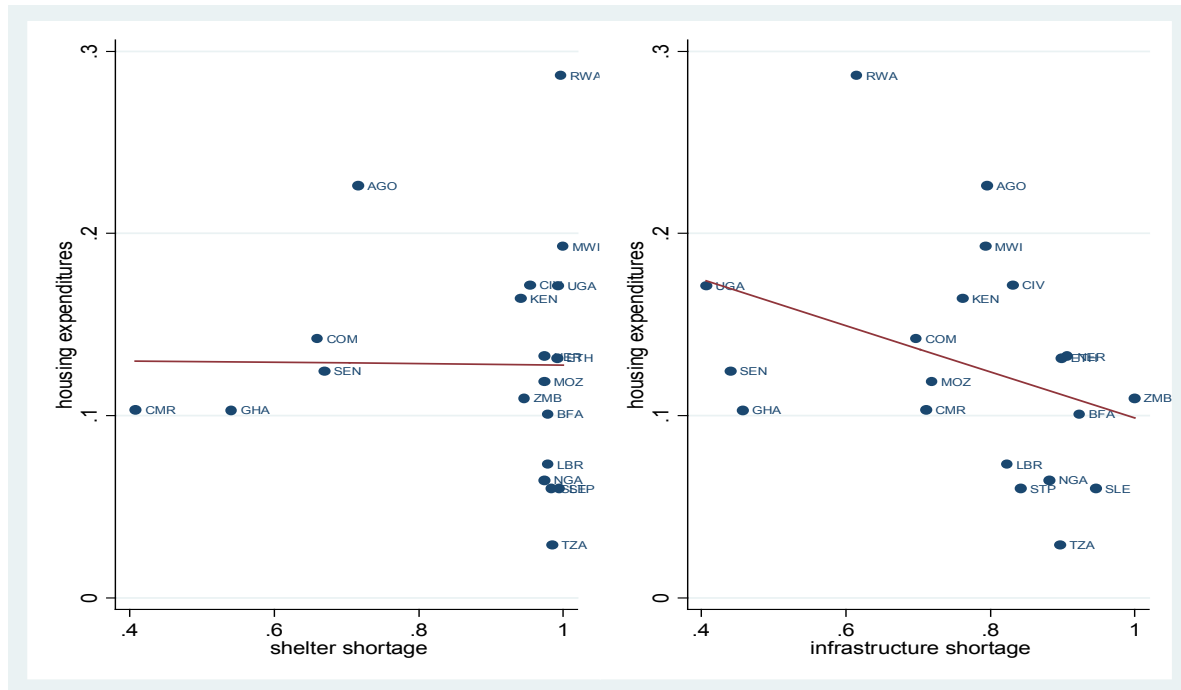


This section highlighted average housing conditions and patterns in housing shortage by GDP per capita, urbanization rates and income quintile in SSA. The housing challenges facing Sub-Saharan African households are indeed great. On the whole, large numbers face shelter and housing infrastructure shortages, and these shortages are even more acute for those living in non-urban areas and those occupying the bottom income quintiles regardless of their urban environment. How households address these housing challenges will be addressed in the following two sections. The next section explores how households allocate and trade-off housing and other expenditures, and how this varies across countries, urban areas and income quintiles. Following an examination of housing expenditures, the subsequent section will examine how households value various housing amenities through the use of hedonic analysis.

Annex 4. Urban Housing Expenditures by Housing Shortage Type

The relationships between housing expenditures and types of housing shortages by country suggest that housing expenditures may be affected by the type of housing shortage a household faces. While it appears that there is no clear relationship between housing expenditures and shelter shortage, there appears to be a negative relationship between housing expenditures and infrastructure shortages (see Figure 18). Higher infrastructure shortages tend to be related to lower shares of spending on housing, however, a significant percentage of housing expenditures are dedicated to housing utilities which could explain this relationship.

Figure 21. Urban Housing Expenditures by Housing Shortage Type



Annex 5. Hedonic Regression Tables

Table 5. Hedonic Estimates for Actual Rent (dependent variable: log actual rent)

Variables	(1) Kigali, Rwanda	(2) Abidjan, Cote d'Ivoire	(3) Dar es Salaam, Tanzania	(4) Maputo, Mozambique
Rooms	0.312*** (0.110)	0.096*** (0.010)	0.555*** (0.050)	-0.657*** (0.208)
Floor (dummy)	0.427*** (0.072)	0.004 (0.100)	0.595*** (0.053)	-1.539** (0.780)
Overcrowded (dummy)	0.178 (0.142)	-0.027 (0.038)	0.033 (0.082)	-0.435 (0.449)
Roof (dummy)	0.537** (0.273)	0.447*** (0.048)	0.667*** (0.172)	1.383*** (0.372)
Walls (dummy)	0.114* (0.069)	-0.053 (0.088)	0.227 (0.176)	0.714* (0.410)
Electricity (dummy)	0.820*** (0.069)	0.187*** (0.0670)	-0.185 (0.125)	0.695*** (0.250)
Water (dummy)	0.247*** (0.061)	0.193*** (0.0350)	0.018 (0.054)	-0.850* (0.072)
Toilet (dummy)	0.175* (0.099)	0.749*** (0.0377)	0.357*** (0.069)	0.097 (0.239)
Constant	10.08*** (0.119)	11.50*** (0.147)	10.57*** (0.323)	11.69*** (1.384)
R ²	0.62	0.42	0.37	0.42
Observations	555	1,598	511	242

Asterisks denote significance at the * 10%, **5%, and ***1% levels.

Table 6. Hedonic Estimates for Imputed Rent (dependent variable: log imputed rent)

Variables	(1) Kigali, Rwanda	(2) Abidjan, Cote d'Ivoire	(3) Dar es Salaam, Tanzania	(4) Maputo, Mozambique
Rooms	0.291*** (0.200)	N/A	N/A	0.047 (0.065)
Homeownership (dummy)	0.103 (0.098)			0.070 (0.094)
Floor (dummy)	0.154** (0.077)			0.346 (0.238)
Overcrowded (dummy)	-0.554** (0.221)			0.162* (0.096)
Roof (dummy)	0.627* (0.352)			1.411*** (0.126)
Walls (dummy)	0.303*** (0.077)			0.780*** (0.125)
Electricity (dummy)	1.460*** (0.086)			0.815*** (0.076)
Water (dummy)	0.394*** (0.080)			0.031 (0.112)
Toilet (dummy)	0.329*** (0.108)			0.401*** (0.076)
Constant	9.550*** (0.144)			7.385*** (0.419)
R ²	0.72			0.52
Observations	622			910

Asterisks denote significance at the * 10%, **5%, and ***1% levels.

Table 7. Hedonic Estimates of Actual Rent by Quintile, Abidjan

Variables	(1) QI	(2) QII	(3) QIII	(4) QIV	(5) QV
Rooms	0.001 (0.035)	0.071*** (0.025)	0.086*** (0.022)	0.102*** (0.021)	0.128*** (0.017)
Floor (dummy)	0.605 (0.423)	0.221 (0.304)	-0.053 (0.195)	0.201 (0.231)	-0.124 (0.158)
Overcrowded (dummy)	0.001 (0.122)	0.025 (0.077)	0.115 (0.071)	-0.113 (0.084)	0.019 (0.105)
Roof (dummy)	0.144 (0.305)	0.081 (0.132)	0.494*** (0.117)	0.442 *** (0.111)	0.472*** (0.072)
Walls (dummy)	0.450 (0.423)	-0.082 (0.169)	-0.017 (0.191)	0.219 (0.177)	-0.228 (0.130)
Electricity (dummy)	0.480*** (0.200)	0.180 (0.143)	-0.137 (0.148)	0.262*** (0.128)	0.1884 (0.130)
Water (dummy)	0.086 (0.123)	0.229*** (0.074)	0.209*** (0.071)	0.108 (0.068)	0.260*** (0.067)
Toilet (dummy)	0.955 (0.208)	0.544 (0.117)	0.614 (0.095)	0.734 (0.075)	0.705 (0.064)
Constant	10.219*** (0.628)	11.333*** (0.359)	11.956*** (0.320)	11.032*** (0.307)	11.742*** (0.261)
R ²	0.26	0.22	0.36	0.41	0.45

Asterisks denote significance at the * 10%, **5%, and ***1% levels.

Annex 6. Graphs of Predicted Prices of Housing in Select Capital Cities

Figure 22. Predicted House Prices Based on Hedonic Estimates from Actual Rent

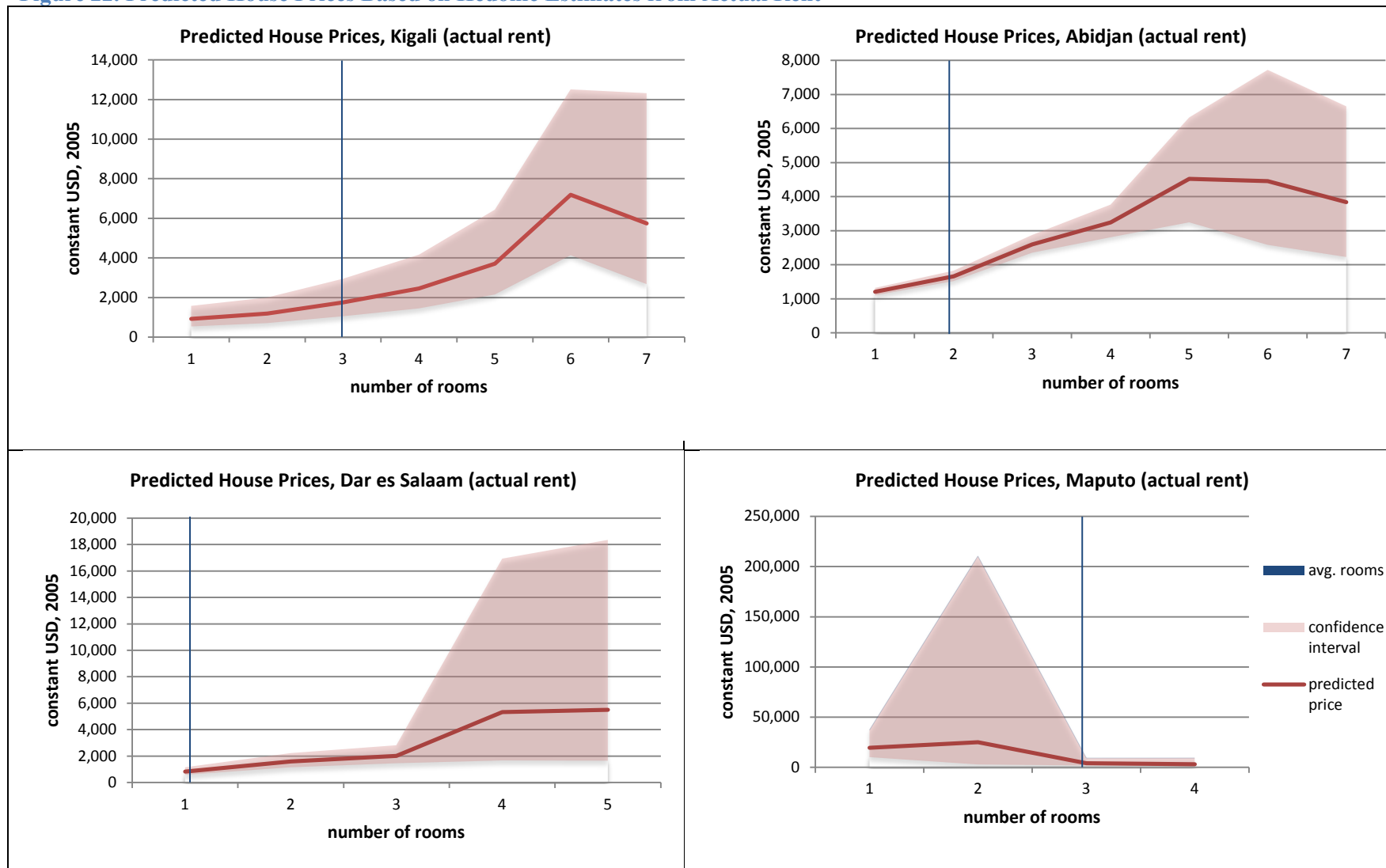


Figure 23. Predicted House Prices Based on Hedonic Estimates from Imputed Rent

