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URBANIZATION IN KAZAKHSTAN

DESIRABLE CITIES, UNAFFORDABLE HOUSING, AND THE MISSING RENTAL MARKET

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ABSTRACT

Kazakhstan's cities are hubs of economic opportunity and prosperity. But despite the government's ambitious targets, the pace of urbanization remains slow. This study focuses on two key constraints: (i) the very high cost of living in Kazakhstan's cities, and (ii) the near absence of a rental housing market outside the capital, Astana. The findings show that the two urban centers of Almaty and Astana are 190 and 240 percent more expensive to live in than the national average. Housing is the primary driver of the disparity: after adjusting for inflation, housing costs tripled in Astana and quadrupled in Almaty between 2001 and 2015. As a result, housing costs for the local population in these areas are more unaffordable than famously exclusive cities such as San Francisco and Vancouver. Demand elasticities from 2015 imply that in the current environment, rural and low-income households are especially unlikely to relocate to high-priced areas where employment prospects are better and average incomes are higher. Regional convergence in wage rates remains slow, but appears to be proceeding most quickly in Astana, where rental housing is most prevalent. The findings suggest that high rates of home ownership and the high cost of living in cities lead to exclusion of lower-income households and restrain economic growth.

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Urbanization in Kazakhstan

Desirable Cities, Unaffordable Housing, and the Missing Rental Market

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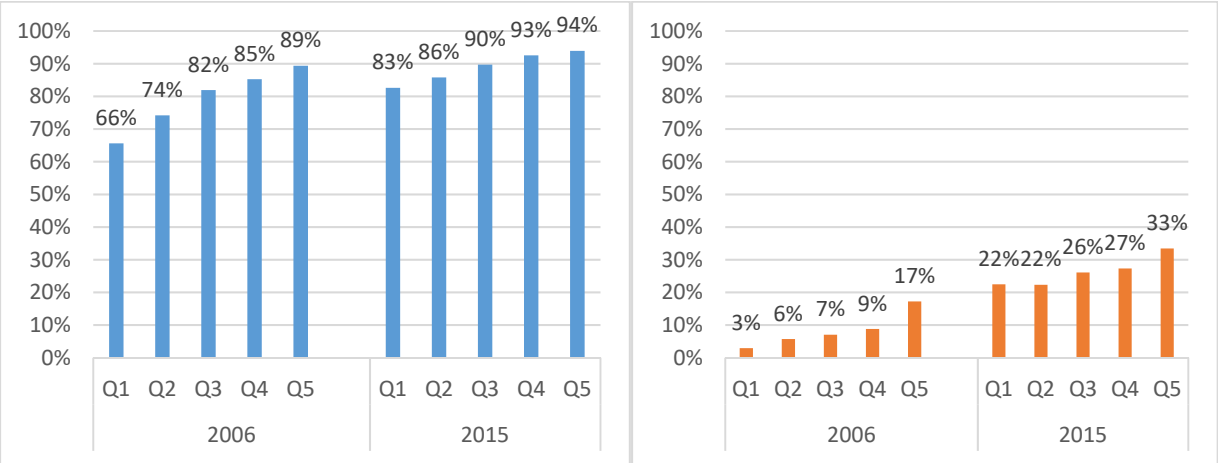
1. Introduction

Urbanization is one of the pillars of Kazakhstan's national "2050" development strategy (www.strategy2050.kz). This focus is well aligned with decades of experience from around the world. Economic growth and employment opportunities in cities have powered massive rural-to-urban migration and an historic reduction in global poverty over the past century. Urbanization is strongly associated with poverty reduction and higher living standards (Ravallion et. al., 2007), and there are compelling theoretical reasons to expect rural-to-urban migration will be pro-poor (Ravaillion, 2002). While supporting the welfare of the rural population is also a crucial component to Kazakhstan's national development strategy, enabling cities to grow and thrive will play a key role in achieving the government's long-term development objectives for rural and urban areas alike.

Globally, cities and towns are hubs of prosperity—more than 80 percent of economic activity is produced in cities by just over half of the world's population (World Bank, 2013). Urban areas feature higher-paying jobs, greater diversity of economic activities, and substantially higher average productivity. These effects are driven not only by the benefits of agglomeration for firms and workplaces, but also by workers taking part in the deeper and more specialized labor markets common in urban areas.

The cost of providing basic services in cities is also much lower. In 2013, the global average cost of providing piped water was only $0.70–$0.80 per cubic meter in urban areas, compared to about $2 in sparsely populated areas. In Kazakhstan, as in most middle-income countries, the high cost of providing services in rural areas leads to significant discrepancies in service quality when compared to urban areas (Figure 1). But the high cost of providing services to sparsely populated locations is particularly relevant in Kazakhstan, the world's 9th largest country, covering an area roughly the size of Western Europe. With only 6.5 people per kilometer on average – ranging to as few as 2.7 people per kilometer in Aktobe region – Kazakhstan is the 10th least densely populated country.

Figure 1: Share of Population living in Households with a Connection to Central Piped Water in Urban (Left) and Rural Areas (Right) by Consumption Quintile



Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

Cities enjoy large advantages over rural areas in terms of monetary measures of welfare as well. In 2015, poverty rates[1] stood at 25 percent in rural areas, compared to only 6.6 percent in the cities of Almaty and Astana, and 16.7 percent in other urban areas. Lower urban poverty rates are driven by higher earnings – on average, per capita income is more than 80 percent greater in Almaty and Astana than in rural areas. Farm jobs still dominate the labor market in the largely rural regions of Akmola, Kostanai, North Kazakhstan and Zhambyl. But since 2003, agriculture is the only major sector in the country that has consistently shed employment (by almost 80,000 jobs per year, on average). In 2015, the rate of unemployment[2] stood at a remarkably low 3.1 percent nationally, but was less than 2 percent in both Astana and Almaty.

Under normal circumstances, low unemployment rates, better public services, lower poverty rates, and higher incomes would be expected to act as strong "pull" factors for households and workers to re-locate from rural districts to the highest-performing urban areas. But rural-to-urban migration has been only moderate in recent years, despite its clear potential to quickly raise the average standard of living. The urban share of Kazakhstan's population grew from 44 percent in 1959 to about 57 percent in 1989, but quickly fell following independence, and by 2015, had only partially recovered to 53 percent.[3] Part of this relatively low level of urbanization is due to differences in definitions: globally standardized methods for assessing urbanization indicate that

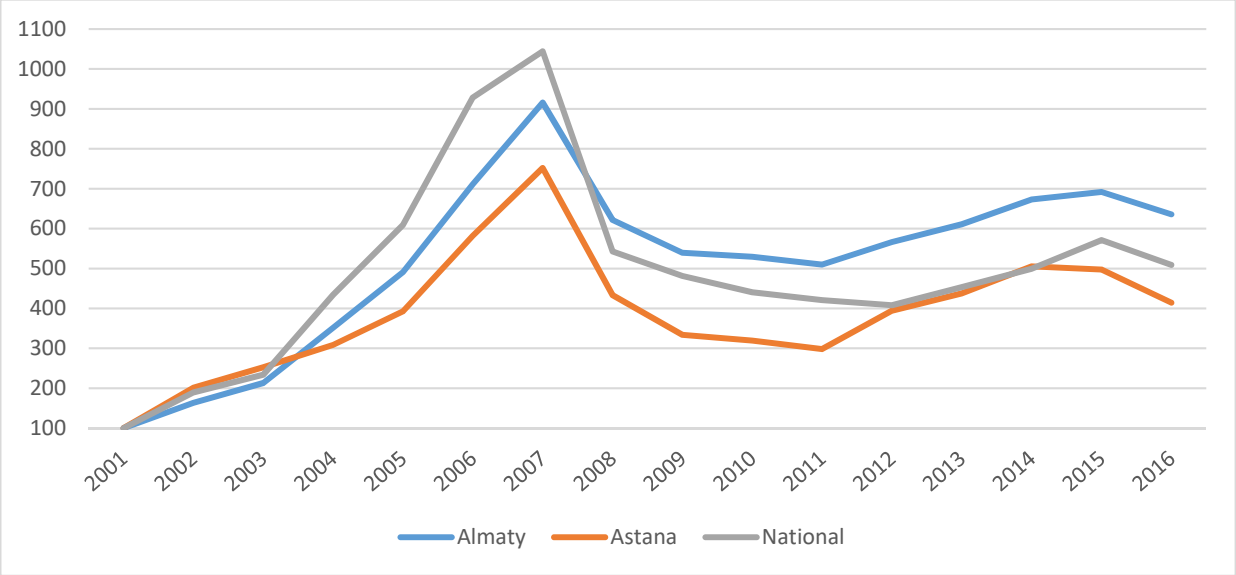
[1] Measured at $5-a-day in 2005 PPP.
[2] The Government of Kazakhstan measures the official unemployment rate using a Labor Force Survey. The unemployed share of the population reported here comes from the Household Budget Survey, and may vary slightly from official estimates.
[3] Another large component of the decline in the urban share of the population was emigration of urban residents following the breakup of the Soviet Union.

Kazakhstan's urban population share may be somewhat higher than official estimates suggest, as are those of the other central Asian countries.

However, a larger determinant of slow urbanization is remarkably low rates of internal migration. Rural-to-urban migration accounted for only one-fifth of urban population growth between 2010 and 2015 (OECD, 2017).[4] Only about 1.7 to 2.3 percent of the population move between regions within the country in a given year.[5] This is a much lower share than in many developed economies. For the US, the comparable figure is 11 percent, in Canada it is 14 percent.[6] Growth projections from the UN predict that the urban share of Kazakhstan's total population is expected to be about 65 percent by 2050, well short of the government's official target of 70 percent.

Why is urbanization proceeding so slowly? In Kazakhstan, as in many countries, one explanation is that is it very expensive to live in cities. In 2006, a single year's growth in housing prices in Astana and Almaty outpaced income growth over the entire period from 2006 to 2015 (Figure 2).

Figure 2: Real Existing Housing Sales Prices (right, 2001=100)



Source: Existing housing sales prices from KazStat, adjusted by the Author using the national CPI.

[4] The large majority was due to natural population growth within cities.
[5] About 300,000 to 400,000 people.
[6] The Russian Federation, which shares many structural characteristics with Kazakhstan and has famously high costs of living in the capital city, has a similarly low rate of internal migration of about 2.6 percent.

The gap in prices between cities and outlying regions in Kazakhstan is one of the largest in the region of Europe and Central Asia. For food, the premium in Almaty was 15 percent above the national average in 2015 – off a peak of as high as 20 percent in 2008. But the divergence in the cost of housing between rural and urban areas is even more stark. On average, the cost of housing consumed (as measured by imputed rents) is 310 percent higher than the national average in the city of Almaty, and about 460 percent higher in Astana.

The large differences in housing costs are due in part to the rapid and volatile appreciation of home values seen in recent years. Official statistics show that real housing prices (measured mostly in urban areas) rose six-fold between 2001 and 2016. In 2016, real housing prices in the city of Astana were three-times higher than in 2001, and prices more than quadrupled in Almaty over the same period.[7] Although slower than the national average, rising housing prices in Almaty and Astana have been particularly remarkable given that these areas were already much more expensive than other parts of the country. Urban housing price growth has also been extraordinarily unstable: in real terms, prices rose by an average of more than 50 percent per year between 2001 and 2007, only to fall by more than 60 percent in real terms over the following five years.

The sensitivity of people to these changes in prices and incomes will play a decisive role determining the urbanization trajectory of the country. This paper investigates both using official microdata from the household budget survey of Kazakhstan. The results show that the responsiveness of housing demand to changes in income is slightly higher than other countries on average – with an elasticity to income of about .66. This means that if incomes in the country grow, on average, housing demand would be expected to rise by 34 percent less than the increase in income, on average. However, as housing prices rise, theory dictates that housing demand will fall.[8] The findings suggest that housing demand is quite responsive to price in Kazakhstan, with an elasticity of about -.85 at the national level. Thus, taken together, the results indicate that the price elasticity dominates the income elasticity in absolute terms. In other words, if over the coming years both incomes and prices were to rise by 10 percent, the price effect would overwhelm the income effect, and on net, demand for housing would fall.

This greater sensitivity to housing prices would be expected to be strongest among low-income households that are budget constrained. For them, theory would predict that rising urban housing costs in cities such as Astana and Almaty would provide a strong incentive to leave. This lines up well with recent demographic statistics: increasingly, the people who can afford to live in sought after urban areas are well-educated high earners. In Astana, the share of the workforce who completed a tertiary degree increased from 43 percent in

[7] In nominal terms prices increased by factors of about 12 and 15, respectively.
[8] Except in rare and extreme cases for specific housing markets.

2006 to 51 percent in 2015. In the city of Almaty, the share grew from 45 percent to 61 percent over the same period.

But perhaps the most remarkable feature of the housing market in Kazakhstan is that, per official statistics, rental housing is nearly non-existent outside of Astana. At around 95 percent, Kazakhstan has one of the highest home-ownership rates in the world. A high ownership rate is one of the primary drivers of low mobility identified in the literature. Thus, despite potential advantages in terms of income and amenities, many potential migrants in Kazakhstan would not be able to sequence the steps of moving to a city in the absence of affordable rental housing options.

These trends have large social implications for Kazakhstan's future economic growth. Ganong and Shoag (2017) show that disproportionate increases in housing prices in high-income places can lead to a dramatic decline in the rate of income convergence across states and in population flows to high-income places. The growing inaccessibility of Astana and Almaty also echoes the literature on affordability and the dangers of what Gyourko, et al. (2006) refer to as the "superstar city" phenomenon. Their conclusion that "living in a superstar city is like owning a scarce luxury good" aptly describes the state of the housing market in urban Kazakhstan. Albouy et al. (2016) find that for many countries, such exclusive cities are much more expensive for the poor, and that the current trend of rising rents over time, such as in Kazakhstan, has been one of the primary drivers of increased real-income inequality in the United States.[9]

The remainder of the paper is organized as follows: section 2 describes the data and section 3 describes the creation of spatial price indexes and for food and housing. Section 4 provides estimates of the affordability of housing. The results presented in this section suggest that housing in key urban centers in Kazakhstan is highly unaffordable using several standard measures of affordability, and that this likely impedes internal migration.

Estimates and correlates of housing demand are derived in section 5 using survey micro-data. These estimates show that housing consumers are currently quite price sensitive (an increase in the price equates to a nearly equal reduction in consumption). However, consumers are also responsive to income: a 10 percent increase in income is associated with a 6.6 percent increase in housing consumption. These results in combination suggest that rural/poor incomes would need to rise by a much larger amount than the cost of housing to induce a faster pace of internal mobility and urbanization. Regional convergence, and the relationship between home ownership, housing costs, and the labor market is discussed in section 6. The discussion focuses on how the

[9] Appendix E reports the effect of housing costs on inequality for Kazakhstan, which similarly highlights this effect.

high cost of housing can impede regional "catch up" growth in rural areas, and reduce potential economic growth in rural and urban areas alike. Section 7 concludes.

2. Data

This study draws mainly from the 2014/2015 rounds of the Kazakhstan Household Budget Survey (HBS), conducted by the Statistics Agency of the Republic of Kazakhstan. For household consumption, the survey is nationally representative, representative at the oblast (region) level, and separately representative for rural and urban areas. The survey uses a stratified sample design with strata corresponding to 16 regions crossed by their urban and rural areas (except for Almaty and Astana cities, which are entirely urban). A complete consumption module (using a diary approach) is gathered in the HBS, covering both food and non-food items. Information on household composition, income, employment, and related topics is also collected. In 2015, the data covered all four quarters of the year, including 47,329 household-observations (about 12,000 unique households in a panel design) and 169,091 individual-observations (about 42,000 individuals, also interviewed in a panel). Results can be matched to the district and PSU level, but official statistics are usually reported for the regional level only. Table 1 provides a description of the HBS sample composition.

Table 1: 2015 HBS Sample Description by Quarter and Region

Quarter	Households	Individuals	Urban Households	Rural Households	Urban Individuals	Rural Individuals
Q1	11985	42706	6195	5790	20132	22574
Q2	11862	42376	6098	5764	19869	22507
Q3	11769	42095	6033	5736	19684	22411
Q4	11713	41914	6000	5713	19578	22336
Total	47329	169091	24326	23003	79263	89828

Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

Table 2: Sample Size by Location

Region	Households	Individuals	Urban Households	Rural Households	Urban Individuals	Rural Individuals
Akmola	3318	10911	1405	1913	4260	6651
Aktobe	3356	13324	1436	1920	5328	7996
Almaty	2835	10179	935	1900	2949	7230
Atyrau	2158	9608	1198	960	5064	4544
West_Kaz	2590	9487	931	1659	3119	6368
Jambyl	2738	10572	1071	1667	3664	6908
Karaganda	3814	12456	2390	1424	7030	5426
Kostanay	3151	9099	1399	1752	3731	5368
Kyzylorda	2394	12310	956	1438	5032	7278
Mangystau	2397	10361	1320	1077	4956	5405
South_Kaz	3120	14128	1200	1920	4544	9584
Pavlodar	3360	10672	1440	1920	4312	6360
North_Kaz	2621	7710	1068	1553	2877	4833
East_Kaz	3539	10068	1639	1900	4191	5877
Astana_city	2588	8932	2588	0	8932	0
Almaty_city	3350	9274	3350	0	9274	0

Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

The analyses discussed in this paper primarily use the data from two modules of the survey; (i) the diary of food consumed, and (ii) the dwelling characteristics and imputed rents of households. The food diary is collected over two-week periods each quarter for each participating household. The main respondent is the household member most knowledgeable regarding household expenditure. The statistical agency aggregates responses to the quarterly level in a public-use data file.

The HBS module on living conditions and the cost of housing was collected in January 2015. Two separate measures of the cost of housing were reported.[10] The first was a measure of monthly rent defined as either: i) rent paid, or the response provided by the respondent to the following question: "Could you please assess how much would you pay per month, if you rented your principal accommodation". In Kazakhstan, about 95 percent of households own their dwelling, and in only about 3 percent of cases were actual rental payments observed. However, robustness analyses conducted by comparing the average of imputed vs. actual rent payments by dwelling types indicates a reasonably strong relationship between the two measures, albeit they are based a small number of observations. The second measure reported in the dwelling module is an estimate the cost of purchasing a house using the question "Could you please assess for how much you could sell your

[10] One additional measure of rent is described in a procedure described in greater detail below.

principal accommodation". Comparing across these two indicators is on average consistent across regions and rural/urban areas (Table 3).

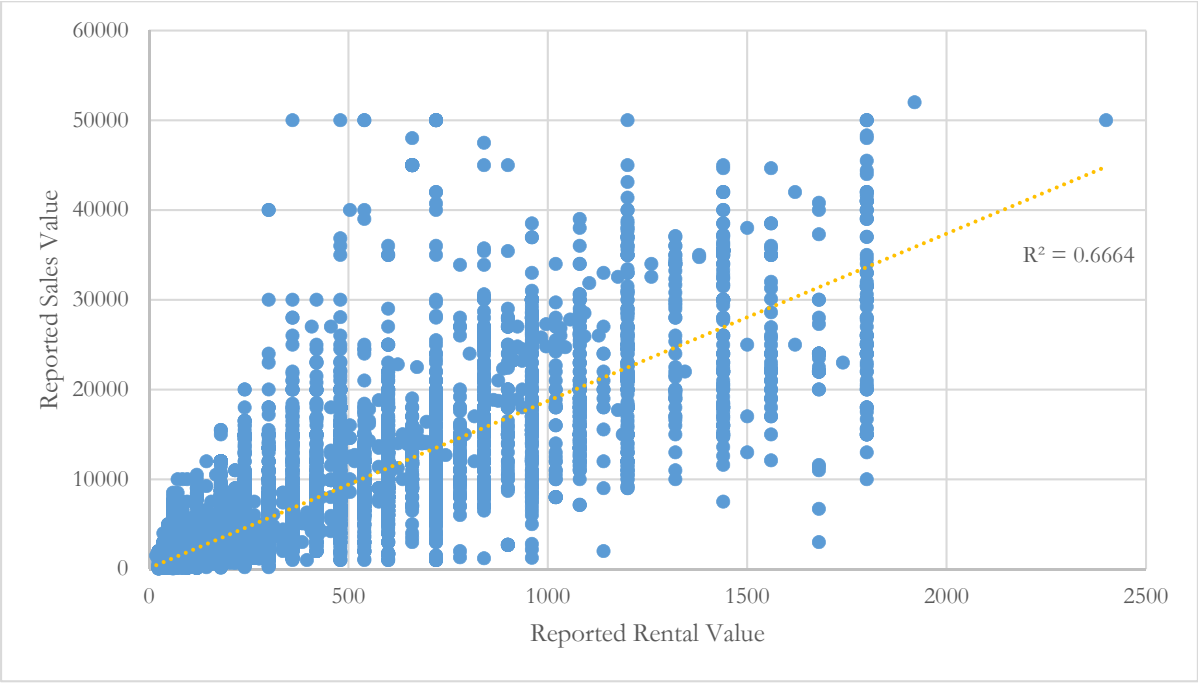
Table 3: Median Reported Rental and Purchase Values for Housing in 1000s of Tenge, HBS 2015

	All		Urban		Rural	
	Median Imputed Rent	Median Home Purchase	Median Imputed Rent	Median Home Purchase	Median Imputed Rent	Median Home Purchase
Akmola	240	2700	360	4400	120	900
Aktobe	300	3300	540	7000	240	2200
Almaty	240	8000	360	9000	240	6000
Atyrau	240	4000	540	9000	120	2000
West_Kaz	240	4018	540	9300	180	1500
Jambyl	240	4500	360	7500	180	3500
Karaganda	420	7500	420	8100	144	1900
Kostanay	180	2500	420	5000	60	700
Kyzylorda	180	3500	420	8000	96	2000
Mangystau	480	11000	960	30000	300	5000
South_Kaz	216	3870	300	6000	132	3000
Pavlodar	276	5800	468	6900	240	2300
North_Kaz	180	2500	420	8000	120	620
East_Kaz	240	4200	360	7000	120	1000
Astana city	1200	20000	1200	20000	.	.
Almaty city	960	18000	960	18000	.	.

Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

Another validation approach is to compare self-reported rental values to home values at the individual level. The results of this comparison are reported in Figure (3). There is a strong relationship between home values and the rent estimations provided by respondents, suggesting consistent estimates.

Figure 3: Sales vs. Rental Value in 1000s of Tenge for 2015



Additional validation comes in the form of associations with indicators of housing quality. Table (4) reports a simple OLS highlighting the association between reported rent and indicators of housing quality and shows that about 52 percent of the variance is explained by housing quality indicators, rising to 72 percent if location is also controlled for.

Table 4: OLS Regression detailing association between rent estimate and housing quality indicators

	(1)	(2)
Living Space M^2	1.987***	1.659***
	(0.115)	(0.096)
Central Heating	45.874***	61.360***
	(13.840)	(11.086)
Central Hot Water	154.309***	58.236***
	(11.139)	(8.958)
Central Water Supply	90.553***	76.931***
	(7.309)	(6.173)
Central Sewage	14.500	52.991***
	(10.628)	(8.894)
Piped Gas	171.232***	85.300***
	(8.581)	(8.426)
LPG (Bottled)	15.803*	0.332
	(9.485)	(8.001)
Landline Phone	36.815***	14.873***
	(6.260)	(5.160)
Garbage Chute	-198.952***	-65.918***
	(14.747)	(11.955)
Elevator	229.541***	107.676***
	(11.923)	(9.456)
Intercom	128.172***	69.930***
	(8.544)	(6.763)
Satellite TV	125.616***	66.761***
	(6.194)	(5.533)
Number of observations	11,191	11,191
Region Dummies	No	Yes
Housing Type Dummies	Yes	Yes
R2	0.52	0.718

note: .01 - ***; .05 - **; .1 - *;

3. Cost-of-Living

An index approach is the most common method of analyzing spatial differences in the cost-of-living. Paasche indexes are constructed to represent spatial differences in purchasing power using a normalized average of prices, weighted by consumption of the goods comprising the index. Such indexes are commonly applied in the context of cross-country comparisons of welfare – for instance, this is the driving motivation behind the work of the International Comparison Program (ICP) and the use of Purchasing Power Parity (PPP) conversion factors. But within-country spatial differences in prices often receive less attention.[11] The method adopted here uses the unit values of consumption in the HBS survey, yielding a customizable Paache index that in turn allows cost-of-living comparisons across spatial units within Kazakhstan. The index values are initially calculated at the district level, but are aggregated to the regions (the level at which standard official statistics in Kazakhstan are reported).

3.1 Constructing Indexes

The Paasche index is calculated for the *h*-th household, and defined as:

Equation 1

$$P_h = \frac{\sum_j p_j^h Q_j^h}{\sum_j p_j^0 Q_j^h}$$

where p_j^0 is the price of commodity *j* for the reference group 0 (in this case, the national average). The index is estimated as the ratio between the cost of a bundle of goods purchased by the *h*-th household, and the cost of the same bundle as paid by a reference household (the "average household", indexed by 0). From Equation 2 we obtain:

Equation 3

$$P_h = \left[\sum_j \left(\frac{p_j^h}{p_j^0} \right)^{-1} w_j^h \right]^{-1}$$

where w_j^h is the budget share of household *h* for commodity *j*, and p_j^h / p_j^0 is the relative price of the *j*-th item. In practice, however, prices are not recorded in the HBS, and unit values are estimated instead. Another limitation is that most budget surveys do not commonly gather information on the expenditure and quantity

[11] Official poverty and equity estimates for many countries do not adjust for local prices, although in large and geographically diverse countries, internal price differences can be economically significant.

of all items, instead gathering this level of detail for food items only. Thus, in most countries where spatial deflation is applied, the indicator is derived from the unit values of food expenditure observed in the survey.

This is the case the Kazakhstan as well, and the calculation proceeds by first obtaining unit values of the food items observed at the household level in the HBS. Unit values are achieved by dividing expenditure on goods by quantity.

Equation 4

$$uv_j^h = \frac{x_j^h}{Q_j^h(pur)}$$

where x_j^h is the expenditure of household *h* on food item *j*. Before estimating unit values, outliers in the distribution of unit values are removed if they are five times above or below the national value. Based on the resulting cleaned unit values, the ratio of price relativities p_j^h/p_j^0 is estimated as:

Equation 4

$$\widehat{\left(\frac{p_j^h}{p_j^0}\right)} = \frac{uv_j^h}{uv_j^0}$$

where uv_j^0 is the national average unit value of commodity *j*.

The *j*-th unit value uv_j^h can be missing even if the actual consumption of commodity *j* is strictly positive (self-production, running down the stocks, gifts received, etc. can lead to such cases). In these instances, missing values are imputed per the following hierarchical procedure:

$$uv_j^h = \begin{cases} uv_j^h & \text{if } uv_j^h \text{ is not missing} \\ E\left[uv_j^h | quarter, district, rural/urban\right] & \text{if } uv_j^h \text{ is missing} \\ E\left[uv_j^h | quarter, region, rural/urban\right] & \text{if } uv_j^h \text{ is still missing} \\ E\left[uv_j^h | quarter, rural/urban\right] & \text{if } uv_j^h \text{ is still missing} \end{cases}$$

The budget shares w_j^h needed to estimate the spatial-price index are calculated as:

Equation 5

$$w_j^h = \frac{\widehat{THE}_h^j}{\sum_j \widehat{THE}_h^j}$$

where $\sum_j \widehat{THE}_h^j$ is the total household expenditure on all food items j included in the index. The index is first averaged for each quarter, region, and area combination, and then normalized for each stratum by the national average.

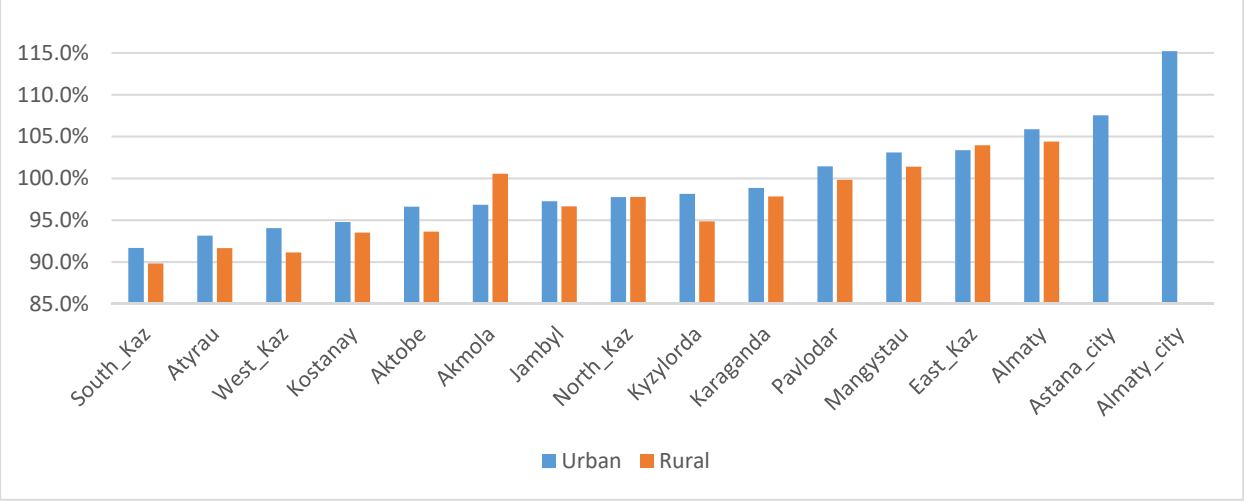
Equation 6

$$P = \frac{AVG(P_h \mid ruraluban)}{AVG(P_h)}$$

3.2 The Cost of Food

Applying this method to reported food consumption for 2015 in the HBS of Kazakhstan and comparing to the national average yields the percentage values reported in Figure (4). The index approach reveals that the largest spatial differences in food costs are between predominantly rural regions and predominantly urban ones. For instance, the rural and largely agricultural regions of South Kazakstan, Atyrau, West Kazakhstan, Aktobe, Kostanay, Jambyl, and North Kazakhstan all enjoy lower than average food prices. In these regions, even urban food prices are lower than the national average. However, the largely urban regions of Astana and Almaty city, alongside the oil-producing region of Mangystau all have above average prices. The most remarkable differences arise when comparing Almaty and Astana to the rest of the country. Within-region food costs vary by no more than about 5 percent in most cases, and are not substantially different by rural and urban areas.

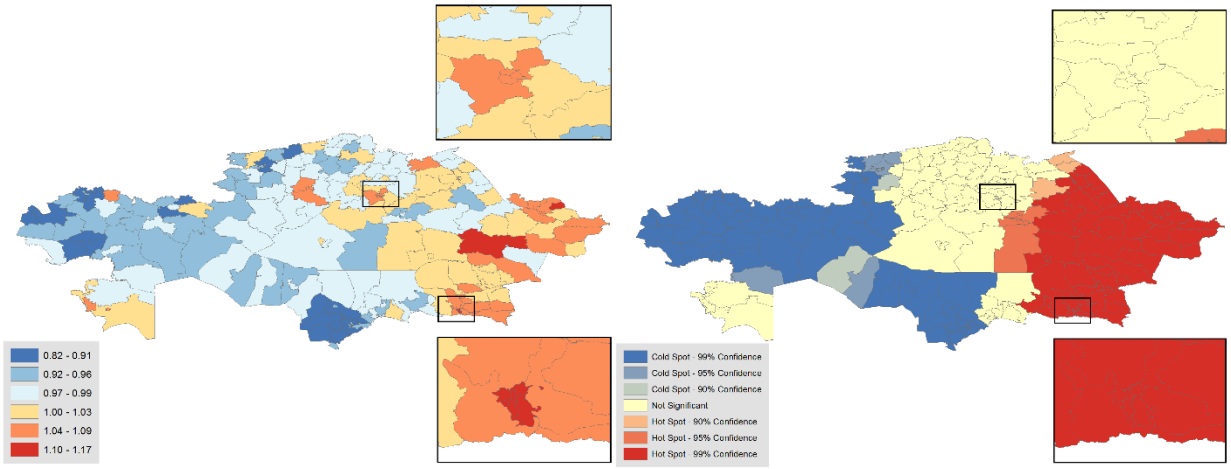
Figure 4: Rural vs. Urban Food-based Spatial Deflation Index



Source: The Household Budget Survey of Kazakhstan, Author's Calculations.
Note: Values are expressed in terms of a percentage of the national average.

Although food prices in Kazakhstan are higher in urban areas than in rural areas, this is the case in most countries. Kazakhstan is an exception only in degree. With a maximum of 115 percent of the national average, and a minimum of about 90 percent of the national average, Kazakhstan records some of the largest average differences between urban and rural prices in Europe and Central Asia (ECA). Food in the two largest cities of Astana and Almaty is between 7 and 15 percent more expensive than the national average, and the cost of food in Almaty is on average more than 28 percent higher than the least expensive region (in 2015, rural areas in the South Kazakhstan region). This difference likely partially reflects differences in quality, but is also strongly associated with the economic development of the region. Figure (5) provides maps of the index value and a clustering analysis that highlights regions of high vs. low average food prices. The results highlight important spatial concentrations of higher food prices in the country. In general, urban areas are more expensive than rural areas on this measure; however, prices are also substantially higher in the east, and lower in the western part of the country.

Figure 5: Food Index Value by District (left), Food Index Hot-Cold Spots (right)

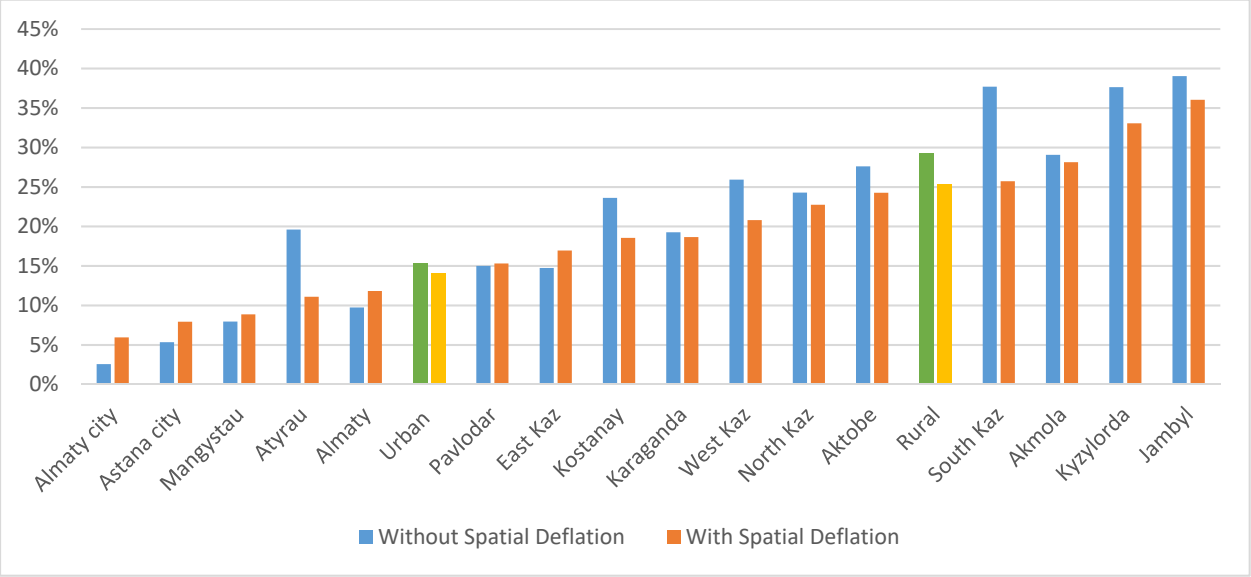


Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

In Kazakhstan, households in the bottom quintile allocated about 69 percent of their total budget to food in 2015, much more than the 48 percent allocated to food by the top quintile over the same period. High food prices reduce the disposable income of (non-producer) households, and are particularly problematic for the poor.

Standard poverty estimates in Kazakhstan[12] partially account for the spatial differences in the cost of food. Thus, one method of highlighting the role that regional price differences play in poverty and economic well-being is to compare poverty rates using spatially adjusted and non-adjusted consumption. The results of this comparison are reported in Figure (6). Ignoring the standard spatial adjustments for Kazakhstan[13] would result in a poverty rate nearly 12 percent higher in South Kazakhstan, 9 percent higher in Atyrau, and 5 percent higher in each of the three regions of Kostanay, West Kazkahstan, and Kyzylorda. These regions are predominantly rural, and the low food prices prevalent in those regions help to reduce the poverty rate. However, this comparison also implies that more than 421,000 people (about 2.4 percent of the population) would fall below the poverty line if they moved to an area where food prices coincided with the national average (while maintaining the same budget).

Figure 6: Poverty Rates at $5-a-day 2005 PPP with and without Spatial Food Price Deflation (left)



3.3 The Cost of Housing

Housing costs can be analyzed in the same index framework by including imputed rent as a component of the Paache index. Including the cost of rent into Equation 1 as an additional consumption item proceeds by assuming the "quantity" of rent is one (i.e., that the household pays imputed rent on only a single dwelling) and

[12] In this case, using the international poverty line at $5-a-day in 2005 PPP, and a welfare aggregate that excludes imputed rent.
[13] Based on a strata-level measure and the unit values of food consumption.

including the resulting unit value as a separate expenditure item for the household. This is conceptually different from most reported food expenditure in the sense that although something of value was consumed (use of the dwelling) no financial transaction took place.

The values reported in Table (5) are disaggregated to explore two alternative measures of imputed rent in this framework. The first uses imputed rent directly as reported in the HBS. This method implicitly assumes that housing is the same "good" for all consumers, regardless of the type of dwelling, and compares the overall differences in the resulting cost-of-living as a partial function of the unmodified imputed housing cost. A second alternative is to use a hedonic housing price measure. The second approach is more common in the literature on measuring the cost-of-living, and imposes the requirement that the spatial deflator for housing be based on consumption of a similar "type" of housing, in terms of size and construction. In both cases, the housing costs are included alongside the other components of the Paache index.

There is no estimation for the first option, as self-reported values are included directly. However, the hedonic option is implemented using a separate imputation technique. The process proceeds by imputing the cost of renting the same "standard" dwelling in each locality, and including this value in the overall cost-of-living index. The first step involves estimating a simple ordinary least squares (OLS) regression of reported rental values:

$$y_h = \beta_0 + \beta_{1h} x_{1h} + \beta_{\dots} x_{\dots} + \varepsilon_i$$

Where y_h is reported rental value of the home, and the x_h term includes housing characteristics of interest, including dummy variables indicating location. Based on the resulting coefficients, a predicted rental value by locality is generated by holding constant a set of housing characteristics. Included in the application described here were variables for the living space of the dwelling (assumed to be 42 M Sq. for "standard" housing), the number of rooms (assumed to be 3 for "standard" housing), a dummy variable for whether the location is rural or urban, and the type of dwelling (assumed to be an apartment for "standard" housing). The results of the estimation procedure were then included as a component of the price index described above (instead of imputed rent for the housing that households report having consumed).

Table 5: Estimated Food-based, Food + Rent-based, and Food + Standard Rent-based Indexes by Region and by Rural and Urban areas (National Average = 100%)

	All			Urban			Rural		
	Food Only	Food + Imp Rent	Food + Standard Rent	Food Only	Food + Imp Rent	Food + Hedonic Rent	Food Only	Food + Imp Rent	Food + Hedonic Rent
Akmola	99%	88%	67%	97%	112%	109%	101%	69%	62%
Aktobe	95%	103%	79%	97%	159%	121%	94%	90%	78%
Almaty	105%	94%	77%	106%	124%	117%	104%	92%	74%
Atyrau	93%	94%	112%	93%	157%	116%	91%	73%	77%
West Kaz	93%	75%	73%	94%	154%	116%	91%	71%	71%
Jambyl	97%	90%	64%	97%	131%	105%	97%	77%	61%
Karaganda	99%	114%	101%	99%	133%	102%	98%	70%	56%
Kostanay	94%	71%	56%	95%	138%	99%	94%	48%	51%
Kyzylorda	96%	71%	64%	98%	133%	102%	95%	61%	61%
Mangystau	103%	150%	157%	103%	274%	167%	101%	105%	123%
South Kaz	91%	86%	56%	92%	128%	96%	90%	67%	53%
Pavlodar	101%	99%	71%	101%	143%	113%	100%	94%	68%
North Kaz	98%	72%	62%	98%	147%	108%	98%	55%	59%
East Kaz	104%	82%	68%	103%	121%	108%	104%	62%	60%
Astana city	107%	304%	240%	107%	304%	240%	.	.	
Almaty city	115%	253%	190%	115%	253%	190%	.	.	

Source: The Household Budget Survey of Kazakhstan, Author's Calculations.
Note: provides a comparison of average imputed rent (left) with hedonic rent estimate (right). Appendix (B) includes the OLS regression model and coefficients used for the imputation procedure.

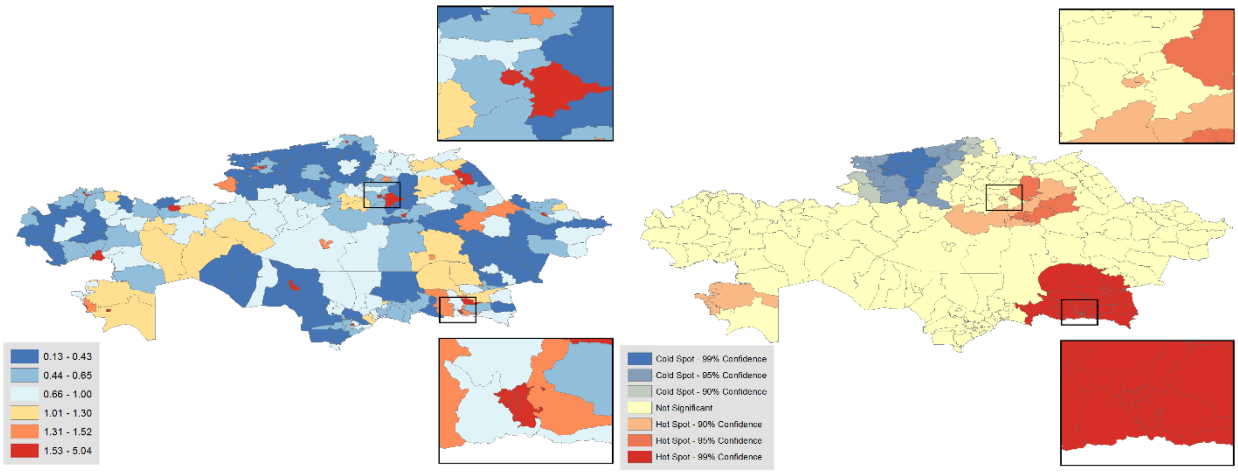
For both methods the estimated differences in the cost of housing are much larger than the cost of food described in the previous section. In 2015, imputed rent was on average three times higher in urban areas than in rural areas (540,000 vs. 180,000 Tenge per year).[14] Imputed rent in regions with the lowest average costs (including Kostanay, Kyzylorda and North Kazakhstan) was only 15 percent of the imputed rent in the highest cost area (Astana City). Table (5) reports several cost-of-living indices across regions and rural and urban areas.

Including imputed rent costs highlights large and economically significant differences in the cost-of-living, both within and between regions. The overall national trend is for a substantially higher cost-of-living in urban areas after accounting for imputed rental costs, and particularly for the two largest cities of Almaty and Astana. Pricing a standard apartment in each region using a hedonic model instead of reported imputed rent moderates the disparity to some extent (reducing the difference in the cost-of-living from 304 percent to 240 percent above the national average in Astana city, and from 253 percent to 190 percent in Almaty), but the magnitudes

[14] Please see appendix F for average imputed rental values and hedonic rent estimates for housing by region.

remain large. Due to the much lower than average cost of housing in the most rural areas, using the hedonic approach rather than the unadjusted imputed rent approach further improves the cost-of-living in these areas relative to the national average (for example, see Kostanay and South Kazakhstan in Table (5)). After including imputed rent in the index, not a single urban area is estimated to have lower cost-of-living than the national average. In contrast, rural areas are all well below the national average with the sole exception of Mangystau.

Figure 7: Index of Imputed Rent (left), Hot-Cold Spot Map of Imputed Rent (right)



Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

Figure (7) maps the values of the index of imputed rental costs, and a spatial analysis of clustering of very high or very low costs. The results highlight the large disparity in the cost of housing for rural vs. urban areas, and particularly for the cities of Astana and Almaty. The areas surrounding the two largest cities are also identified as "hot-spots" where prices are substantially higher, whereas the north-central part of the country is noted for particularly low housing costs.

4. Affordability

There are several customary approaches to measure the affordability of housing. The HBS data for Kazakhstan are sufficient for two of the most common: one based on monthly expenditure, and another based on the estimated value of an occupied dwelling.

Most monthly expenditure approaches of the first type were initially calibrated on data from the United States. The first such definition was applied in the 1920s and set at monthly expenditure at 25 percent of income (see Pelletiere (2008) for a detailed history). In later years, the threshold rose to 30 percent of income, which remains

a popular standard, and has been officially adopted by the U.S. Department of Housing and Urban Development.[15]

The second approach measures the affordability of housing by comparing the median home value in each locality with the median income in the same locality. The resulting indicator is expressed as a multiple of annual income or consumption. A common series of thresholds use a multiple of 3 to indicate "affordable" housing, 3.1 to 4.0 as "moderately unaffordable," and 4.1 to 5.0 as "seriously unaffordable. Any estimate above 5 is often considered to indicate that the locality is "severely unaffordable".

Both affordability measures are variations of income and consumption thresholds. Although these are commonly used in the literature, there are concerns with their reliability. One important challenge is that the value of housing may reflect differences in quality that are unaccounted for in raw housing cost comparisons. This limitation is partially addressed by using hedonic models of imputed rental values by locality (as applied in section 3.3, and used in the second approach outlined here). However, this is not a complete solution. More robust approaches have been suggested by Glaeser and Gyourko (2003), for instance, who use the cost of housing construction to partially account for differences in quality.[16] While including supply side prices and quality adjustments in this way would be technically ideal, the available data in this study do not permit the approach.

Despite their drawbacks, threshold methods are popular for practical reasons, and even have some theoretical advantages. They are more easily generalizable to counties and contexts with constraints on data availability, and the resulting indicators are often easier to compare across countries. Threshold indicators are also conceptually simple, and easy to communicate. While they may not entirely reflect all dimensions of the value of housing, it has also been repeatedly shown that household expenditures surpassing commonly used thresholds is often correlated with other deprivations. For instance, Newman and Holupka (2014) find an inflexion point on expenditure for childhood enrichment activities when housing costs are about 30 percent of a household's budget, indicating that the threshold may coincide with important welfare dimensions commonly associated with "affordability."

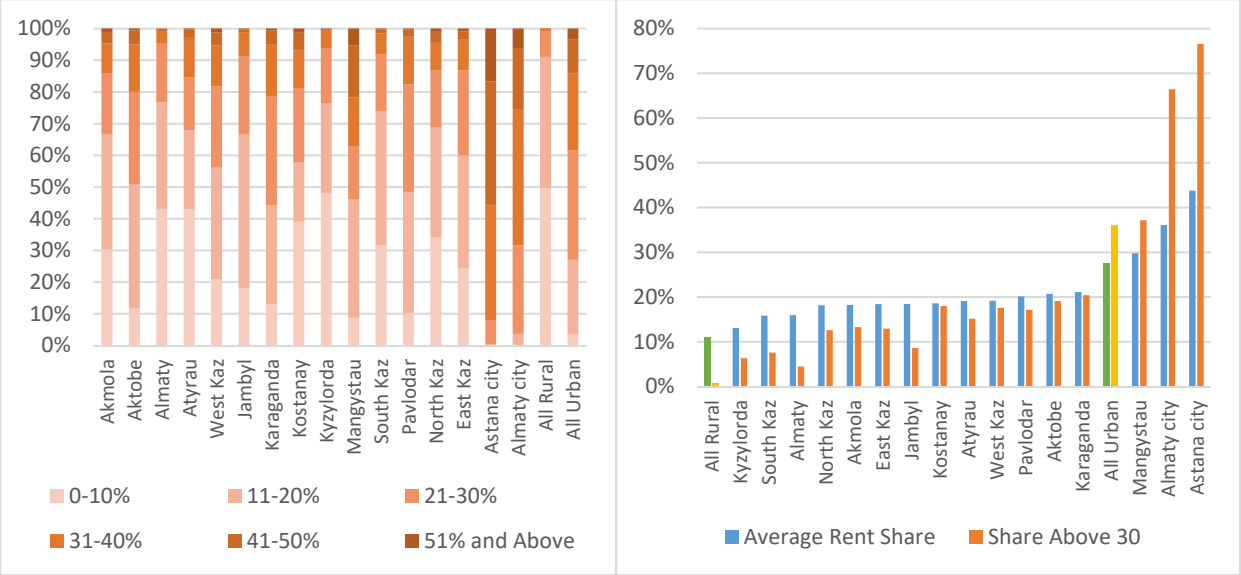
4.1 Imputed Rent Threshold

Using a simple threshold definition, housing in rural areas of Kazakhstan is almost always affordable: in 2015, there were virtually no rural areas where housing accounted for more than 30 percent of total expenditure. On

[15] For instance, Feldman (2002).
[16] Glaeser and Gyourko (2003) find that this moderates some affordability concerns in the US context.

average, housing accounted for only about 11 percent of total consumption in rural Kazakhstan, and even less in the most rural parts of the country including Jambyl and Kyzlorda. In contrast, imputed rent in 2015 accounted for more than 28 percent of consumption in urban areas on average. More than 36 percent of urban households allocated more than 30 percent of their budget to housing in 2015. In the most expensive urban markets of Astana and the city of Almaty, rent accounted for 36 and 44 percent of total average consumption respectively in 2015. More than 66 percent and 77 percent of households in Astana and the city of Almaty live in unaffordable housing, despite enjoying the highest average incomes in the country.

Figure 8: Imputed Rent Share of Total Consumption, 2015[17]



4.2 Home Value Threshold

Measuring the affordability of housing using home values yields qualitatively similar results to the imputed rent approach. Comparing the median home value with the median income in each locality in 2015 identifies the same urban centers as the least affordable, while most rural areas were affordable for the large majority of residents. According to the home values measure, the regions of Akmola, North Kazakhstan, Kyzylorda, Aktobe, Kostanay, Atyrau, and South Kazakhstan were all "affordable" in 2015 (with a multiple of 3 or less). In contrast, West Kazakhstan, East Kazakhstan, and Jambyl were all moderately unaffordable (with a multiple of between 3.1 to 4.0), while Pavlodar, Almaty region, and Karaganda were all severely unaffordable (with multiples of 4.1 to 5.0).

[17] Total consumption per capita is used for the measures adopted here.

At the extreme, Mangystau was above the "severely unaffordable" threshold with a multiple of about 6.2, while Almaty City and Astana City were both more than twice the threshold, with multiples of 10.6 and 11.8 respectively. The three areas where housing is least affordable are also, in the same order, the regions of the country that recorded the lowest rates of poverty in 2015 (at 8.9, 7.9, and 5.9 respectively).[18] Per the home value based measure, the cities of Almaty and Astana are more unaffordable than many famously exclusive metro areas, such as San Francisco in the United States and Vancouver in Canada (Table 6).

Table 6: Kazakhstan Cities Median Multiple Affordability Measures vs. International Cities

Affordability Rank	Country	City	Median Multiple
1	China	Hong Kong	18.1
2	Australia	Sydney, NSW	12.2
	Kazakhstan	*Astana City*	*11.8*
3	Canada	Vancouver, BC	11.8
	Kazakhstan	Almaty City	10.6
4	N.Z.	Auckland	10
5	U.S.	San Jose, CA	9.6
6	Australia	Melbourne, VIC	9.5
7	U.S.	Honolulu, HI	9.4
8	U.S.	Los Angeles, CA	9.3
9	U.S.	San Francisco, CA	9.2
10	U.K.	Bournemouth & Dorset	8.9

Source: 13th Annual Demographia International Housing Affordability Survey: 2017 and The Household Budget Survey of Kazakhstan, Author's Calculations.

4.3 Simulating Migration Affordability

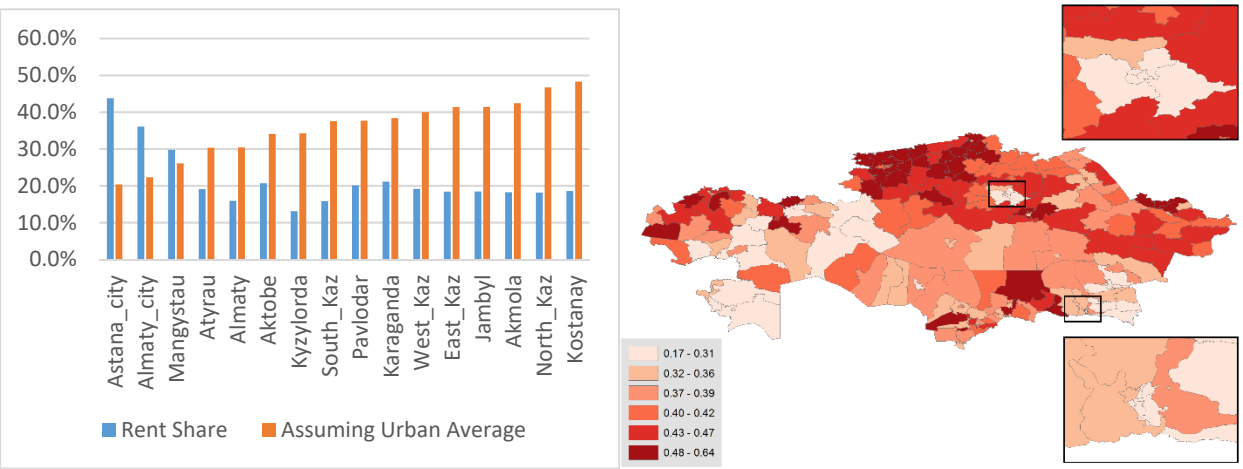
Another approach to gauging potential housing demand is to simulate a scenario in which a household in a rural area moves to an urban area. If we assume that in such a scenario, households would pay the median monthly cost of urban housing following their move, we can estimate the likely budget share of housing in an urban area for previously rural households. The results of this exercise are presented graphically in Figure (9).

On average, if rural households relocated to the median urban area, they would be expected to spend nearly 20 percent more of their current total budget on housing alone, even before taking differences in the cost of other goods and services into account. In about half of Kazakhstan's regions, this would equate to more than doubling of the share of consumption allocated to housing. In every region other than Mangystau and the cities

[18] The middle class, defined as households consuming above the line of $10-a-day in 2005 PPP terms (but excluding imputed rent), was also largest in Astana (34 percent) and Almaty (50.5 percent).

of Almaty and Astana, the average imputed rent share would be higher than the 30 percent affordability threshold applied in section 3.4. The regions of North Kazkahstan and Kostanay do very poorly by this measure: such a migration in these areas would equate to households spending more than half of their current total budget, on average. Similar comparisons based on average income are included in Appendix D.

Figure 9: Budget Share Allocated to Rent vs. Simulated Share using Average Urban Rent (left), Mapping of Simulated Rent Share using Average Urban Rent (right)



One weakness of this approach is that it does not consider the higher incomes prevalent in urban areas. If households were to relocate, one would expect higher incomes to compensate for a portion of the increase in the cost-of-living. But although average income in Almaty was 66 percent higher than the national average (and 92 percent higher average in Astana), the price indexes calculated in section 3.3 suggest that the cost-of-living was 240 percent higher in Astana and 190 percent higher in Almaty. Thus, despite the higher expected income households could gain from migrating, the high cost-of-living in urban areas would more than overwhelm the expected monetary benefit for most rural households.

5. Housing Demand Elasticities

5.1 Income and Prices

Accurate measures of the elasticity of housing demand to income and price effects are essential to forecast trends in urbanization and to formulate related policies. There are also important distributional implications of demand elasticities. Demand for housing usually rises with income, and in Kazakhstan, following more than a decade of real average income growth, greater demand for housing is a natural expectation. On the other hand,

housing's status as a necessity good means that one would expect housing demand to be relatively inelastic to price and income. Although poor people are often especially sensitive to price changes, if housing demand is on average inelastic to price, as prices rise the poor may become more budget constrained rather than consume less housing, and housing would effectively displace other consumption. Conversely, if households are relatively responsive to price, they may be reluctant to move to areas experiencing rapid price appreciation, or more likely to move away in favor of lower cost areas. This latter scenario is of greatest interest with regards to the future of urbanization in Kazakhstan, as prices have risen much more quickly than incomes in urban areas over the past decade.

Depending on market trends, price and income effects can work either in tandem or in opposite directions. However, it is common for incomes to rise while housing prices increase (and vice versa), as has been the case in Kazakhstan over the past decade. Thus, with respect to the net change in demand due to these factors, either the income or the price effect could dominate. The analysis described in this section provides demand elasticity estimates for both income and price, and show that demand in Kazakhstan is quite responsive to changes in both income and price in comparison to other countries. However, the absolute value of the elasticity to price is larger, even as prices have risen faster than have incomes, suggesting that rising prices have reduced demand for housing in high-cost localities on net, and in turn, discouraged urbanization.

5.2 Estimation

Using imputed rent, cross-sectional demand elasticities can be estimated using a standard utility maximization approach:[19]

Equation 7 $$U = U(H, Z)$$

Where a household's utility (U) is a function of the consumption of housing (H) and other goods (Z). Households maximize utility subject to a budget constraint.

Equation 8 $$Y = p_h H + p_z Z$$

The term Y is total income (here, approximated in the following using total consumption, p_h is the unit price of housing, and p_z is a price index for all non-housing goods. Maximization yields a demand function for housing:

[19] The description here draws from the approach outlined in Grootaert and Dubois (1988).

Equation 9 $$H = h(Y, p_h)$$

In the case of housing, such a model is difficult to evaluate empirically because only consumption of housing is observed (either as the home value, or in the form of imputed rent). The solution applied in much of the literature is to consider imputed rent as a dependent variable and to decompose rent into price and quantity components (see Malpezzi (1999); Grootaert and Dubois (1988); and Follain et al. (1980) for examples). This approach is adopted here using the hedonic rent value calculated as per the procedure described in section 3.1 as the price variable. The estimation proceeds using a log-log method to estimate the elasticities associated with each term, such that:

Equation 10 $$\ln(p_h H) = \alpha + e_y \ln(Y) + (e_p + 1) \ln(p_h) + Controls$$

Where the term $p_h H$ is the log of imputed rent, $\ln(Y)$ is the log of household income, $\ln(p_h)$ is the log price of housing from the hedonic regression. The elasticity associated with household income is the term e_y, while $(e_p - 1)$ yields the demand elasticity to price.

5.3 Elasticity and Comparisons

The results of the estimation are reported in Table (7).[20] The findings suggest an elasticity of demand to total consumption (a proxy for permanent income) of between .54 and .61 for rural and urban areas separately, and .66 for the population overall. Put differently, a 10 percent increase in income is associated with a 5.4 percent increase in housing consumption for rural housing, 6.1 percent increase for urban housing, and a 6.6 percent increase nationally. By way of comparison, Malpezzi and Mayo (1985) provide income elasticities across eight countries with a range of between 0.4 to 0.6. Malpezzi (1999) also reports income elasticities across many studies falling within this range. The national estimate for Kazakhstan is thus roughly at the upper end of the standard range found in the literature.[21]

[20] Note that the signs for the coefficients are in the expected direction, and the models have relatively goodness of fit, as measured by the R^2.
[21] Though other studies of specific markets have found higher estimates.

Table 7: Log-Log OLS Regressions (Dependent Variable = ln(imputed rent))

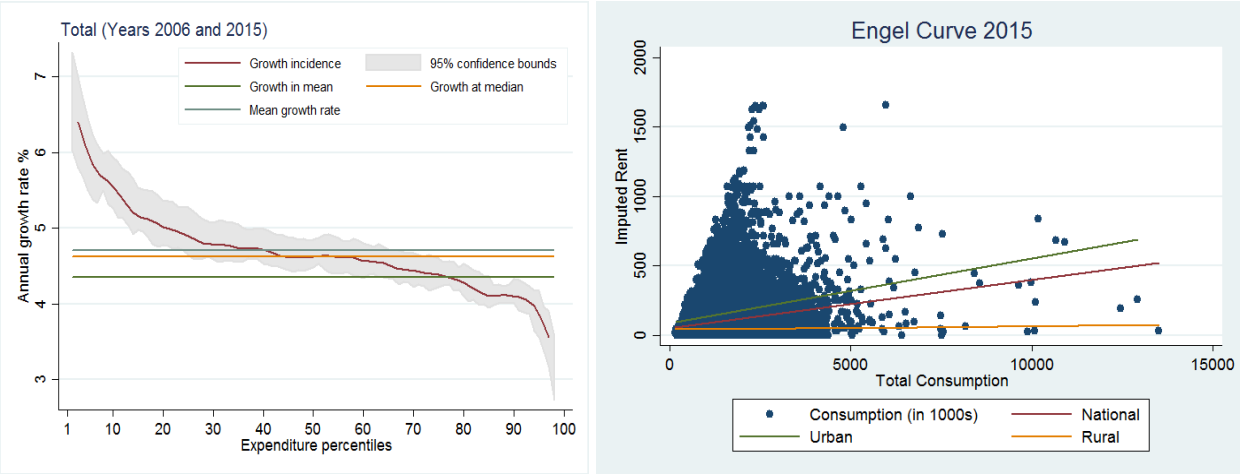
	All	Urban	Rural
	(1)	(2)	(3)
Ln(Consumption)	0.657***	0.609***	0.541***
	(0.022)	(0.023)	(0.024)
Ln(Hedonic Rent)	0.155***	0.010	0.051***
	(0.014)	(0.015)	(0.016)
Ln(Transportation)	0.062***	0.004	-0.013**
	(0.007)	(0.008)	(0.006)
Household Size	-0.208***	-0.158***	-0.116***
	(0.006)	(0.007)	(0.006)
Constant	2.072***	3.430***	2.086***
	(0.090)	(0.095)	(0.096)
Number of observations	11,138	5,198	5,940
Log-Likelihood	-13,625	-4,670	-5,751
Adjusted R2	0.333	0.366	0.258

Source: The Household Budget Survey of Kazakhstan, Author's Calculations.
*Note: .01 - ***; .05 - **; .1 - *;*

There is a larger measured difference between rural and urban areas with respect elasticity of demand to price. The results suggest a demand elasticity of about -.85 for the population overall. The estimates fluctuate substantially within rural and urban areas however. Urban areas are nearly unit elastic (-1), and rural areas are also close, at about -.95. To compare with other studies: the seminal experimental study from Hanushek and Quigley (1980) find price elasticities of between -.64 and -.45. In their study using a similar approach Grootaert and Dubois (1988) find a range of between -0.36 and -0.40, while Follain et al. (1980) find a range between -0.2 to -0.3. At the high end, Malpezzi (1999) find a range from -0.76 to -1.08. Thus, in comparison to other countries, the results indicate that consumers are relatively sensitive to housing prices in Kazakhstan.

The median poor household in Kazakhstan lives in a home with an imputed rental value about 42 percent of the national median, and about 13 percent of the median in Almaty and Astana. But despite the current low cost, the demand elasticity to price among poor households is about -.9. This means that if housing prices for poor households were to rise by 10 percent, poor households would be expected to consume 9 percent less housing on average. For households with low levels of wealth, low levels of income, or both, this relatively high sensitivity to price indicates that income would need to grow substantially more than housing prices before even basic urban housing would become attractive on average.

Figure 10: Growth Incidence Curve for 2006-2015 (Left), Approximation of Engel Curve for Imputed Rent and Total Consumption (Right)



Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

Because price elasticities are higher than income elasticities in absolute terms, price has a greater influence on housing consumption than does household income for a given percentage change. Figure (10) provides the growth incidence curve for consumption. Although growth has been pro-poor in recent years, the average annual growth rate in housing costs between 2001 and 2016 was about 16 percent, well above even the highest performing quantiles. Because the price effect is expected to dominate the income effect, demand is likely being strongly restrained by these high prices, and is consistent with the slow rate of urbanization in Kazakhstan.

6. Mobility, Ownership, and the Rental Market

There is a strong consensus in the literature that homeowners are less geographically mobile than renters. Hughes and McCormick (1985) provide some of the first empirical demonstrations that housing policy significantly reduces mobility, while also noting that the findings are consistent with the literature dating from the late 1960s. More recent studies have repeatedly confirmed that homeowners are less mobile (see, for instance, Barcelo, 2006; Andrews and Sánchez, 2011). This empirical regularity is of crucial importance in Kazakhstan, where outside a small market in Astana, nearly all households own their dwelling.

The absence of affordable rental options is a crucial missing step in the urbanization ladder, and low-income people are especially likely to be affected by high rates of home ownership. In the absence of a rental market, low-income people are not able to move to high cost areas, as they are usually unable to purchase housing in high cost locations. Acquiring new housing is usually "front-loaded," in the sense that purchasing a dwelling

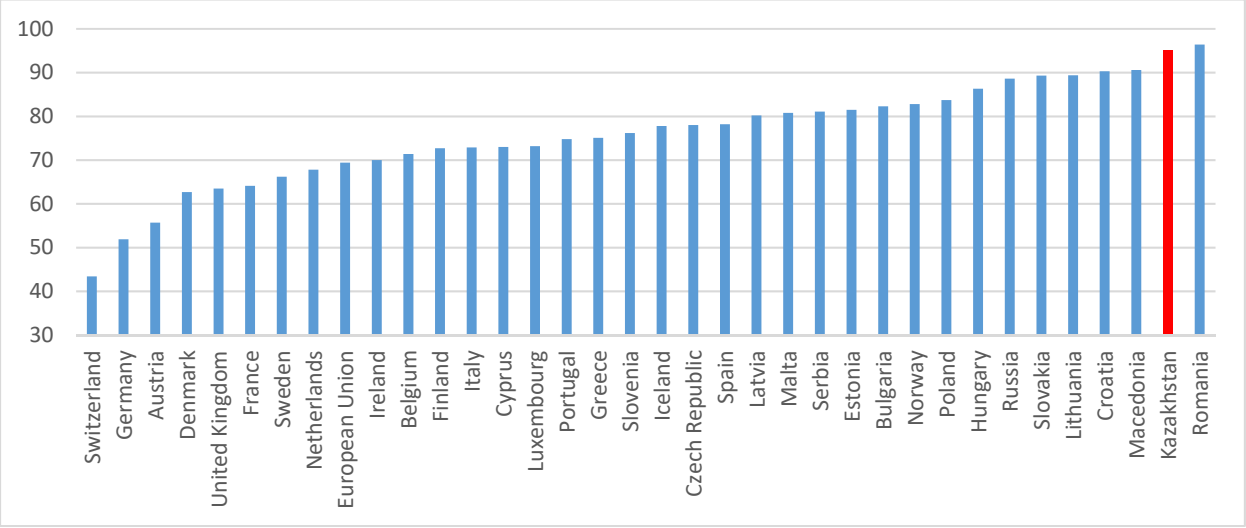
usually requires a large up-front payment. For most rural households, this one-time cost is unachievable given their income and equity in lower-cost rural housing. Such costs are unrealistic for most rural households in a context where house prices are rising by 50 percent per year or more, and cost upwards of 11 times the annual total household consumption of even relatively well-off urban residents. This relationship ultimately restricts the population of rural residents with the financial ability to relocate to urban areas, despite the other public and private benefits to doing so.[22]

6.1 The Soviet Legacy

High home ownership rates in Kazakhstan are largely a legacy of the Soviet Union's housing policies (Struyk, 2000). The widespread housing privatization efforts undertaken in most CIS countries and among formerly managed economies in Eastern and Central Europe led to much higher rates of home ownership in these areas than in Western Europe. Among the EU member states that were formerly part of the Soviet Union, none has a rental market share that is above the EU average.[23]

But even by regional standards, Kazakhstan's home ownership rate is very high. Among EU and other regional comparator countries, only Romania has a higher rate of home ownership than Kazakhstan (Figure 11).

Figure 11: Home Ownership Rate by Country, 2015



Source: EuroStat, RusStat and the Household Budget Survey of Kazakhstan

[22] In Kazakhstan, the challenge is exacerbated by the need to officially register to qualify for social services such as schools, the public health system, access to targeted social assistance, and employment centers.
[23] See Lex and Sunega (2014) for more details.

In addition to the drive for privatization following independence, policy-related impediments may also play a role in explaining the high share of households that own their homes. Hughes and McCormick (1981) note that UK housing policies lead to "extreme shortages of rental accommodation in certain areas." Similarly, Gilderbloom and Appelbaum (1987) argue that housing policies and other market imperfections have led to shortages in affordable rental units throughout the United States.

Privatizing government-owned housing in the wake of the breakup of the Soviet Union provided significant benefits for most recipient households, and in some countries, subsides were moderately pro-poor (Struyk, 2000). Under privatization, sitting tenants had the right to purchase their units, typically at a substantial discount or, in some cases, for free except for a nominal processing fee. Take-up of such privatization offers was very high. Due in part to the appreciation in home values that followed in many CIS countries, a popular view emerged that, in comparison to alternative investments or the banking system, housing was a preferable means of storing wealth. Even though privatizations were ultimately very costly to the governments involved, the programs were extremely popular throughout the former Soviet Union (Struyk, 2000). Home ownership has also been shown to be positively associated with better education outcomes for children (Haurin et al. 2002) and higher levels of community engagement (Di Pasquale and Glaeser, 1999).

6.2 The Labor Market

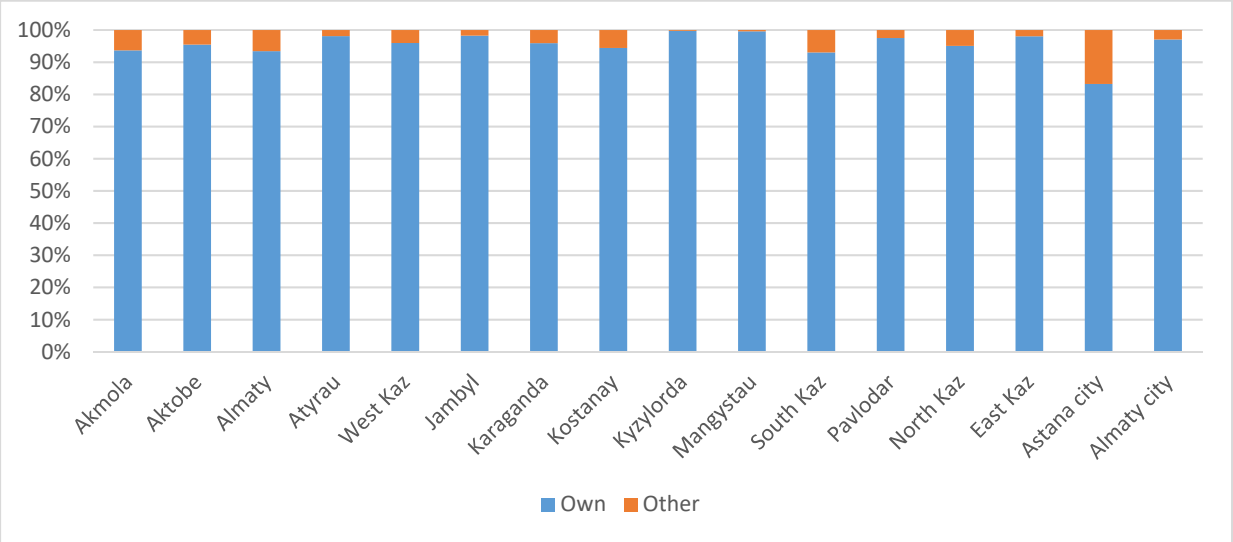
But despite the clear beneficial aspects of home ownership, there are significant drawbacks as well. In a seminal study using cross-country comparisons of unemployment, Oswald (1996) finds that by reducing mobility, a high rate of home ownership directly impedes the functioning of the labor market. Dohmen (2004) develops a related theoretical model to show that the high moving costs related to home ownership are a severe impediment to regional mobility, which is hypothesized to ultimately lead to dysfunction in labor markets. In addition, the model suggests that higher moving costs reduce on-the-job search effort and effectiveness, which in turn would be expected to reduce potential productivity.

Supplementing the view articulated in Oswald (1996) and related work, Blanchflower and Oswald (2013) find that increasing home-ownership rates are a precursor to rising unemployment, and suggest that lower worker mobility is primarily to blame.[24] The results suggest that the impact of high ownership rates on the labor market are significant at the macro level: a doubling of the rate of home-ownership can be followed in the long-run by more than a doubling of the unemployment rate.

[24] Secondary issues include greater commuting times and fewer new businesses in areas with high ownership rates.

Although not universal,[25] the negative relationship between home ownership and the functioning of the labor market has since been replicated in many other settings. Munch et al. (2008) find that home ownership in Denmark has a negative impact on job-to-job mobility both in terms of transition into new local jobs and new jobs outside the local labor market. In a study focusing on the UK, Battu et al (2008) find much the same relationship. Laamanen (2017) also finds that home-ownership has a significant and causal effect on unemployment.[26] In each of these studies, the negative effect on labor markets is primarily driven by reduced worker mobility.[27]

Figure 12: The Share of Owner-Occupied Out of Total Occupied Housing by Region in 2015



Source: The Household Budget Survey of Kazakhstan, Author's calculations

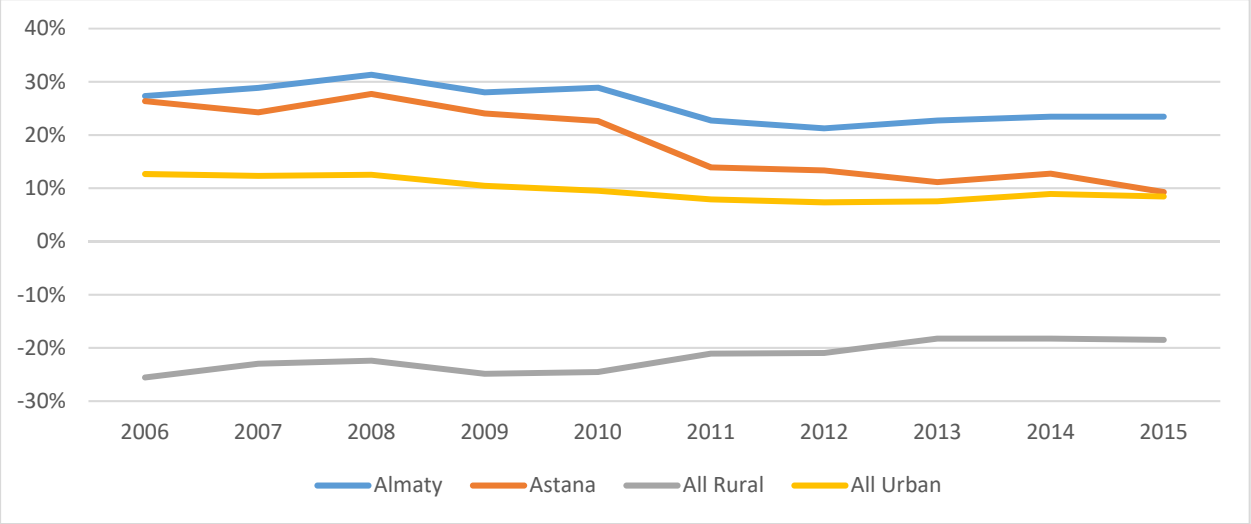
The movement of workers from low-productivity rural areas to high productivity urban ones has also traditionally been one of the primary drivers of regional economic convergence. Models of wage rate convergence, such as that proposed by Ganong and Shoag (2017), begin with the proposition that wage premia in higher productivity geographic areas attract qualified workers. Over time, this process leads to an increasing supply of labor in areas with above average wages, while reducing the supply of labor in lower productivity

[25] Many studies show that homeowners are less likely to be unemployed than renters. For instance, Van Leuvensteijn and Koning (2004) demonstrate that this is the case in the Netherlands.
[26] Laamanen (2017) also finds that homeowners are less likely to be unemployed than non-owners, providing an explanation for the apparent inconsistency between Oswald (1996) and the empirical results from Van Leuvensteijn and Koning (2004), among others.
[27] Laamanen (2017) also highlights the role of policy in the rental market: the deregulation used for the identification strategy was shown to substantially increase the supply of rental dwellings on the market by making renting more profitable for landlords.

areas. With more workers to choose from, employers would be expected to negotiate wages more aggressively in high productivity areas, while workers who remain in lower productivity locations would face less competition from other workers, and negotiate for higher wages. Unhindered, most theoretical models suggest that this process would be expected to continue until wages roughly equalize across regions. The relationship has been empirically validated in many contexts. In the case of the United States, regional convergence between 1880 and 1980 continued at a stable rate of about 1.8 percent per year. However, Ganong and Shoag (2017) show that the rising cost of housing in cities beginning in 1980 led to 50 percent slowdown in the rate of regional wage convergence. Absent these impediments to mobility, the authors estimate that wage inequality would have been 8 percent smaller between 1980 and 2010.

Recently, a similar pattern is apparent in urban Kazakhstan, with the noted exception of Astana. The two most economically dynamic urban centers of Astana and Almaty enjoy higher wages than the rest of the country (even after controlling for gender, sector, and level of education). But while convergence has rapidly continued in Astana, where the rental market is largest, convergence largely halted in Almaty and other urban areas in 2011. While it is unlikely that these trends are entirely driven by the rental market and the cost of housing, they are consistent with the experiences of other upper-middle income countries, as well as the best-studied international examples, such as the United States. Figure (13) reports the wage differentials between 2006 and 2015 in more detail.

Figure 13: Location-Specific Wage Residual (National Average=0%)



Source: The Household Budget Survey of Kazakhstan, Author's calculations

6.3 Macroeconomic Effects

These effects can be sufficient to translate to large effects on aggregate economic performance. Hsieh & Moretti (2017) find that spatial misallocation of labor in the US lowered aggregate US growth by more than 50% from 1964 to 2009. Parkhomenko (2017) finds that regulations liming new housing construction accounted for approximately 23 percent of the wage dispersion, and 85 percent of housing price dispersion in metro areas between 1980 and 2007 in the US. The analysis also indicated that had regulations not increased over this time, US output in metro areas would have been 2 percent higher. In most such studies, policies and regulations, alongside social preferences, are particularly important determinants of the cost of housing (Rubaszeka and Rubio, 2017).

A small but influential literature makes the case that the absence of a rental housing market may also be a primary determinant of the business cycle, above and beyond the potential impacts on employment (Czerniak and Rubaszek, 2016). In an influential paper, Arce and Lopez-Salido (2011) argue that housing bubbles are caused by homeowners treating their properties as investments, and suggest that the presence of a robust rental market substantially reduces the risk of a housing bubble and can moderate the economic cycle. This is of interest in Kazakhstan considering the country's experience with quickly rising prices between 2001 and 2007.

7. Conclusion

Greater urbanization is an important goal in Kazakhstan's national development strategy. But the high cost-of-living in urban areas relative to rural areas in Kazakhstan lowers living standards for urban residents, and inhibits rural-to-urban migration. The cost of food is substantially higher in urban areas than in rural areas, and the difference in the cost of housing calculated using imputed rental costs is much larger. The high cost of living in urban areas alongside the lack of a rental housing market makes the most dynamic labor markets in the country unaffordable to most low-income households. Simulations conducted in this study find that few rural households are financially capable of moving to urban areas (even in second tier cities) suggesting a significant impediment to achieving the government's urbanization goals.

Constraints to internal migration are a crucial factor for Kazakhstan's future economic growth. Cities are commonly the divers of economic growth and diversification in middle-income countries, and without a large and growing pool of workers located in cities, theory and global experience suggest that businesses will struggle with the trade-off between the benefits of agglomeration and high labor costs. There is already a large income gap for jobs in the cities of Almaty and Astana, and to a lesser extent in other urban areas as well. But for the

poor and middle class households who may otherwise consider moving to access these opportunities, the cost-of-living is an important limitation. Providing basic services including water, electricity, education and health care is substantially more expensive in rural areas, and if a large share of the population in Kazakhstan is priced out of living in cities and remains in rural areas, they will remain costlier to serve.

These results suggest important policy questions for further exploration. In many of Kazakhstan's peer countries, high housing prices tend to reflect constrained supply coupled with high demand, with the latter often unmet due to regulatory hurdles or other impediments to construction and investment. Access to transportation is also a common concern for densely populated areas, as congestion can lead to larger premiums paid for transport-accessible housing in cities, or higher costs for personal modes of transportation. For the poor and middle class, this can mean accessing more remunerative jobs in cities requires long and costly commutes from outside urban areas. Supporting the creation and expansion of a rental housing market is a core recommendation of the latest OECD assessment of the country's urbanization strategy (OECD, 2017). Registration requirements such as the *propiska* system in many former Soviet countries have also contributed to underperformance in rental markets.

Urban growth commonly leads to poverty reduction and improved access to basic services, and urbanization in Kazakhstan would very likely contribute to improving standards of living. However, the acute divergence in the cost-of-living in urban areas relative to the countryside is a threat to Kazakhstan's growth strategy and will inhibit the country from achieving key development objectives.

Appendix A: Additional Indicator Mapping

Table 8: Comparison of the Observed Share of Imputed Rent in Total Consumption (left) vs. Simulated Rent using average Urban Imputed Rent (Right)

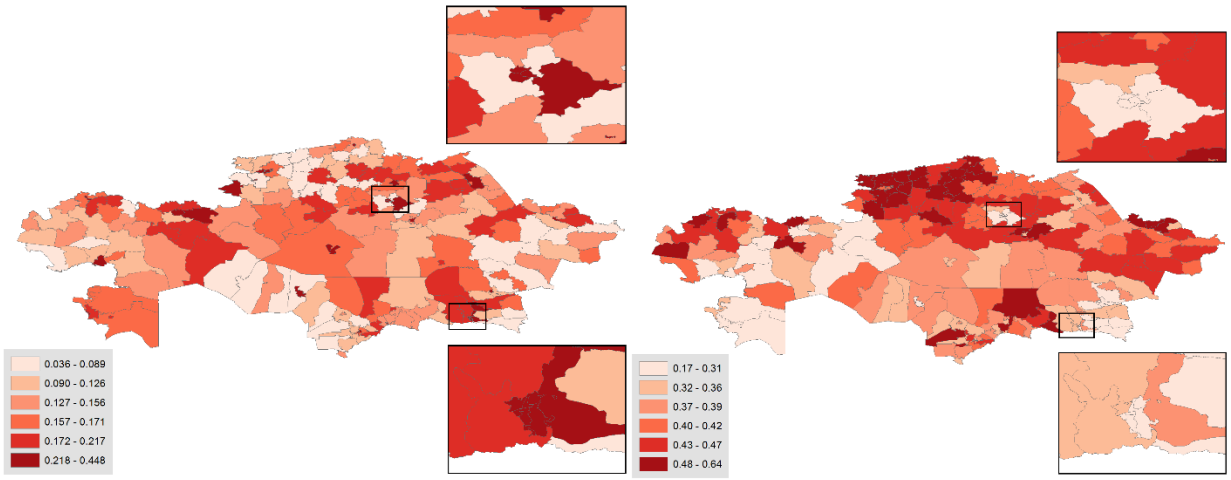
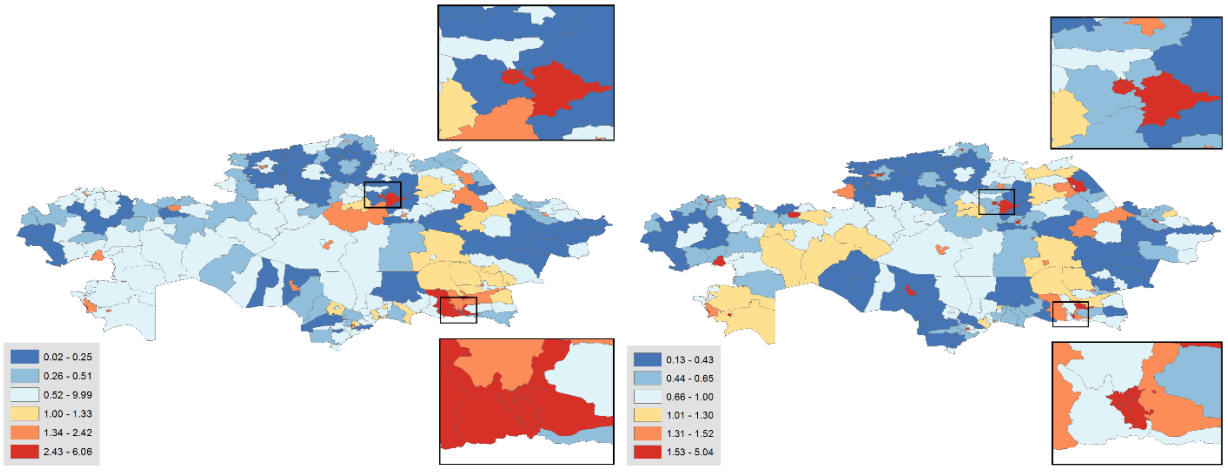


Table 9: Comparison of Index of Imputed Rent (left) to Index of Dwelling Value (right)



Appendix B: Imputed Rent Model for "standard" Apartment

y= Annual Imputed Rent	**OLS**
The living space inhabited by HH	674.454***
	(128.827)
How many living rooms inhabited by HH	37,603.448***
	(2,676.055)
Dwelling Type 2	-224,705.997***
	(41,185.943)
Dwelling Type 3	-126,726.730***
	(5,427.233)
Dwelling Type 4	-103,078.839***
	(8,034.620)
Urban Area	262,240.176***
	(4,856.847)
Constant	176,623.607***
	(10,805.581)
Number of observations	11,191
Adjusted R2	0.720

note: .01 - ***; .05 - **; .1 - *; Region Dummies Not Shown

Appendix C: Imputed and Hedonic Rent Estimates

Table 10: Average Imputed Rent Paid vs. Average Imputed "Standard" rent in 1000s of Tenge, HBS 2015

	Imputed Rent (Reported)			Imputed Rent (Hedonic)		
	Average Rent	Average Urban Rent	Average Rural Rent	Average Hedonic	Average Rural Hedonic	Average Rural Hedonic
Akmola	276	411	168	366	506	244
Aktobe	397	490	255	487	587	324
Almaty	272	401	232	349	548	286
Atyrau	358	588	161	441	580	318
West_Kaz	341	525	168	425	559	297
Jambyl	271	399	184	332	489	226
Karaganda	389	448	170	409	463	201
Kostanay	263	432	96	327	453	190
Kyzylorda	259	456	110	319	469	206
Mangystau	687	1032	354	738	872	609
South_Kaz	247	363	153	295	440	178
Pavlodar	364	425	218	451	530	267
North_Kaz	241	420	120	347	498	236
East_Kaz	294	404	141	384	492	230
Astana_city	1266	1266	.	1279	1279	.
Almaty_city	925	925	.	974	974	.

Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

Appendix D: Mobility and Income

Another way to consider the accessibility of housing in Astana City and Almaty City that takes income into account is to estimate the share of average income estimated imputed rent in the two most dynamic cities would account for among households in each region. Table (11) reports this comparison, highlighting that in many regions, rent alone would account for most of household income were the household to move and incur that cost. Looking to households in the 25th percentile of income, in many cases rent in Astana or Almaty cities would cost more than the current entire household income, on average. The final two rows of Table (11) indicate that even with the higher incomes household enjoy in the two largest cities, for households in the bottom 25 percent, rent would account for more than half of household income in Almaty and more than 90 percent in Astana. In practice, the large majority of these households own their homes, and thus do not pay rent month-to-month. However, for a household looking to relocate to an urban center, this cost is tall hurdle that most people at the bottom of the income distribution could not clear.

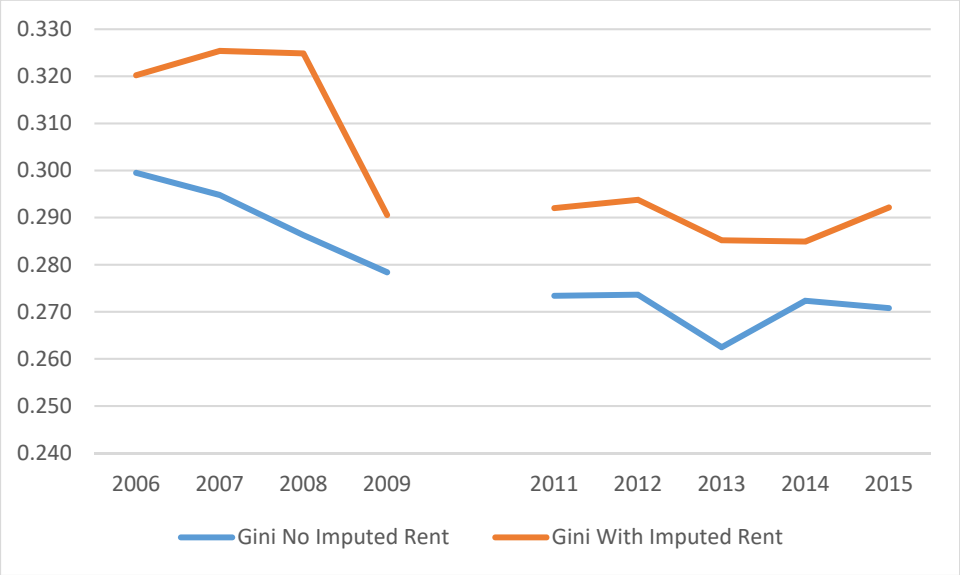
Table 11: Rent Estimates in Almaty and Astana as a Share of Average/25th Percentile Household Income (2006-2015)

	Average Income				25th Percentile Income			
	Imputed Rent		Standard Rent		Imputed Rent		Standard Rent	
	Almaty	Astana	Almaty	Astana	Almaty	Astana	Almaty	Astana
Akmola	70%	96%	74%	97%	118%	161%	124%	161%
Aktobe	53%	72%	55%	73%	89%	121%	93%	121%
Almaty	61%	84%	65%	85%	100%	136%	105%	136%
Atyrau	41%	57%	44%	57%	68%	93%	71%	93%
West_Kaz	61%	83%	64%	84%	103%	141%	108%	141%
Jambyl	64%	87%	67%	88%	93%	127%	98%	127%
Karaganda	54%	74%	57%	74%	90%	123%	95%	123%
Kostanay	68%	93%	71%	94%	112%	154%	118%	154%
Kyzylorda	53%	73%	56%	73%	81%	110%	85%	110%
Mangystau	38%	52%	40%	53%	59%	80%	62%	80%
South_Kaz	59%	81%	62%	82%	81%	111%	86%	111%
Pavlodar	63%	86%	66%	87%	96%	132%	102%	132%
North_Kaz	73%	100%	77%	101%	123%	169%	130%	169%
East_Kaz	71%	97%	74%	98%	117%	160%	123%	160%
Astana_city	42%	58%	45%	59%	66%	90%	70%	90%
Almaty_city	45%	61%	47%	62%	69%	94%	72%	94%

Appendix E: Inequality

Consumption-based inequality estimates for Kazakhstan traditionally do not include imputed rental values. However, including imputed rent amplifies the measured inequality in the country (Figure 14).

Figure 14: Gini Coefficient by Year



Source: The Household Budget Survey of Kazakhstan, Author's Calculations.

	Without Imputed Rent				With Imputed Rent			
	Gini	90/10	90/50	10/50	Gini	90/10	90/50	10/50
2015	0.271	3.184	1.898	0.596	0.292	3.502	2.018	0.576
2014	0.272	3.249	1.892	0.582	0.285	3.502	1.979	0.565
2013	0.262	3.097	1.849	0.597	0.285	3.416	1.987	0.582
2012	0.274	3.321	1.922	0.579	0.294	3.622	2.038	0.563
2011	0.273	3.291	1.920	0.583	0.292	3.547	2.024	0.571
2010		3.287	1.949	0.593		3.460	2.041	0.590
2009	0.278	3.355	1.933	0.576	0.291	3.423	1.966	0.574
2008	0.286	3.352	1.962	0.585	0.325	3.446	2.009	0.583
2007	0.295	3.487	1.953	0.560	0.325	3.564	1.987	0.558
2006	0.299	3.587	1.980	0.552	0.320	3.638	2.005	0.551

Appendix F: Mincer Earnings Function

	Dependent Variable = Individual Labor Income									
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Publicly Owned Entity	24,519*	29,001*	5,977*	21,337*	28,381*	.	10,353*	-21,379*	-25,597*	-52,410*
	(13,497)	(13,879)	(21,338)	(15,050)	(14,787)	.	(24,044)	(34,001)	(38,474)	(25,767)
Male	94,491***	120,922***	137,145***	135,146***	155,471***	163,496***	198,944***	226,484***	270,198***	285,918***
	(15,554)	(14,301)	(17,511)	(16,989)	(17,326)	(25,273)	(27,595)	(26,264)	(24,529)	(33,174)
Age	1,708*	2,244.481*	2,833.062*	3,492.361**	3,432.649**	4,059.306**	4,031.510**	4,348.179**	4,101.551*	3,961.153
	(833)	(1,170)	(1,341)	(1,343)	(1,330)	(1,667)	(1,689)	(1,966)	(2,126)	(2,636)
Secondary Education	75,937***	93,695***	83,678***	111,163***	126,883***	348,810***	362,093***	483,590***	240,373***	612,737***
	(8,488)	(12,416)	(16,581)	(16,571)	(10,306)	(58,504)	(58,065)	(37,204)	(55,018)	(87,403)
Tertiary Education	198,561***	238,642***	253,060***	295,821***	318,784***	590,658***	625,860***	766,598***	557,283***	951,250***
	(17,208)	(15,975)	(20,223)	(29,668)	(28,262)	(73,765)	(78,474)	(40,132)	(46,199)	(110,017)
Constant	2,481***	14,962***	41,937***	19,082***	24,393***	-137,816***	-103,817***	-200,647***	67,165***	-264,232***
	(36,205)	(56,261)	(60,006)	(52,756)	(56,380)	(28,407)	(38,412)	(99,493)	(142,545)	(60,297)
Number of observations	20,289	20,302	20,534	83,702	42,480	84,760	83,680	83,993	83,678	82,448
Log-Likelihood	-274,280	-279,166	-285,479	-1,171,827	-598,666	-1,203,456	-1,196,671	-1,210,196	-1,209,369	-1,199,242
Adjusted R2	0.145	0.140	0.131	0.129	0.122	0.127	0.131	0.125	0.143	0.138

note: .01 - ***; .05 - **; .1 - *;

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