



HOUSING PRICE INDEX

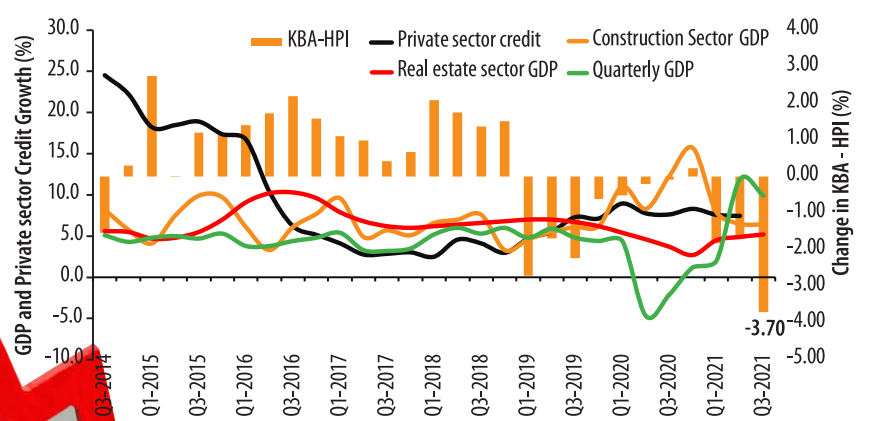
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Quarter 3 House Prices in record drop, by the highest margin since 2014

House prices posted a record drop in the third quarter of 2021. The KBA-HPI reveal that on a quarter-on-quarter basis, the quality-adjusted house prices contracted by 3.70 percent in the third quarter of 2021 (**Figure 1**) compared to a 1.82 percent contraction in the previous quarter. This was the highest downward price adjustment noted since the third quarter of 2014. Similarly, the quality unadjusted prices contracted by 11.20 percent in the third quarter of 2021 compared to a 4.20 percent contraction in the second quarter¹.

Figure 1: Evolution of Sectoral & Overall GDP, and House Prices (Q1-2013-Q3-2021)



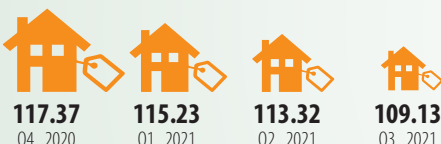
As observed in the KBA HPI report for the second quarter of 2021, the main reason for the observed changes in house prices is the demand-supply interactions. On the demand side, the number of concluded transactions during the quarter rose by 25.6 percent compared to the second quarter of 2021, reflecting a pent-up demand

Continued on page 2...

1. The price growth, unadjusted for quality, is computed as: $(P_2/P_1 - 1) \times 100\%$, where P_2 is the average house price in the second quarter of 2021, and P_1 is the average house price in the first quarter of 2021.

The Numbers at a Glance

1 House prices depicted recovery in Quarter 4 2020.



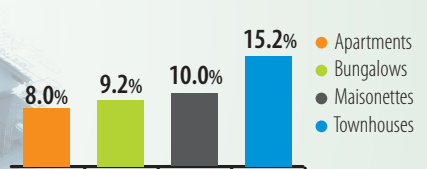
* Based on Base period Q1_2013

2 The main prices drivers were sensitive to:

Plinth area (size)
No. of Bedrooms
No. of Floors
Age



3 Market activity by house type



Quarter 3 House Prices in record drop, since 2014

Figure 2a: Cement production and consumption

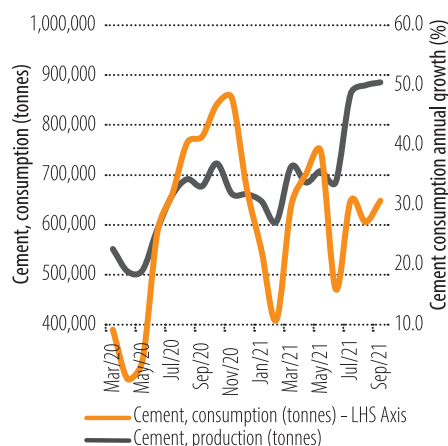
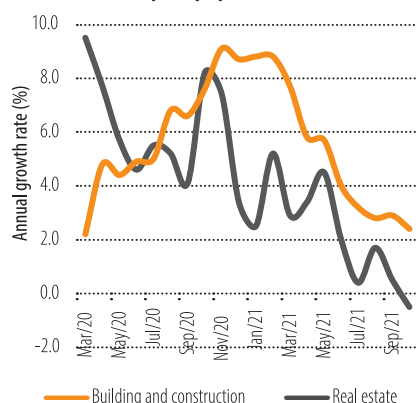


Figure 2b: Sectoral credit to the real estate, building and construction sector (y-o-y, percent)



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among home buyers mirroring the economic recovery observed in the second and third quarters of 2021. This is suggestive of the strengthening of the household's balance sheets as the adverse effects of the pandemic continued to wane.

Overall, in the interplay between demand and supply, construction costs rose during the quarter on account of increases in input costs as noted by KNBS (2021)². In addition, cement consumption (by quantum) surpassed production during the period, thus exerting upward pressure on cement prices. In particular, as production rose to 894,361 MT in September 2021 from 876,998 MT in July 2021, consumption also rose but by a higher margin, to 885,312 MT in September 2021 from 862,225 MT in July 2021 (Figure 2a). A key concern for the sector was the evolution of real estate financing and the building and construction sector activities. As growth in banking sector

lending to the building and construction sector slowed to 0.5 percent in September 2021 from 0.4 percent and 1.7 percent in July, and August 2021, respectively, loans to the real estate sector also further decelerated to 2.9 percent in September 2021 from 3.2 percent in July 2021.³ (Figure 2b).

The intersection of the demand and supply-side developments of the housing market resulted in a softening of prices; consistent with a market correction trend observed from the recent past. Other major concerns during the period, included the relatively low levels of concluded housing market transactions occasioned by the switch in April 2021 from manual processing of title transfers to an electronic system at the lands registry.

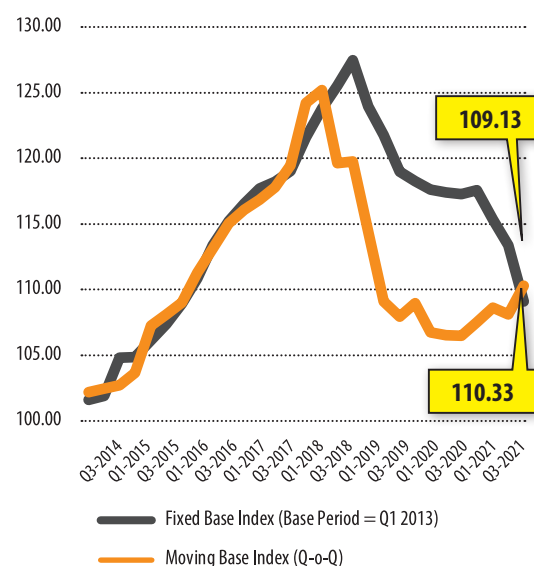
Nonetheless, analyses of the evolution of the specific indices of the KBA Composite Housing Price Index (KBA-HPI) indicate that house prices rose by 10.33 percent in the third quarter of 2021 compared with prices in a similar period in 2013 (Base period=Q1 2013) and by 9.13 percent based on the moving base index (Table 1, and Figure 3).

Table 1: Price Movement Series

Period	Index with a fixed base*	Index with a moving base
Q1-2017	115.92	116.37
Q2-2017	116.67	117.52
Q3-2017	117.59	118.01
Q4-2017	119.19	118.81
Q1_2018	123.83	121.29
Q2_2018	124.78	123.42
Q3_2018	119.38	125.10
Q4_2018	119.48	127.00
Q1_2019	114.30	123.56
Q2_2019	109.17	121.47
Q3_2019	108.02	118.76
Q4_2019	107.86	118.04
Q1_2020	106.87	117.44
Q2_2020	106.66	117.20
Q3_2020	106.63	117.11
Q4_2020	107.21	117.37
Q1_2021	108.69	115.23
Q2-2021	108.19	113.32
Q3-2021	110.33	109.13

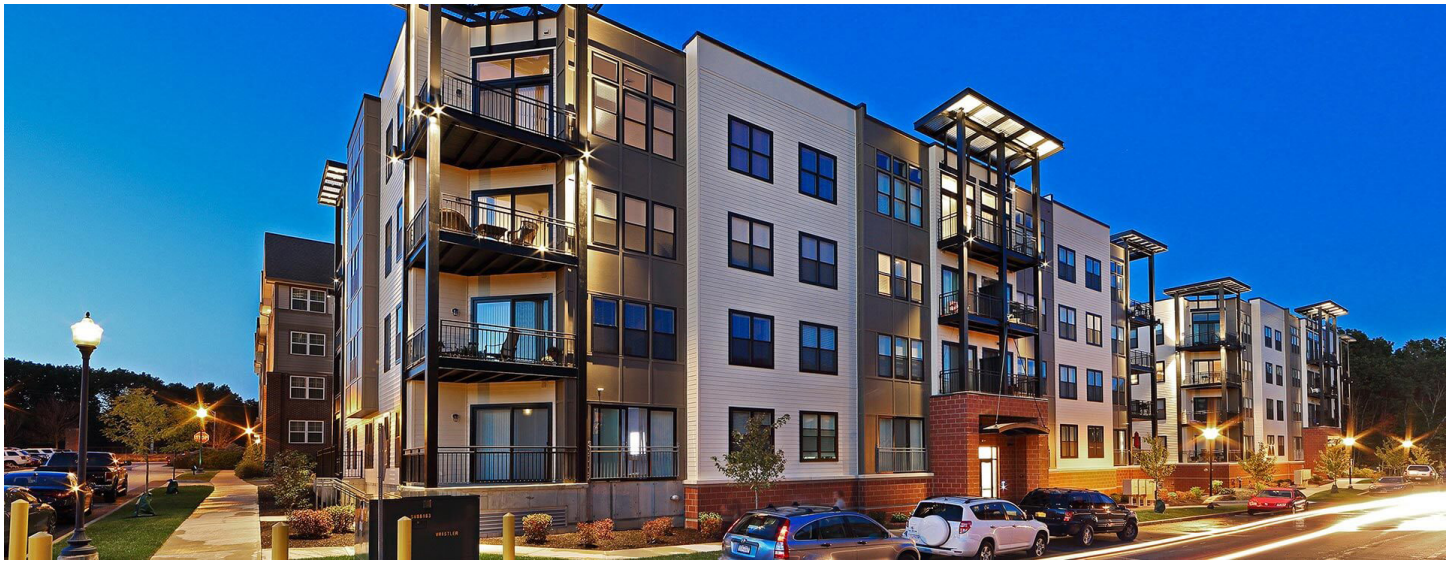
* Base Period Q1_2013

Figure 3: Sectoral credit to the private sector (y-o-y, percent)



2. See KNBS (2021). Construction Input Price Indices for the Third Quarter of 2021. <https://www.knbs.or.ke/download/construction-input-price-indices-for-third-quarter-2021/>

3. Despite depicting a marginal improvement from the 2.8 percent registered August 2021



Apartments in the lower market segment (region 1) dominated transactions during third quarter

Transactions in the lower-market segment (i.e., region 1) dominated during the third quarter of 2021 accounting for 70.1 percent of all the transactions; sustaining the trends registered in the previous quarter. However, activity in both region 2 and 3 contracted to account for 19.7 percent, and 10.3 percent of the all the concluded transactions, respectively (Figure 4a). In terms of the type of houses

transacted, apartments dominated, despite the fact that their share in total transactions contracted to 47.0 percent during the quarter compared to 81.1 percent in the previous quarter. The share of bungalows rose to 26.5 percent compared to 5.4 percent in the previous quarter. The share of maisonettes also registered some notable growth to 22.2 percent of all the transactions compared to 13.5 percent in

the previous quarter, despite remaining below the levels recorded over the third quarter of 2020. For the transactions analyzed, flats re-emerged to account for 4.3 percent of all transactions during the quarter (Figure 4b). The divergence in the proportions of house types by region and across types, characterize the dynamics in the market and the interaction between consumer preferences and the affordability of the houses.

Figure 4: Quarterly comparison of regional and house type distributions

Figure 4a: Quarterly distribution of house transactions by region (%)

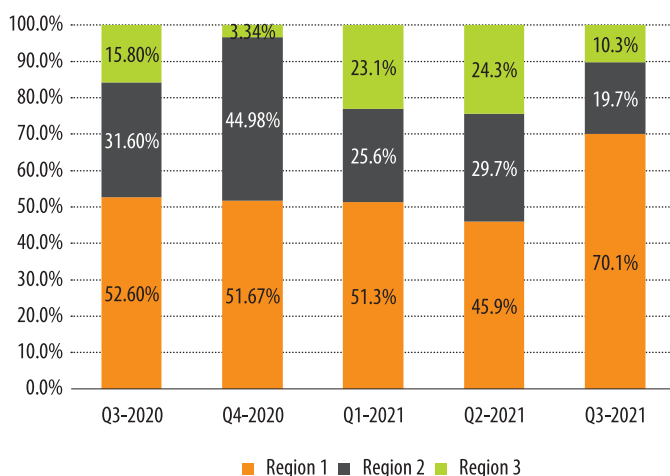
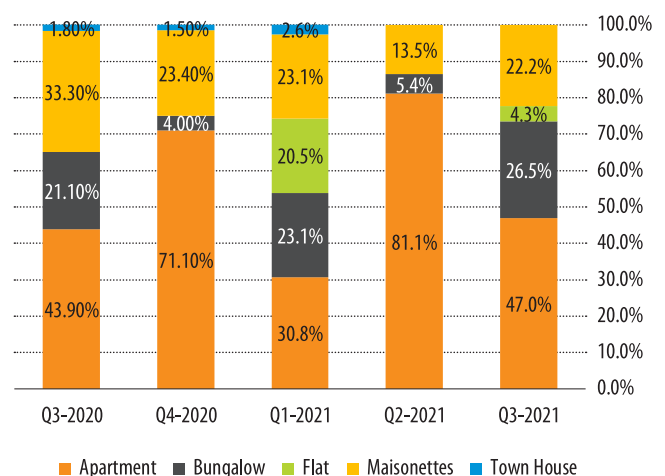


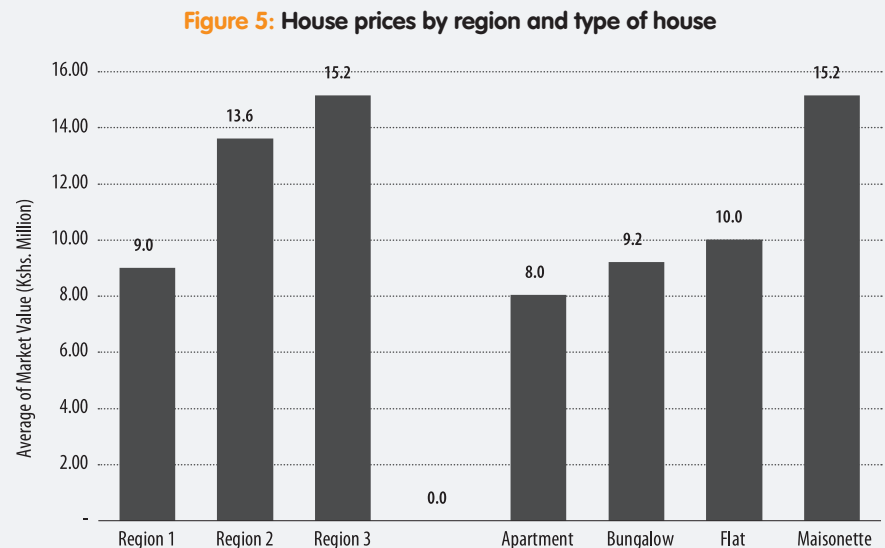
Figure 4b: Quarterly distribution of house transactions by house type (%)



House prices by region and type of house characterised by sizeable differentials

Across regions, house prices in the 'up-market' segment (i.e., region 3) remained high relative to the mid- and lower-segment. On average, its costs Kshs. 15.2 million to purchase a house on the up-market segment, compared with Kshs. 13.6 million and Kshs. 9.0 million in the mid and lower segments, respectively. By house type, the average price of maisonnettes stood at Kshs. 15.2 million, flats at Kshs. 10.0 million, bungalows at Kshs. 9.2 million, and apartments at Kshs. 8.0 million (**Figure 5**). For the houses traded- and used for these analyses- significant heterogeneities by region/ segment and type reflect a somewhat segmented market.

Similarly, analyses by plinth area across regions and by house type show marked differences. For instance, the highest average plinth area was for houses transacted in the mid-segment of the market (i.e., region 2) at 1,962.2 square feet, as



the respective plinth areas for the up-market (Region 3) and lower market segment (Region 1) averaged 1,457.9 square feet and 1,219.3 square feet respectively (**Figure 6a**). By house type, the average plinth area was highest for maisonnettes at 2,104.0 square feet, followed by bungalows at 1,664 square feet, while that of flats and

apartments was 1,351.5 square feet and 890.8 square feet, respectively (**Figure 6b**). Purchases of maisonnettes were driven by their structural benefits of providing larger plinth area; a key house demand feature particularly pursued by the mid to up-market segments.

Figure 6: Average plinth area across region and by house type

Figure 6a: Average plinth area across regions

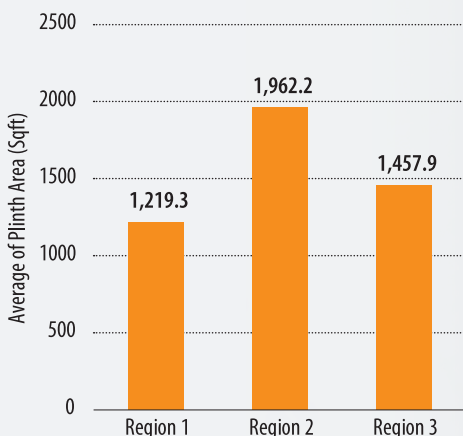
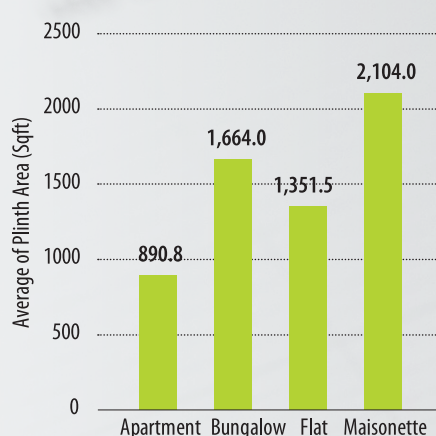


Figure 6B: Average plinth area by house type



Drivers of House Prices using a Hedonic Regression

Based on the hedonic regression analyses (whose results are presented in Table 2), a significant portion of house prices variations can be explained. The results suggest that house prices continued to reflect movements in its fundamentals. Overall, the model's goodness of fit measure; depicted by the F-statistic ($F(9,29) = 17.47$), whose probability was below 5%, was satisfactory, suggesting that the model estimated fits the data well. More importantly, the fundamental drivers of house prices included in the model jointly explain about 57.2 percent of the observed house price variations. The hedonic regression estimates for the third quarter of 2021 reveal two main patterns about the attributes of shadow prices, consistent with those from previous periods:

- First, the structural characteristics – that include plinth area, the number of bedrooms, bathrooms, and floors – are established to significantly drive average house prices. In particular, it is observed that an additional 10 percent increase in the plinth area is associated with a 2.6 percent increase in the average house prices, all other factors remaining largely unchanged. Similarly, a 33 percent increase in the number of bedrooms (say 1 more bedroom for a 3-bedroomed unit) on average increases the average price by 20.5 percent. House prices are also noted to increase with number of bathrooms and floors (See results in Table 2).
- Second, region/segment differences, as well as the type of house are also noted to be significant drivers of house price variations during the quarter. In particular, the hedonic regression results confirm our earlier view that house price variations were highest in region 3, followed by region 2 and lowest in region 1. Similarly, these changes for bungalows were highest, followed by maisonettes, then apartments and finally flats.

Based on the sizes of regression coefficients, the three most important drivers of house price changes (ranked from the most to the least important) include, number of bedrooms, the house being in region 3 (relative to region 2), and the plinth area.

The computation of the KBA-HPI is underpinned by estimating the weights and the shadow prices. The weighting scheme applied to the shadow prices varies from one quarter to another and relates to the units transacted during the quarter (See Technical Note for details).

The weights applied in the case of quantitative attributes (i.e., plinth area, number of bedrooms, number of bathrooms, and number of floors) are their respective averages, and proportions are applied as weights in the case of the qualitative attributes (i.e., type of house, and the region). The qualitative and quantitative parameters, that drive the house price change and feed into the

construction of the KBA-HPI, are based on an estimation of a hedonic regression. The regression generates the shadow prices or marginal contributions, taking cognizance of the heterogeneous nature of housing goods best characterized by their attributes.

The hedonic regressions recognize that a dwelling is composed of a bundle of characteristics for which no market for them exists, as they cannot be sold separately, so the prices of the characteristics are not independently observed. The demand and supply for the properties implicitly determine the characteristics' marginal contributions to the prices of the properties.

Technical Note

The index follows a Laspeyres index method. In this method, the index is computed by getting the ratio of the estimated current quarter price from the hedonic method (multiplied by the weights of the preceding quarter) to the price of the preceding quarter (multiplied by the respective weights of that quarter).

The weights of the quantitative variables are obtained by getting their respective mean values. For the dummy variables however, their weights are computed as the proportions of the number of houses possessing a certain attribute to the total number of houses. Thus the index is computed by the formula:

$$Index = \frac{\sum_{i=1}^n w_i \frac{\hat{P}_i}{\hat{P}_0}}{\sum_{i=1}^n w_0 \frac{\hat{P}_i}{\hat{P}_0}}$$

Where; \hat{P}_1 is the shadow price from the estimated hedonic function for the current quarter;

\hat{P}_0 is the shadow prices from the estimated hedonic function for the preceding quarter;

And w_0 are the weights of the respective variables for the preceding quarter.



4. For comparison purposes, the hedonic regression estimates for the fourth quarter of 2020, first, and second quarter of 2021 are presented in Tables 3, 4 and 5, respectively annexed to this report.

5. That is 0.62% times 33%.

Table 2: Housing Price Index Drivers for Quarter 3 of 2021

Source	SS	df	MS
Model	31.75	9.00	3.53
Residual	20.60	102.00	0.20
Total	52.35	111.00	0.47

Number of obs = 112.00
 F(9, 29) = 17.47
 Prob > F = 0.00
 R-squared = 0.607
 Adj R-squared = 0.572
 Root MSE = 0.449

	Coef	Std. Err.	t - stats	P> t	[95% Conf. Interval]	
Constant	12.85	0.50	25.89	0.00	11.87	13.83
Plinth Area	0.26	0.08	3.29	0.00	0.10	0.42
No. of Bedrooms	0.62	0.21	2.88	0.01	0.19	1.04
No. of Bathrooms	0.15	0.07	2.18	0.03	0.01	0.29
No. of Floors	0.07	0.03	2.19	0.03	0.01	0.13
House Type Dummy						
Region 1	-0.21	0.11	-1.82	0.07	-0.43	0.02
Region 3	0.35	0.19	1.89	0.06	-0.02	0.73
House Type Dummy						
Apartment	-0.10	0.12	-0.76	0.45	-0.34	0.15
Bungalow	0.02	0.14	0.17	0.87	-0.25	0.30
Flats	-0.12	0.23	-0.51	0.61	-0.57	0.33

Notes:

1. All the Quantitative variables (Plinth Area, No. of Bedrooms, No. of Bathrooms, No. of Floors) enter the hedonic regression function in their natural logarithm. The house price is also expressed in its natural logarithmic form.
2. Reference categories for the dummy variables for house types and region were maisonettes and region 2, respectively.



Housing Price Index
 Quarter 3, 2021 **+ 109.13**

Table 3: Housing Price Index Drivers for Quarter 2 of 2021

Source	SS	df	MS
Model	25.53	8.0	3.19
Residual	6.09	28.0	0.22
Total	31.62	36.0	0.88

Number of obs = 37.00
 F(9, 29) = 14.67
 Prob > F = 0.00
 R-squared = 0.807
 Adj R-squared = 0.752
 Root MSE = 0.466

	Coef	Std. Err.	t - stats	P> t	[95% Conf. Interval]	
Constant	13.77	0.17	81.85	0.00	13.44	14.10
plinth area	0.402	0.146	2.750	0.010	0.103	0.701
No. of bedrooms	0.697	0.493	1.410	0.169	-0.313	1.708
No. of bathrooms	-0.760	0.687	-1.100	0.279	-2.168	0.649
No. of floors	0.399	0.338	1.180	0.248	-0.293	1.092
House Type Dummy						
Region1	-0.474	0.211	-2.250	0.033	-0.906	-0.042
Region3	1.043	0.254	4.110	0.000	0.523	1.563
House Type Dummy						
Apartment	-0.818	0.434	-1.880	0.070	-1.707	0.071
Bungalow	-0.663	0.326	-2.040	0.051	-1.330	0.004

Notes: All the Quantitative variables (Plinth Area, No. of Bedrooms, No. of Bathrooms, No. of Floors) enter the hedonic regression function in their natural logarithm. The house price is also expressed in its natural logarithmic form



Housing Price Index
 Quarter 2, 2021  **113.32**

Table 4: Housing Price Index Drivers for Quarter 1 of 2021

Source	SS	df	MS
Model	9.33	10.0	0.93
Residual	1.55	28.0	0.06
Total	10.88	38.0	0.29

Number of obs = 39

 $F(9, 29) = 16.87$

Prob > F = 0.00

R-squared = 0.858

Adj R-squared = 0.807

Root MSE = 0.235

	Coef	Std. Err.	t - stats	P> t	[95% Conf. Interval]	
Plinth Area	0.244	0.079	3.090	0.004	0.082	0.406
No. of Bedrooms	0.804	0.284	2.830	0.009	0.222	1.386
No. of Floors	-0.452	0.232	-1.950	0.061	-0.927	0.023
No. of Bathrooms	0.086	0.210	0.410	0.686	-0.344	0.515
Regional Dummy						
Region 1	0.041	0.104	0.390	0.698	-0.172	0.253
Region 2	0.608	0.121	5.030	0.000	0.360	0.855
House Type Dummy						
Apartment	0.284	0.122	2.330	0.027	0.034	0.533
Bungalow	-0.076	0.143	-0.530	0.598	-0.369	0.216
Flat	0.398	0.165	2.420	0.022	0.061	0.735
Town House	0.447	0.269	1.660	0.107	-0.103	0.997

Notes: All the Quantitative variables (Plinth Area, No. of Bedrooms, No. of Bathrooms, No. of Floors) enter the hedonic regression function in their natural logarithm. The house price is also expressed in its natural logarithmic form



Housing Price Index
Quarter 1, 2021  **115.23**

Table 5: Inter quarter Sub-Regional Indices (Moving Base): Q2-2013 – Q4-2020

	Region 1			Region 2			Region 3		
	Apart-ments	Bunga-lows	Maison-ettes	Apart-ments	Bunga-lows	Maison-ettes	Apart-ments	Bunga-lows	Maison-ettes
Q3-2013	99.67	100.40	99.40	102.44	100.99	100.49	98.56	105.20	102.09
Q4-2013	100.74	102.82	99.38	101.80	100.82	98.81	103.75	103.95	100.32
Q1-2014	100.45	99.38	99.67	101.63	100.91	100.91	97.70	102.58	102.58
Q2-2014	100.50	99.67	99.54	100.75	101.75	101.27	96.70	102.74	103.32
Q3-2014	99.41	100.31	100.33	100.63	101.27	99.91	98.90	102.98	100.56
Q4-2014	97.48	99.29	105.21	97.82	101.98	99.61	104.54	104.36	100.62
Q1-2015	95.20	101.54	100.95	98.67	102.01	100.25	104.67	104.92	100.71
Q2-2015	102.92	102.78	100.53	101.11	102.05	100.77	105.23	104.91	102.51
Q3-2015	103.54	103.04	101.02	104.81	102.99	101.51	105.54	105.43	104.08
Q4-2015	105.23	104.57	104.66	104.84	103.47	102.43	106.25	105.37	105.26
Q1-2016	105.56	106.49	104.87	104.22	103.30	102.58	107.05	105.96	105.37
Q2-2016	103.48	104.08	102.96	100.19	100.30	100.93	101.23	100.96	100.27
Q3-2016	104.81	104.92	104.02	103.62	101.51	102.62	103.07	102.59	104.29
Q4_2016	106.82	105.05	104.83	105.04	102.61	103.60	105.72	102.94	105.94
Q1_2017	108.63	105.81	104.96	106.75	102.81	104.27	107.49	103.27	106.24
Q2_2017	109.73	105.97	105.22	107.86	102.96	104.27	108.65	103.83	106.70
Q3_2017	110.04	106.08	105.63	107.93	103.17	105.08	109.38	103.94	107.08
Q4_2017	111.53	106.86	106.04	108.61	103.51	105.84	110.63	104.04	107.75
Q1_2018	112.39	107.16	108.82	110.07	105.58	108.03	111.41	107.04	110.08
Q2_2018	113.30	107.92	109.49	110.96	106.33	108.70	112.31	107.80	110.76
Q2_2019	103.58	100.58	104.35	102.83	107.41
Q3_2019	100.97	114.91	98.75	95.66	99.22	99.84	99.36	.	102.67
Q4_2019	102.6	87.15	101.27	.	.	101.16	99.04	.	.
Q1_2020	103.07	101.38	103.91	102.03	100.14	102.35	99.96	104.29	103.92
Q2_2020	103.04	101.22	104.85	102.10	100.57	102.14	99.91	.	103.86
Q3_2020	102.57	101.11	104.45	101.80	100.53	101.66	101.02	104.21	103.84
Q4_2020	105.26	108.06	104.47	103.89	105.13	107.00	.	108.96	110.97

Note: The dot (.) as usually denotes insufficient observations to run the regression analysis. This is even the case where Apartments were not common in Region 3.

* Definition of the Sub-regions listed overleaf ** Base period: Q1_2013

THE DEFINITION OF THE SUB-REGIONS

REGION 1

Athi River, Mlolongo, Mavoko, Nakuru, Ngong, Ruaka, Syokimau, Embakasi, Kahawa Wendani, Thika, Mtwapa, Utange, Kitengela, Kiembeni, Nyeri, Likoni, Eldoret, Ruiru, Kilifi, Thika road (Kasarani, Roysambu, Ruaraka), Meru, Bungoma.

REGION 2

Thindigua (Kiambu Road), Kiambu, South B, South C, Kabete, Komarock, Imara Daima, Mombasa, Buruburu, Rongai, Waiyaki Way (Uthiru, Regen, Kinoo, Kikuyu), Mbagathi road, Ngong Road, Langata.

REGION 3

Kileleshwa, Kilimani, Lavington, Westlands, Spring Valley, Riverside, Milimani (Kisumu), Milimani (Nakuru), Runda, Karen, Garden Estate, Parklands, Ridgeways, Muthaiga, Loresho, Kitisuru, Adams Arcade, Nyali, Mountain View, Nyari.

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