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Inspecting the Nexus Between Internal Factors, External Factors, and House Prices: ARDL Approach on the Djiboutian Real Estate Industry

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ABSTRACT

Land business such as real estate has shifted radically in the course of the last years. What's more, it has been catching a lot of interest. In my country, Djibouti purchasing a typical house costs multiple times the yearly family income. Accordingly, the current paper analyzes the relationship that exists between various factors and house prices in the Djiboutian market. In this review, an ARDL approach was adopted to predict and foresee the factors that influence the Djiboutian real estate industry for a period of 29 years. The model demonstrated a positive and apparent link between the employment rate, manufacturing cost, national income, external debt, LGDP, tax, inflation, and house prices. Except for the inflation rate that displayed no remarkable influence on the Djiboutian real estate industry. The outcome will give a substantial and unmistakable examination to the Djiboutian populace to know better how their income affects their selections of houses and it will likewise give the public authority an understanding of the most proficient method to direct the rising costs of real estate in relation to residents' earnings. The paper will likewise extend the actual literature and add evidence concerning the real estate industry in the horn of Africa, especially the Somali peninsula.

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1. Introduction

The real estate industry is considered a phenomenon across countries and histories. The industry showcases a want and a need, a portion of individuals utilize houses as a means of housing and family building, whereas others consider purchasing a house a tool to broadcast their affluence. And others purchase for the sake of tangible investments (Delmendo, 2020). The consumption of real estate offers a cover and a significant tool of abundance for families. Subsequently, buying a house means a lifetime accomplishment for some families and addresses one of the biggest tools of Homeownership, therefore denotes a deposit of wealth and a wellspring of income assortment for the government (Diamond & Mcquade, 2019).

One of the first industries to encounter a gloomy state of things in terms of many types of activities, such as sales, values, availability, financing, building, and lending, is the real estate sector (Ricks, 2020). Real estate is very intimately related to a specific geographic area, which has an impact on both the balance between the sale and acquisition of real estate as well as the value of individual properties. Disasters could disrupt this, leading to an imbalance in space between urban and rural areas. Conflicts between formal and informal property also result from legal inconsistencies relating to real estate. Lack of legislative requirements for everyone to be eligible for sustainable housing, whatever their location, is the challenge (Brotman, 2021). Coping with double standards, which dishonest communities can enact to protect the safety of the elite's property while battling the presence of vulnerable people on unofficial land, is an even bigger problem. Three fundamental factors such as land use pattern, population density pattern, and neighborhood unit design can be used to describe the spatial component of cities. But when both are subject to human activity, cities are defined by a variety of dynamic interactions between the social networks and physical elements, constituting the urban system (Feres, 2021).

For a country to advance and develop the real estate industry is an indispensable factor. That is why most countries around the globe are providing many regulations such as tax exoneration to make house prices proportional to the income earned. And apparently, it is something Djibouti is lacking and failing to achieve. China the investment in real estate promoted 3311.98 hundred million in 2000 to 44319.69 hundred million yuan in 2011 which is 13 times higher. These results indicate how vital are household spending and real estate investment for the macro economy. Other data revealed that real estate benefit in the USA is close to their annual average GDP (Hong, 2014). The real estate sector participates a crucial role in a nation's economic growth since the linkage of government policies on the real estate industry and the volatility of house prices influence the population's purchase of houses. For example, increasing house costs and offering a low-interest rate motivate households to purchase houses and enhance housing finance which as a result ameliorates economic performance (Gardner, 2019).

House prices have increased unprecedentedly in Djibouti. It takes almost 10 months for an average person to buy a house, and taking a loan from the bank is not helping the case with their unimaginable loan conditions. A lot of questions arise about this price increase. When the average income increased only twice the cost of houses increased ten times over the last decades. What increased the house's prices 10 times from their normal cost? Consequently, this paper explores the real estate industry of Djibouti by utilizing an ARDL model to assess the cointegration between various factors and house prices. Moreover, the real estate industry in the horn of Africa has not been investigated sufficiently, which means there is a lack of geographic information about the region since we possess little information about the Somali peninsula when it comes to purchasing houses. Therefore, in this paper, we hypothesize the presence of a prominent link between internal and external factors and the cost of real estate in Djibouti.

The study is composed of the following. Section 1 will consist of background studies where the past literature on our topic will be dissected and reviewed. Section 2 involves presenting the methodology adopted by the study and how the data was collected. Furthermore, section 3 compromises displaying the findings, and finally section 4 consists of a discussion and conclusion.

2. Literature Review

All the more explicitly, starting from early 1997 to 2002, actual house costs increased around 28% while the actual per capita of each individual went up only around 15%. Interestingly, during the

past 20-year time span, actual house costs increased just 13% while the new exhibition of house costs relative to income is taken as proof by some that house costs are off the mark with "essentials," and that costs should deteriorate or tumble to permit income to catch up (Glaeser, 2002). In a study conducted by Byrne and Norris (2022) they stated that the increase in housing costs across the countries is a significant contributing element of homelessness, especially among the youth, The never ceasing increase of prices in the real estate industry, is mainly affecting young people in relevance to other demographic individuals. In emerging countries and African countries, the real estate industry is considered a vital employment engine next to agriculture. This is a result of the channel in reverse and forward linkages that exist with the other sectors such as the construction and infrastructure sectors (Kisho & Marfatia, 2017). For governments, the prices of houses represent a noteworthy restriction on solving poverty. Investigation of spatial destitution traps has exhibited that the more underprivileged people's house cost increase in relevance with rich people abundance disparity is probably to go up (Rehman, Ali, & Shahzad, 2020).

Al-Masum and Lee (2019) presume that real estate markets with more adaptable and straightforward circumstances are more subjected to greater instability. The experimental examination of (Asal, 2018) doesn't uphold the cointegration between earning and lodging costs over the long run. Bahmani-Oskooee and Ghodsi (2016) discover that per capita pay and lodging costs are emphatically and unequivocally related and the significance of the typical measure of borrowings which is straightforwardly connected with the low-loan fees as the primary inspiration driving the shift in housing costs.

2.1 Does income inequality affect house prices?

One of the fundamental requirements for the settlement and development of individuals is housing or shelter. Thus, through increased investment and job creation, the housing market is one of the variables that influence any nation's socioeconomic development and serves as a tool for economic growth in some industrialized and emerging nations (Aha, 2018). The cost of housing is likened to a two-edged sword. On the one hand, rising home costs are preferable since they boost the economy by generating wealth. However, a rise in housing costs diminishes demand for homes and results in rising rental rates, which is detrimental to both the economy and society (Ahmed, 2020). Additionally, rising housing costs could result in rising household spending, which could then fuel high inflation and macroeconomic instability. Therefore, rather than increasing productivity, the adverse effects of high housing costs include a decrease in the wealth impact, a decline in township housing, and an increase in housing investment (He, Hu, Wang, & Yao, 2020).

Confronted with a restricted supply of lodging stock, similar to the case in a large number of top-level income nations, this inserts upward pressure and tension on housing costs, forcing low earners workers out of the market Monfared & Pavlov (2019). Additionally, as an immediate aftereffect of the offering system, that increases the worth of houses, property holders and financial backers anticipate that house costs should continue to go up and hold on to properties that in any case would have been put onto the market, further confining supply and forcing costs up Muzindutsi, Jamile, Zibani & Obalade (2020). The property market, often known as the real estate industry, is crucial for speculators, land developers, and regulators as well as for the nation's economy. However, one of the most significant economic difficulties of the twenty-first century is the level of property prices, which was made even more problematic by the worldwide financial crisis of 2008 (Parrikar, 2019). It is also asserted that the pre-crisis housing bubble was one of the origins and initiators of the financial crisis of 2008 albeit it was also impacted by the same catastrophe (Kleinman, 2020).

A connecting element is that as individuals acquire more, they become less open to properties and houses that are being constructed and built in the close area to them and are more able to pay to restrict development in spaces lining them, further confining supply (Gyourko, Mayer & Sinai, 2013). A subsequent prompt peculiarity by which earning difference and housing price are associated is that imbalance has been associated with placing assets into lodging, expanding the desire for acquiring houses demonstrates that real estate became a measurement for social and financial accomplishment (Nakajima, 2005). This clearly showcases the extended use of lodging by the rich as a self-absorbed exhibition of affluence and abundance, while lodging use for shallow reasons represents mimicry tries of lower-pay laborers (Dwyer, 2009). The outcome of this phenomenon made the housing stock more overpriced. For globally engaging urban communities, which have set up strategies intended to draw in the unfamiliar venture, expanded pressure from utilization streams stems from local people, yet additionally from global financial investors who may not be guaranteed to involve those houses for significant stretches of time (Chong, 2007).

A study carried out by authors such as Coskun and Jadevicius (2017) observed the presence of a positive connection between interest rates, income, housing purchasing, and urbanization. The authors find that housing prices are extremely sensitive to changes in income and monetary policy. They come to the conclusion that Turkey's housing market is a crucial tool for implementing monetary policy in the real economy. (Kolcu & Yamak, 2018) research demonstrates that long-term changes in income level have a favorable impact on housing values. On the other hand, while interest rates on mortgages have little impact on home prices over the long term, they do have a big and detrimental impact in the short term.

The income volatility and climate change-related savings issues affect households in developing economies as well. They also experience limitations in the insurance and low credit sectors, as well as social coverage. Following these obstacles, emerging nations frequently experience issues with the allocation of savings, which makes it difficult to decide on profitable investments (Watson, 2019). Another issue for households in emerging nations is finding a source of income. Although there are many options for capital investment, domestic savings and investing in real estate are the most dependable option (Kenjio, 2020). It is claimed that raising money from domestic sources is known to be the engine of economic growth in developing nations. The economic well-being of households is frequently threatened in developing nations like those in East Africa as a result of surging prices in tern of real estate, income volatility, and basic consumption (Rosenthal, Strange & Urrego, 2022).

2.2 Factors that affect the real estate industry

We mentioned a booming construction industry four years ago. Long-standing perceptions of rapid real estate growth exist. However, the scenario seemed clear-cut and warmly accepted due to the strong economy, as well as the positive reactions of investors, contractors, politicians, and economists. Building companies have exhausted their supply of work, and shareholders have been well-positioned and supported by their income. In most nations, five to seven percent of the nation's GDP was contributed by the construction industry. Investors took out loans with high-interest rates for a longer time, which pleased the banks (Golob, Bastic & Psunder, 2012).

Additionally, (Case, 2003) emphasized in their study that it is important to establish and routinely monitor the findings of measures of many elements affecting the real estate market. They discovered that investors who reside in developed cities think that real estate prices can remain stable and that there is only minimal price risk at very high price levels. Researchers believed that investors are thinking incorrectly, according to their research. According to (GE, 2008), both internal and

external forces have an effect on the real estate market. They were reduced to the internal ones. Those factors consist of credit conditions, inflation, economic development, interest rates, the location of the property, and the speed of sales of real estate.

According to Guo, Yuan, & Chen (2011), the real estate market has a significant impact on economic growth. However, he discovers that the conventional real estate operating model is detrimental to the realization of national economic interest, limits the process of modifying the national living environment, and reduces the effectiveness of the market economy. Additionally, they learn that both the expansion and scope of property investment can be used to facilitate the real estate industry's development on economic growth. For property investment, interest rates are also crucial. Without buying or selling the underlying asset directly, Ciurlia and Gheno (2009) stated that the real estate derivatives market enables investors to minimize risk and return the expository shape to property. Given how quickly a market is expanding, there is an urgent need to use straightforward pricing strategies.

In their study, Frappa and Mésonnier (2010) discovered strong support for the favorable impact of inflation targeting on actual house price rise and the ratio of house price to rent. Additionally, the success and profitability of businesses are significantly impacted by inflation. Real interest rates are lowered as a result of inflation, but because of the inflationary pressure, nominal interest rates will also decline. In addition to that, the location of the property may be a vital determinant of the house price. In particular, many qualities may be assessed using the pertinent future indices. Differences in the year, real estate property size, style, or asset amortization may be particular.

In real estate literature, it has been recommended that house cost and income amount ought to have proportional and long-run balance relationships, for example, cointegration (Goodman, 2008). Nonetheless, divergence is generally identified between house cost and earnings all around the globe so the lodging reasonableness and affordability issue has been a significant issue in numerous regions and is broadly examined. During the last few years, numerous nations have encountered quick increments and high unpredictability in house costs. Contrary, the increase in earnings and incomes is moderately slow and gives off the impression of being not able to reach the expanded house cost (Chen, 2004). Several countries such as Ireland, Japan, the United Kingdom, and Thailand have suffered a problem with affordability. For instance, Taiwan's housing cost has gone up quickly over the course of years (Banerjee, 1999). An uncommon peculiarity in Taiwan is that house cost rises significantly more quickly than the population income, and hence the Taiwan lodging framework is continually under the tension of affordability issue. In the last 30 years (1973-2002), the actual expansion in normal house cost in Taipei has been 7.0%/annum with a 21.1% standard deviation, showing an exceptionally high pace of increment and high levels of house cost. In any case, family pay during similar periods has expanded by just 4.4% with a 6.2% standard deviation. Affordability is a diverse part of multidimensional elements. An action is connected to various particular, yet, related, metropolitan aspects, for example, land use, network designs, and populace dispersion (Miller, 2018).

3. Methodology

3.1 Data Sources

In this study, the data used is secondary data published by the world bank over the period 1991 until 2020. We incorporate the house prices in Djibouti as a dependent variable to estimate the model. Some other variables such as GDP, national income, external debt, employment, inflation rate, amount of tax paid, and total manufacturing cost was also selected to assess the Djiboutian real estate industry. Consequently, to carry on with the study and forecast the long-run relationships from short-run

dynamics an Autoregressive Distributed Lag (ARDL) is performed.

Table 1: Variable Definition

Variables	Definition	Source
Years	**1991 until 2020**	
HP	Average house price in Djibouti	Department of the ministry of budget in Djibouti
LGDP	The logarithm of GDP per capita (current US$)	World Bank
INC	Net national income (current US$)	
EMP	Percentage of total employment	
TAFM	Tariff rate, applied, simple mean, manufactured products %	
TAX	Tax payments	
DB	External debt	Country Economy
INF	Inflation, consumer prices (annual %)	The statistics portal for market data

3.2 Econometric Model

We apply the ARDL approach to cointegration for empirical analysis. The ARDL technique has the benefit of not require the same degree of integration for each variable, which is one of its benefits. It does not really concern if factors have varied order of integration, integration of order zero, or integration of order one. ARDL has an advantage over traditional cointegration methods because of this characteristic. Standard cointegration procedures become unstable when there is a mixed order of integration because the test's ability to detect cointegration is reduced.

There are two steps in the ARDL approach. First, the F-statistic is used to examine the long-term association between the variables. In the unconstrained error correction model, the significance of the lagged values of the variables is evaluated using the F-statistic (ECM). The second step is to derive the parameter estimates for the long-run relationship's error correction model. Consequently, since we could not obtain a cointegration among the variables in the long run we only performed the short-run cointegration which is specified by the below equation.

Our model's general functional form is as follows:

$$\mathbf{HP}_t = \mathbf{Y_t, LGDP_t, INC_t, EMP_t, TAFM_t, TAX_t, DB_t, INF_t} \quad (1)$$

$$\mathbf{HP} = \int (lGDP, INC, EMP, TAFM, TAX, DB, INF) \quad (2)$$

We employ the log-linear assumption for empirical purposes because it yields effective outcomes and makes it simple to comprehend estimated parameters. The following is how the functional form of house price model is put together:

$$HP_t = \beta_0 + \beta_1 LGDP_t + \beta_2 INC_t + \beta_3 EMP_t + \beta_4 TAFM_t + \beta_5 TAX_t + \beta_6 DB_t + \beta_7 INF_t + \varepsilon_t \quad (3)$$

In this equation, βo is the constant, and εt is regarded as the equation's error term. The parameters of $\beta 1$ through $\beta 7$ are the coefficients that are utilized to calculate the house price. The below table contains the short-run equation used to estimate the ARDL Bounds testing.

$$\Delta HP_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta HP_{t-i} + \sum_{i=1}^{q} \beta_2 \Delta LGDP_{t-i} + \sum_{i=1}^{q} \beta_3 \Delta INC_{t-i} + \sum_{i=1}^{q} \beta_4 \Delta EMP_{t-i} + \sum_{i=1}^{q} \beta_5 \Delta TAFM_{t-i} + \sum_{i=1}^{q} \beta_6 \Delta TAX_{t-i} + \sum_{i=1}^{q} \beta_7 \Delta DB_{t-i} + \sum_{i=1}^{q} \beta_8 \Delta INF_{t-i} + e_t \quad (4)$$

4. Results and Discussion

A preliminary study of summary data and a correlation coefficient analysis opens this section. Table 2 provides the fundamental estimation of the central tendency and distribution of the variables, and it is clear that over the study period, TAX per capita has the greatest average of 24.60 and EMP has the lowest average of 0.834. We also notice that, with the exception of HP, EMP, and TAX, series are favorably skewed across the analyzed time frame. Except for INF, all variables exhibit moderate tails in terms of dataset peaks as indicated by Kurtosis. Since we are unable to reject the Jarque-Bera probability, the normality analysis test reveals that all series are normally distributed, which is desirable.

Table 2: Descriptive Statistics

	HP	LGDP	INC	EMP	TAFM	TAX	INF
Mean	4.161034	3.090757	8.946672	0.834333	15.25433	24.60000	2.215954
Median	4.487280	2.971127	8.855661	0.850000	18.00000	23.00000	1.879688
Maximum	5.092159	3.507816	9.465647	0.930000	33.49000	36.00000	11.95862
Minimum	2.761928	2.877089	8.668920	0.700000	0.000000	0.000000	-0.847390
Std. Dev.	0.777962	0.238051	0.270914	0.057517	13.70503	10.50648	2.419940
Skewness	-0.565566	0.707503	0.717582	-0.788655	0.006885	-0.956653	2.158771
Kurtosis	1.806312	1.858283	2.042493	3.207855	1.389028	3.642691	9.797201
Jarque-Bera	3.380440	4.132201	3.720642	3.163890	3.244275	5.092237	81.05389
Probability	0.184479	0.126679	0.155623	0.205575	0.197476	0.078385	0.000000
Sum	124.8310	92.72271	268.4002	25.03000	457.6300	738.0000	66.47863
Sum Sq. Dev.	17.55153	1.643381	2.128435	0.095937	5447.010	3201.200	169.8272
Observations	30	30	30	30	30	30	30

The pairwise correlation between the different variables, which is underlined in Table 3, is what we attempt to investigate. There is a substantial statistical relationship between GDP, INC, EMP, TAX, and DB to house prices ($p < 0.01$). This shows that a high level of house prices is correlated with increased GDP, income, employment, taxes, and national debt.

Table 3: Correlations Matrix

Variables	HP	GDP	INC	EMP	TAFM	TAX	INF	DB
HP	1.000							
LGDP	0.798	1.000						
INC	0.840	0.993	1.000					
EMP	0.724	0.441	0.481	1.000				
TAFM	-0.210	-0.092	-0.099	-0.194	1.000			
TAX	0.836	0.762	0.773	0.739	-0.172	1.000		
INF	0.325	0.044	0.070	0.172	-0.231	0.234	1.000	
DB	0.867	0.921	0.952	0.494	-0.111	0.764	0.124	1.000

The current study then uses the ADF and PP unit root tests to investigate the characteristics of stationarity of the studied variables. After running the test all the variables were revealed to be stationary at first difference which implies the dataset satisfies the test of I (I) and not I (2).

Table 4: The results of Unit root test

Variables	Panel A: Augmented Dickey-Fuller test				McKinnon Critical Value
	At level	Note	At first difference	Note	
HP	-1.792	Not stationary	-4.642***	Stationary	1% - 3.750 5% - 3.000 10% - 2.630
LGDP	1.315	Not stationary	-4.012***	Stationary	
INC	2.06	Not stationary	-2.795*	Stationary	
EMP	-2.199	Not stationary	-5.045***	Stationary	
TAFM	-6.44***	Stationary	-7.319***	Stationary	
TAX	-2.278	Not stationary	-5.527***	Stationary	
INF	-3.721**	Stationary	-8.328***	Stationary	
DB	0.9705	Not stationary	-4.297***	Stationary	

***, **, and * indicate significance at 1% and 5%, and 10% level respectively

Table 5: The results of Unit root test part 2

Variables	Panel B: Phillips–Perron test				
	At level	Note	At first difference	Note	
HP	-1.288	Not stationary	-29.424***	Stationary	1% - 17.200 5% - 12.500 10% - 10.000
LGDP	0.914	Not stationary	-23.227***	Stationary	
INC	1.285	Not stationary	-11.870*	Stationary	
EMP	-5.301	Not stationary	-27.560***	Stationary	
TAFM	-25.629***	Stationary	-28.584***	Stationary	
TAX	-4.226	Not stationary	-28.637***	Stationary	
INF	-19.885***	Stationary	-35.825***	Stationary	
DB	0.054	Not stationary	-22.906***	Stationary	

***, **, and * indicate significance at 1% and 5%, and 10% level respectively

Consequently, it is important to look into long-run characteristics. To determine the best-performing model, we investigate the lag criterion selection prior to the examination of long-run equilibrium. Therefore table 6 suggests that 2 is the appropriate lag order for the study.

Table 6: Log order selection criteria

Lag	LogL	LR	Df	P	FPE	AIC	HqIC	SBIC
0	-72.1007				6.6e-08	6.16159	6.27306	6.5487
1	105.04	354.28	64	0.000	1.4e-11	-2.54153	-1.53827	0.942435
2	272.882	335.68	64	0.000	**2.9e-14 ***	**-10.529***	**-8.6343***	**-3.9485***

According to the bounds test result presented in Table 7, the estimated F-statistics for the house price specification are less than the upper bound critical value with a value of 1.59. Thus, it suggests that long-run cointegration does not exist. As a result, the model will only estimate the short-run cointegration.

Table 7: ARDL bounds test

Model: F (HP, GDP, INC, EMP, TAFM, TAX, INF, DB)								
Optimal Lag Length: ARDL ((2,2,2,2,2,2,2,0)								
F-statistic: 1.591								
T-statistic: -2.314								
Critical Value	10%		5%		2.5%		1%	
[I_0]	[I_1]		[I_0]		[I_0]		[I_0]	[I_1]
F	2.030	3.130	2.320	3.500	2.600	3.840	2.960	4.260
T	-2.570	-4.230	-2.860	-4.570	-3.130	-4.850	-3.430	-5.190

Table 8, demonstrates the short-run estimation result. The factors employed in the study have a distinctive impact on house prices. More importantly, the impact varies among the lags. Starting with the LGDP, we notice that an increase of 1% in LGDP at lag (2) reduces house prices by 6.75% and with ($p < 0.10$) statistical level. National debt revealed a similarimpact, since a 1% increase in the Djiboutian national debt decreases the house price by 3.19% with ($p < 0.05$) significance level. On the other hand, an increase in national incomeat lag (2), manufacturing cost at lag (1), and employment at lag (2) rise the house prices by 10%, 0,02%, and 4.77% respectively. This mainly indicates that in Djibouti the national income, employment, and manufacturing cost plays a vital role in increasing the value of thereal estate industry. Finally, the model illustrated that the inflation rate does not have any noteworthy impact on the Djiboutian real estate industry. This can be explained by the fact that the Djiboutian currency does not fluctuate since it is tied to the dollar.

Table 8: ARDL short-run estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
HP (-1)	0.119775	0.350848	0.341388	0.7444
HP (-2)	0.426788	0.305339	1.397751	0.2117
LGDP	-5.142479	3.036428	-1.693595	0.1413
LGDP (-1)	5.531515	3.600362	1.536378	0.1754
LGDP (-2)	-6.759223	3.142411	-2.150967	**0.0750***
INF	0.055	0.027	2.040	0.088*
INF (-1)	-0.033155	0.017858	-1.856551	0.1128
INF (-2)	-0.022064	0.018183	-1.213448	0.2706
DP	-3.196552	1.294923	-2.468527	**0.0486****
INC	6.549699	3.598083	1.820330	0.1186
INC (-1)	-7.813416	4.288050	-1.822137	0.1183
INC (-2)	10.01134	4.057149	2.467581	**0.0486****
TAFM	-0.003984	0.003276	-1.216046	0.2696
TAFM (-1)	0.012	0.006	2.070	**0.083***
TAFM (-2)	-0.006412	0.003567	-1.797369	0.1224
TAX	0.003237	0.010693	0.302728	0.7723
TAX (-1)	-0.006190	0.011056	-0.559871	0.5958

TAX (-2)	0.017386	0.010529	1.651276	0.1498
EMP	-2.246985	1.896602	-1.184743	0.2809
EMP (-1)	-0.437592	1.616868	-0.270642	0.7957
EMP (-2)	4.772544	2.225494	2.144488	**0.0757***
C	-30.41466	13.98925	-2.174145	**0.0726***
R-squared	0.995132	Mean dependent var		4.258679
Adjusted R-squared	0.978096	S.D. dependent var		0.708283
S.E. of regression	0.104826	Akaike info criterion		-1.642053
Sum squared resid	0.065931	Schwarz criterion		-0.595321
Log-likelihood	44.98874	Hannan-ǫuinn criteria.		-1.322056
F-statistic	58.41220	Durbin-Watson stat		1.922427
Prob(F-statistic)	0.000028			

***, ** and * indicate significance at 1% and 5%, and 10% level respectively

Different diagnostic tests have been presented in Table 9. The results indicate that our estimated model is satisfied. The LM test for serial correlation shows that the issue of serial correlation does not affect our empirical findings. Also, the White test is used to test for heteroscedasticity, and this again demonstrates that our results are free from heteroskedasticity. In addition to that, we observe the Durbin-Watson test that is close to 2.0 which implies the model is not suffering from autocorrelation.

Table 9: Diagnostic test

Tests	**Prob**	**Verdict**
Durbin-Watson	1.922427	No prominent autocorrelation
Breusch-Godfrey LM test for autocorrelation	0.8051	No serial correlation
White's test for heteroskedasticity	0.4110	The model is free from heteroskedasticity

To determine the model stability, we perform the cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of the square of the recursive residual (CUSUMSǫ). The plots for CUSUM and CUSUMSǫ are shown in Figures 1 and 2, respectively. The estimated line is well inside the critical bounds at a 5% level of significance, as seen in both figures, indicating that the model is stable and dependable.

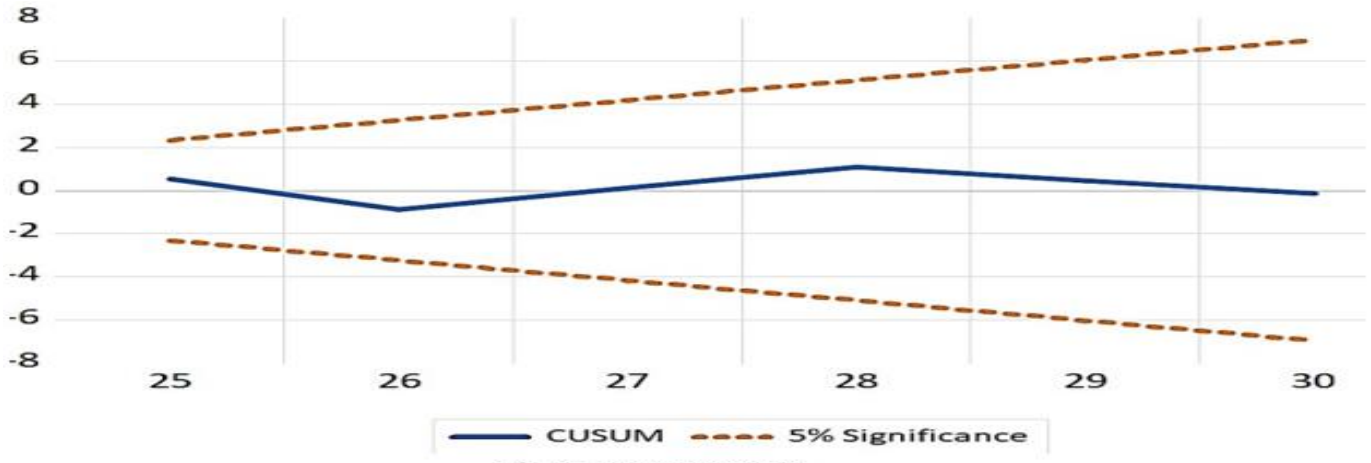

Figure 1 CUSUM Test

Figure 2 CUSUM Square Test

To sum up, the last 10–12 years have been the most significant period in African real estate, according to many specialists. We have transitioned from a glut of foreclosed properties, hesitant purchasers, and wary lenders to skyrocketing prices, a dearth of available properties, and heated competition. African countries are experiencing unprecedented and dysfunctional urbanization due to the present demographic surge. Finding adequate property has turned into a major issue. The rate of urbanization on the continent is the highest in the world. The pace of urban population increase has reportedly attained 3% annually, according to UN-Habitat. In reality, assuming the current course of events continues, the urban population will increase from 40% in 2009 to 60% in 2050.

The government has taken numerous initiatives to increase housing accessibility for underprivileged individuals. However, the issue continues, and the size of the ghetto is growing. As a result, only members of the upper social classes can afford to reside inadequate homes. This condition widens the divide between the rich and the underprivileged and calls for several steps to ensure shelter for everyone. Public authorities in several East African countries have chosen to construct low-cost or affordable state housing as a means of halting the growth of slums. Nevertheless, the targeted underprivileged demographic was not benefited from such initiatives, and civil servants benefited from them. These types of initiatives were unsustainable due to rising demand and a shortage of public financial resources. In previous initiatives, the Djiboutian government constructed houses for newlyweds in order to support them and relieve some of the unbearable housing costs however, the targeted demographic could not benefit fromsuch policies.

Housing demand is essentially limitless in theory. People with adequate homes seek larger and more comfortable homes, whereas those without adequate homes yearn for one. Unfortunately, this need is not actually satisfied, particularly due to financial constraints. Besides regulations limiting property accessibility prevent numerous social developments of real estate proposals. Additionally, because credit institutions are reluctant to support public building projects, it is challenging for developers of residential properties to find long- period funding. In addition to these challenges, the availability of competent individuals, fundamental infrastructure (including such roadways, energy, water, etc.), and high building prices cannot be ruled out. In Djibouti for an average person to purchase a house, there will be many conditions that need to be stultified. First, the individual has to consult the government for the land purchasing (the Djiboutian government monopolized and control the real estate industry), next after satisfying the government requirement the person purchases the land based on two options, with the help of a bank (the bank offer a loan and even a construction contract for a

long-term interest rate) or from a personal investment which is nearly impossible because of the astronomical house prices.

In relevance with our short-run model outcome. The variables used in the study displayed distinctive effects on housing costs. What's more, the influence differs between the lags. Starting with the LGDP, we see observed an increase of 1% in the LGDP at lag (2) resulting in a 6.75 percent decrease in housing prices with a statistical threshold of (p 0.10).The impact of the national debt was comparable, with a 1% increase in Djibouti's national debt decreasing home prices by 3.19% with a significance level of (p 0.05). The price of homes increases by 10%, 0,02%, and 4.77%, respectively, in response to increases in national income, manufacturing costs, and employment. The primary takeaway from this is that Djibouti's national GDP, employment rate, and manufacturing costs all have a significant impact on how valuable the real estate sector becomes there. The model also showed that the Djiboutian real estate market is not much impacted by the inflation rate. This can be explained by the fact that since the Djiboutian currency is linked to the dollar, itdoes not fluctuate.

5. Conclusion and Implication

The lack of efforts to address the housing problem in Djibouti highlights the necessity of doing a more comprehensive examination of the demands of the populace and taking the surroundings of the homes into account. To put sustainable housing policies into practice on a bigger scale, we need a fundamental change. A strategy that will incorporate all of the sector's participants in various fields and take into account important variables including the accessibility of property investment, the national income level, the permitted forms of leasing, the financing sector, and the infrastructure situation.

As a result, the study shed the light on the relationship that exists between various factors and house prices. A data of 29 years (1991 until 2020) was collected from sources such as ministry of budget and finance in Djibouti, the World Bank, Statista, and the country's economy. To carry on with the investigation an Autoregressive Distributed Lag (ARDL) Model was performed. Consequently, the short-run findings unveiled a positive and apparent link between the employment rate, manufacturing cost, national income, external debt, LGDP, tax, inflation, and house prices. Except for the inflation rate that displayed no apparent influence on the Djiboutian real estate industry. Nevertheless, those impacts varied across the variables. For instance, LGDP and external debt reduced house prices. Whereas the rest increased the Djiboutian real estate industry's value in conformity with the results, we suggest that a partnership with the private sector is required because government funds won't be enough to cover the surging costs of housing problems. Subsidies to the private industry that are only basic simply will not work well. Implementing leverage-producing incentive mechanisms is the answer in this case. To ensure the integrity of the system, government bodies should provide a favorable climate for investors and establish appropriate legislation and regulations and monitor the increasing house prices in consonance with the Djiboutian populace. Finally, the paper will offer a concrete framework for the real estate industry in Djibouti. It will also provide empirical evidence to the experts and the Djiboutian government to know the necessary regulations concerning the real estate industry in proportion to income.

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