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FISCAL AND REAL REPERCUSSIONS OF THE CENTRAL BANK OF IRAQ'S REAL ESTATE INITIATIVES BY USING MULTIPLE CORRESPONDENCE ANALYSIS

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Abstract

The importance of the study stems from the fact that Iraq's economy is facing a housing crisis, especially in the Iraqi capital, Baghdad, great demographic pressure due to pronounced population growth over the past two decades. The Central Bank of Iraq undertakes several initiatives represented in granting real estate loans, mainly through the Real Estate Bank at very low interest, and in the last two years, the interest has become zero. The purpose of the study is to analyze the fiscal implications of the Iraqi central bank's real estate initiatives, as well as its real impact on the spatial dimension of the Iraqi governorates through new housing in those governorates. Using data mainly from the Central Bank of Iraq's bulletins, the study obtained a 6-year sample of study variables for 15 Iraqi governorates. Multiple Correspondence Analysis (MCA) was used to test such repercussions. One of the study's findings is that the greatest impact of the Iraqi central bank's real estate initiative was the fiscal and real repercussions for the year 2021, and the highest relative impact was in Baghdad governorate, with fiscal and real returns distinct from the rest of the governorates. One of the conclusions reached is that the strength of the fiscal repercussion was more important, more significant, and stronger than the real impact of the initiatives of the Central Bank of Iraq. Similarly, it was concluded that Baghdad was the first governorate that benefited from the effects of the initiative.

Keywords	monetary policy, government revenues, multiple correspondence analysis
JEL Classification	E58, G21, H20

INTRODUCTION

Today's central banks have objectives other than traditional ones for which they have been established, such as money supply management, monetary stabilization, and supervision of the financial and banking system, to have some modern activities or initiatives that address some social aspects such as addressing the population crisis, climate volatility, renewable energy, and others. Therefore, central banks' real estate initiatives are important for housing finance, which plays an important role in satisfying the housing needs of individuals and in promoting the development of the building and construction sector and other vital economic sectors. In addition, practical studies confirm that mortgages have a positive impact on poverty alleviation, housing quality, infrastructure, and urbanization.

In addition to the above, the Government's finances will be affected by the revitalization of the economy, its increased sales and purchase of real estate, and increased production or import of certain commodities for the building and construction sector. The Government will receive additional revenues for its federal budget in the form of tax

revenues associated with those sectors, such as a property transfer tax, a tax on the production of construction and iron goods, or a tariff on the import of certain construction goods. Otherwise in the form of state fees on real estate registration or applications for mortgages from banks and agents of the central bank that directed them to manage its real estate initiative.

1. LITERATURE REVIEW AND HYPOTHESES

Many studies have examined the relationship between monetary policy and the rise in real estate prices, mortgages, and their repercussions on the economy, through price bubbles or on GDP depending on prevailing economic conditions and expectations. The increases in government revenues are another funding aspect accompanying the expansion of mortgages, which can be a positive source along with addressing the deficit in housing units. In other words, mortgage effects are socio-economic effects.

The asset price index consists of combining the prices of private and commercial real estate, as well as stocks, in accordance with the relevant economic weights. It is a practical reality that stock and real estate prices rise strongly during the boom period. In addition, the growth of real GDP is particularly strong during the boom period, which is mainly driven by total private investment and is also reflected in investment in housing and the movement of buying and selling in the real estate sector. In that case, the growth rates in output will be positive, and the gaps will also be positive (meaning that there will be a deviation in the gross domestic product from its possible level, i.e. a change in the output gap). According to Taylor's rule, monetary policy will be more flexible during periods of prosperity than in normal times (Detken & Smets, 2004, p. 5).

One of central banks' tasks in most countries in the world is to monitor real estate prices, notice any sharp increases in their level, and try to intervene to reduce them because it is an important aspect of risk management. In economies where a large portion of consumers are credit constrained, home price spirals fueled by positive credit booms are especially harmful. Consumption may be affected by a sharp rise in home prices that is beyond the usual effects of relatively small wealth. At the same time, the financial liberalization implemented by many countries in the 1980s and 1990s

caused the expansion of the volume and amounts of loans to skyrocket proportions in the housing market, increasing the possibility of the financial system's vulnerability to a collapse in house prices (Allen & Rogoff, 2011, p. 2).

The growing total debt of households resulting from a change in the terms of borrowing or credit due to the rise in real estate prices may contribute to an increase in the possibility of a crisis. This effect may not be clear at the level of one family, but it is clearer at the overall level of an economy. There is plenty of evidence of a correlation between total debt and the likelihood of crises (Alpanda & Ueberfeldt, 2016, p. 6).

In other words, the business cycle of housing or real estate prices between boom and stagnation, which is definitely associated with general economic activity, is a source of concern for all economic policymakers. The economic explanation that relates to individuals' expectations regarding future housing prices and their tolerance for large credit conditions in the current period due to future expectations that may occur or not, the most often heard explanation for housing booms is household optimism about future home prices. The expectations of future increases in house prices played a large role in periods prior to house price increases. Furthermore, expectations of future house price increases correlate with optimism about economic conditions (Lambertini et al., 2017, p. 2).

From the practical evidence, there is a clear relationship between the collapse of asset prices and their sudden sharp decline, and the exposure of economic activity to recession and stagnation, which is accompanied by financial instability. The sharp decline in asset prices has a clear impact on consumption and goes beyond it to indirectly affect the values of collateral provided to obtain bank credit, which leads to the decline of the latter, i.e., bank lending, which leads to a vicious circle of exacerbating the decline in spending and the indirect effects on asset prices, lending, and economic

activity. These cases in which the economic slowdown is accompanied by a decline in the prices of financial assets may have slight repercussions if the financial sector is flexible, which is what happened at the beginning of the new millennium in many industrialized countries. For that policymakers must respond early to any boom in asset prices to prevent or mitigate the occurrence of a collapse reflected in the overall economic activity (Detken & Smets, 2004, p. 7).

Therefore, economists concluded that the repercussions of the severe financial crisis greatly affect asset prices, production, and employment, and precisely that the effect on the high unemployment rate lasts for 5 years. While the decline in housing prices lasts for 6 years, the impact of the crisis on the decline in production lasts only two years on average. In the sense that recessions caused by the financial crisis will eventually end, even if they are accompanied by large increases in government debt. In other words, the possibility of overcoming financial crises results from increasing the flexibility of monetary policy, which is due in essence to the less stringent global exchange rate regime. Flexibility was previously absent in the Great Depression crisis, which is mainly due to the development of the work and roles of central banks (Reinhart & Rogoff, 2009, p. 11).

It is possible, in fact, that fiscal policy has clear repercussions and can affect housing prices through subsidies and tax measures and their effects on (wealth) and then on household disposable income: capital taxes on housing gains, tax deductions for interest payments, and taxes on rental value. Calculated for the home and value-added tax on new homes are just a few examples of how fiscal policy can significantly affect housing markets. In addition to the fact that the housing supply is usually inelastic in the short term, subsidies directed towards purchasing a home may eventually lead to an increase in demand and prices. Similarly, the tax deduction of interest rates may affect the demand for mortgage debt. In addition, the government's good financing condition and low sovereign financing needs allow for lower interest rates and better financing terms for mortgage loans. While high government indebtedness can crowd out resources away from homeowners (Agnello & Sousa, 2010, p. 5).

The strength of the transmission of monetary policy signals with regard to mortgage loans differs according to the nature of the economy in different countries and according to their repercussions. With regard to the interest rate and the characteristics that determine the extent of income effects and the side effects of changes in interest rates, the speed of transmission of the effects of monetary policy reduces periods of time slowdown and determines the efficiency of the policy (Calza et al., 2009, pp. 13-15).

The relationship between monetary policy and asset prices is a subject of extensive literature. Asset prices are seen as a key component of the monetary policy transmission mechanism. In the traditional view, increasing liquidity leads to higher asset prices due to the transmission mechanism of monetary policy measures to the economy as a whole. Another view attributed to Austrian economists in the 1920s and more recently to the Bank for International Settlements holds that an environment of low inflation and accommodative monetary policy creates an environment conducive to asset booms and the consequent possibility of future recessions (Bordo & Landon-Lane, 2013, p. 3).

Monetary policy significantly affects the smoothing of volatility in real estate loans. As empirical evidence shows in the US economy in the early eighties of the last century, improved monetary policy was largely responsible for reducing volatility. Many researchers believe that monetary policy is responsible for the significant reduction in GDP volatility and inflation. Changes in inflation and real GDP have led to a more responsive monetary policy since the early 1980s (Taylor, 2007, pp. 1-2).

Central banks with supervisory authority can reduce the possibility of bubbles by supervising the financial system according to the bank law that allows it to play this role. Suppose rising house prices lead to excessive risk-taking on the part of financial institutions. In that case, the central bank, along with other supervisory agencies that vary from one country to another, can encourage financial institutions not to over-risk and even issue compulsory orders to them. Working through regulatory channels can have an indirect effect on adjusting real estate prices if it succeeds in direct-

ing excessive bank financing towards rationing. To reduce excessive house prices, it is necessary to remind institutions to maintain risk management practices that are appropriate to the economic and financial environment. Even if the central bank is not directly involved in prudential supervision, it can still play a role through the transparency and advertising effect it exercises through financial stability reports that some central banks may publish. In these reports, central banks can assess whether increases in asset prices may lead to elevated risk-taking on the part of financial institutions or whether distortions caused by inappropriate taxation or regulatory policies may stimulate overvaluations of assets (Mishkin, 2007, pp. 44-45).

In addition to the above, property tax and transfer fees are the direct channel for influencing the government's financial revenues. In addition to the tax for sales of construction materials used (construction tools, iron and dyes, etc.) in the construction of homes and the renovation of existing structures as well, which doubles the government revenue generated from the original channel (Lutz et al., 2011, p. 1).

The indirect channel that can affect government revenues because of rising real estate prices by reversing those prices' rise over real economic activity. Because higher asset prices increase consumer confidence and consumption through the wealth effect, and this will increase the collection of indirect taxes. In addition, increased property price volatility will be reflected in fluctuating revenues, which can lead governments to act with discretion and adjust expenditure and revenues accordingly (Tagkalakis, 2011, p. 8).

Mortgages are an important factor in the country's economic and social development, especially in times of financial and economic crises. In addition to addressing the housing crisis and its social repercussions on the family system by providing more apartments in new housing complexes. At the same time, it has a positive impact on the promotion of the production of construction materials and construction, as well as to increase the stability and efficiency of the country's banking sector because mortgages are low risk compared to other types of loan (V. Volkova & N. Volkova, 2019, p. 437).

It not only facilitated mortgages for families who wanted to buy a house but also fueled house prices, as a result of a large number of citizens obtaining mortgage credit and increasing competition for getting houses in the sense of increasing demand and prices (Aalbers, 2008, p. 150).

Therefore, the study aimed to analyze the fiscal implications of the Iraqi central bank's real estate initiatives and its real impact on the spatial dimension of the Iraqi governorates through new housing in those governorates. The real impact is the level of treatment of the housing crisis and the provision of new numbers of housing at the spatial level spread across the Iraqi governorate. The fiscal impact is represented by examining the extent to which government revenues associated with housing purchases have increased.

The hypotheses of the study came to ascertain their validity:

H1:   The initiatives of the Central Bank of Iraq have a positive impact on the Government's finances.

H2:   The initiatives have real repercussions and are balanced between Iraqi governorates.

H3:   The fiscal repercussions are stronger than the real repercussions due to the different response rates between the two variables.

2. METHODS

The accepted are absolute numbers and for a period of 6 years only for the study variables. These data were obtained from the Central Bank of Iraq, the Iraqi Ministry of Planning, the Ministry of Finance / Tax Authority, and the Ministry of Justice / Real Estate Registration Department. The paper relied on a modern method that relies on the classification and arrangement of the data represented by multiple correspondence analysis (MCA) after fulfilling its requirements, which is converting the paper data from the digital format into classified and ordered variables, which are subject to the researchers' discretion based on reality.

At the start of multivariate correspondence analysis, this study uses the great indicator matrix to summarize the data, with rows representing individuals and columns representing variable categories. In the graph, the points of the rows and columns in a low-dimensional space represent different weights, and the weights of the individuals are always uniform. The weights of the variables are influenced by the marginal frequencies of the ratios column (X) of the matrix (Z) with dimensions $(m \cdot n)$, and the maximum limit of the matrix is $SVD = \min(n, m)$ (Greenacre, 1988; Hwang & Takane, 2002; Le Roux & Rouanet, 2010, pp. 35-37), where m is the number of classes, and n is the sample size.

So, the single value of the matrix is analyzed, which is used to find the best graphic representation to the profiles of the row and column in a two-dimensional domain:

$$SVD = \left(\frac{1}{\sqrt[q]{n}} Z \cdot D^{-\frac{1}{2}} \right), \qquad (1)$$

where (q) represents the number of variables and that:

$$SVD = \left(\frac{1}{\sqrt[q]{n}} Z \cdot D^{-\frac{1}{2}} \right) = A \cdot A_x \cdot Y^T, \qquad (2)$$

where A – the row symmetric single vector matrix with dimensions $(n \cdot m\text{-}q)$; Y^T – vertical symmetric single vector matrix with dimensions $(m\text{-}q \cdot m)$; $A_x = diag(\pi_m^{\;2})$ represents the diagonal matrix of single positive values $(\pi_m^{\;2})$ arranged in descending order.

The SVD matrix contains the following constraint:

$$A^T \cdot A = I_M, \qquad (3)$$
$$\text{and} \quad \left(Y^T D^{-1/2} \right) D \left(D^{-1/2} \right) Y = Y^{*T} D Y^* = I_M,$$

As a second step, the low-dimensional space used for the graph of the correlation between categories, which uses the Pert matrix, enables us to perform a harmonic analysis of the multidirectional table by performing the eigenvalue analysis (ED) on the transformed Pert matrix $(D^{-2} \cdot B) / (q^2 \cdot n)$ as in the following formula:

$$ED\left(\frac{1}{q^2 n} D^{-1} B \right) = Y \cdot A_B \cdot Y^T, \qquad (4)$$

where $A_B = diag(\pi_m^{\;B})$ represents the diagonal matrix of eigenvalues $(\pi_m^{\;B})$; Y represents the eigenvector matrix.

Finally, the application of the MCA method using the matrix (B) gives eigenvalues $\pi_m^{\;B}$ equal to the square of the single values $\pi_m^{\;z}$ for analysis using the matrix (Z).

3. RESULTS

The paper relied on data distributed on the variables of the problem, which are the amounts of the Central Bank's real estate initiatives, real estate taxes and real estate registration fees (government fiscal repercussion), and new residential houses (the real repercussion). The data spanned 6 years and were distributed over 15 Iraqi governorates (except for the Kurdistan Region). The approved numerical data were converted into data classified according to six qualitative scales (weak, acceptable, average, good, very good, and excellent) by the researchers, based on estimating the maximum and minimum numeric value. From those mentioned data, the PERT matrix was reached by the approved R software to reach the results of the MCA (Appendix A).

Table 1 shows the values of Inertia and the Singular Value, which is analyzed by Chi-Square within MCA analysis, and Chi-Square is used to calculate the difference between frequencies in each cell of the combination table. Pairs of cells whose observed and expected values are the same can be considered independent of each other.

Therefore, the cell pairs differ for the observed and expected values. Table 1 shows that the inertia of the first and second axes is 19.7640% and 16.6115% of the total variance, respectively. This means that the two axes constitute 36.3755% of the total variance as a cumulative value. The total value of the Chi-Square statistic is 5,376.929, which is a measure of the extent of correlation between rows and columns in the full dimensions of Table 1. The value of the Chi-Square for the first axis was 1,062.6938, while for the second axis it was 893.1888, which are significant values.

The size of the contribution for each category in the study can be known in relation to C – governorate, ML – mortgage loan, Y – years, government fiscal returns – real estate sales taxes and real estate registration fees – RE, new houses – NH for the first and second axes through Table 2.

Table 1. Inertia, singular values, and chi-square decomposition for governorates, years, mortgage loans, government real estate returns, and new houses

Categories	Singular value	Inertia	Chi-Square	Percentage	Cumulative percentage
1	0.6872	0.4723	1062.6938	19.7640	19.7640
2	0.6301	0.3970	893.1888	16.6115	36.3755
3	0.5483	0.3006	676.4142	12.5799	48.9554
4	0.4399	0.1935	435.4253	8.0980	57.0534
5	0.3925	0.1540	346.5527	6.4452	63.4986
6	0.3434	0.1179	265.2893	4.9338	68.4324
7	0.3214	0.1033	232.4281	4.3227	72.7551
8	0.2739	0.0750	168.8399	3.1401	75.8952
9	0.2642	0.0698	156.9985	2.9199	78.8151
10	0.2259	0.0510	114.8389	2.1358	80.9508
11	0.2093	0.0438	98.5883	1.8335	82.7844
12	0.2025	0.0410	92.3084	1.7167	84.5011
13	0.2011	0.0405	91.0230	1.6928	86.1940
14	0.2004	0.0402	90.3675	1.6807	87.8746
15	0.2000	0.0400	90.0000	1.6738	89.5485
16	0.2000	0.0400	90.0000	1.6738	91.2223
17	0.2000	0.0400	90.0000	1.6738	92.8961
18	0.2000	0.0400	90.0000	1.6738	94.5699
19	0.2000	0.0400	90.0000	1.6738	96.2437
20	0.1597	0.0255	57.4112	1.0677	97.3115
21	0.1459	0.0213	47.9224	0.8913	98.2027
22	0.1334	0.0178	40.0152	0.7442	98.9469
23	0.0876	0.0077	17.2807	0.3214	99.2683
24	0.0795	0.0063	14.2293	0.2646	99.5329
25	0.0664	0.0044	9.9304	0.1847	99.7176
26	0.0545	0.0030	6.6884	0.1244	99.8420
27	0.0408	0.0017	3.7418	0.0696	99.9116
28	0.0325	0.0011	2.3748	0.0442	99.9558
29	0.0276	0.0008	1.7177	0.0319	99.9877
30	0.0113	0.0001	0.2883	0.0054	99.9931
31	0.0101	0.0001	0.2282	0.0042	99.9973
32	0.0074	0.0001	0.1244	0.0023	99.9996
33	0.0029	0.0000	0.0195	0.0004	100.0000
Total	–	2.3897	5376.929	–	–

About the contribution to the value of inertia for the second dimension, the largest percentage of the contribution of real estate loans to the initiative of the Iraqi Central Bank for the year 2020 is 0.114, while the contribution of government revenues generated as a result of real estate sales (taxes on real estate sales plus real estate registration fees), which represents the fiscal repercussions. For 2020, it came in second with a value of 0.105. Basra Governorate ranked third in this dimension with a value of 0.081.

With regard to the Corr column of the first dimension, it represents the value of correlation to explain each dimension in terms of its contribution to the inadequacy of the column. Therefore, each of the real estate loans to the initiative of the

Central Bank of Iraq and the government revenues generated as a result of real estate sales (taxes on real estate sales plus real estate registration fees) for the year 2021 represent most of the inertia, as each of them formed 0.708, while the second dimension was consistent with the previously mentioned contributions of this dimension. The real estate initiative loans of the Iraqi Central Bank for the year 2020 constitute most of the inertia, with a value of 0.477.

Continuing to analyze the table of contributions (Table 2), it can be concluded from the data of the Quality column, which shows the category of the variable that has a higher relative frequency, that the greatest impact was for each of the amounts of the real estate initiative of the Iraqi Central

Table 2. Contributions of the category in relation to governorate, years, mortgage loans, government real estate returns, and new houses

Category Contributions	Quality	Inertia	Dim #1			Dim #2		
			Coord	Corr	Contr	Coord	Corr	Contr
C.1/ Ninevha	0.042	0.023	−0.395	0.038	0.004	−0.118	0.003	0.000
C.2/ Kirkuk	0.076	0.019	−0.480	0.067	0.007	−0.145	0.006	0.001
C.3/ Diyala	0.330	0.021	0.158	0.007	0.001	0.233	0.015	0.002
C.4/ Anbar	0.104	0.018	−0.447	0.062	0.006	−0.196	0.012	0.001
C.5/ Baghdad	0.953	0.047	2.390	0.675	0.161	−1.452	0.249	0.071
C.6/ Babil	0.373	0.023	0.271	0.018	0.002	0.747	0.136	0.019
C.7/ Karballa	0.629	0.029	0.269	0.014	0.002	1.488	0.427	0.074
C.8/ Wasit	0.324	0.020	0.024	0.000	0.000	0.207	0.012	0.001
C.9/ Salaheldin	0.304	0.021	−0.762	0.152	0.016	−0.622	0.102	0.013
C.10/ Najaf	0.294	0.025	0.977	0.217	0.027	0.184	0.008	0.001
C.11/ Diwanyia	0.220	0.020	−0.671	0.127	0.013	−0.438	0.054	0.006
C.12/ Muthana	0.211	0.020	−0.494	0.067	0.007	−0.568	0.089	0.011
C.13/ TheQar	0.134	0.020	−0.611	0.104	0.011	−0.326	0.030	0.004
C.14/ Maysan	0.211	0.021	−0.687	0.123	0.013	−0.545	0.077	0.010
C.15/ Basrah	0.713	0.030	0.457	0.039	0.006	1.552	0.449	0.081
Year.1/ 2016	0.023	0.015	0.005	0.000	0.000	0.024	0.001	0.000
Year.2/ 2017	0.018	0.015	0.018	0.000	0.000	0.031	0.001	0.000
Year.3/ 2018	0.059	0.016	−0.018	0.000	0.000	−0.195	0.034	0.003
Year.4/ 2019	0.011	0.015	−0.034	0.001	0.000	0.041	0.002	0.000
Year.5/ 2020	0.040	0.016	0.011	0.000	0.000	0.021	0.000	0.000
Year.6/ 2021	0.027	0.016	0.018	0.000	0.000	0.079	0.006	0.001
ML.1/ Mortgage6102	0.927	0.030	−0.663	0.480	0.072	−0.513	0.287	0.052
ML.2/ Mortgage7102	0.240	0.027	−0.271	0.033	0.004	0.081	0.003	0.000
ML.3/ Mortgage8102	0.660	0.028	0.191	0.022	0.003	0.275	0.046	0.008
ML.4/ Mortgage9102	0.326	0.029	0.466	0.064	0.009	0.942	0.260	0.045
ML.5/ Mortgage2002	0.847	0.040	0.370	0.026	0.005	1.594	0.477	0.114
ML.6/ Mortgage2102	0.972	0.049	2.304	0.708	0.175	−1.328	0.235	0.069
RE.1/ Revenues2016	0.942	0.029	−0.649	0.503	0.073	−0.493	0.290	0.050
RE.2/ Revenues2017	0.361	0.028	−0.241	0.029	0.004	0.097	0.005	0.001
RE.3/ Revenues2018	0.614	0.030	0.379	0.080	0.012	0.369	0.076	0.014
RE.4/ Revenues2019	0.365	0.031	0.311	0.018	0.003	1.332	0.321	0.060
RE.5/ Revenues2020	0.793	0.039	0.403	0.027	0.005	1.635	0.443	0.105
RE.6/ Revenues2021	0.972	0.049	2.304	0.708	0.175	−1.328	0.235	0.069
NH.1/New Houses2016	0.108	0.025	−0.460	0.071	0.009	−0.109	0.004	0.001
NH.2/New Houses2017	0.319	0.024	−0.595	0.202	0.025	−0.452	0.116	0.017
NH.3/New Houses2018	0.281	0.019	−0.444	0.260	0.025	−0.090	0.011	0.001
NH.4/New Houses2019	0.438	0.021	0.070	0.003	0.000	0.732	0.350	0.045
NH.5/New Houses2020	0.353	0.022	0.572	0.109	0.012	0.836	0.233	0.031
NH.6/New Houses2021	0.825	0.031	1.215	0.717	0.111	−0.467	0.106	0.020

Bank, accompanied by its fiscal repercussions (taxes on real estate sales plus real estate registration fees) for the year 2021 with the same value (0.972). According to the Quality column, the second highest relative frequency was in the Baghdad governorate, with fiscal and real returns distinct from the rest of the governorates with a value of 0.953. The third place was with a value of 0.927 for the share of real estate loans within the initiative of the Iraqi Central Bank in the year 2016 as it appears in the Quality column.

To complete the analysis in a more detailed manner, and by using the geometric shapes of the two-dimensional MCA axes and the correlation between the variables. Figure 1 presents the MCA algorithm in a two-dimensional chart (X and Y axes represent dimensions 1 and 2, respectively), which shows the correlations between variables and the use of a column chart to search for relationships between classes of variables and to provide an interpretation of the main axes in relation to the classes of columns and indicators. To provide an

explanation of the main axes with regard to the column categories, the points far from the origin indicate the most influential categories in this column diagram so that the Baghdad governorate is the largest influencing in the model. As this influence came in harmony with very large financing (EF) for the real estate initiative of the Iraqi Central Bank, which resulted in a very strong fiscal percussion (EFR) (government revenues from real estate sales). After that, the real percussion has been represented by additions at the level of new houses (ERR) with less impact and closer to the point of origin. This can be explained by the fact that the sums granted to purchase real estate did not generate new housing from nothing, but rather a large part of the sums went to trading in old real estate located within the old residential areas in the governorate and not in new areas for housing.

The governorates of Basra and Karbala within the model were characterized by impact and morale, distinguished by the presence of a fiscal repercussion ranging between good (GFR) and very good (VFR) in connection with very good real estate initiative financing (VF); in a less influential manner outside the orbit of the two governorates and closer to the point of origin with good financing (GF). This indicates the correlation between the real estate loan and the fiscal repercussion represented by government revenues (taxes on real estate sales plus real estate registration fees). The real repercussion appeared clearly outside the orbit of the governorates of Basra and Karbala (Figure 1, the bottom part) by the amount of VRR with a

very good effect. But it was not characteristic of Basra and Karbala.

The governorate of Babil came after them with the strength of influence. It was distinguished by the fact that the effect of the volume of financing the initiative by the Iraqi Central Bank is not within the orbit of the governorate and with a good estimate (GF), which is a common feature with the governorates of Basra and Karbala. Despite the remote impact of the funding force of the initiative within the governorate of Babil, a medium-strength fiscal repercussion appeared (MFR) and a good real repercussion (GRR). This is acceptable and means that the repercussions were stronger than the strength of financing, and it was not the only cause of the fiscal and real repercussions, but there are other factors that contributed to the weak correlation between the above forces.

The governorates (Wasit, Diyala, and Najaf) participated in a non-strong level of influence of the variables, a medium financing effect of the Central Bank's real estate initiative, a weak correlation with the fiscal and real repercussions, which do not appear in Figure 1. Najaf governorate remains farther from the point of origin and in an orbit that differs from the orbit of the two governorates, Diyala and Wasit. However, they have weak correlations between the funds of the real estate initiative and the fiscal and real repercussions. It is clear from the data classification that the real repercussion (increase in new residential houses) was relatively clearer.
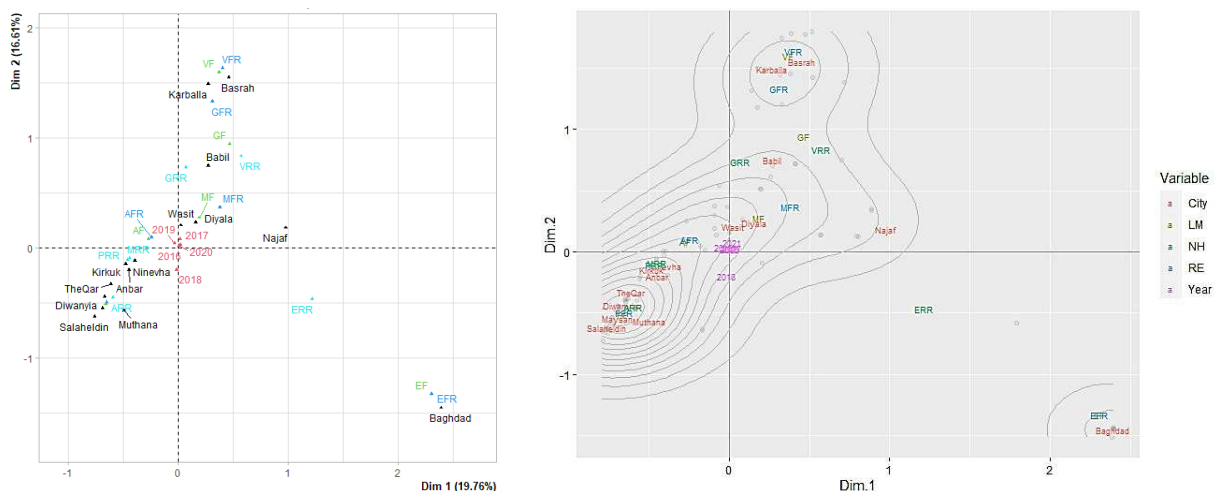
Figure 1. Correlations among the variables in relation to the governorate, years, real estate loans, real estate government revenues, new houses

As for the governorates (Nineveh, Kirkuk, Anbar, Dhi Qar, Diwaniyah, Maysan, Muthanna, Salah al-Din), it was not distinguished by anything, and there were no effects of the variables nor a clear correlation that could be diagnosed. Rather, it was located in the negative quadrant of the first dimension as an indication of negative effects and correlations. These governorates were associated with common characteristics represented by the absence of the effect of the main variable, which is the Central Bank's real estate initiative. The lack of fiscal repercussion is represented by government revenues resulting from the revitalization of the real estate market, which is supposed to be the natural result of the expansion of granting real estate loans, as was evident in the governorate of Baghdad and other governorates (Karbala, Basra, Diyala, Wasit), with the relative difference between them in the degree of strength of real estate financing (the initiative of the Iraqi Central Bank) and its association with the strength of the fiscal and real repercussion, as previously explained. While the real repercussion, whose strength ranged between medium and weak, was a prominent characteristic of those governorates (Nineveh, Kirkuk, Anbar, Dhi Qar, Diwaniyah, Maysan, Muthanna, and Salah al-Din). This indicates weakness and delay at the level of reconstruction and the great differentiation between the governorates, which generates a large difference in the level of service and living for the members of the same country.

From the above, it is possible to diagnose Figures 2 and 3, which illustrate the most important variables of the study that have a significant impact on the results and a strong correlation between them. It is the Iraqi Central Bank's real estate initiative, and its fiscal return is represented by government revenues generated as a result of real estate sales (taxes on real estate sales plus fees for real estate registration). The third variable is the governorate, which is an important factor in terms of the advantages it includes in terms of livability, investment, infrastructure, population, and others. While the real repercussion appears away from the area of strong influence, and the correlation is not strong. So, it appears alone closer to the point of origin, which is the same case for the years variable. This means that it is not important and has no effect, rather, it is just a time scale that shows the transition from one point to another.

Consequently, the validity of the study's hypotheses can be examined. Thus, *H1:* The initiatives of the Iraqi Central Bank have a positive impact on the Government's finances; and *H3:* The fiscal repercussions are stronger than the real repercussions due to the different response rates between the two variables. As previously concluded from the data of the Quality column, which shows the category of the variable, its higher relative frequency has been proven. The greatest impact was for each of the amounts of the real estate initiative of the Central Bank of Iraq. Accompanied by its fiscal repercussions (taxes on real estate sales plus real estate registration fees) for the year 2021 with the same value (0.972). According to the Quality column, the second highest relative frequency was
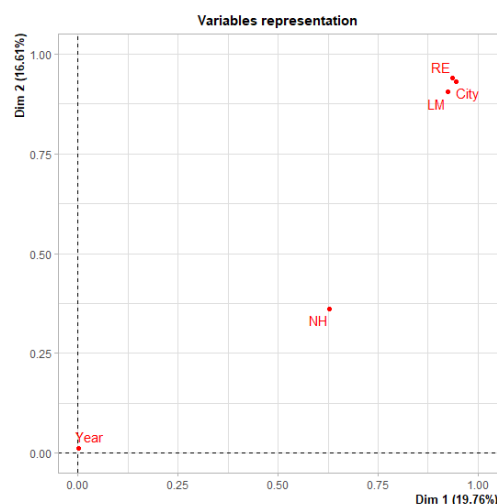
Figure 2. Impact strength and correlation among study variables
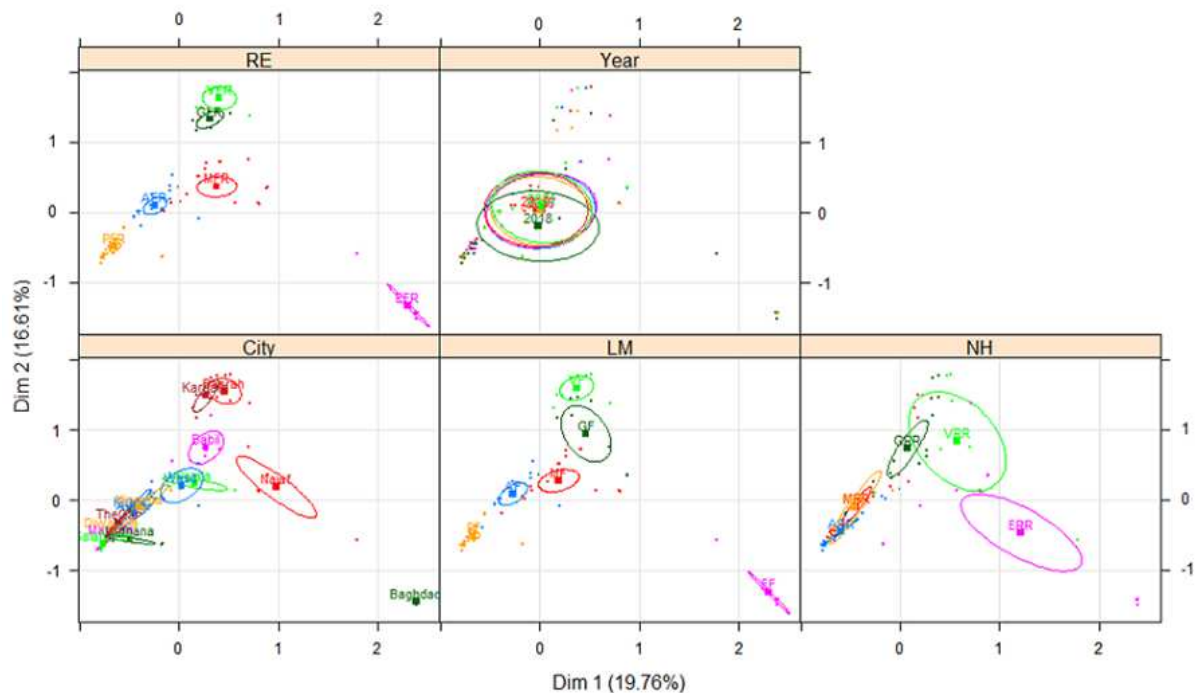
Figure 3. Synthesis diagram of the MCA analysis of the study variable

in the Baghdad governorate, with fiscal and real returns distinct from the rest of the governorates with a value of 0.953. The third place was with a value of 0.927 for the share of real estate loans within the initiative of the Iraqi Central Bank in the year 2016, as it appears in the Quality column.

The second hypothesis (*H2:* The initiatives have real repercussions and are balanced between Iraqi governorates) was not proved; the real repercussion at the level of Iraq's governorates was uneven. The governorate of Baghdad has had the greatest real repercussion in terms of increasing the number of new houses or adding residential complexes. Subsequently, the governorates of Basra, Karbala, and Babylon were, respectively, in terms of the impact of the Central Bank of Iraq's initiatives on addressing the deficit in the number of housing units as previously mentioned.

Finally, after reviewing the findings at the previous point, it is explained that the study was consistent with previous studies in terms of the real and fiscal impact. This means that economic relations within the subject matter of the study apply to what economic theory stipulates. Expanding the granting of loans in Iraq has contributed to strengthening the Government's finances while

addressing the deficit in housing units despite the different impact (repercussion) and its superiority over the real repercussion. Reflecting a rapid response is reflected in the different nature of the two effects. The fiscal effect is placed within a law and instructions enforceable by the authority of the law, and no property ownership transaction can be performed without the payment of property fees and tax. While the creation of new houses or residential complexes requires a relatively long period of time to complete, the residential requirements of such houses or complexes and the effect may appear after a long period of time. The results show that the repercussion back of these initiatives has been very uneven between the Iraqi governorates, and the impact has been significantly concentrated in Baghdad governorate. This may reflect the non-proliferation of banking branches in the rest of the governorates. They activate those initiatives granted by the Central Bank of Iraq through some specialized or commercial banks, whether governmental or private. The largest number of banking branches will be concentrated in the Baghdad governorate as the Iraqi capital.

This study differs from previous studies in that it used the classification of digital data of ranks and

searching for the impact by analyzing to ascertain the results. This analysis helped to give multiple trends in the analysis at the level of fiscal and real repercussion, time element and spatial distribution represented in Iraqi governorates.

In fact, the previous studies applied to Iraq are just one study (Abdelhasan & Ismail, 2020), which is not quantitative in nature. It focuses on the Central Bank of Iraq's initiatives and its role in solving the housing crisis and concludes that it has a main role in addressing this crisis and the problem of unemployment, which is different from the current study and methodology for classifying data and determining the fiscal implications of these initiatives.

CONCLUSION

Based on the purpose of the study – to analyze the fiscal implications of the Iraqi central bank's real estate initiatives and its real impact on the spatial dimension of the Iraqi governorates through new housing in those governorates – this study examines the diagnosis of the repercussions of the fiscal and real initiatives represented by the Central Bank of Iraq. The most important conclusion is that the fiscal repercussions of the Central Bank of Iraq's real estate initiatives had a greater impact and stronger correlation. In other words, the correlation was primarily between the amounts of real estate loans and increases in government revenues (taxes on real estate and real estate registration fees). However, the importance of this connection and relationship was relatively uneven according to the Iraqi governorates. This was an important factor in the emergence of these effects according to the amounts of initiatives and other factors related to the size of the governorate, its demographic characteristics, and the nature of its economic activities. The capital, Baghdad, was at the forefront of all of them, by a wide difference due to its diversity and being a center for the main government departments and its large markets and other features.

The real repercussion was not clear and was not strongly associated with the amounts of real estate loans, and there were no clear additions to the new residential homes, despite the doubling of the amounts of real estate loans granted by the Central Bank, to contribute to solving the housing crisis. This comes because most of the loans granted to purchase real estate were made on existing real estate, especially in Baghdad, whose share of those amounts exceeded half of the total value, in the sense that the process was to replace ownership of existing real estate and not to create new cities that contribute to solving the housing crisis.

The strength of the fiscal repercussion is an economically positive indicator, especially with the global conditions that were represented by the decline in global economic activity because of the COVID-19 pandemic and, currently, the Ukrainian-Russian war. This strengthened the fiscal ability of the Iraqi government by diversifying revenues and reducing the deficit in the government budget. However, the issue of the feasibility of these real estate loans remains linked to the stated goal of the Central Bank of Iraq from these initiatives. This should help solve part of the housing crisis plaguing Iraq. This is a social problem that affects the stability of society and the promotion of citizenship among its members.

AUTHOR CONTRIBUTIONS

Conceptualization: Ahmed Abdulzahra Hamdan, Safaa Ali Hussein.
Data curation: Ahmed Abdulzahra Hamdan, Safaa Ali Hussein.
Formal analysis: Ahmed Abdulzahra Hamdan.
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Validation: Ahmed Abdulzahra Hamdan, Safaa Ali Hussein.
Visualization: Ahmed Abdulzahra Hamdan, Safaa Ali Hussein.
Writing – original draft: Safaa Ali Hussein.
Writing – review & editing: Ahmed Abdulzahra Hamdan, Safaa Ali Hussein.

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APPENDIX A

Table A1. PERT matrix for governorates, years, real estate loans, and real estate fiscal returns for the government and new houses

	C.1	C.2	C.3	C.4	C.5	C.6	C.7	C.8	C.9	C.10	C.11	C.12	C.13	C.14	C.15	Y.1	Y.2	Y.3	Y.4	Y.5	Y.6	ML.1	ML.2	ML.3	ML.4	ML.5	ML.6	RE.1	RE.2	RE.3	RE.4	RE.5	RE.6	NH.1	NH.2	NH.3	NH.4	NH.5	NH.6
C.1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	3	1	1	1	0	0	3	1	2	0	0	0	5	0	1	0	0	0
C.2	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	3	3	0	0	0	0	4	2	0	0	0	0	0	0	4	1	1	0
C.3	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	2	4	0	0	0	0	3	3	0	0	0	0	0	2	2	0	2
C.4	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	0	0	0	3	2	1	0	0	0	2	2	2	0	0	0
C.5	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	6	0	0	0	0	0	6	0	0	0	0	0	6
C.6	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	4	1	0	0	0	1	4	1	0	0	0	0	0	4	2	0
C.7	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	2	4	0	0	0	0	3	3	0	0	0	3	2	1	0
C.8	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	1	1	1	1	1	1	0	2	4	0	0	0	0	3	3	0	0	0	0	2	1	2	0	1
C.9	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	1	1	1	1	1	1	6	0	0	0	0	0	6	0	0	0	0	0	0	4	2	0	0	0
C.10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	1	1	1	1	1	1	0	0	2	3	0	1	0	0	5	0	0	1	0	0	0	0	2	4
C.11	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	1	1	1	1	1	1	6	0	0	0	0	0	6	0	0	0	0	0	0	0	2	2	2	0
C.12	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	1	1	1	1	1	1	6	0	0	0	0	0	6	0	0	0	0	0	0	0	4	0	0	2
C.13	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	1	1	1	1	1	1	4	2	0	0	0	0	4	2	0	0	0	0	0	0	6	0	0	0
C.14	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	1	1	1	1	1	5	0	1	0	0	0	5	1	0	0	0	0	1	5	0	0	0	0
C.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	1	1	1	1	1	0	0	2	4	0	0	0	0	2	4	0	1	0	0	2	2	1	1
Y.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	0	0	0	0	0	7	1	3	1	2	1	7	1	4	0	2	1	3	1	4	2	2	3
Y.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	15	0	0	0	0	7	0	4	1	2	1	7	1	4	0	2	1	2	1	5	2	2	3
Y.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	15	0	0	0	7	3	1	1	1	2	8	2	1	2	0	2	2	3	4	2	2	2
Y.4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	15	0	0	5	4	2	2	1	1	6	3	3	1	1	1	0	4	4	3	2	2
Y.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	15	0	5	2	4	3	0	1	5	3	3	3	0	1	1	3	5	3	0	3
Y.6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	15	4	3	4	1	2	1	4	5	3	0	2	1	1	3	5	3	0	3
ML.1	3	3	0	2	0	0	0	0	6	0	6	6	4	5	0	7	7	7	5	5	4	35	0	0	0	0	0	35	0	0	0	0	0	6	10	15	2	0	2
ML.2	1	3	2	2	0	1	0	2	0	0	0	0	2	0	0	1	0	3	4	2	3	0	13	0	0	0	0	2	11	0	0	0	0	1	1	5	4	1	1
ML.3	1	0	4	0	2	4	0	4	0	2	0	0	0	1	0	3	4	1	2	4	4	0	0	18	0	0	0	0	4	14	0	0	0	1	4	3	4	2	4
ML.4	1	0	0	0	0	1	2	0	0	3	0	0	0	0	0	2	1	1	1	2	3	0	0	0	9	0	0	0	0	0	4	5	0	0	0	2	3	2	2
ML.5	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4	2	2	1	1	0	0	0	0	0	8	0	0	0	0	1	7	0	1	0	2	2	2	1
ML.6	0	0	0	0	6	0	0	0	0	1	0	0	0	0	0	1	1	2	1	1	1	0	0	0	0	0	7	0	0	0	0	0	7	0	0	0	0	1	6
RE.1	3	4	0	3	0	0	0	0	6	0	6	6	4	5	0	7	7	8	6	5	4	35	2	0	0	0	0	37	0	0	0	0	0	6	11	15	2	1	2
RE.2	1	2	3	2	0	1	0	3	0	0	0	0	2	1	0	1	1	2	3	3	5	0	11	4	0	0	0	0	15	0	0	0	0	1	2	7	4	0	1
RE.3	2	0	3	1	0	4	0	3	0	5	0	0	0	0	0	4	4	1	3	3	3	0	0	14	4	0	0	0	0	18	0	0	0	1	2	2	4	3	6
RE.4	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	2	0	0	2	1	3	0	0	0	5	1	0	0	0	0	6	0	0	0	0	2	3	1	0
RE.5	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	4	2	2	0	1	0	0	0	0	0	7	0	0	0	0	0	7	0	1	0	1	2	2	1
RE.6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	7	0	0	0	0	0	7	0	0	0	0	1	6
NH.1	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	3	2	2	0	6	1	1	0	1	0	6	1	1	0	1	0	9	0	0	0	0	0
NH.2	0	0	0	2	0	0	0	2	4	0	2	0	0	5	0	1	1	3	4	3	3	10	1	4	0	0	0	11	2	2	0	0	0	0	15	0	0	0	0
NH.3	1	4	2	2	0	0	3	1	2	0	2	4	6	0	0	4	5	4	4	5	5	15	5	3	2	2	0	15	7	2	2	1	0	0	0	27	0	0	0
NH.4	0	1	2	0	0	4	2	2	0	0	2	0	0	2	0	2	2	2	3	3	3	2	4	4	3	2	0	2	4	4	3	2	0	0	0	0	15	0	0
NH.5	0	1	0	0	0	2	1	0	0	2	0	0	0	0	0	2	2	2	2	2	0	0	1	2	2	2	1	1	0	3	1	2	1	0	0	0	0	8	0
NH.6	0	0	2	0	6	0	0	1	0	4	0	2	0	0	0	1	3	3	2	2	3	3	2	1	4	2	1	6	2	1	6	0	1	6	0	0	0	0	16