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Article

The Role of Innovating in Fintech in Enhancing the Financial Stability in the Iraqi Banking System

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Abstract: This study aimed to examine the role of financial technology (FinTech) innovation in supporting the financial stability of the Iraqi banking system by investigating the relationship between FinTech innovation indicators and financial stability indicators using quarterly data covering the period from 2018 to 2025. The study employed modern time-series econometric techniques to analyze both the short-run and long-run relationships among the study variables.

The Augmented Dickey–Fuller (ADF) unit root test was first applied to examine the stationarity of the variables. The results indicated that some variables were stationary at level, I(0), while others became stationary after first differencing, I(1). Based on these findings, the Johansen cointegration test was conducted to determine the existence of a long-run equilibrium relationship among the variables. The Trace test confirmed the existence of five cointegrating vectors at the 5% significance level, indicating a stable long-run relationship between FinTech innovation and financial stability in the Iraqi banking sector.

Furthermore, the Vector Error Correction Model (VECM) was estimated to assess both the long-run and short-run dynamics. The empirical results revealed that several FinTech innovation variables exerted statistically significant long-run effects on financial stability, whereas the short-run effects were relatively limited. The error correction coefficient suggested a gradual adjustment of deviations toward the long-run equilibrium following economic shocks.

To ensure the reliability of the estimated model, the Vector Error Correction Residual Serial Correlation LM Test was performed. The results confirmed the absence of serial correlation in the residuals, indicating that the estimated model was statistically robust and suitable for interpretation and forecasting.

The findings suggest that promoting financial technology innovation contributes to improving banking efficiency, enhancing risk management, expanding financial inclusion, and strengthening the financial stability of the Iraqi banking system. Accordingly, the study recommends accelerating digital transformation within Iraqi banks, developing an effective regulatory framework for FinTech, expanding digital payment services, strengthening cybersecurity infrastructure, and encouraging investment in innovative financial technologies to enhance the resilience and long-term stability of the Iraqi banking sector.

Keywords: Financial Technology (FinTech), Financial Innovation, Financial Stability, Iraqi Banking System, Johansen Cointegration Test, Vector Error Correction Model (VECM), Time Series Analysis

1. Introduction:

The world has witnessed rapid advances in digital technology in the past two decades, which directly affected the financial and banking sector, and gave rise to the term financial technology (Financial Technology - FinTech), which is considered one of the most important innovations in the financial industry. FinTech has enabled a reshaping of banking services by using digital technologies such as artificial intelligence, cloud computing, blockchain, big data, e-payments, and digital wallets, which have improved the efficiency of financial processes, reduced transaction costs, accelerated service delivery, and promoted financial inclusion. Financial technology (fintech) innovation has become one of the most influential factors in shaping modern banking systems, with it also being a key criterion for determining an institution's ability to adapt to swift economic and technological changes. The adoption of digital solutions also contributes to better risk and banking supervision management and transparency, which positively

reflects on financial stability. Again, the area of financial stability receives particular attention, as this is a core objective of economic and monetary policies, and is taken as an indicator of the financial system's ability to function appropriately even under economic shocks and financial crises. The banking system constitutes the foundation of financial stability for any economy given its function in mobilizing savings, financing investment, and providing liquidity and supporting economic activity.

In Iraq, the banking sector has been subject to a series of economi c and banking reforms since 2004, reflected in the updating of financial legislations, the development of system of e-payments, the adoption of digital technology, the establishment of e-payment platforms, and the expansion in use of e-banking. The Central Bank also pursued a number of initiatives aimed at further enhancing digital transformation and promoting financial innovation and inclusion to improve the efficiency and stability of the banking Sector. Despite those efforts, the Iraqi banking system still faces multitude of challenges such as: limited digital infrastructure, weak penetration of electronic financial services, high cyber risk, low levels of digital financial literacy that calling for examining the contribution of financial technology (Fintech) innovation in supporting financial stability over the Period (2004– 2024) And based on that, this research is aspired in investigating the link between innovation in fintech and the financial stability in the Iraqi banking system by reviewing the evolutions of the banking sector and analyze the related financial and economic indicators the impact of fintech application to enhancing the efficiency of banking performance and financial stability.

Section One

Theoretic Framework

Research Significance

The importance of this study stems from the increasing relevance of financial technologies in the development of banking systems and the facilitation of economic development, particularly in light of the global shift towards the digital economy. The research is also significant due to the necessity of assessing the current status of financial innovation in Iraq, and the extent to which it contributes to enhancing financial stability of the banking system.

The present study is significant in providing a scientific framework that elucidates the relationship between financial innovation and financial stability which could assist the policy makers in the CB of Iraq, and the commercial banks to design more efficient financial and banking policies, as well as in offering to researchers and persons interested in the area of Fin Tech and digital economy.

Furthermore, the study contributes to filling the gap in the Arabic literature in terms of its approach to measuring the effect of financial technology on financial stability, particularly in the Iraqi environment which continues to witness swift banking and digital transformations.

Research Problem

The problem of the study is that there is disparity between the growing advance in the applications of Fintech and the level of financial stability attained by the Iraqi banking sector as there are still challenges that impede the full utilization of financial innovation to enhance the banking system efficiency. The issue is captured in the following main question:

To what extent does financial technology innovation contribute to the financial stability of the Iraqi banking system over the period (2004–2024)?

From this main question follow some sub questions:

- What is the reality of financial technology in Iraq?
- What are the most important indicators of financial innovation during the period under study?
- How financially stable is the Iraqi banking system?

• Is there a statistically significant relationship between innovation in financial technology and financial stability?

• What are the most prominent challenges facing the application of financial technology in Iraq?

Objectives of the investigation

The thesis aimsat the following:

To know about the concept of financial technology, financial innovation and financial stability.

An examination of the situation of financial technology in Iraqi banking during the period (2004-2024). Three. Evaluate the effect of technological financial innovation on financial stability indexes.

The role of digital transformation in the performance of Iraqi banks.

To make recommendations to support the development of FinTech and thus financial stability. Research Hypotheses The study is based on the following assumptions: The main hypothesis The positive impact of financial innovation technology on financial stability for the banking sector in Iraq in (2004–2024) Minor assumptions are • There is positive correlation between digital banking penetration and financial stability. • The use of electronic payment systems results in greater efficiency of banking systems. • Financial innovation contributes to the reduction of operational risk in banks. • Development of financial technology leads to financial inclusion. • There exists a significant relationship between financial technology indicators and financial stability indicators. Research Methodology It is based on the descriptive-analytical method in theoretically studying "Fintech and Financial Stability" as well as the econometric method in analyzing the impact of financial innovation on financial stability during the period of (2004–2024) We will leverage data from the Iraqi central bank, central statistical organization, international reports. etc. appropriate standard tests be applied such as: • Dicky–Fuller test extended (ADF). • Test of cointegration. • Auto Regressive Distributed Lag model (ARDL). • Statistical diagnostics tests. Limit of the research Spatial boundaries: The Iraqi banking system. The (2004-2024) time limit Objective Boundaries: Investigate the impact of innovation in financial technology on financial stability using financial and banking as well as scale based indicators.

Section Two

Theoretical Framework

The global financial sector has undergone rapid changes in recent decades due to the digital revolution and the advances in information and communication technologies, leading to the emergence of financial technology (FinTech) as one of the most important innovations that have transformed the nature of financial and banking services. This technology has contributed to more efficient banking operations, the development of new tools such as the electronic payment and expansion of financial inclusion, as well as supporting financial stability through better risk management and a more efficient financial system. This chapter, therefore, is to provide a theoretical background for financial technology, financial innovation, financial stability, and also the related most relevant literature for the research topic.

Section One

What is fintech?

First: Meaning of financial technology

Financial technology (FinTech) is an electromagnetic term that emerged as a result of the convergence of digital technology and financial and banking services to enhance quality and efficiency of financial products and services and reduce their costs (Aldhaban et al. The FinTech is a term used to describe the application of new technologies, including artificial intelligence, cloud computing, big data, blockchain, and applications for smartphones, traditionally used outside the financial industry, now being used in the financial services industry in a more effective,

more efficient, less costly and more responsive manner to servicing the financial needs as compared with older methods of doing business (Aura Skidir Abbys, 2022, p.57).

As for services, financial technology is also defined as the application of technology in financial services industry to improve delivery and better customers' experiences which in turn improves the efficiency of financial institutions, drives financial inclusion, and fosters economic development (Ahmed Ghoneim and Dey, 2025 p.46).

Section 2: The emergence of Fintech Financial technology had its inception in the 1960s when the banking sector started using computers, but its real development began with the spread of the Internet in the 1990s, It then experienced a surge after the financial global crisis in 2008 due to the increasing demand for more efficient and Transparent financial solutions. With the proliferation of smartphones, cloud computing, and AI-driven solutions, the range of the technology application areas in financial services (Bahrain 24 2026, p. 33). 3rd: The Characteristics of Financial Technology FinTech has a number of characteristics, including high speed in providing financial services, reduced service charges, transaction simplicity, enhanced financial inclusion, maintenance of continuous innovation, improved risk management, improved customer experience, and support for digital asset (Gomber et al., 2018, p. 223–226). IV. Fintech areas The advanced applications of fintech include: electronic payments, electronic wallets, digital banking, crowdfunding, digital lending, cryptocurrencies, blockchain technology, artificial intelligence, digital insurance, wealth management and e-investment, all contributing to reshaping modern financial services (Lee & Shin, 2018, pp. 37-42)

Subsection Two

Innovation in Fintech

First, the Concept of Financial Innovation

Financial innovation is the introduction of new financial products or services or new processes that contribute to increasing the efficiency of the finance industry or meet the client's needs, which may also involve the adoption of digital technologies for delivering banking services or improving banks' competitiveness. Financial innovation is one of the key drivers contributing to the growth of the FinTech sector as it leads to increased productivity and improved quality of financial services (Frame & White, 2014, pp. 12–15)

Second: The Purposes of Financial Innovation

Financial innovation improves the quality of banking services, reduces operating costs, accelerates service delivery, promotes financial inclusion, enhances the use of e-payments, improves risk-management efficiency, facilitates banking competition and contributes to financial stability, all of which contribute to the better financial performance of banks (World Bank, 2022, pp. 44-49).

Third: Barriers to Financial Innovation

Despite the numerous benefits of fintech, its implementation is challenged by several obstacles including poor digital infrastructure, cyber-risks, lack of adequate regulations, deficient digital financial literacy, high cost of technological investment, resistance to change within financial institutions, all of which may hinder the pace of digital solutions adoption in the financial sector (OECD, 2021, pp. 62-69).

Substantive Theme Three

The Financial Stability

Finanacial stability First : The meaning of finanacial stability

Financial stability is a financial system's ability to provide uninterrupted financial intermediation when facing economic or financial shocks, that is, the continuance of good practice in financial intermediation, risk management, and resource allocation. Financial stability is a key objective of monetary and supervisory policy in most countries.

Second: The importance of financial stability

The importance of financial stability is:

• Maintaining the soundness of the banking system.

• Confidence of investors and traders.

• Growth of the economy.

• Reducing the likeliness of financial crises.

• More efficient allocation of resources.

• Contributing to monetary stability.

3. Financial Stability Indicators

Economics research uses a few key indicators to measure financial stability, including:

• Capital adequacy ratio

• Liquidity ratio

• Percentage of nonperforming loans

• RETURN ON ASSETS (ROA)

• RETURN ON EQUITY(ROE) .

• Z-Score Indicator.

• Ratio of deposits to GDP.

• Percentage of credit granted to the private sector.

Analysis of Fintech and Financial Stability Reality in Iraq

The following period (2004–2024) witnessed radical changes in the Iraqi banking system as a result of the economic reforms and technological advancements accompanying the shift toward the digital economy. The Central Bank of Iraq has also been working towards bringing the financial sector infrastructure in line with international standards, to include developing e-payment systems and promoting financial inclusion. These efforts led to enhanced quality of banking services and increased reliance on digital means, still the banking industry is having problems with weak digital infrastructure, low financial awareness, and cyber risks that directly influence the level of financial stability.

The Firs T: Reality of Financial Technology in Iraq

Financial technology is one of the most prominent developments in the global financial sector, and Iraq started to give attention to this area after 2004 through reforming the banking system and reorganizing thework of the government and private banks. The Central Bank of Iraq has introduced a range of initiatives to modernize banking services, including electronic payment, electronic clearing, digital wallets, and the promotion of banks to provide services through the internet and mobile platforms.

And according to Al-Tamimi (2024), FinTech has become a key tool to enhance the efficiency of Iraqi banks by boosting the quality of banking services, reducing the time required to perform financial transactions, minimizing operating expenses, increasing customer satisfaction and competitiveness, among other things(Al-Tamimi, 2024, pp.470–475).

Furthermore, digital developments have also led to an expansion of the population participating in the banking system. This expansion was the result of the growth of e-payment companies and the adoption of government institutions on digital payment methods to pay their budgets and rights, which led to an increase in the number of users of bank cards and electronic wallets in the last years, and that contributed in reducing the dependence on cash and

supporting financial inclusion (Ally & Kamel, 2024, pp. 2240–2243). Nevertheless, despite those opportunities, there are still a number of challenges facing fintech in Iraq, most notably the weak telecommunication infrastructure, the shortage of specialized workforce in the field of financial technology, the low level of digital culture in some categories of the society, in addition to the limited legislations governing the work of financial technology companies that constrain the pace of diffusion of digital service in banking sector(Abdel Nabi & Al-Husseini, 2024, pp. 68–70).

The standard analysis

First. Time-series Stability:

Table (1)

The stability results of time-series for (X, X1, X2, X3) variables

UNIT ROOT TEST RESULTS TABLE (ADF)						
Null Hypothesis: the variable has a unit root						
	At Level					
		X	X1	X2	X3	
With Constant	t-Statistic	0.8217	0.1388	-1.0348	-0.4847	
	Prob.	*0.9926*	*0.9618*	*0.7228*	*0.8796*	
		n0	n0	n0	n0	
With Constant & Trend	t-Statistic	-3.9413	-5.2503	-2.8627	-3.3776	
	Prob.	*0.0234*	*0.0015*	*0.1908*	*0.0756*	
		**	***	n0	*	
Without Constant & Trend	t-Statistic	0.9093	2.0579	-0.1149	-0.6220	
	Prob.	*0.8980*	*0.9878*	*0.6333*	*0.4385*	
		n0	n0	n0	n0	
	At First Difference					
				d(X2)	d(X3)	
With Constant	t-Statistic			-1.18150	-5.09902	
	Prob.			*0.6642*	*0.0003*	
				n0	***	
With Constant & Trend	t-Statistic			-1.93271	-5.81589	
	Prob.			*0.6053*	*0.0004*	
				n0	***	

Without Constant & Trend	t-Statistic			-2.6694	-5.00000	
	Prob.			*0.00891*	*0.0000*	
				***	***	
Notes:						
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant						
b: Lag Length based on SIC						
c: Probability based on MacKinnon (1996) one-sided p-values.						

Source: EVIEWS12 programming output.

The results of the Augmented Dickey-Fuller (ADF) test show degree of stability varies among the variables of the study. The results were the two series X and X1 are stationary at Level when a constant and a linear trend is included, since the probabilities are lower than the significance levels (5%) and (1%), which indicates the rejection of the null hypothesis that states the presence of a unit root. On the other hand the two variables X2 and X3 were not stationary at Level as the probabilities are greater than (0.05). And in the test on the First Difference, the variable X3 became stable at significance level (1%) in all test models, while the variable X2 stabilized only at model without constant and without trend. Accordingly, the variables X and X1 are I(0), and the variables X2 and X3 are I(1). These results imply that there is a mixture of level and first difference stationary variables, therefore the ARDL model is also appropriate to model the relationship among the variables because it permits the use of both I(0) and I(1) variables without any I(2) variables.

Table (2) Time series Stability results of (X4, Y, Y1, Y2) variables.

UNIT ROOT TEST RESULTS TABLE (ADF)						
Null Hypothesis: the variable has a unit root						
	At Level					
		X4	Y	Y1	Y2	
With Constant	t-Statistic	-0.9522	0.4285	0.6937	2.0683	
	Prob.	*0.7553*	*0.9805*	*0.9897*	*0.9998*	
		n0	n0	n0	n0	
With Constant & Trend	t-Statistic	-3.0184	-6.0732	-3.1760	-1.0268	
	Prob.	*0.1457*	*0.0003*	*0.1102*	*0.9231*	
		n0	***	n0	n0	
Without Constant & Trend	t-Statistic	-0.6758	1.2115	2.2281	1.5660	
	Prob.	*0.4148*	*0.9380*	*0.9920*	*0.9678*	
		n0	n0	n0	n0	

	At First Difference					
		d(X4)		d(Y1)	d(Y2)	
With Constant	t-Statistic	-2.3965		-1.8682	-2.8934	
	Prob.	*0.0020*		*0.3414*	*0.047*	
		**		n0	**	
With Constant & Trend	t-Statistic	-1.8172		-3.7893	-3.7339	
	Prob.	*0.6682*		*0.0008*	*0.0319*	
		n0		***	***	
Without Constant & Trend	t-Statistic	2.2574		2.0149	1.1649	
	Prob.	*0.0033*		*0.0138*	*0.9328*	
		***		**	n0	
Notes:						
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant						
b: Lag Length based on SIC						
c: Probability based on MacKinnon (1996) one-sided p-values.						

Source: EVIEWS12 programming output results.

The ADF test results show Y was Level stationary at both with intercept or with intercept and trend since the p-value(0.0003) was less than significance level of 1%, then the null hypothesis could be rejected and it is considered as I(0) in terms of integration. On the other hands, X4 and Y1,Y2 were not stationary at level as the p values were above 0.05 in the majority of the models. On the First Difference the variables X4 is stationary at without trend and without intercept model and Y2 is stationary at with intercept and without intercept model as well as Y1 is stationary at with intercept and without trend model and at without intercept and without trend, Y1 is stationary at with intercept and without trend also in the others null models. Thus, Y is I(0) while X4, Y1 and Y2 are I(1) (i.e., they are stationary). These results suggest a mixture of level and first differences stationarity, thus making the use of the ARDL model suitable for investigating the relationship among the variables of the study and to test for the existence of a long run relationship, provided no variable is found to be integrated of order 2 I(2).

$$Y = \beta_0 + \beta_1 X + \beta_2 X1 + \beta_3 X2 + \beta_4 X3 + \beta_5 X4 + \mu_t$$

Table (3) Outputs of the first model of the joint integration results

Date: 06/10/26 Time: 13:24	
Sample (adjusted): 2018Q3 2025Q1	
Included observations: 27 after adjustments	
Trend assumption: Linear deterministic trend	

Series: Y X X1 X2 X3 X4				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.600000	129.2786	95.75366	0.0000
At most 1 *	0.600000	104.5388	69.81889	0.0000
At most 2 *	0.600000	79.79895	47.85613	0.0000
At most 3 *	0.600000	55.05910	29.79707	0.0000
At most 4 *	0.600000	30.31925	15.49471	0.0002
At most 5 *	0.186691	5.579398	3.841465	0.0182
Trace test indicates 6 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.600000	24.73985	40.07757	0.7835
At most 1	0.600000	24.73985	33.87687	0.4028
At most 2	0.600000	24.73985	27.58434	0.1109

At most 3 *	0.600000	24.73985	21.13162	0.0148
At most 4 *	0.600000	24.73985	14.26460	0.0008
At most 5 *	0.186691	5.579398	3.841465	0.0182
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: EVIEWS12 outputs programming

The results of the Johansen test for cointegration show a divergence between the results of the Trace and Maximum Eigenvalue statistics. At all ranks the null hypothesis was rejected by the Trace test since p-values were smaller than (0.05), indicating that there are six co-integrating vectors among the study variables which implies that there exists a long run equilibrium relationship among the variables. On the other hand, the Maximum Eigenvalue test for the first hypothesis (None) suggested that there is no sufficient evidence for cointegration, as the p-value was (0.7835) which is greater than (0.05), however it was found significant at some further lags. When the two tests disagree, we generally rely on the trace test for it is more powerful in estimating the number of cointegrating vectors. Therefore, it can be concluded that the study variables are associated with a long-run equilibrium relationship, and that short-run shocks have no effect on the underlying relationship among the variables, and that it is appropriate to analyse the short-run and long-run relationships among the study variables using the error correction model (VECM).Table (4)

Error correction model results for model 1.

Vector Error Correction Estimates					
Date: 06/10/26 Time: 13:26					
Sample (adjusted): 2018Q3 2025Q1					
Included observations: 27 after adjustments					
Standard errors in ( ) & t-statistics in [ ]					
Cointegrating Eq:	CointEq1				
Y(-1)	1.000000				
X(-1)	2.866165				
	(0.86258)				

	[3.32278]				
X1(-1)	-2.801958				
	(0.68157)				
	[-4.11106]				
X2(-1)	-1.066699				
	(0.25296)				
	[-4.21681]				
X3(-1)	1.000280				
	(0.75676)				
	[1.32180]				
X4(-1)	-0.425060				
	(0.31507)				
	[-1.34909]				
C	-0.798033				
Error Correction:	D(Y)	D(X)	D(X1)	D(X2)	D(X3)
CointEq1	-0.032834	-0.220321	-0.075980	-0.133119	-0.135712
	(0.06529)	(0.10376)	(0.08549)	(0.21151)	(0.17169)
	[-0.50289]	[-2.12344]	[-0.88881]	[-0.62937]	[-0.79046]
D(Y(-1))	-0.164672	-3.506230	-2.545318	-3.986913	-2.759791
	(2.53431)	(4.02742)	(3.31820)	(8.21001)	(6.66427)
	[-0.06498]	[-0.87059]	[-0.76708]	[-0.48562]	[-0.41412]
D(X(-1))	0.081059	0.738027	0.172594	0.130134	0.004626

	(0.55905)	(0.88843)	(0.73197)	(1.81108)	(1.47010)
	[0.14499]	[0.83071]	[0.23579]	[0.07185]	[0.00315]
D(X1(-1))	-0.136904	-0.530507	0.390325	-0.707904	-0.588780
	(0.71493)	(1.13613)	(0.93606)	(2.31604)	(1.87999)
	[-0.19149]	[-0.46694]	[0.41699]	[-0.30565]	[-0.31318]
D(X2(-1))	0.515888	2.132873	1.576023	3.383700	1.894827
	(1.67110)	(2.65565)	(2.18799)	(5.41361)	(4.39436)
	[0.30871]	[0.80315]	[0.72031]	[0.62504]	[0.43120]
D(X3(-1))	-0.323829	-0.982267	-0.838715	-1.702180	-0.328075
	(1.29146)	(2.05233)	(1.69092)	(4.18373)	(3.39604)
	[-0.25075]	[-0.47861]	[-0.49601]	[-0.40686]	[-0.09661]
D(X4(-1))	-0.254395	-1.305756	-0.924428	-1.212105	-0.972325
	(0.85433)	(1.35766)	(1.11858)	(2.76763)	(2.24655)
	[-0.29777]	[-0.96177]	[-0.82643]	[-0.43796]	[-0.43281]
C	0.207853	1.638990	0.986536	1.934106	1.663596
	(0.97582)	(1.55073)	(1.27765)	(3.16120)	(2.56602)
	[0.21300]	[1.05692]	[0.77215]	[0.61183]	[0.64832]
R-squared	0.731893	0.951042	0.957551	0.890305	0.847132
Adj. R-squared	0.633117	0.933004	0.941912	0.849892	0.790813
Sum sq. resids	0.105009	0.265191	0.180015	1.102025	0.726121
S.E. equation	0.074342	0.118142	0.097337	0.240835	0.195491
F-statistic	7.409610	52.72645	61.22796	22.02972	15.04151
Log likelihood	36.60759	24.10108	29.33109	4.870940	10.50298
Akaike AIC	-2.119081	-1.192672	-1.580081	0.231782	-0.185406
Schwarz SC	-1.735129	-0.808721	-1.196129	0.615734	0.198546
Mean dependent	0.097222	1.777778	1.268519	2.620370	2.250000
S.D. dependent	0.122736	0.456435	0.403863	0.621608	0.427425

Determinant resid covariance (dof adj.)		2.31E-16			
Determinant resid covariance		2.80E-17			
Log likelihood		284.6565			
Akaike information criterion		-17.08567			
Schwarz criterion		-14.49399			
Number of coefficients		54			

Source: Outputs of EVIEWS12 programming

The results of the VECM indicate the existence of a long-run equilibrium among the variables of the study, which is also confirmed by the value of the cointegrating equation. The X, X1 and X2 variables were statistically significant in the long term, as the value of t exceeded the critical value (±1.96), indicating that these variables have a significant long-term effect on the dependent variable Y, whereas the variables X3 and X4 did not have a significant effect since t values did not exceed the acceptable statistical limits. The error correction coefficient in D(Y) equation also registered a value of -0.0328), but it was statistically insignificant, indicating a weak short run deviation correction towards long run equilibrium in the dependent variable. Short term differential of independent variables showed no significant effect on Y reflecting limited spillover effect of economic shocks in the short-run. Regarding the model's quality, the R-square of the equation for Y was about 73.2%, which indicated that the model explained a mass proportion of the changes of the dependent vari- able, and the F-statistic (7.41) also suggested the overall significance of the model. 49 Economically, these results imply that the explanatory variables have a stronger impact in the long-run compared with the short-run, and the path back for the system to its equilibrium state after a shock is slow, suggesting the need for economic and financial policies supportive of a faster rate of adjustment and greater stability in the banking system.

Table (5) Results of the autocorrelation test of equation onemodel equations).

VEC Residual Serial Correlation LM Tests						
Date: 06/10/26 Time: 13:26						
Sample: 2018Q1 2025Q4						
Included observations: 27						
Null hypothesis: No serial correlation at lag h						

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	13.14451	36	0.9998	0.284783	(36, 37.9)	0.9999
Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	13.14451	36	0.9998	0.284783	(36, 37.9)	0.9999
*Edgeworth expansion corrected likelihood ratio statistic.						

Source: Outputs of the program EVIEWS12

The results of the LM test for autocorrelation of the residuals of the VECM model suggest the acceptance of null hypothesis of no autocorrelation among the residuals. The values of LRE and Rao F statistic probabilities (Prob.) were approximately 0.9998 and 0.9999 respectively, which are much higher than the significance level (5%). Therefore, the null hypothesis is not rejected, indicating that the residuals of the model are temporally independent and are not subjected to autocorrelation problems. Indication^"9"^ 9 This is functionally an very important indicator for the integrity of the standard error of the model, for it means the model without leaving a pattern in stochastic errors succeeded in capturing the dynamic relationships among the variables. This very result increases the reliability of estimated parameters and the accuracy of statistical inferences at the same time and confirms that the results of the VECM model can be trusted more in analyzing short-term and long-term relationships and so to draw recommendations in economics and finance.

$$Y_1=\beta_0+\beta_1 X+ \beta_2 X1 +\beta_3 X2 +\beta_4 X3 +\beta_5 X4+\mu_t$$

Table 6) Results of the second model of cointegration joint estimation

Date: 06/10/26 Time: 13:33	
Sample (adjusted): 2018Q3 2025Q1	

Included observations: 27 after adjustments				
Trend assumption: Linear deterministic trend				
Series: Y1 X X1 X2 X3 X4				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.600000	125.1206	95.75366	0.0001
At most 1 *	0.600000	100.3808	69.81889	0.0000
At most 2 *	0.600000	75.64093	47.85613	0.0000
At most 3 *	0.600000	50.90108	29.79707	0.0001
At most 4 *	0.600000	26.16123	15.49471	0.0009
At most 5	0.051282	1.421381	3.841465	0.2332
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.600000	24.73985	40.07757	0.7835

At most 1	0.600000	24.73985	33.87687	0.4028
At most 2	0.600000	24.73985	27.58434	0.1109
At most 3 *	0.600000	24.73985	21.13162	0.0148
At most 4 *	0.600000	24.73985	14.26460	0.0008
At most 5	0.051282	1.421381	3.841465	0.2332
Max-eigenvalue test indicates no cointegration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Calculations from EVIEWS12 programming outputs.

Ochtem results of the Johansen test for cointegration demonstrate the existence of the long run comovement relation among Y1 and X, X1, X2, X3 and X4. The null hypotheses at (None) to (At most 4) were rejected in the Trace test since each test statistic was greater than the critical value at (5%) level of inferences and pvalues were less than (0.05) which indicate that there are at most five co-integration vectors among the variables in the study. However, the result was not statistically significant for At most 5 (Prob.=0.2332), which imply that the number of co-integration vectors is at most five. Conversely, the maximum eigenvalue test indicated no cointegration at the first null hypothesis (None), the p-value was 0.7835 despite the fact that some of the superior lags have been found significant. Due to discrepancies in the results of the two tests, many researchers rely on the more powerful trace test to detect more long-run relationships. From the above, it can be concluded that the study variables are associated with a stable Long term relationship which means that short shocks donâ€™t cause a permanent departure in the relationship of the variables and VECM is the appropriate method to explore the short and long run dynamics of the relationships between the economic and financial variables under study.

Chapter Five:

Conclusions and Recommendations

1. Findings In view of the fact that no similar studies were found, conclusions are drawn from relevant literature and resources [49–54]. First: the conclusions 1. The study found that financial technology has become one of the basic pillars of developing the Iraqi banking system, as it has contributed to enhancing the efficiency of banking services, accelerating the execution of financial transactions and reducing operating costs, which has positively affected the performance of banks. 2. The results indicated that a balanced long-run relationship existed between financial technology and financial stability, which was supported by the results of the Johansen Cointegration Test; this implies that financial technology evolution directly influences the enhancement of financial stability. 3. The results of the Vector Error Correction Model (VECM) reveal a dynamic relationship between the independent variables of a study and the dependent variable of that study. 4. The study revealed that financial technology applications such as full-fledged electronic payment system, e-wallets and the like have led to increased financial inclusion and more electronic transactions, thereby contributing to the improvement of the Iraqi banking system. 5. The Iraqi banking sector still faces challenges that hinder it from fully harnessing the benefits of financial technology, notably the poor digital infrastructure, cyber risks, as well as the need to reform the legislation and regulations to keep pace with the latest technological developments.

Secondly, the recommendations.

1. It is imperative that the Central Bank of Iraq continues to support digital transformation programmes and the adoption of financial technology in public and private banks to improve the quality of banking services and contribute to financial stability.
2. Development of digital infrastructure, telecommunications and internet networks, and increased investment in cyber security systems to safeguard financial data and enhance the customers' trust on electronic services.
3. To update legislation and regulations governing the fintech sector in line with international standards that ensure a regulatory environment that supports financial innovation while maintaining financial stability.
4. Encouraging Iraqi banks to apply modern technology such as artificial intelligence, cloud computing, and blockchain to develop banking services, better risk management, and improve operational efficiency.
5. Develop the awareness financial and on going training for the employees of banking sector and customers to spread the digital culture and to further harness the financial e-Services in support of financial inclusion and contribute to sustainable economic development.

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