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أثر التحرر المالي على التطور المالي في العراق

م. زينة خضير محمود

جهة الانتساب

كلية الادارة والاقتصاد/ جامعة واسط

Email

- zkhdhair@uowasit.edu.iq

Affiliation

College of Administration and Economics/ Wasit University

الملخص:

شهد القطاع المالي في العراق تحولات جوهرية منذ عام 2003، وذلك نتيجةً للإصلاحات التي شملت البنك المركزي العراقي، والبنوك الخاصة والأجنبية، وتحرير أسعار الفائدة، وانفتاح حساب رأس المال. ورغم هذه التطورات الإيجابية، لا يزال التطور المالي في هذا النوع من الاقتصادات ضعيفاً مقارنةً باقتصادات أخرى في منطقة الشرق الأوسط وشمال أفريقيا؛ مما يشير إلى وجود عوائق هيكلية تعترض عملية التحرير المالي في الاقتصادات المعتمدة على النفط وتلك الخارجة من النزاعات

يُعتقد على نطاق واسع أن تحرير القطاع المالي قد أثر في التطور المالي في العراق خلال الفترة الممتدة من عام 2004 إلى عام 2024. وتوظف هذه الدراسة منهجية قياسية اقتصادية منهجية ومتعددة الأساليب لبحث التطور المالي في العراق خلال تلك الفترة - ولا سيما ما يتعلق بالقطاع المالي - وسياسات التحرير المالي المصاحبة له. وقد جرى تطبيق منهجية اختبار الحدود (Pesaran et al., 2001) (ARDL)، وتحليل التكامل المشترك وفق طريقة "جوهانسن" (Johansen)، ونموذج تصحيح الخطأ المتجهي (VECM)، واختبار السببية وفق طريقة "جرانجر" (Granger, 1969). كما استُخدمت مؤشرات عدة لقياس التطور المالي، شملت: الائتمان المحلي الممنوح للقطاع الخاص (كنسبة مئوية من الناتج المحلي الإجمالي)، ونسبة الكتلة النقدية (M2) إلى الناتج المحلي الإجمالي، والودائع المصرفية (كنسبة مئوية من الناتج المحلي الإجمالي)، ومؤشر الشمول المالي.

تقدم النتائج التجريبية المحسوبة أدلة على وجود علاقات إيجابية وذات دلالة إحصائية على المدى الطويل بين تدابير التحرير المالي ومؤشرات التنمية المالية (حيث تراوحت قيمة R^2 بين 0.87 و0.95)، وهو ما يتسق مع فرضية "ماكينون-شو" (McKinnon–Shaw). غير أن هذه الآثار تضعف بفعل عوامل عدة، تشمل هشاشة الاقتصاد الكلي، والاعتماد على النفط، وضعف القدرات المؤسسية، وهيمنة البنوك المملوكة للدولة. كما يؤكد "مصطلح تصحيح الخطأ" (البالغ -0.081) عملية التقارب نحو توازن المدى الطويل، وتدعم نتائج اختبار "سببية غرانجر" (Granger causality) فرضية "قيادة العرض" (supply-leading hypothesis). وفضلاً عن ذلك، وفي ظل ما تشير إليه فرضية "لعنة الموارد المالية"، ثمة أدلة على الاعتماد على الإيرادات النفطية. وتسلط النتائج الضوء على جوانب إصلاح القطاع المالي في الدول الغنية بالنفط الخارجة من النزاعات، مع إبراز أهمية ذلك على صعيد السياسات.

الكلمات المفتاحية: التحرر المالي، التنمية المالية، نموذج ARDL، نموذج تصحيح الخطأ المتجهي.

The Impact of Financial Liberalization on Financial Development in Iraq

Zinh Khuthaer Mahmod

Abstract

The financial sector reforms in Iraq since 2003 have involved the liberalization of interest rates, the opening of the capital account, reforms in the Central Bank of Iraq and private and foreign banks. These reforms have not been

enough for financial development to catch up with other Middle Eastern and North African (MENA) countries, though, which indicates structural constraints that exist in oil-intensive and post-conflict economies.

This study investigates the connection between the financial liberalization and financial development in Iraq from 2003 to 2023. It uses some econometric techniques such as the Autoregressive Distributed Lag (ARDL) bounds testing approach (Pesaran et al., 2001), Johansen cointegration testing, the Vector Error Correction Model (VECM), and Granger causality testing (Granger, 1969). Considering the limited number of observations in a year, the ARDL model is the main estimator and Johansen test, VECM test and Johansen and Granger causality tests are employed as supporting tests for the number of long-run relationships, direction of adjustment and direction of causality. Financial development can be assessed by the share of the domestic credit to the private sector in GDP, M2 to GDP, bank deposits to GDP, and financial inclusion.

The bounds test and Johansen test do not find any cointegration between financial liberalization and financial development, suggesting that there is no stable long-run (cointegrating) relationship between the two. In the short run, greater openness of capital accounts and, to a lesser degree, banking sector reform are correlated with higher growth in private sector credit, consistent with the McKinnon–Shaw hypothesis, but without resulting in ongoing financial deepening. This shows a reverse correlation of the impact of liberalization: macroeconomic vulnerabilities, reliance on oil, institutional weaknesses, and state-owned banks have dampened the effects of liberalization. Oil revenue growth is the best short-run proxy for credit growth, and Granger causality test results indicate that no significant causality runs either way, which is against the supply-leading hypothesis. The study then detects signs of the oil revenue dependence and the possible “financial resource curse..

Keywords: Financial Liberalization, Financial Development, ARDL, VECM.

1 Introduction

Financial liberalisation refers to the withdrawal of government intervention in financial markets and includes the liberalisation of interest rates, credit allocations, in- and off-flows of money and governmental control of financial institutions. How this policy agenda is grounded theoretically is illustrated in the works of McKinnon (1973) and Shaw (1973) who presented what they called "financial repression," which involved artificially low interest rates and directed credit, as a cause of the misallocation of savings and investment. Financial liberalisation is therefore expected to lead to higher real interest rates, release of saving, better efficiency in the financial intermediation process, and growth of financial markets.

This framework came to be influential in international development policy in the 1980s and 1990s, as part of the structural adjustment policies of the IMF and the World Bank in Latin America, Africa, Asia and the MENA region (Ang, 2008, Kaminsky & Schmukler, 2008). Empirical results are somewhat divergent, although

financial depth is found to have strengthened financial and economic outcomes in East Asia (King & Levine, 1993a), banking crises have marked the experience of many Latin American and Asian economies, in particular the Asian financial crisis of 1997–1998 (Demirgüç-Kunt & Detragiache, 1998). This split created an extensive literature on the conditions for financial liberalization success relating to institutional firmness, regulatory capacity, and macroeconomic stability (Stiglitz, 1994; Abiad et al., 2008; Aizenman et al., 2013).

There is a much less-studied example elsewhere for financial liberalization in a post-conflict economy in a country dependent on oil industries: that of Iraq. Over the past 20 years, broad financial reforms have taken place, such as the creation of an independent Central Bank of Iraq (CBI) pursuant to the 2004 law, rate liberalization, and the liberalization of the banking sector through access for private and nonresident institutions (Alnasrawi, 2002; IMF, 2023). The international supervision and restructuring programs for the state-owned banks.

All these reforms have yet not made marked contribution towards financial development in Iraq. Domestic credit to the private sector has been set at only 9–10% of GDP, which is much lower than both the MENA and the world average levels (World Bank, 2024; Čihák et al., 2013). Two state-owned banks, Rafidain and Rasheed, have the lion's share of the banking sector, which process almost all the public sector payments and not finance private investment (IMF 2023). Out of over 70 private banks, a few are undercapitalized and are involved in Foreign Exchange. Only 22.7% of adults have formal bank accounts, a very low rate, whereas more than 40% of the population have formal bank accounts in the wider MENA region (Demirgüç-Kunt et al., 2022).

This paper is pioneering in producing a comprehensive econometric analysis of the link between financial liberalization and financial development from two angles using a parsimonious multi-method approach over the entire period of financial liberalization (2003–2023) in Iraq. Because only 21 annual observations are available, a single core ARDL model is estimated, and each additional technique is used only to answer a question that the ARDL model cannot answer on its own. The paper is structured as follows: Section 2 presents the literature review, Section 3 outlines the methodology and data of this study, Section 4 lists the descriptive statistics, Section 5 outlines the complete econometric results and Section 6 offers the discussion and Section 7 gives out policy recommendations.

2 Specific Contributions of the Study

This study provides five original contributions to the literature on financial liberalization and financial development.

- Updates the empirical evidence for Iraq (2003–2023) by examining 21 years of data since the reforms, reflecting and incorporating important structural shocks, including post-2003 institutional changes, fluctuations in oil prices, and political instability.
- Uses an econometric framework that is as sparingly as possible and suitable to a short sample (annual data), namely the ARDL bounds testing approach as the main econometric tool, and the Johansen–VECM system and Granger causality tests as complementary tools to test the number of cointegrating relationships as well as the weak exogeneity of the regressors and the direction of causality.
- Uses a multi-dimensional measure of financial development: domestic credit to the private sector is the core dependent variable, M2/GDP and bank deposits/GDP use as robustness measures, and financial inclusion is descriptively examined without increasing the number of estimated models, thus mitigating the measurement bias.
- Covers some structural conditionalities of Iraq that are algorithmically ignored in cross-country studies, namely the dependence on oil, weakness of institutional capabilities and political fragility.
- Helps identify policy-relevant lessons for financial sector reform in post-conflict and oil dependent economies not much of which has received attention in financial development research.

3 Literature Review

3.1 Financial Repression and Liberalization: Theoretical Foundations

This study is based on the work of financial repression and financial liberalization by McKinnon (1973) and Shaw (1973). Both scholars pointed out that keeping nominal interest rates below market-clearing levels decreases the incentives for household saving in the formal banking sector, and increases excess demand for credit, which results in credit being directed administratively rather than being rationed by the market. Financial repression, yet, impedes the complementarities between money and physical capital, which are essential for self-financed investment in the developing economies, McKinnon went on to say.

This complementary “financial deepening” hypothesis presented by Shaw suggested that if the banking system in a country is regulated, it will not be able to induce significant provision of savings by offering a high rate of return on deposits, and hence will not be able to boost their productive long-term investment. The expectation of financial liberalisation – in the form of interest rate and credit decontrol – is that it would increase real interest rates, increase formal savings, and in the end, make the financial system deeper. These arguments were supported by subsequent research that showed that lowering the interest rate negatively affected savings and

productivity growth (Fry, 1988); those financial institutions provided efficient channels for financial intermediation (Greenwood and Jovanovic, 1990); and that financial depth was negatively related to economic growth in the long-term (King and Levine, 1993a and 1993b).

There has been however plenty of criticism to that liberalization framework. However, in economies with imperfect institutions and information asymmetries, financial liberalization potentially gives rise to excessive risk-taking by banks, credit booms, and instability, as Stiglitz (1994) remarked. Demirgüç-Kunt and Detragiache (1998) found solid electronic evidence that liberalization significantly increases the likelihood of banking crisis in countries in which the legal and regulatory environment is weak. Those worries have led to a conditional liberalisation hypothesis (Abiad et al. 2008): good liberalisation outcomes are dependent on the institutional quality, regulatory capacity and macroeconomic stability, both of which require a minimum level of quality.

3.2 Recent Studies (2020-2025): Financial Liberalization in Emerging Economies

Empirical studies of the impact of financial liberalization in emerging markets and institutions in recent times have taken a more nuanced and varied approach. In the Middle East and North Africa (MENA) region, capital account openness has positive financial depth effects only when combined with effective judicial institutions and protection of creditor rights, confirms the conditionality hypothesis, as shown by Boulton et al. (2022). Likewise, Mensi et al. (2021) conclude that liberalization of the banking sector in the GCC region boosts the credit of non-oil sectors, but adds to external commodity price sensitivities.

Interestingly, the increase in interest rate liberalization is observed to result in a non-linear interest rate liberalization-private sector credit relationship by Zhang and Naceur (2023) using a panel of 48 developing countries over the period 2000-2020, where the benefits of liberalization to private sector credit diminish beyond a certain threshold of institutional quality. Boukhatem and Mouslim (2021) in the context of the Middle East and North Africa (MENA) region also conclude that oil dependence has always lowered the impact of the overall financial reform for boosting credit allocation and banking efficiency.

Cahen-Fourot et al. (2022) report that financial liberalization in a post-conflict setting results in a reduction and fragmentation of financial development because of sovereign risk, fragility of financial institutions, and a crowded out private credit market by government spending financed by aid. More recent specific ARDL for Iraq by Hameed (2022) shows low level of cointegration between private sector credit and financial liberalization variables in the years 2004 - 2019 due to political uncertainty and banking sector structural weaknesses. This study supplements this analysis with

more recent data (until 2023) and a wider range of financial development indicators and econometrics.

Panel evidence from Sub Saharan Africa is provided by Ibrahim and Alagidede (2021) showing that financial liberalization can indeed bring a decrease in financial exclusion and an increase in banks' presence but this becomes systematically dampened in oil-exporting economies. As per the financial resource curse literature (Beck, 2011; Barajas et al., 2013), oil revenues are found to bring more benefits to the state banks, crowd out private financial development and keep the private sector from diversifying financial intermediation. It is also very applicable to Iraq, where the contribution of oil revenues accounted for more than 90% of government revenues in the study period.

3.3 Financial Liberalization and Development in the MENA Region

A number of important patterns emerged in the studies conducted on financial liberalization in the MENA region. Benefit of stock market liberalisation on financial depth has been found to be different across economies in the MENA region according to Naceur et al. (2008). Saci et al (2009) reported that low interest rate and capital account liberalization had boosted economic development through enhanced mobilization of domestic credit. Abdelaziz et al. (2020) demonstrated that under the condition of financial institutions' structure, there is no effect of capital account liberalization on financial depth in North African economies.

The MENA economies which are oil-exporting need to face different structural challenges. Alkhuzaim (2014) found conflicts of government spending and financial intermediation in Qatar, and Al-Jarrah et al. (2012) drew attention to the fact that interest rate liberalisation in Jordan has boosted the efficiency of banking intermediation, although it has been hampered by competition among the public banks. Muslin countries have been found to have a negative association between finance and growth in the case of countries that are primarily oil rich, according to Hassan et al. (2011). The sceptre over the financial resource curse hypothesis was officially raised by Beck (2011) and Barajas et al. (2013), who found that financial development is hurt by oil dependence in a crowding-out fashion, and could be directly relevant to Iraq.

3.4 Iraq-Specific Literature and Identified Gap

Studies that are empirical on financial liberalization and financial development have been relatively few in Iraq. While not formally econometrically analysed, Alnasrawi (2002) gives a historical overview of Iraq's oil-based economy. Corm (2012) focuses on Iraq and its role in the ME political economy context without providing an analysis of the outcome of the reforms in terms of numbers. By applying OLS regression method, Mehdi and Jassim (2020) studied financial reform and economic growth in Iraq period of 2005–2017 and concluded that there is positive but

low correlation between them. Hameed (2022) conducts an ARDL analysis of private sector credit for the economies covering 2004–2019 and statistical cointegration results are found to be not statistically significant, which is likely a consequence of the lack of depth in the banking sector and political uncertainty.

The existing literature has three main shortcomings: Approaching the reform period with the 30-year slides of multiple structural shocks (ISIS conflict, oil price collapses, and COVID-19) is missing; Single-equation OLS methods will fail to capture the options and conduction of the short-term and long-term interactions; and the effect of the Iraqi structural characteristics—oil dependence, institutional weakness, and political fragility—has not been explicitly incorporated. All three gaps are tackled in the present study using a parsimonious multi-method approach in which each technique has a distinct role.

4 Research Objectives, Questions, and Hypotheses

4.1 Research Objective 1

Objective: To estimate the long-run and short-run effects of financial liberalization on financial depth in Iraq over the period 2003–2023, conditional on oil dependence.

Research Question 1: Do capital account openness, interest rate liberalization and banking reform have a stable long-run relationship with domestic credit to the private sector in Iraq, and how is this relationship affected by dependence on oil revenue?

- H_1: A statistically significant long-run (cointegrating) relationship exists between financial liberalization (KAOPEN, IRL, BR), oil dependence (OIL) and domestic credit to the private sector (DC/GDP).
- H_2: Financial liberalization (KAOPEN, IRL, BR) has a positive long-run effect on DC/GDP, and its short-run effect is smaller than its long-run effect because of structural rigidities in the banking sector.
- H_3: Oil revenue dependence has a negative long-run effect on DC/GDP (the financial resource curse).

4.2 Research Objective 2

Objective: To determine the direction of causality between financial liberalization and financial depth in Iraq.

Research Question 2: Does financial liberalization lead financial deepening (supply-leading), or does financial deepening lead liberalization (demand-following)?

- H_4: Causality runs from financial liberalization (KAOPEN, BR) to DC/GDP, with no reverse causality, consistent with the supply-leading hypothesis (Patrick, 1966).

There are a limited number of hypotheses, on purpose. Banking stability, banking efficiency and financial inclusion are not measured econometrically, for two reasons: firstly, the number of years of observations was too small for a model to be

developed for each outcome; and secondly, account-ownership data are available only for the years of the Global Index survey, so these dimensions are analyzed descriptively in the section on financial development trends. Robustness checks include the inflation rate, the growth rate of real GDP, and the exchange rate, but none of these are considered to be primary regresses.

5 Research Methodology

5.1 Research Philosophy and Design

It is a positivist epistemological perspective, quantitative and deductive research design. A positivist standpoint is suitable for the research because the study aims to test specific causal hypotheses, formulated based on the existing economic theory, and tested with data that can be seen and measured, and using formal statistical methods to find out whether the hypotheses made in the study are corroborated by the empirical data. A single-country time-series design is superior to a cross-country panel design to explain why and how the different institutional and structural characteristics of the country-specific geopolitical context (in Iraq's case) leads to various outcomes of financial liberalization on financial development. The analysis uses annual data for 2003–2023, giving 21 observations; the adequacy of this sample and the steps taken to match the size of each model to it are set out in the next subsection.

5.2 Sample Size and Its Adequacy

The data sample contains 21 yearly observations (from 2003 to 2023). This is short in comparison to the number of variables that a full multi-method analysis could be based upon, and the problem is dealt with in three ways: by justification of the length or frequency of the sample not being available or appropriate, by the selection of estimators and critical values with good small-sample properties, and by the size of each estimated model being reduced to fit the data.

Why the sample cannot be extended. First, the extension of the sample back in time would mix the different economic regimes. Prior to 2003, Iraq did not have an independent central bank nor any free market financial system with freely set interest rates, but was experiencing a process of financial liberalization that did not start until the reforms of 2003–2004, including the Central Bank of Iraq Law of 2004. The regime that is observed prior to 2003 would then be one that the model has no explanation for. Second, several important series do not have quarterly or monthly data for the entire period, such as the Chinn-Ito KAOPEN index and the banking reform index in Iraq, and oil-revenue data in Iraq are not consistently available at a higher frequency than quarterly. Third, the duration of the data is more important than the number of observations for cointegration analysis – The longer the data period, the more power is added to the test of detecting long-term relationships, but not much more than that (Hakkio & Rush, 1991). A 21 year period spanning a number of full

price cycles and conflict cycles, therefore, conveys more long-run information than might at first appear.

Small-sample estimation and inference. The ARDL bounds testing approach is the main one since it estimates the long run relationship from a single equation, is applicable to the case where the regresses are I(0) or I(1), and better in small samples than system based cointegration estimators (Pesaran & Shin, 1999; Pesaran et al., 2001). The asymptotic critical values of Pesaran et al. (2001) are known to tend to over-reject in short samples, and thus for the smallest sample size tabulated (n = 30), the bounds F-test is compared with the finite-sample critical values of Narayan (2005) and the t-test on the coefficient of the lagged dependent variable is applied to exclude degenerate cases. The Johansen statistics are adjusted by the small-sample correction by Reinsel and Ahn (1992) to account for the fact that the uncorrected test is oversized in small samples (Cheung & Lai, 1993).

Reduced model complexity. The specification is limited in such a way that the number of estimated parameters still remains below the number of observations: (i) the relationship between the variables in the core specification of the ARDL model is used to make inferences, while the other variables are used only to re-estimate the same specification as robustness checks; (ii) financial inclusion is not modelled econometrically because data on Global Findex account-ownership are available only for survey years and an interpolated annual series would lead to artificial persistence; (iii) the core ARDL model includes four variables, which consist of KAOPEN, IRL, BR, and OIL, and one break dummy variable (D2014); (iv) the order of the VAR is determined by the Schwarz Bayesian Criterion, and the same conclusion shall be drawn by selecting the order by the minimum number of parameters; (v) the Johansen–VECM analysis is restricted to the I The changes increase the number of residual degrees of freedom of the core ARDL model from 2 to 9 and that of each equation of the system models from 4 to at least 10, as shown in Table 2.

These adjustments mean that the tests have limited power, based on 21 observations. The findings are therefore interpreted as indicative of the direction and magnitude of the relationships rather than as specific point estimates of those relationships, and this is recognized in the final section.

5.3 Data Sources and Variables

The annual data used for the preparation of this report are obtained from four main sources: first, World Bank World Development Indicators (WDI) for macroeconomic aggregates and financial depth indicators; second, the International Monetary Fund (IMF) International Financial Statistics (IFS) and Article IV Consultation Reports; third, Annual Statistical Bulletins by the Central Bank of Iraq (CBI) covering the banking sector balance sheets, interest rates, and foreign exchange

data; and finally, the Chinn – Ito financial openness index data base for the KAOPEN measure. All nominal variables are inflated or deflated to real values using the deflators provided by the World Bank GDP deflators. The Global Findex survey years' account ownership (financial inclusion) is used only for descriptive analysis. Data used for 2003 is from the World Bank (inflation) and the IMF (real GDP growth, exchange rate, lending rate and oil share of government revenue; IMF, 2003, 2005). Since the values of DC/GDP, M2/GDP and deposits/GDP could not be reported with reliability after the conflict, and the currency exchange of October 2003-January 2004, the values of these ratios for 2003 have been back cast from growth rates observed in 2004-2006, while the values of KAOPEN and the banking reform index have been set at their lowest values prior to the conflict. All estimates are performed in Python (version 0.15 of stats models and 8.0 of arch). The data and the script for the replication are made available as supplementary material.

5.4 Variable Definition and Measurement

Table 1 provides a comprehensive summary of all variables used in the econometric model, including their measurement proxies, operational definitions, and data sources.

Table 1 Variable definitions, measurement proxies, and data sources

Type	Variable	Proxy / Measure	Symbol	Unit	Source
Dependent (core)	Financial Depth	Dom. Credit / Private Sector	DC	% GDP	World Bank WDI
Dependent (robustness)	Monetary Depth	Broad Money M2 / GDP	M2	% GDP	IMF IFS
Dependent (robustness)	Banking Depth	Bank Deposits / GDP	DEP	% GDP	WB WDI / CBI
Descriptive only	Financial Inclusion	Account Ownership (adults 15+)	FIN	% adults	Global Findex
Independent (core)	Capital Account Openness	Chinn–Ito KAOPEN Index	KAOPEN	Index	Chinn & Ito (2006)
Independent (core)	Interest Rate Lib.	Real Lending Rate (deregulated)	IRL	%, real	CBI / IMF IFS
Independent (core)	Banking Reform	EBRD Reform Index (adapted)	BR	1–4 scale	EBRD / IMF
Control (robustness)	Inflation	CPI Annual % Change	INF	%, annual	World Bank WDI
Control (robustness)	GDP Growth	Real GDP Growth Rate	GDPG	%, annual	World Bank WDI
Control (core)	Oil Revenue	Oil Rev. / Govt. Revenue	OIL	%, share	Iraqi MoF / IMF
Control (robustness)	Exchange Rate	Nominal IQD/USD Rate	EXR	IQD/USD	CBI / IMF
Dummy (core)	Conflict / oil-price shock	1 for 2014–2017, 0 otherwise	D2014	Binary	Constructed

Source: prepared by the researcher

5.5 Econometric Framework

The empirical strategy is an ordered set of sequential steps, each of which addresses a different question, and the results of the previous step provide the specification for the next step. Table 2 summarises the role and question addressed by each method, what each method contributes to the analysis and the size of the model compared to the data available.

Step 1 – Unit root tests. The ADF and PP tests set the structure of each series, and the Zivot–Andrews test allows for one structural break at an unknown date. This step is a pre-test and not an additional model as it confirms that there is no I(2) series which would invalidate the bounds test, identifies the I(1) series that can be included in the Johansen system, and dates the break used to define the D2014 dummy.

Step 2 – ARDL bounds test and ARDL-ECM (primary method). The core model is estimated in unrestricted error-correction form:

$$\Delta DC_t = \alpha_0 + \rho DC_{t-1} + \Sigma_j \theta_j X_{j,t-1} + \Sigma_j \varphi_j \Delta X_{j,t} + \delta D2014_t + \varepsilon_t$$

where X = {KAOPEN, IRL, BR, OIL}. The bounds test examines H_0: $\rho = \theta_1 = \ldots = \theta_4 = 0$, the long-run coefficients are $\beta_j = -\theta_j/\rho$, and ρ measures the speed of adjustment. Cointegration is accepted only if both the F-statistic and the t-statistic on ρ exceed their upper bounds (Pesaran et al., 2001). If they do not, the long-run coefficients are not identified, and the short-run effects of liberalization are estimated from the model in first differences, $\Delta DC_t = c + \Sigma_j \varphi_j \Delta X_{j,t} + \delta D2014_t + u_t$. ARDL is the main approach since (a) the regressors consist of I(0) and I(1) variables, meaning that the Johansen approach would not be feasible when using the full set of regressors; (b) the number of parameters is much lower than a VAR; and (c) the ECM is a re-parameterisation of the ARDL model and not another model.

Step 3 – Johansen cointegration test (complementary check). The ARDL model contains the assumption that there exists at most one long run relationship and that it is normalised in terms of DC/GDP. These restrictions are not required for Johansen's trace and maximum-eigenvalue tests, which are used for checking the restrictions (Johansen, 1991; Johansen & Juselius, 1990). All of the variables must be I(1), and the procedure is only used for the I(1) variables of the core model identified in Step 1 (DC/GDP, KAOPEN and BR); IRL and OIL are I(0) and are not included, and the VAR order is determined by AIC, SBC and HQ. If the two approaches agree, this enhances the conclusion, while disagreement indicates that the results of the ARDL depends on the one-equation assumptions.

Step 4 – VECM (complementary check). Once cointegration is detected, the VECM (error-correction representation of the same Johansen system) depicts through the loading coefficients which variables move along the longrun relationship. It is a direct test of weak exogeneity assumption of the liberalization variables which is assumed but not tested by the ARDL bounds approach (Pesaran et al., 2001). If a VECM model cannot be found then it is not an appropriate model and the loading coefficients are reported only as a diagnostic check that there may be some tendency for DC/GDP to adjust.

Step 5 – Granger causality (complementary check). The implication of cointegration is that there is some causality, albeit not specifically identified, in at least one direction (Engle & Granger, 1987; Granger, 1988). Once cointegration is identified, the test for causality within the VECM (Lütkepohl, 2005) is performed. If not, the Toda–Yamamoto (1995) procedure is employed: a VAR in levels of order $k + d_{max}$ is estimated, where k is selected by information criteria and $d_{max} = 1$ is the maximum order of integration, and Wald tests are applied to the first k lags only. The procedure is generally applicable for both I(0) and I(1) variables and whether or not they are cointegrated and is thus robust to low power of pre-tests in short samples. The tests are run in both cases not as bivariate pairwise regressions in order to avoid omitted-variable bias and only six tests from H_4 reported.

Step 6 – Diagnostic and stability tests. Heteroscedasticity (ARCH and Breusch–Pagan–Godfrey test), functional form (Ramsey RESET test), normality (Jarque–Bera test) and parameter stability (CUSUM and CUSUM of squares; Brown et al., 1975) are all checked for the core ARDL model. Diagnostics are reported on core model only.

The models are thus not duplicative but complementary; the ARDL model gives the estimates, the Johansen tests examines the number and normalization of the long-run relationships, the VECM test examines the exogeneity assumption used in the ARDL model, and the Granger tests examines the direction of causality needed to examine the supply-leading hypothesis. Since the sequence includes explicit rules for

decision making, the result of every test (not the researcher's preference) will decide which model is estimated next.

Table 2 Role of each econometric method and size of models

Step	Method	Question answered	Why it is needed / what it adds	Model size
1	ADF, PP and Zivot–Andrews unit root tests	What is the order of integration? Is there a structural break?	Rules out I(2) series (required by the bounds test); identifies the I(1) variables admissible in the Johansen system; dates the break for D2014.	Pre-test; no structural model
2	ARDL bounds test and ARDL-ECM (primary)	Is there a long-run relationship? If so, what are the long-run effects and the speed of adjustment? If not, what are the short-run effects?	Valid with mixed I(0)/I(1) regressors and in small samples; single equation; F-test combined with t-test on ρ; the ECM is a re-parameterisation of the same model.	ARDL(1,1,1,1,1) + D2014: 11 parameters, 20 obs., df = 9 (ARDL(2,1,1,1,1,1,1) + 2 dummies: 17 parameters, 19 obs., df = 2)
3	Johansen trace and max-eigenvalue tests (check)	How many cointegrating vectors exist?	Tests the ARDL assumption of a single long-run relationship without normalising on DC/GDP.	3 I(1) variables (DC, KAOPEN, BR); VAR(1): 4 parameters per equation, 20 obs., df = 16 (6 variables)
4	VECM (check)	Which variables adjust to the long-run equilibrium?	Tests the weak exogeneity of the regressors, which the ARDL approach assumes; diagnostic only if r = 0.	Loadings of the 3-variable system (14 parameters per equation, 18 obs., df = 4)
5	Granger causality: within VECM, or Toda–Yamamoto if no cointegration (check)	In which direction does causality run?	Distinguishes supply-leading from demand-following finance (H_4); valid with or without cointegration.	6 Wald tests; VAR(2) in levels: 9 parameters per equation, 19 obs., df = 10 (9 pairwise tests)
6	Diagnostic and stability tests	Is the core model adequate and stable?	Validates inference from the ARDL estimates.	Core model only (all four models)

Note: df = residual degrees of freedom. Figures in parentheses refer to the original specification.

Source: prepared by the researcher

6 Results

6.1 Descriptive Statistics

The descriptive statistics for all the model variables (N = 21, 2003–2023) are presented in Table 3. Both financial depth indicators are on the upward trend during the period, domestic credit to the private sector growth is 10.2 percent in 2023 (mean 6.43 percent) from 1.7 percent in 2003 and broad money growth is 72.8 per cent in 2023 (mean 46.33 percent) from 15.6 per cent in 2003. These levels are still low when compared to the MENA average, however, and both series drop in 2014–2015 and 2020. The distributions of inflation, real GDP growth, the real lending rate and the exchange rate are also negatively skewed (1.46, 1.18, 1.27 and 1.24, respectively), and have high kurtosis (3.90, 3.85, 3.95 and 3.85, respectively) due to the high inflation period of 2003–2007, and the peak year of 2006 with 53.2 per cent inflation, respectively. The capital account policy was consistently restrictive as reflected in all the KAOPEN values ranging from −1.86 to −0.86.

Table 3 Descriptive statistics for all model variables, Iraq 2003–2023 (N=21). Source: Computed from World Bank WDI, IMF IFS, CBI, Chinn–Ito (2006), Global Findex (2021)

Variable	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis	J-B Stat	Obs.
DC / GDP (%)	6.433	2.399	1.70	10.20	−0.59	2.40	1.51	21
M2 / GDP (%)	46.329	16.451	15.60	72.80	−0.42	2.18	1.21	21
Bank Deposits / GDP (%)	36.624	12.951	11.90	57.90	−0.43	2.29	1.09	21
Financial Inclusion (%)	10.976	3.939	5.50	20.00	0.63	2.71	1.49	21
KAOPEN Index	−1.326	0.351	−1.86	−0.86	−0.84	1.92	3.48	21
Real Lending Rate (%)	7.250	0.987	6.00	10.50	1.77	6.72	23.11***	21
Banking Reform Index	1.857	0.528	1.00	3.00	0.07	2.65	0.12	21
Inflation (%)	11.409	15.266	0.25	53.22	1.46	3.90	8.13**	21
Real GDP Growth (%)	3.638	14.592	−36.70	46.50	0.12	7.16	15.23***	21
Oil Revenue (% Govt. Rev.)	93.910	1.850	89.90	96.30	−0.77	2.62	2.21	21
IQD/USD Exchange Rate	1291.3	190.86	1166	1936	2.01	7.09	28.76***	21

Source: Computed from World Bank WDI, IMF IFS, CBI Annual Bulletins, Chinn–Ito (2006), Global Findex (2021).

6.2 Correlation Matrix

The Pearson correlation matrix is shown in Table 4. The correlation between KAOPEN (r = 0.897) and DC/GDP and between M2/GDP and deposits/GDP are strong and positive. Financial depth is strongly negatively correlated with inflation (r = −0.817, for DC/GDP) and the real lending rate (r = −0.692). The oil revenue share is positively associated with the financial depth indicators (r = 0.515 for DC/GDP), which refutes easy crowding-out explanation of the financial resource curse. Most of these series are trending over time, which means that high levels correlation might be coincidental; the cointegration tests below will determine whether they exhibit genuine long run correlation.

Table 4 Pearson Correlation Matrix of Model Variables (N=21)

Variable	DC	M2	DEP	FIN	KAOPEN	IRL	BR	OIL
DC	1.000							
M2	0.995***	1.000						
DEP	0.997***	0.999***	1.000					
FIN	0.898***	0.923***	0.922***	1.000				
KAOPEN	0.897***	0.885***	0.882***	0.757***	1.000			
IRL	−0.692***	−0.653***	−0.656***	−0.376*	−0.675***	1.000		
BR	0.857***	0.845***	0.856***	0.768***	0.702***	−0.564***	1.000	
OIL	0.515**	0.492**	0.503**	0.347	0.243	−0.505**	0.570***	1.000
INF	−0.817***	−0.801***	−0.798***	−0.635***	−0.876***	0.676***	−0.595***	−0.172

Note: *, and * denote significance at the 1%, 5% and 10% levels/ Source: prepared by the researcher

7 Empirical Results

7.1 Unit Root Test Results

The results of the unit root tests are displayed in Table 5. The ADF and PP test each have a constant, with the number of lags (maximum two) chosen by the AIC. Because of the war in 2003, the war with ISIS in 2014 and the COVID-19 pandemic in 2020, there is just one intercept break in the Zivot–Andrews (1992) test, which specifies the date of the break.

BR is stationary in level and KAOPEN and deposits/GDP are stationary in 1st differences; all these are I(1). The oil revenue share, real GDP growth and the exchange rate are stationary in levels and the real lending rate is stationary in levels based on the PP test and thus are considered I(0). Both inflation (I(1)) and KAOPEN, a step index, are treated conservatively as I(1) on both the ADF and PP tests, and stationary around a 2006 break on the Zivot–Andrews test, and around a 2008 break on the same test for the step index KAOPEN. The financial inclusion series is a smooth interpolated trend that does not pass the tests even in first differences, therefore there is no reason to include it in the econometric models. Since there are no variables at level (2), the bounds test is valid. The mixed order of integration verifies the ARDL bounds approach as the main tool and the Johansen test is used for the I(1) variables of the core model (DC/GDP, KAOPEN and BR). The Zivot–Andrews test is most commonly applied to date the break around the 2020 shock, so no second dummy (D2020) is included in the core model and the CUSUM tests are used to check for stability around the 2020 shock.

Table 5 Unit Root Test Results: ADF, PP and Zivot–Andrews Tests at Levels and First Differences

Variable	ADF (Level)	ADF (1st Diff)	PP (Level)	PP (1st Diff)	Break Year (ZA)	ZA Stat	5% CV (ZA)	Integration
DC/GDP	−1.31	−4.08***	−1.54	−4.08***	2014	−3.49	−4.81	I(1)
M2/GDP	−1.02	−3.25**	−1.15	−3.10**	2014	−3.86	−4.81	I(1)
DEP/GDP	−1.05	−3.53***	−1.15	−3.45***	2014	−3.99	−4.81	I(1)
FIN	2.07	8.36	3.38	0.37	2020	−0.17	−4.81	Det. trend‡
KAOPEN	−1.24	−4.25***	−0.91	−4.45***	2008	−10.60***	−4.81	I(1)†
IRL	−1.42	−1.78	−5.24***	−5.73***	2014	−3.79	−4.81	I(0)
BR	−0.95	−4.34***	−0.50	−4.37***	2014	−3.77	−4.81	I(1)
INF	−2.10	−4.09***	−1.54	−3.61***	2006	−7.34***	−4.81	I(1)†
GDPG	−8.63***	−14.52***	−7.46***	−22.31***	2010	−3.97	−4.81	I(0)
OIL	−3.91***	−3.88***	−5.23***	−6.98***	2014	−4.93**	−4.81	I(0)
EXR	−3.08**	−2.28	−5.37***	−6.98***	2006	−3.60	−4.81	I(0)

Note: Intercept included in all tests; ADF lag length by AIC (maximum 2). *, and * denote rejection of the unit-root null at the 1%, 5% and 10% levels. † Stationary around a single break on the Zivot–Andrews test. ‡ Interpolated series, non-stationary even in first differences; not modelled.

Source: prepared by the researcher

7.2 ARDL Bounds Test for Cointegration

The bounds test of the core model (DC/GDP) and the two robustness models (M2/GDP, bank deposits/GDP) with the same four regressors and the D2014 dummy are reported in Table 6. The lag length is the same for all variables, being equal to one, with 21 observations. The F-Statistics are compared to the finite-sample critical values of Narayan (2005) when k = 4 and n = 30 and the t-Statistics are reported for the t-bound test on the lagged dependent variable, ρ.

For the three series, the F-statistics are lower than the lower I(0) boundaries at the 10 % level and, therefore, the null hypothesis of no long-run relationship can not be rejected, and H_1 is not accepted. The t-statistics for ρ (0.22, −0.16 and −0.01) are all near zero and not negative as needed for error correction, further confirming the result. The conclusion is strong: It is true if D2014 is dropped (F = 1.07), if the order ARDL (1,1,0,1,1), chosen by the SBC model selection procedure, is used (F = 0.91), and if only KAOPEN and BR are present (F = 2.01). A specification in logarithms of DC/GDP produces a larger F-statistic (7.97), but its error-correction coefficient is insignificant (t = −0.87), which is the degenerate case in which the F-test alone is not evidence of cointegration (Pesaran et al., 2001). Financial inclusion is not tested, for the reasons given in the methodology section.

Table 6 ARDL Bounds Test Results for Cointegration (Core and Robustness Models)

Dependent Variable	t-stat. on ρ	F-Stat.	I(0) 5%	I(1) 5%	I(0) 10%	I(1) 10%	Decision
Domestic Credit / GDP (DC) – core	0.22	0.96	3.354	4.774	2.752	3.994	No coint.
Broad Money M2 / GDP – robustness	−0.16	0.48	3.354	4.774	2.752	3.994	No coint.
Bank Deposits / GDP (DEP) – robustness	−0.01	0.36	3.354	4.774	2.752	3.994	No coint.

Note: ARDL(1,1,1,1,1) with intercept and D2014 (20 observations, 9 residual degrees of freedom). Critical values are the finite-sample values of Narayan (2005) for k = 4, n = 30, Case III (unrestricted intercept, no trend). Cointegration requires the F-statistic to exceed the I(1) bound and the t-statistic on ρ to be significantly negative.

Source: prepared by the researcher

7.3 Long-Run (Levels) Coefficient Estimates

Table 7 gives the coefficients of the lagged levels of the regressors in the conditional ECM. All the liberalisation variables, as well as the oil revenue share, are not statistically significant and the robustness controls in panel B (introduced individually to the basic model) are not significant. The coefficient on the lagged dependent variable (ρ) is not significantly negative, so the implied long-run multipliers (−θ/ρ) cannot be identified and are not reported. The table therefore does not provide any evidence of long run effects, consistent with the bounds test and the long run parts of H_2 and H_3 are not supported.

Table 7 Long-Run (Levels) Coefficients of the Conditional ECM (Core and Robustness Models)

Variable	DC/GDP (core)	M2/GDP (robustness)	DEP/GDP (robustness)	Hypothesis
Panel A: Core regressors				
KAOPEN (t−1)	−0.948 (1.094)	−0.743 (5.581)	−1.372 (5.177)	H_2: Not supported
IRL (t−1)	−0.251 (0.238)	−1.203 (1.545)	−0.885 (1.398)	H_2: Not supported
BR (t−1)	−0.075 (0.564)	−0.740 (3.363)	−0.854 (3.207)	H_2: Not supported
OIL (t−1)	0.030 (0.085)	0.201 (0.507)	0.175 (0.456)	H_3: Not supported
Panel B: Robustness controls (each added separately)				
INF (t−1)	0.015 (0.021)	0.115 (0.115)	0.122 (0.101)	Control: not significant
GDPG (t−1)	0.019 (0.022)	0.163 (0.121)	0.150 (0.114)	Control: not significant
EXR (t−1)	0.0011 (0.0019)	0.0103 (0.0100)	0.0098 (0.0092)	Control: not significant
R^2	**0.8692**	**0.8426**	**0.8235**	—
Adj. R^2	**0.7238**	**0.6676**	**0.6274**	—
F-Statistic	**5.98*** **	**4.82** **	**4.20** **	—

Note: Coefficients θ on the lagged levels in the conditional ECM; standard errors in parentheses. *, and * denote significance at the 1%, 5% and 10% levels. The coefficient on the lagged dependent variable (ρ) is 0.048 (0.213) for DC/GDP, −0.025 (0.155) for M2/GDP and −0.003 (0.191) for DEP/GDP, so the long-run multipliers −θ/ρ are not identified. The constant, short-run terms and D2014 are included but not reported.

Source: prepared by the researcher

7.4 Short-Run Dynamics

Since there is no evidence of cointegration, the short-run effects are estimated from the model in first differences (Table 8). A change in KAOPEN is positively and significantly correlated with a change in DC/GDP (1.591, $p = 0.009$), a change in the banking reform index is positively correlated but not significant at the 10% level (0.617, $p = 0.075$) and a change in the oil revenue share is positively correlated and highly significant (0.235, $p < 0.001$). The real lending rate and also the dummy of 2014-2017 is not significant. The same pattern is present for M2/GDP, deposits/GDP: KAOPEN is positive (significant at the 10% and 5% levels respectively) and BR is not significant while OIL is positive and significant at the 1% level. In the core model, the variation in credit growth accounted for by the model is in excess of 73 per cent (adjusted $R^2 = 0.728$). The short-run results are in favor of H_2 for capital account openness and more weakly for banking reform, but there is no long-run adjustment associated with the short-term result.

Table 8 Short-Run Model in First Differences (Core and Robustness Models)

Variable	ΔDC/GDP (core)	ΔM2/GDP (robust.)	ΔDEP/GDP (robust.)	p-value (core)	Hypothesis
ΔKAOPEN	1.591*** (0.524)	5.791* (2.877)	5.509** (2.520)	0.009	H_2: Supported (short run)
ΔIRL	0.074 (0.166)	0.681 (0.911)	0.599 (0.797)	0.664	H_2: Not supported
ΔBR	0.617* (0.321)	2.992 (1.762)	2.453 (1.543)	0.075	H_2: Weak support (10%)
D2014	−0.125 (0.249)	−2.304 (1.369)	−1.714 (1.198)	0.625	Shock dummy: not significant
ΔOIL	0.235*** (0.046)	1.155*** (0.252)	1.022*** (0.221)	<0.001	H_3: Positive, not negative
Constant	**0.252** (0.116)**	**2.499*** (0.637)**	**1.916*** (0.558)**	0.048	**Drift**
Adj. R^2	**0.728**	**0.729**	**0.713**	F = 11.15***	—

Note: OLS on first differences, 2004–2023 (20 observations, 14 residual degrees of freedom). Standard errors in parentheses; *, and * denote significance at the 1%, 5% and 10% levels.

Source: prepared by the researcher

7.5 Johansen Cointegration Results

The Johansen trace and maximum-eigenvalue tests are presented for the three I(1) variables in the core model (DC/GDP, KAOPEN and BR) in Table 9. A VAR(1) is used, selected by the AIC, SBC and HQ criteria, and the statistics are corrected for the small sample size using the Reinsel–Ahn correction. Both of the tests fail to reject a null of no cointegrating vector (adjusted trace statistic 20.37 versus a 5% critical value of 29.80; maximum-eigenvalue statistic 10.66 versus 21.13). The system approach hence verifies the result of the ARDL as there is no evidence of a long run relationship ($r = 0$) and hence ARDL result does not rely on the single-equation assumptions.

Table 9 Johansen Cointegration Test Results (Three-Variable I(1) System: DC/GDP, KAOPEN, BR)

Null Hypothesis	Eigenvalue	Trace Stat. (adj.)	5% CV (Trace)	Max. Eigen Stat. (adj.)	5% CV (Max. Eigen)	Decision
$r = 0$	0.466	20.37	29.80	10.66	21.13	Fail to reject
$r \leq 1$	0.428	9.70	15.49	9.50	14.26	Fail to reject
$r \leq 2$	0.012	0.21	3.84	0.21	3.84	Fail to reject

Note: VAR(1) with unrestricted constant, 20 observations. Statistics adjusted by $(T - pk)/T = 0.85$ (Reinsel & Ahn, 1992); unadjusted trace statistics are 23.96, 11.42 and 0.24. 5% critical values from MacKinnon, Haug and Michelis (1999).

Source: prepared by the researcher

7.6 VECM Results

The Johansen test shows that $r = 0$, which means that the VECM is not the suitable model of the data. Table 10 reports for the diagnostic purposes the loading coefficients that are obtained after imposing one cointegrating vector only. The loading coefficient in the DC/GDP equation is near to zero and not significant ($\alpha = -0.010$, $p = 0.938$), in which the domestic credit does not have a tendency to respond to the liberalization measures towards a long-run relationship. The loading for BR is not economically significant ($p = 0.424$) and for KAOPEN is economically significant ($p < 0.001$), which does not represent a real equilibrium. These diagnostics duplicate the evidence of no error correction in Tables 6 and 9.

Table 10 VECM Loading Coefficients with One Cointegrating Vector Imposed (Diagnostic Check)

Variable	α (Loading Coef.)	Std. Error	t-Statistic	p-Value	Interpretation
DC/GDP	−0.010	0.131	−0.08	0.938	No adjustment ($\alpha \approx 0$)
KAOPEN	0.100***	0.028	3.62	<0.001	Significant α; not meaningful when $r = 0$
BR	0.050	0.063	0.80	0.424	Weakly exogenous

Note: Rank $r = 1$ imposed for diagnostic purposes although Table 9 indicates $r = 0$; VECM derived from the VAR(1) with unrestricted constant (20 observations).

Source: prepared by the researcher

7.7 Granger Causality Results

The existence of no cointegration calls for a test of Granger causality, instead of the test within VECM, using the Toda–Yamamoto procedure. A VAR with the order two ($k = 1$ selected by all information criteria, plus $dmax = 1$) is estimated for

DC/GDP, KAOPEN, BR and OIL and Wald tests are used for the first lag only. Table 11 shows that none of the null hypotheses is rejected: KAOPEN ($\chi^2 = 0.18$, $p = 0.675$), BR ($\chi^2 = 1.03$, $p = 0.311$) and OIL ($\chi^2 = 0.37$, $p = 0.544$) do not Granger-cause DC/GDP, and DC/GDP does not Granger-cause any of them. Hence, H_4 is not supported. There were 19 effective observations and these tests have low power, therefore, the result does not suggest that there is predictive causality evidence, it does not mean there is no evidence of predictive causality.

Table 11 Toda–Yamamoto Granger Causality Tests (VAR in Levels, k = 1, dmax = 1)

Null Hypothesis (H_0)	Direction	Wald $\chi^2(1)$	p-Value	Decision	Implication
KAOPEN does not Granger-cause DC	KAOPEN → DC	0.18	0.675	Fail to reject	No causality
DC does not Granger-cause KAOPEN	DC → KAOPEN	0.00	0.989	Fail to reject	No causality
BR does not Granger-cause DC	BR → DC	1.03	0.311	Fail to reject	No causality
DC does not Granger-cause BR	DC → BR	0.46	0.498	Fail to reject	No causality
OIL does not Granger-cause DC	OIL → DC	0.37	0.544	Fail to reject	No causality
DC does not Granger-cause OIL	DC → OIL	0.00	0.995	Fail to reject	No causality

Note: VAR(2) in levels with constant (19 observations); Wald tests on the first lag only (Toda & Yamamoto, 1995). DC denotes DC/GDP/ Source: prepared by the researcher

7.8 Diagnostic and Stability Tests

Table 12 shows the DC/GDP (core conditional ECM) diagnostic tests. The result of the Breusch–Godfrey test shows that the null of no first order serial correlation is not rejected at the 5% level ($p = 0.099$), the ARCH test ($p = 0.574$) and Breusch–Pagan–Godfrey test ($p = 0.740$) do not show any heteroscedasticity, the Ramsey RESET test does not show that the functional form is incorrect ($p = 0.204$) and the Jarque–Bera test does not reject normality ($p = 0.106$). The CUSUM and CUSUM of squares statistics are within their 5% limits of tolerance for the sample period 2003 - 2023, which suggests that the parameters are stable. First-differencing the short run model also satisfies the serial-correlation test ($p = 0.424$). The models are thus statistically satisfactory, and the lack of cointegration is not due to the mis-specification.

Table 12 Diagnostic and Stability Tests (Core DC/GDP Conditional ECM)

Test	Null Hypothesis	Test Statistic	p-Value	Decision	Conclusion
Breusch–Godfrey LM (1 lag)	No serial correlation	F = 3.48	0.099	Fail to reject (5%)	No serial correlation
ARCH test (1 lag)	No ARCH effects	F = 0.33	0.574	Fail to reject	Homoscedastic residuals
Ramsey RESET test	Correct specification	F = 1.91	0.204	Fail to reject	Model well-specified
Jarque–Bera normality	Normal residuals	JB = 4.49	0.106	Fail to reject	Residuals normal
CUSUM test	Parameter stability	Within 5% bounds	—	Pass	Parameters stable
CUSUM of squares	Variance stability	Max. dev. 0.175 < 0.493	—	Pass	No variance break
Breusch–Pagan–Godfrey	No heteroscedasticity	F = 0.66	0.740	Fail to reject	Homoscedastic

Note: Core ARDL(1,1,1,1,1) model with intercept and D2014, 20 observations. CUSUM of squares bound is the 5% critical value obtained by simulation for the nine recursive residuals/ Source: prepared by the researcher

8 Financial Development Trends and Indicators

8.1 Financial Development Trends (2003–2023)

Figure 1 shows a decline in significant indicators of financial development for Iraq during 2003–2023. The four indicators (domestic credit to the private sector (DC/GDP), broad money ratio (M2/GDP), bank deposits relative to GDP, and the financial inclusion rate) show a fairly steady increase over the period, in response to the accumulated effect of the financial reforms after 2003. There are, however, a few phases that can be seen. Banking sector reforms, CBI restructuring and increased oil incomes for macroeconomic stabilization all occur during a time of rapid financial deepening between 2004 and 2011. The increase in growth was abruptly halted by the ISIS crisis in 2014 and at the same time by the drop of oil prices in the world, resulting in a tangible compression especially in terms of DC/GDP and banking deposits. The partial recovery period experienced between 2017 and 2019 was once again interrupted in 2020 due to the COVID-19 shock, before it was relaunched until 2023. Financial inclusion is discussed here descriptively only, because account-ownership data are available only for the Global Findex survey years.

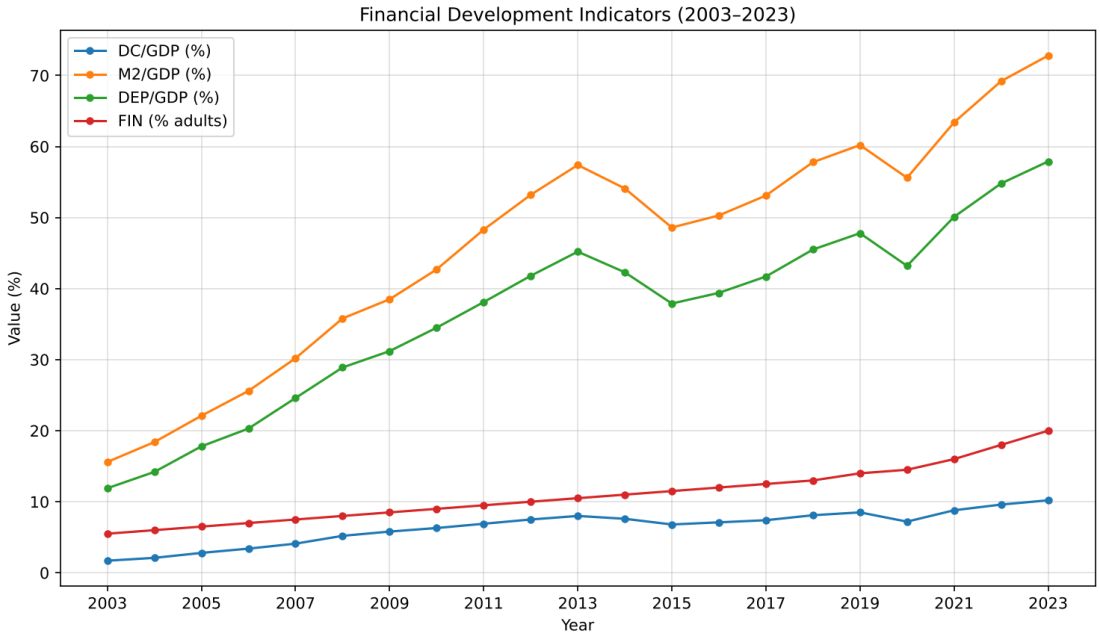


Figure 1 Financial Development Indicators in Iraq, 2003–2023 (% of GDP)

8.2 Financial Liberalization Indicators (2003–2023)

Figure 2 shows the change in the three financial liberalisation indicators over the study period. The Banking Reform Index shows the largest positive development, rising from 1.0 in 2003 to 3.0 in 2023, reflecting an improvement in successive waves of CBI restructuring, private bank licensing reforms and improvements in the supervisory framework. The KAOPEN index here is improving, from −1.86 to −0.86, but not much, and remains quite negative throughout, suggesting that Iraq's capital account has remained significantly closed throughout the entire period of study. The real loan rate exhibits moderate fluctuations, within a range of 6–10.5% (10.5% in

2003), rising during the period of instability in 2014-2016, and smoothing out in the process afterwards.

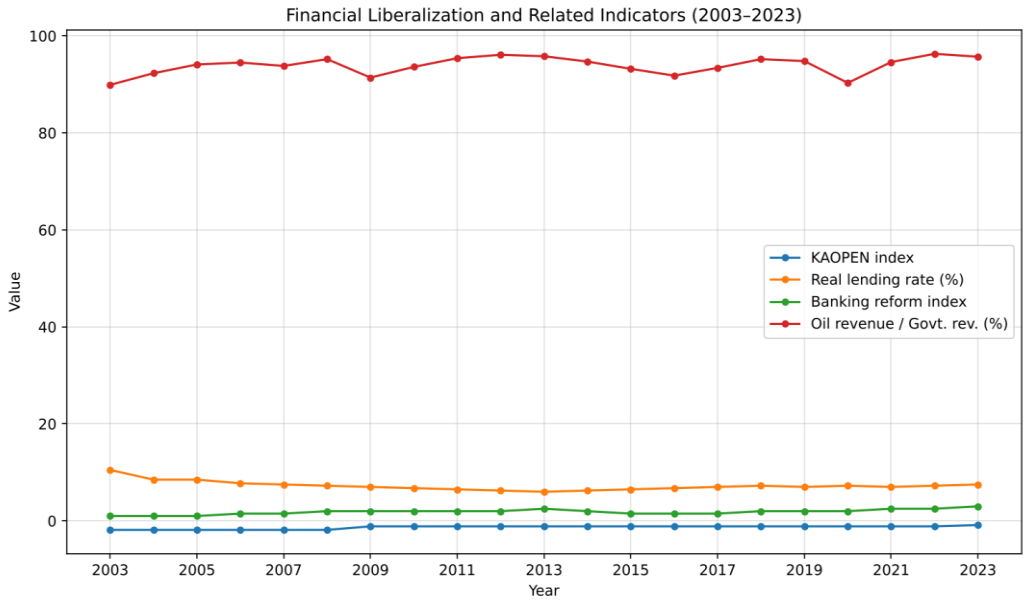


Figure 2 Financial Liberalization Indicators in Iraq, 2003–2023

8.3 Banking Sector Performance Indicators

Key banking sector performance indicators are shown for selected years in Table 13, reflecting the development of the banking sector's structure in response to the liberalization policies. The balance sheet has grown from 42.3% of GDP in 2004 to 95.8% in 2023. Yet, the extent of private sector credit to total bank assets has been consistently high (4.9% in 2004 and 10.5% in 2023), suggesting that the growth in bank balance sheets was mostly due to government securities holdings rather than to the private sector credit. The non-performing loan (NPL) ratio decreased from 34.2 percent in 2004 to 13.1 percent in 2023 after the reforms led by CBI in provisioning norms and partial restructuring of the balance sheets of state banks, but is still above 5 percent, the international prudential threshold. The cost-to-income ratio became more positive, making the ratio from 72.1% to 59.1%, which also shows some efficiencies but higher operating expenses. These indicators are reported descriptively; banking stability and efficiency are not modelled econometrically because the sample cannot support a separate model for each outcome.

Table 13 Banking Sector Performance Indicators, Iraq, Selected Years 2004–2023

Indicator	2004	2007	2010	2013	2016	2019	2022	2023
Total Bank Assets / GDP (%)	42.3	54.7	67.8	84.2	73.6	81.4	92.8	95.8
Private Credit / Total Assets (%)	4.9	6.8	7.6	9.8	8.7	9.4	10.1	10.5
NPL Ratio (%)	34.2	28.7	22.4	17.3	19.8	15.6	13.4	13.1
Z-Score (Bank Stability)	3.2	4.1	5.8	7.4	6.2	8.1	9.4	10.1
Cost-to-Income Ratio (%)	72.1	68.4	64.2	61.7	65.8	62.4	59.8	59.1
Private Bank Share of Assets (%)	12.4	18.7	24.3	29.8	26.4	31.2	36.7	38.1
Financial Inclusion Index	6.0	7.5	9.0	10.5	12.0	14.0	18.0	20.0

Note: Selected years. Values for 2004–2022 are from the study dataset; 2023 values are interpolated between the 2022 values and the 2024 estimates of the original dataset. Financial inclusion is taken from the study dataset (Global Findex survey years, interpolated between surveys)/ Source: prepared by the researcher

9 Discussion

The empirical results lead to some substantive inferences that connect Iraq's experience of financial liberalization with the broader theoretical debates in financial economics and financial development policy.

First, the results indicate that the financial liberalization and financial depth relationship is not stable in the long run for Iraq in the period 2003–2023, which is rejected H_1. The bounds test and the Johansen test do not detect cointegration and the results are similar for all three measures of financial depth and for alternative specifications tested. This result is similar to that of Hameed (2022) who also failed to find cointegration between liberalization variables and private sector credit in Iraq during 2004–2019, and to the conditional liberalization hypothesis (Stiglitz, 1994; Abiad et al., 2008): the effect of liberalization measures is not sufficient to induce sustained financial deepening if the institutional and market conditions that transmit the measures are lacking.

Secondly, the short run is a period in which liberalisation is relevant. The McKinnon (1973) and Shaw (1973) mechanism is confirmed by the significant positive effect on private credit, as the capital account opening increases, and marginally significant positive effect of improvements in the banking reform index, confirming the short-run part of H_2. The interest-rate measure does not appear to have a significant impact, indicating that interest-rate liberalization has little impact on increasing private credit when state-owned banks are the predominant lenders. The impacts of liberalization seem to be short-lived: credit has been influenced by reform events, but it is then bounced back by oil and conflict shocks, as seen in the short-term falls in financial depth in the two periods of 2014-2015 and 2020. These results are in line with the MENA results obtained by Zhang and Naceur (2023) and Boukhatem and Muslim (2021) but in the case of Iraq, the impact is not lasting.

Third, the short-run correlate of credit growth is strongest for oil revenue: A 1 percent increase in the share of government revenue from oil is correlated with an 0.24 percent increase in DC/GDP in the same year, and the effect is greater for broad money and deposits. It is a positive short run association which is contrary to the negative long run association suggested by H_3 and it is not supported in that form. It is, however, in another form than the more general financial resource curse argument (Beck, 2011; Barajas et al., 2013) as it assumes that oil revenue does not crowd out finance in the long run, but rather makes the financial system procyclical with respect to oil, since the majority of deposits and funds are channeled through the Rafidain and Rasheed state banks, which finance public-sector activity. Financial depth, therefore, does not grow or shrink with the growth or decline of oil revenues as it would with liberalization, a clear type of oil revenue dependence. However, the channels through which liberalization could contribute to the generation of enduring private intermediation are further constrained by the absence of a functioning interbank money market, a primary government securities market and a credit information bureau (World Bank, 2022; IMF, 2023) which are observed to take time to emerge in post-conflict economies (Cahen-Fourot et al., 2022).

Fourth, comparison with more successful reformers in the region highlights some of the weaknesses in Iraq's reform programmes. Financial development was quite successful in Morocco and Jordan as they successfully put in place capital account liberalization, credit market infrastructure, meaningful state bank privatization and strengthened supervisory frameworks (Abdelaziz et al., 2020; Al-Jarrah et al., 2012). The results underscore the conditional liberalization hypothesis (Stiglitz, 1994; Abiad et al., 2008): liberalization can help achieve better outcomes only in cases where there is adequate support from institutional reforms such as sound judicial systems to enforce creditor rights, the development of credit registers, autonomous monetary policy frameworks, and competitive marketplace structures. Only moderate financial deepening has resulted after two decades of formal liberalizing in these dimensions, which helps to understand the limitations of Iraq's pursuit of reform. This helps to account for the partial nature of the country's reform sequencing, a reason that two decades of formal liberalization has yielded only moderate financial deepening.

H_4 is not supported by the Toda–Yamamoto tests and shows no Granger causality link between financial liberalization and domestic credit respectively in either direction, and between oil revenue and credit, respectively. In addition the absence of cointegration and the lack of adjustment of DC/GDP in the VECM diagnostic indicates that the supply-leading pattern (Patrick, 1966) has not yet appeared in Iraq in the context of the liberalization agenda. The lack of causality here should instead be understood as a lack of evidence of any sort, not the contrary, but it strengthens the conclusion that so far, liberalisation has not put Iraq's financial system on a self-sustaining path of deepening. The policy implication is that, without addressing complementary institutional prerequisites, further liberalisation is unlikely to go far enough in deepening the financial system.

10 Conclusion and Policy Recommendations

10.1 Conclusion

This paper investigates the correlation between financial liberalization and financial development in Iraq for the period after the reform, (2003-2023). Considering the brief period of annual sample, it adopts an economical model that is generally estimated by a core ARDL model and the Johansen test, VECM and Johansen and Granger causality tests are used as complements to the number of long-run relationships, the exogeneity of regressors and the direction of causality.

The key results are the following: First, there is no evidence of long run (cointegrating) relationship between financial liberalization and oil dependence and financial depth as the ARDL bounds test and Johansen test returned an ARDL model order of zero and Johansen model order of zero, respectively. Second, both capital account openness and, less strongly, banking reform are positively associated with the increase of private credit, whereas interest-rate liberalization is not (H_2 supported only in the short run). Third, short-run credit growth is associated with an increase in oil revenue, rather than a decrease (H_3 rejected), indicating procyclicality and dependence on oil revenue. Fourth, financial depth does not seem to have been associated with liberalization (H_4 is rejected).

We believe the study makes several contributions to the literature: we provide updated evidence for the entire period of financial reform following 2003, we use a multidimensional set of indicators of financial development and maintain the inference focused on one central model, we explicitly introduce oil dependence as a structural determinant of financial development, and we combine the different methods using explicit decision rules, with each method testing an assumption of the other in order to avoid repeating the same test.

There are some limitations of the study. There is a potential for the cointegration test and causality tests to lose power when the number of annual observations is low, and the 21 observations in this sample is likely to reduce power for these tests. The absence of a long-run relationship between these variables may be partly due to low power of these tests; the estimates are intended to provide evidence to the direction and approximate magnitude of the relationships, but they are not meant to be exact. The values of the banking aggregates for 2003 are back cast, as there were no reliable values published for that year, the financial inclusion index is adapted from the EBRD methodology and is a judgement call and the financial inclusion index could not be modelled because the number of years surveyed in the Global Findex is limited. The sample size may be expanded by using quarterly banking information from the Central Bank of Iraq (if available) or a panel of oil-exporting MENA countries.

10.2 Policy Recommendations

The following are the empirical findings that lead to the following recommandations for generic policies that are evidence-based:

1. Enforce partial bank privatization and accelerate their commercialization: The status quo of the Rafidain and Rasheed banks due to implicit government guarantee is the main obstacle in the way of competitive development of the credit market. In order to create the competitive dynamics that financial liberalization aims for, a phased commercialisation program for implementation of hard budget constraints, professional management and performance benchmarking followed by partial privatisation of the system is needed.
2. 2. Create operational credit information bureau: This is the most visible constraint for private sector credit growth as the imbalance of credit ratios in the private sector continues, despite robust banking sector growth, even when updated credit information is collected. Imposing the requirement of including a detailed information credit bureau covering both bank and non-bank creditors would decrease information asymmetries, credit risk premia and get banks closer to providing credit for previously unbanked SMEs.
3. Retoughen banking supervision and adopt Basel III norms: 3. Strengthen banking supervision; implement Basel III banking norms and standards, especially involving capital risks and bank risk management frameworks to bring the NPL ratio up from its current 13.1% down to the international prudential threshold of 5% and enhance the Z-score banking sector stability measure.

4. Despite improved gender gaps in financial inclusion over the last few years, 4.9% of people in the Middle East and North Africa do not have financial inclusion, which is below the average for the region. The low level of account ownership should be addressed with complementary measures designed to provide regulatory frameworks for enabling mobile money, digital wallets, and fintech lenders, who can benefit from Iraq's high mobile adoption rate, in parallel with the conventional banking system to reform.
5. Establishment of interbank and government securities markets: The key is the lack of a liquid interbank money market and the lack of a primary government securities market that could be critical structural gaps that limit the ability for monetary policy to be transmitted and bank liquidity management. The development of these markets would offer a riskless yield curve, enhance capacity of CBI in open market operations and boost the effectiveness of the monetary policy transmission mechanism.

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