

Repercussions of global oil price shocks on banking soundness indicators in Iraq amidst parallel exchange rate fluctuations

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Abstract

The main objective of the study is to estimate impulse response functions and test two basic hypotheses. The first is to show the response of both exchange rates and banking soundness indicators in Iraq to oil price shocks. The second is to estimate the response of banking soundness indicators to oil price shocks, for the period between 2016-2024 through monthly data. The study used the (VAR) methodology to estimate impulse response functions, and it concluded that oil price shocks have a decisive and significant impact on the exchange rate and banking soundness indicators. Also, the parallel exchange rate fluctuates greatly, which makes its shocks significantly affect the soundness indicators of the Iraqi banking sector, oil price shocks reduce non-performing loans and increase liquidity levels in Iraqi banks in the short term. However, non-performing loans tend to increase proportionally in the long term. Bank profitability is also proportionally affected in the medium term by rising oil prices. Capital adequacy levels decrease in the event of a positive oil shock. Regarding exchange rates, oil shocks to the local currency led to significant fluctuations in its value, both upward and downward.

Keywords: Banking Soundness Indicators, Impulse Response Functions, Exchange Rate, Oil Prices

JEL Classification: G21, E44, Q43

1. Introduction

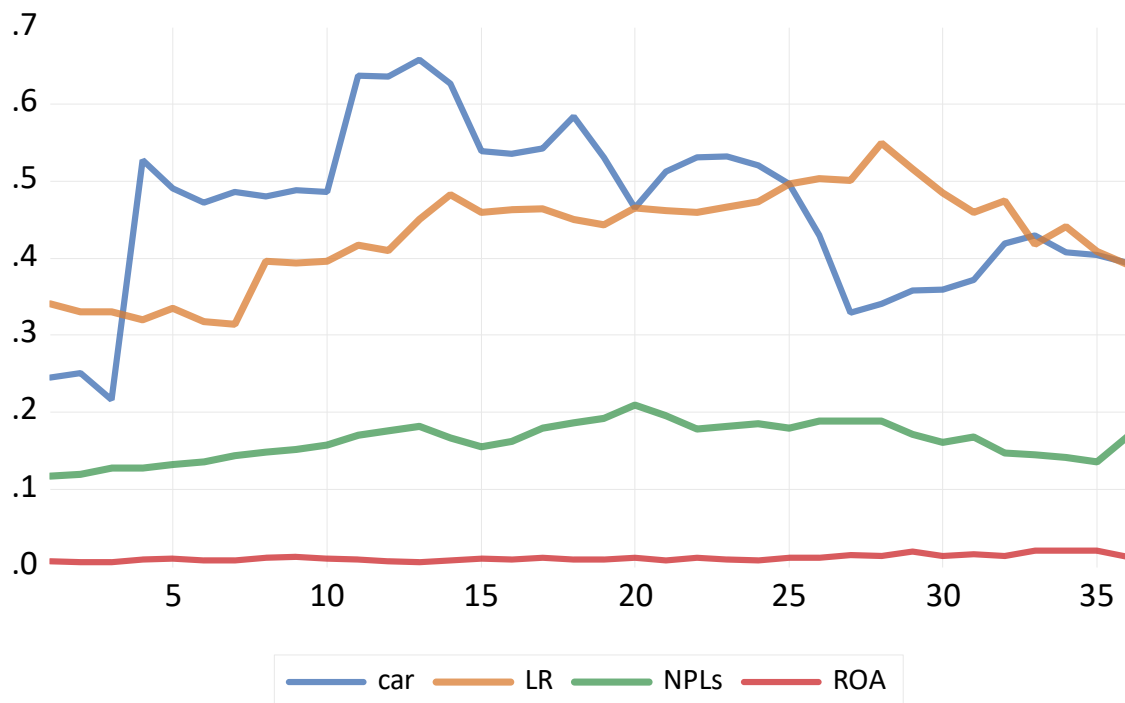
Iraq is a rentier state whose revenues consist primarily of oil revenues. More than 90% of its foreign currency comes from these revenues, which prompted Iraq to establish a currency auction window to stabilize prices and link the currency's stability to global oil prices. This auction window was established in lieu of the current fixed foreign exchange system to create a parallel market with a price different from the official exchange rate and bring a new level of instability for financial institutions, most notably banks. (Al Dulaimi et al., 2021). A functional financial system is a significant factor in attaining stable economic growth. A viable financial system facilitates economic activity which includes collecting bank savings and reallocating it towards production, providing information about returns to invest, improving governance and risk management, and contributing to exchange rate stability (Bitetto et al., 2023). The exchange rate is a key economic indicator and refers to one currency's value with respect to another. An exchange rate that is rising means that the local currency is depreciating, and the opposite is true (Ullah & Nobanee, 2025). Since the demise of the Bretton Woods system of fixed exchange rates, both real and nominal exchange rates have fluctuated substantially. Advocates of managed or fixed exchange rates have pointed to this volatility as adverse, on the basis that exchange rate uncertainty reduces company valuations. (Baum et al., 2001) Transactions involving exchange rates represent a large portion of banking sector activities, and foreign exchange markets are effectively a way of settling international transactions because they act as a financial intermediary (Lagat & Nyandema, 2016). Exchange rates influence different institutional activities. A depreciation of the local currency boosts the competitiveness of exporting companies and an increase in production due to the increase in foreign market share while importers will be paying higher costs. Domestic companies will also increase their sales and profits as imports decrease due to the increase in import costs (Fu et al., 2025). Studies outline various external factors that induce exchange rate movements, including oil price movements and speculative behavior (Lam & Ojede, 2025). In addition, there are other economic factors, such as economic growth, money supply, foreign investment, inflation, terms of trade, available international liquidity, and the financial development of the country (Bhowmik, 2020).

The banking industry faces substantial exposure to risks stemming from exchange rate variations, which include currency spreads, credit risk, interest rate fluctuations, and inflation, all of which may diminish profits (Keshtgar et al., 2020). For banks in developing economies, adverse fluctuations in exchange rates may trigger heightened withdrawal of bank deposits, compounding the economic crisis (Mamonov et al., 2024). Hence, carefully examining exchange rate conditions and accessing reliable and ongoing information to understand these would diminish losses and enhance bank profits. Additionally, it should be noted that a majority of bank profits arise from foreign exchange-related transactions, including the collection of fees and commissions. This solidifies the necessity of promoting a strong bank-management understanding of exchange rate fluctuations (Babazadeh & Farrokhnejad, 2012). The link between exchange rate and financial

soundness is multifaceted, producing differing results. Exchange rate invariably influences all dimensions of bank soundness as it pertains to profitability, liquidity, and credit risk. Bank profit can be impacted by these banking transactions, particularly for banks whose assets are foreign currency denominated, may present losses or profits depending on the cumulating direction of behavior either favorably, or unfavorably (Ahmadyan & Valipourpasha, 2025).

The banking soundness indicators for the Iraqi banking sector are displayed in Figure (1). There is a worrying increase in non-performing loan ratios, which negatively impacts confidence in the banking sector. The average non-performing loan ratio is (0.16313), while the return on assets ratio is considerably low. Conversely, Iraqi banks have a sizeable amount that comes under liquidity and capital adequacy levels that surpass both the 8% capital adequacy level required by the Basel Accords and the Central Bank of Iraq's minimum capital adequacy ratio of (12%). They have sizeable liquidity ratios above the threshold of (30%) that is also set by the Central Bank of Iraq. Thus, the Iraqi banking sector weaknesses relate to low profits, high non-performing loans, and an increase in excess funds in banks.

Figure 1. Banking Safety Indicators for the Iraqi Sector 2016-2024



The government of Iraq injects large amounts of US dollars and other foreign currencies it obtains from oil sales through its currency auction window to keep exchange rates stable. Nevertheless, the exchange rate varies significantly in the parallel market, creating instability in finance. Thus, we have the aim of illustrating the influence of the issue on banking soundness indicators by

estimating impulse response functions (IRFs). The study aims to treat prices and exchange rates as external variables that afford estimates of banking soundness indicators with IRFs. The first objective is to estimate the response of both exchange rates and banking soundness indicators in response to impulse response. The second is to estimate the response of banking soundness indicators in response to exchange rates. The study attempts to consider an oil price shocks and exchange rate variability in the Iraqi market. Given that an oil price shock is the country's only foreign currency strain in Iraq, the study also demonstrates the effect of all of these variables at once on banking soundness indicators. The results of this study are important for policymakers, particularly the Central Bank of Iraq and the Ministry of Finance, in developing comprehensive plans for the Iraqi economy and the banking sector. The study is based on two hypotheses:

- 1- There is a statistically significant impact of oil price shocks on the exchange rate.
- 2- There is a statistically significant impact of exchange rate shocks on banking soundness indicators.

2. Literature Review

Studying the impact of exchange rate shocks on banking soundness indicators under oil price volatility requires dividing previous studies into those dealing with the relationship between oil prices and exchange rates, and those concerning exchange rates and banking soundness indicators. Regarding the relationship between oil prices and exchange rates, there is a long-term relationship. The study by Chen & Chen (2007), which used longitudinal data to estimate the co-integrity methodology of the G7 countries for the period 1972-2005, concluded that there is a direct, long-term impact of oil prices on real exchange rates. The study by Hashmi et al. also used this approach. (2022) A more recent methodology was used to estimate this relationship through the Quantile ARDL methodology in Pakistan. It concluded that oil prices affect exchange rates regardless of the state of the financial market, whether it is a rising or falling market. The evidence of the study by Beckmann et al. (2020) showed that the links between exchange rates and oil prices vary according to the sample countries, with some common patterns, which are strong long-term links that are useful for economic forecasting. As for the impact of exchange rate shocks on banking soundness indicators, the relationship has been studied according to different methodologies that focus on liquidity, credit risk, and capital adequacy. Regarding non-performing loans, the study by Mohamadi et al. showed. (2016), the exchange rate, whether official or parallel, has a direct impact on non-performing loans in Iran for 18 banks. The analysis showed no effect on capital adequacy using the GARCH exponential model. In relation to this, Abbassi & Bräuning (2023) used longitudinal data methodology working with German banks during Brexit which considered an external shock. They found significant losses to German banks due to mismatching the exchange rate of the pound sterling and the value of their assets and liabilities. As a result, a reduction occurred in the amount of credit they extended, and this reflected as a percentage point loss in equity. A study by Sinaga et al. (2020) confirmed this occurrence in determining that the

exchange rate negatively impacted non-performing loans, while interest rates and inflation show no effect on credit risk. As it concerns bank liquidity, the study by Osundina et al. (2016) assessed the impact of exchange rates on the performance of Nigerian banks during the timeframe of 2005-2016, applying the ARCH LM method, which showed that the exchange rates had a negative impact on bank liquidity, which was measured as an employment rate. Finally, Mamonov et al. (2024) studied the relationship between exchange rates and the efficiency of Russian banks, using a quarterly data methodology that obtained data from Russian commercial banks on asset and liability revaluations from 2004-2020, and used a nonparametric copula method. They concluded that revaluation constitutes 26.5% of Russian banks' costs, and that revaluation is primarily due to foreign currency bank deposits and financial instability. This was corroborated by Martin & Mauer's (2003) study of a sample of 105 US banks, which showed that long-term exposure is more prevalent than short-term exposure, and that 72% of internationally operating banks and 88% of domestic banks have exchange rate risk exposure. Regarding the Iraqi context, Hadi et al. (2022) studied the effects of the exchange rate on capital adequacy in light of the Corona pandemic. The study concluded that the Corona pandemic greatly affected capital adequacy, and the volatility of the exchange rate reinforced this effect. Yaqub (2024) indicated that the Iraqi economy is afflicted with the Dutch disease, which led to an increase in the real exchange rate, which expanded the markets for non-tradable goods. The exchange rate is one of the important variables that are attributed to the transformation of Iraq from an industrial and agricultural country to a service country.

Previous studies have not integrated banking soundness indicators into a single study, nor have they combined the impact of oil prices with exchange rates into a single model that illustrates the shocks experienced by oil-producing countries like Iraq. In light of this knowledge gap, this study aims to explain the mechanism by which oil price shocks affect exchange rates and vice versa, with the goal of providing sustainable insights and solutions for decision-makers in oil-producing countries to lay the foundations for comprehensive planning towards economic diversification.

3. Methodology

This research uses the banking soundness indicators that are used by the International Monetary Fund (Babihuga, 2007) and Kasselaki & Tagkalakis (2014). These indicators are: Capital Adequacy (CAR), which is measured as the ratio of core capital to risk-bearing assets; Liquidity (LQ), which is measured as the ratio of liquid assets to total assets; Credit Quality (NPLs), which is measured as the ratio of non-performing loans to total loans; and Return on Equity (ROA), which is measured as the ratio of return to total assets. All data related to banking soundness indicators and the parallel exchange rate were obtained from the official website of the Central Bank of Iraq (<https://cbi.iq/page/51>). Oil prices, specifically Brent crude, were obtained from the Federal Reserve website (<https://fred.stlouisfed.org/series/DCOILWTIC>) in the form of monthly data. These indicators are considered to be foundational for measuring financial stability, for the

enhancement and tightening of oversight of the banking sector, and for indicator the extent of systemic risk building in banks (Kyei et al, 2023). The study also employs global oil prices (BRN) and the parallel exchange rate (EX), which are external variables. Iraq uses a fixed exchange rate system, and exchange rate movements are only conducted on the parallel exchange rate, which has a significant impact on the financial stability of Iraqi banks. To estimate the impact of for oil price and exchange rate shocks, we use the VAR methodology, which is important because it can explain the dynamic economic relationships between a set of studied variables without pre-imposed causal constraints. The VAR methodology allows for the estimation of IRF responses and the determination of the direction and magnitude of the effect (Majenge et al., 2025).

4. Results

Table 1 presents the descriptive statistical measures for the studied variables:

Table 1. Descriptive Statistical Measures

	CAR	EX	LR	NPLS	BRN	ROA
Mean	0.46763	1350.29245	0.43136	0.16313	68.15905	0.01085
Median	0.48498	1285.00000	0.45278	0.16575	67.73961	0.00967
Maximum	0.65820	1603.00000	0.54940	0.20970	111.98740	0.02040
Minimum	0.21600	1196.00000	0.31430	0.11730	33.37716	0.00550
Std. Dev.	0.10341	133.92620	0.06106	0.02293	17.63163	0.00396
Skewness	-0.38752	0.28104	-0.52414	-0.23622	0.16559	0.97498
Kurtosis	2.79634	1.39512	2.31406	2.07473	2.45502	3.11062
Jarque-Bera	2.83622	12.77109	6.93161	4.76697	1.79617	16.84765
Probability	0.24217	0.00169	0.03125	0.09223	0.40735	0.00022
Sum Sq. Dev.	1.12293	1883303.93400	0.39146	0.05523	32641.81000	0.00165
Observations	106	106	106	106	106	106

Table 2 indicates that most of the variables are not stationary at the level, but they become stationary when taking the first difference, except for the capital adequacy ratio (CAR) and the profitability ratio (ROA), which are stationary time series at their levels. Therefore, one of the conditions of cointegration is that the time series stabilize at the first difference, and thus it is possible to proceed with the var methodology.

Table 2. ADF Static Test for VAR Methodology

		<u>At Level</u>					
		BRN	CAR	EX	NPLS	LR	ROA
With Constant	t-Statistic	-2.31232	-2.94465	-0.69619	-2.49778	-2.15145	-2.50968
	<i>Prob.</i>	<i>0.17007</i>	<i>0.04375</i>	<i>0.84232</i>	<i>0.11893</i>	<i>0.22544</i>	<i>0.11618</i>
		n0	**	n0	n0	n0	n0
With Constant & Trend	t-Statistic	-2.76966	-3.25079	-1.90521	-2.66921	-0.81629	-3.43154
	<i>Prob.</i>	<i>0.21188</i>	<i>0.08050</i>	<i>0.64480</i>	<i>0.25155</i>	<i>0.96001</i>	<i>0.05292</i>
		n0	*	n0	n0	n0	*
Without Constant & Trend	t-Statistic	-0.34142	-0.33391	0.93141	0.42554	0.03975	-0.47737
	<i>Prob.</i>	<i>0.55989</i>	<i>0.56273</i>	<i>0.90549</i>	<i>0.80371</i>	<i>0.69313</i>	<i>0.50660</i>
		n0	n0	n0	n0	n0	n0
		<u>At First Difference</u>					
		d(BRN)	d(CAR)	d(EX)	d(NPLS)	d(LR)	d(ROA)
With Constant	t-Statistic	-3.78665	-4.73274	-10.24946	-3.47101	-2.29328	-3.06332
	<i>Prob.</i>	<i>0.00413</i>	<i>0.00016</i>	<i>0.00000</i>	<i>0.01070</i>	<i>0.17620</i>	<i>0.03261</i>
		***	***	***	**	n0	**
With Constant & Trend	t-Statistic	-3.79338	-4.86318	-10.22086	-3.38282	-3.03436	-2.98166
	<i>Prob.</i>	<i>0.02071</i>	<i>0.00070</i>	<i>0.00000</i>	<i>0.05930</i>	<i>0.12839</i>	<i>0.14254</i>
		**	***	***	*	n0	n0
Without Constant & Trend	t-Statistic	-3.80924	-4.74647	-10.19345	-3.41404	-2.28574	-3.07846
	<i>Prob.</i>	<i>0.00020</i>	<i>0.00000</i>	<i>0.00000</i>	<i>0.00080</i>	<i>0.02221</i>	<i>0.00238</i>
		***	***	***	***	**	***

We move to the next step of the var methodology, which is choosing the optimal slowdown period. According to Table 3, the optimal slowdown period varies according to the statistical test. According to the Schwartz criterion (SC) test, the optimal slowdown period is 1. The Hannan-Queen criterion (HQ) test has determined the slowdown period to be (2). As for the rest of the tests, represented by the probability logarithm criterion (LR), the final prediction error (FPE), and the (AIC), they have determined the slowdown period to be (7). Since most of the tests agree on the slowdown period to be (7), it will be chosen to estimate the model.

Table 3. Selection of the optimal slowdown period

Lag	LogL	LR	FPE	AIC	SC	HQ
0	596.9617	NA	0.0000	-12.1848	-12.0255	-12.1204
1	940.7016	637.8678	0.0000	-18.5299	-17.41511*	-18.0792
2	1011.0440	121.8301	0.0000	-19.2380	-17.1676	-18.40086*
3	1053.8003	68.7627	0.0000	-19.3773	-16.3514	-18.1538
4	1110.2702	83.8316	0.0000	-19.7994	-15.8179	-18.1895
5	1161.7309	70.0290	0.0000	-20.1182	-15.1811	-18.1219
6	1185.0362	28.8313	0.0000	-19.8564	-13.9638	-17.4737
7	1254.8103	77.68665*	7.10e-17*	-20.55279*	-13.7046	-17.7837
8	1286.5969	31.4589	0.0000	-20.4659	-12.6622	-17.3105

Here it is necessary to verify some diagnostic tests to ensure that the var methodology is going in the right direction. Table 4 shows the serial autocorrelation test of the model estimated by the (LM) test. The slowdown periods (1, 2, 4, 5, 7) are healthy periods and do not suffer from the correlation problem, while there is autocorrelation in the rest of the slowdown periods, which are (3, 6). Therefore, a small part of the model suffers from the problem, while the majority of the slowdown periods are healthy. Likewise, the cumulative test shows that the slowdown periods are healthy from slowdown period 1 to h.

Table 4 Autocorrelation Sequential Test (LM)

Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	Df	Prob.	Rao F-stat	df	Prob.
1.0000	30.5025	36.0000	0.7272	0.8383	(36, 196.0)	0.7301
2.0000	37.0048	36.0000	0.4224	1.0330	(36, 196.0)	0.4263
3.0000	55.9828	36.0000	0.0180	1.6366	(36, 196.0)	0.0186
4.0000	29.1683	36.0000	0.7831	0.7990	(36, 196.0)	0.7855
5.0000	35.0279	36.0000	0.5147	0.9732	(36, 196.0)	0.5185
6.0000	61.2601	36.0000	0.0054	1.8143	(36, 196.0)	0.0056
7.0000	26.0230	36.0000	0.8898	0.7075	(36, 196.0)	0.8913
8.0000	29.0048	36.0000	0.7895	0.7942	(36, 196.0)	0.7919

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1.0000	30.5025	36.0000	0.7272	0.8383	(36, 196.0)	0.7301
2.0000	76.5202	72.0000	0.3356	1.0693	(72, 212.5)	0.3518
3.0000	118.1108	108.0000	0.2380	1.1011	(108, 190.6)	0.2800
4.0000	163.0227	144.0000	0.1327	1.1392	(144, 159.8)	0.2106
5.0000	209.6424	180.0000	0.0644	1.1562	(180, 126.3)	0.1924
6.0000	318.3476	216.0000	0.0000	1.6826	(216, 91.6)	0.0025
7.0000	387.5469	252.0000	0.0000	1.6717	(252, 56.4)	0.0112
8.0000	709.5704	288.0000	0.0000	5.4344	(288, 20.9)	0.0000

We now move to the next diagnostic test, the heteroskedasticity test, to confirm the presence of a heteroskedasticity problem. According to Table (5), the probability ratio for the Chi-Sq test is (0.14860), which is greater than the probability ratio of 5%. Therefore, the model does not suffer from this problem. Furthermore, all the one-way heteroskedasticity tests shown in the table are valid, and their significance exceeds 5%.

Table 5. Residual Heteroskedasticity Test for Variable Variance (VAR)

Joint test:						
Chi-sq	Df	Prob.				
1825.96425	1764.00000	0.14860				
Individual components:						
Dependent	R-squared	F(84,13)	Prob.	Chi-sq(84)	Prob.	
res1*res1	0.91256	1.61510	0.16824	89.43060	0.32223	
res2*res2	0.85234	0.89334	0.64526	83.52940	0.49397	
res3*res3	0.95041	2.96601	0.01614	93.14010	0.23205	
res4*res4	0.80874	0.65443	0.87569	79.25697	0.62603	
res5*res5	0.88122	1.14821	0.41427	86.35997	0.40837	
res6*res6	0.88319	1.17013	0.39762	86.55252	0.40272	
res2*res1	0.89607	1.33427	0.29044	87.81443	0.36647	
res3*res1	0.94131	2.48218	0.03489	92.24838	0.25216	



res3*res2	0.92505	1.91007	0.09601	90.65477	0.29061
res4*res1	0.92876	2.01751	0.07873	91.01806	0.28157
res4*res2	0.79142	0.58721	0.92494	77.55895	0.67668
res4*res3	0.90794	1.52639	0.19984	88.97840	0.33434
res5*res1	0.83406	0.77788	0.76206	81.73795	0.54955
res5*res2	0.83706	0.79502	0.74492	82.03149	0.54043
res5*res3	0.94152	2.49166	0.03434	92.26899	0.25168
res5*res4	0.90571	1.48659	0.21594	88.75964	0.34027
res6*res1	0.81531	0.68320	0.85138	79.90047	0.60638
res6*res2	0.90017	1.39544	0.25789	88.21635	0.35522
res6*res3	0.92692	1.96303	0.08702	90.83845	0.28602
res6*res4	0.86590	0.99933	0.54178	84.85836	0.45326
res6*res5	0.92071	1.79715	0.11870	90.22982	0.30139

To complete the remaining diagnostic tests, a cross-autocorrelation test must be performed. Most of the columns for the studied variables fall within the bounds (not exceeding the dashed lines). This suggests that the individual residuals do not exhibit a strong and persistent autocorrelation problem as shown in the Figure 2.

Figure 2. Test for discrete autocorrelation functions



We now estimate the impulse response functions according to two models: the first is the impact of oil price shocks on exchange rates and banking soundness indicators, and the second is the impact of exchange rate shocks on banking soundness indicators.

Figure 3 shows the analysis of the Impulse Response Functions (IRFs) of the VAR model, as it analyzes the response of both the exchange rate and the banking soundness indicators of the Iraqi banking sector to a shock of one standard deviation (One S.D.). For ten periods, the Capital Adequacy Ratio (CAR) shows an inverse relationship with rising oil prices (BRN), but the response is weak. It increases after the third period until it reaches a decrease of (-0.01) in the sixth period, after which it recovers by the end of the period. The local currency exchange rate (EX) responds directly at the beginning of the period (the first period), then decreases inversely until it reaches (-0.5) in the fourth period. The value of the local currency then tends towards continuous fluctuation in the long term. This is strong evidence that oil prices are a primary driver of the value of the local currency. As for bank liquidity, rising exchange rates lead to an increase in liquidity levels at banks in periods 1 and 2 by (0.001), followed by relative stability in the medium term. Then, it tends towards an increase in the long term, similar to the increase at the beginning of the period. Regarding non-performing loans, in the first and second periods there is an inverse relationship between oil prices and non-performing loans, but they quickly rise with rising oil

prices in the long term, although the increase is slight. The profitability of the banking sector does not respond at the beginning of the period. The period, however, responds in period 3 and reaches its peak in period 6 by an amount of (0.0005), after which it decreases in the long term, so that the rise in oil is inversely proportional.

Figure 3. Impulse response functions of the impact of oil price shocks on the exchange rate and banking soundness indicators

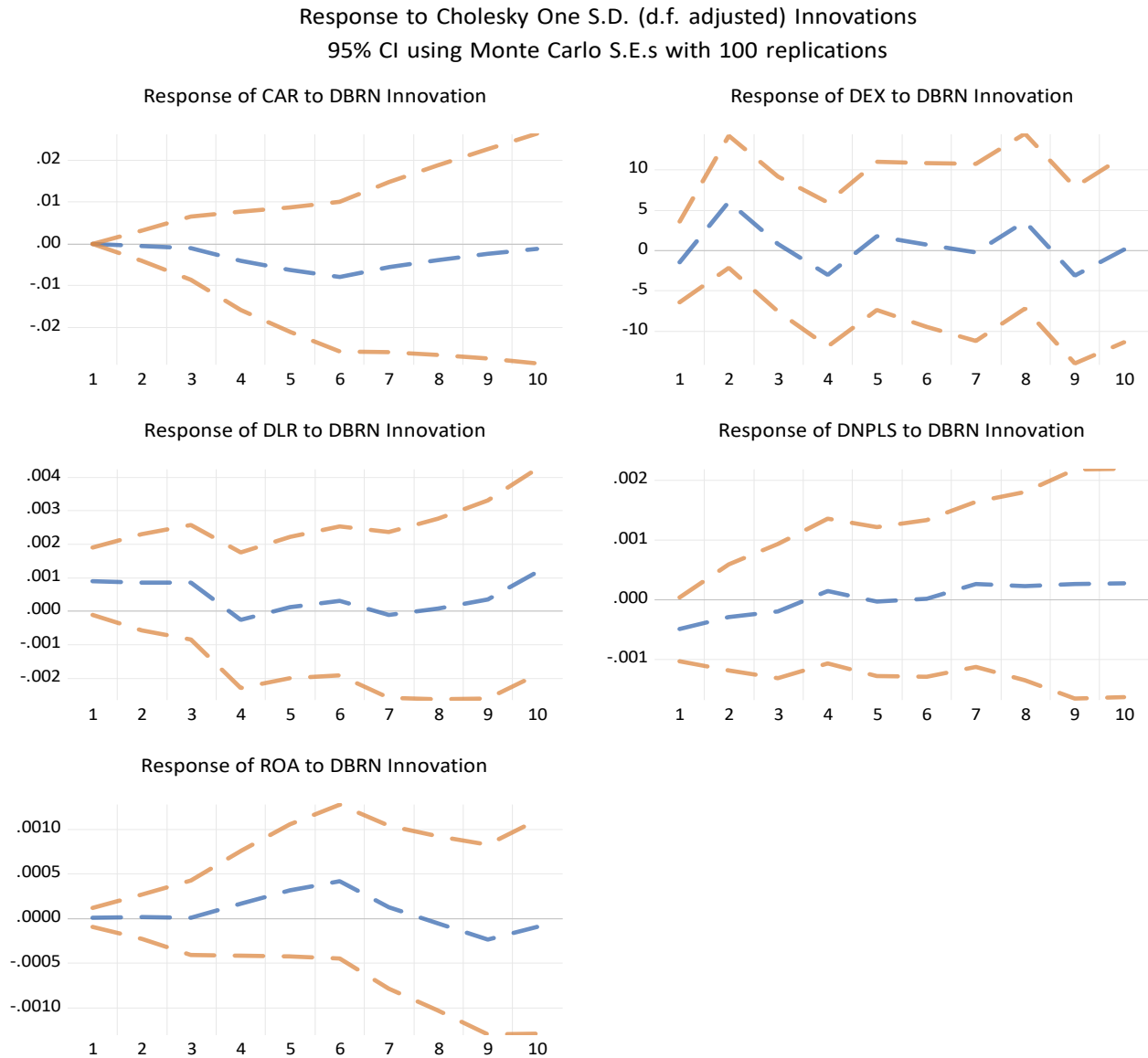
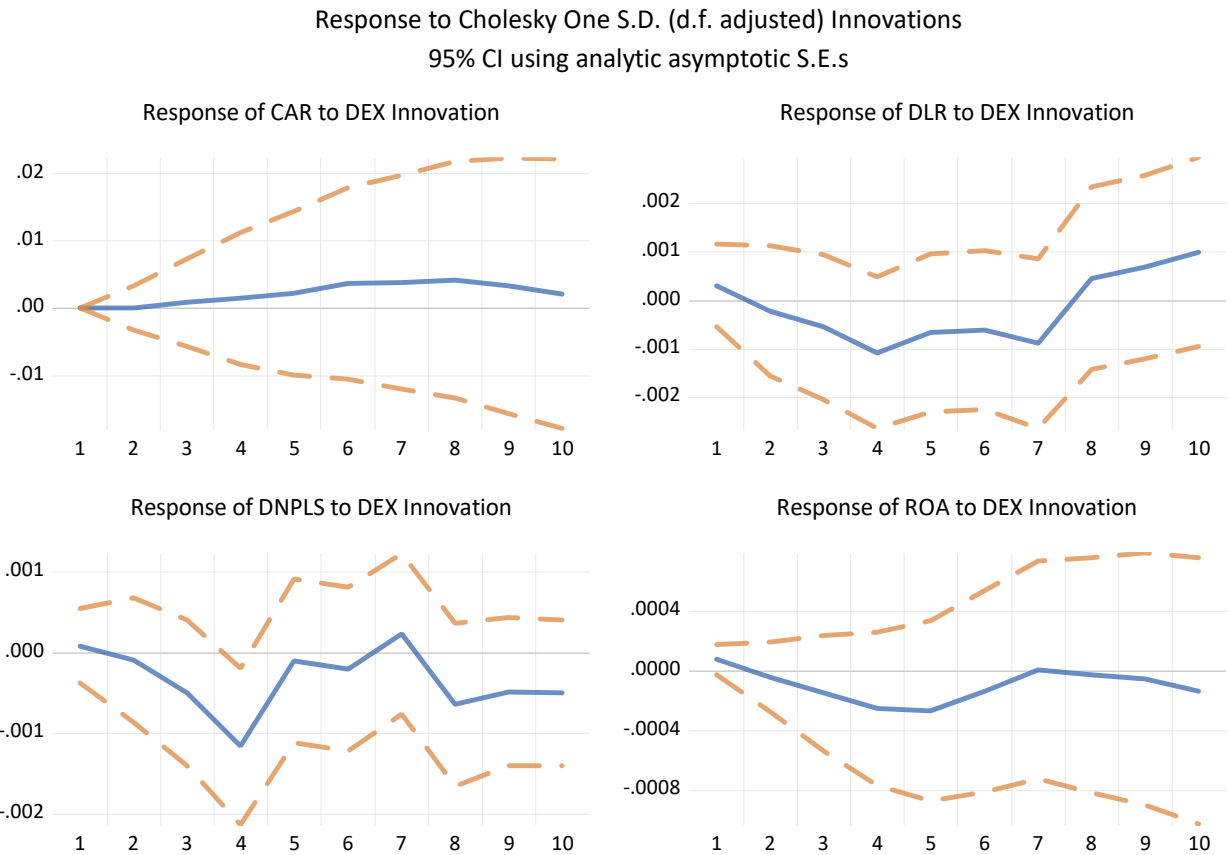


Figure 4. Impulse Response Functions To Exchange Rates On Financial Soundness Indicators



In fact, the exchange rate is one of the most influential variables in economic and banking dynamics. Since oil prices affect exchange rates and banking soundness indicators, it is useful to analyze the response of banking soundness indicators to oil price shocks. Figure 4 shows that a decrease in the value of the currency leads to an increase in the capital adequacy ratio (CAR) of banks, thus reducing capital risk. In period 4, we find that the exchange rate shock has a positive impact on capital adequacy, and this increase continues until period 10. However, a decrease in the value of the currency has a significant negative impact on bank liquidity levels. Exchange rate instability can destabilize the banking sector, and the decline reaches its peak in period 4, reaching (-0.002). It then recovers after period 8 and rises again once the shock subsides. Non-performing loans respond inversely to rising exchange rates (i.e., a decrease in the value of the currency), decreasing as the currency depreciates (i.e., rising exchange rates). Therefore, an increase in exchange rates leads to... A shock occurs in periods 1 and 2, increasing significantly in period 4 to reach -0.001, then it returns to stability and quickly declines in the long term. As for the profitability of banks, it responds negatively in period 1, at the beginning of the period, as the decline in exchange rates leads to a reduction in bank profits, reaching a peak in period 5 and reaching (about -0.0004), then it moves towards stability in period 7. Perhaps the main reason for this is that many of the assets of Iraqi banks are denominated in foreign currency.

5. Conclusion, Recommendations, and Limitations of the Study

In light of the study's primary objective, which is to determine the responsiveness of banking soundness indicators to both oil prices and exchange rates in Iraq, the study concludes that oil price shocks negatively impact capital adequacy and create exchange rate instability. Oil price shocks reduce non-performing loans and increase liquidity levels in Iraqi banks in the short term. However, non-performing loans tend to increase proportionally in the long term. Bank profitability is also proportionally affected in the medium term by rising oil prices. Capital adequacy levels decrease in the event of a positive oil shock. Regarding exchange rates, oil shocks to the local currency lead to significant fluctuations in its value, both upward and downward. Because banks deal in foreign currency, currency depreciation negatively impacts their profits. The study recommends diversifying revenue sources away from oil revenues by developing private sector economic activities and easing pressure on the currency exchange market. It also recommends working to reduce the gap between official and unofficial exchange rates. This gap must be narrowed to achieve financial stability. Programs targeting the private sector should be implemented, including incentives for exporting companies that obtain foreign currency to increase the country's foreign exchange reserves. The government could purchase these currencies at a rate higher than the parallel market rate to encourage these companies to export and alleviate pressure on the currency auction window.

Despite the relative importance of the study's findings, it suffers from some limitations, namely its short timeframe, which may not align with the results of a longer-term study. Furthermore, it failed to differentiate between public and private banks, particularly since private banks are more closely tied to government activities, significantly impacting their financial performance compared to public banks. Additionally, there is a pressing need to include certain regulatory variables such as government spending, GDP, public debt, and interest rates to adjust the relationship. Finally, the study's findings cannot be generalized to most oil-producing countries due to the economic and political instability in Iraq.

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Vector Autoregression (VAR) Model Appendix

Vector Autoregression Estimates						
Date: 11/03/25 Time: 00:55						
Sample (adjusted): 9 106						
Included observations: 98 after adjustments						
Standard errors in () & t-statistics in []						
	CAR	DBRN	DEX	DLR	DNPLS	ROA
CAR(-1)	1.76910	-10.06030	-130.85354	-0.03253	0.01323	-0.00858
	0.10456	16.73434	204.86242	0.03694	0.01997	0.00433
	[16.9191]	[-0.60118]	[-0.63874]	[-0.88062]	[0.66222]	[-1.97986]
CAR(-2)	-0.78249	8.52547	291.16717	0.02930	-0.01165	0.01123
	0.19462	31.14749	381.30882	0.06875	0.03718	0.00807
	[-4.02058]	[0.27371]	[0.76360]	[0.42621]	[-0.31350]	[1.39194]
CAR(-3)	-0.52169	-0.51661	-424.71643	-0.02389	0.00103	-0.00215
	0.20013	32.02866	392.09611	0.07069	0.03823	0.00829
	[-2.60678]	[-0.01613]	[-1.08319]	[-0.33799]	[0.02696]	[-0.25969]
CAR(-4)	0.85636	-6.52348	213.10617	0.03702	0.01241	-0.00819
	0.18341	29.35297	359.34016	0.06479	0.03503	0.00760
	[4.66912]	[-0.22224]	[0.59305]	[0.57149]	[0.35434]	[-1.07815]
CAR(-5)	-0.34545	6.75249	87.65427	-0.01289	-0.01476	0.00775
	0.19402	31.05074	380.12436	0.06853	0.03706	0.00804
	[-1.78052]	[0.21747]	[0.23059]	[-0.18811]	[-0.39830]	[0.96347]
CAR(-6)	-0.14620	-14.72762	-450.81004	-0.02285	0.00383	-0.00660
	0.18675	29.88825	365.89318	0.06597	0.03567	0.00774
	[-0.78282]	[-0.49276]	[-1.23208]	[-0.34635]	[0.10724]	[-0.85217]
CAR(-7)	0.12600	12.60437	397.18530	0.02270	0.00213	0.00504
	0.09323	14.92124	182.66637	0.03293	0.01781	0.00386
	[1.35142]	[0.84473]	[2.17438]	[0.68923]	[0.11984]	[1.30367]
DBRN(-1)	-0.00032	0.82329	2.67426	0.00005	0.00008	-0.00001
	0.00087	0.13906	1.70243	0.00031	0.00017	0.00004
	[-0.36293]	[5.92025]	[1.57085]	[0.17820]	[0.48653]	[-0.15901]
DBRN(-2)	0.00013	0.04349	-1.55396	0.00008	-0.00001	0.00002
	0.00114	0.18232	2.23200	0.00040	0.00022	0.00005
	[0.11822]	[0.23853]	[-0.69622]	[0.18793]	[-0.02995]	[0.43905]
DBRN(-3)	-0.00104	-0.35305	-2.26838	-0.00002	0.00013	0.00006
	0.00113	0.18124	2.21876	0.00040	0.00022	0.00005
	[-0.92092]	[-1.94793]	[-1.02237]	[-0.04739]	[0.57985]	[1.34240]
DBRN(-4)	0.00088	0.30822	4.40062	0.00023	-0.00007	-0.00009
	0.00114	0.18270	2.23656	0.00040	0.00022	0.00005
	[0.76851]	[1.68709]	[1.96758]	[0.56448]	[-0.30859]	[-1.80026]
DBRN(-5)	0.00008	0.04108	0.49841	-0.00006	-0.00015	0.00003
	0.00116	0.18522	2.26742	0.00041	0.00022	0.00005
	[0.07246]	[0.22179]	[0.21981]	[-0.13680]	[-0.68412]	[0.58533]
DBRN(-6)	0.00091	-0.20518	-3.67313	-0.00064	0.00024	-0.00008
	0.00113	0.18074	2.21264	0.00040	0.00022	0.00005

	[0.80600]	[-1.13522]	[-1.66006]	[-1.60059]	[1.09702]	[-1.69101]
DBRN(-7)	-0.00104	0.04446	1.77875	0.00092	-0.00002	0.00008
	0.00086	0.13747	1.68290	0.00030	0.00016	0.00004
	[-1.20712]	[0.32345]	[1.05696]	[3.02768]	[-0.14063]	[2.17487]
DEX(-1)	0.00000	-0.01756	-0.17742	-0.00002	-0.00001	-0.00001
	0.00007	0.01119	0.13695	0.00002	0.00001	0.00000
	[0.06658]	[-1.56935]	[-1.29552]	[-0.62986]	[-0.46483]	[-2.42040]
DEX(-2)	0.00002	-0.00944	0.18291	-0.00002	-0.00002	0.00000
	0.00007	0.01157	0.14165	0.00003	0.00001	0.00000
	[0.33491]	[-0.81581]	[1.29130]	[-0.87462]	[-1.41223]	[-0.66810]
DEX(-3)	-0.00001	-0.00271	-0.02526	-0.00003	-0.00002	0.00000
	0.00007	0.01128	0.13815	0.00002	0.00001	0.00000
	[-0.12419]	[-0.23989]	[-0.18283]	[-1.12661]	[-1.81056]	[0.75382]
DEX(-4)	-0.00003	0.00671	-0.22820	0.00002	0.00004	0.00000
	0.00007	0.01167	0.14284	0.00003	0.00001	0.00000
	[-0.40042]	[0.57487]	[-1.59762]	[0.64997]	[2.74172]	[-0.72226]
DEX(-5)	0.00006	-0.00021	-0.01418	0.00000	0.00000	0.00000
	0.00007	0.01089	0.13336	0.00002	0.00001	0.00000
	[0.82831]	[-0.01898]	[-0.10633]	[0.08533]	[-0.27984]	[1.32238]
DEX(-6)	0.00001	0.01515	0.29666	-0.00001	-0.00001	0.00000
	0.00007	0.01120	0.13708	0.00002	0.00001	0.00000
	[0.14151]	[1.35320]	[2.16411]	[-0.44646]	[-0.47935]	[0.56467]
DEX(-7)	0.00003	0.01464	-0.07312	0.00000	-0.00003	-0.00001
	0.00007	0.01143	0.13989	0.00003	0.00001	0.00000
	[0.48516]	[1.28098]	[-0.52268]	[-0.09592]	[-2.28256]	[-2.35749]
DLR(-1)	0.14328	-8.88003	-860.27124	0.80041	-0.00726	-0.01597
	0.30523	48.84918	598.01360	0.10782	0.05830	0.01265
	[0.46941]	[-0.18178]	[-1.43855]	[7.42377]	[-0.12451]	[-1.26259]
DLR(-2)	0.01056	-12.68470	261.45477	-0.02787	-0.02942	-0.00016
	0.36646	58.64867	717.97935	0.12945	0.07000	0.01519
	[0.02882]	[-0.21628]	[0.36415]	[-0.21531]	[-0.42032]	[-0.01051]
DLR(-3)	-0.28961	-7.47585	589.85179	-0.84475	-0.10891	0.03186
	0.35313	56.51592	691.87009	0.12474	0.06745	0.01463
	[-0.82012]	[-0.13228]	[0.85255]	[-6.77213]	[-1.61452]	[2.17740]
DLR(-4)	0.52841	8.30842	-1111.53785	0.69086	0.09561	-0.03605
	0.39169	62.68627	767.40770	0.13836	0.07482	0.01623
	[1.34907]	[0.13254]	[-1.44843]	[4.99331]	[1.27793]	[-2.22106]
DLR(-5)	0.00015	-1.71218	560.14311	0.00261	0.00295	-0.00154
	0.35139	56.23698	688.45527	0.12412	0.06712	0.01456
	[0.00042]	[-0.03045]	[0.81362]	[0.02106]	[0.04399]	[-0.10541]
DLR(-6)	-0.67459	-19.86621	-35.69432	-0.58818	-0.07511	0.01083
	0.35021	56.04857	686.14879	0.12371	0.06690	0.01451
	[-1.92622]	[-0.35445]	[-0.05202]	[-4.75461]	[-1.12285]	[0.74597]
DLR(-7)	0.74493	4.11501	-919.58285	0.45252	0.06146	-0.01898
	0.28906	46.26124	566.33184	0.10211	0.05521	0.01198
	[2.57708]	[0.08895]	[-1.62375]	[4.43194]	[1.11303]	[-1.58450]

DNPLS(-1)	-0.16154	-2.11983	-2367.18392	-0.04013	0.92407	-0.02862
	0.72903	116.67566	1428.34798	0.25752	0.13926	0.03021
	[-0.22158]	[-0.01817]	[-1.65729]	[-0.15582]	[6.63570]	[-0.94734]
DNPLS(-2)	0.23052	-91.58729	-1038.63621	0.02823	0.00456	0.01162
	1.01795	162.91341	1994.39225	0.35957	0.19444	0.04219
	[0.22646]	[-0.56218]	[-0.52078]	[0.07850]	[0.02347]	[0.27551]
DNPLS(-3)	0.61376	-141.28575	3015.97126	0.57703	-0.36463	-0.04706
	1.00006	160.05045	1959.34389	0.35326	0.19103	0.04144
	[0.61372]	[-0.88276]	[1.53928]	[1.63347]	[-1.90879]	[-1.13560]
DNPLS(-4)	-0.51663	214.30521	1811.13397	-0.59455	0.12350	0.03814
	1.15399	184.68672	2260.94198	0.40763	0.22043	0.04782
	[-0.44769]	[1.16037]	[0.80105]	[-1.45854]	[0.56029]	[0.79757]
DNPLS(-5)	-0.19520	58.27125	214.81112	0.13525	0.20904	0.01980
	1.12671	180.32052	2207.49081	0.39799	0.21522	0.04669
	[-0.17325]	[0.32315]	[0.09731]	[0.33984]	[0.97128]	[0.42411]
DNPLS(-6)	1.11741	4.96560	-4002.78228	0.70282	-0.14815	-0.02398
	1.04397	167.07804	2045.37583	0.36877	0.19941	0.04326
	[1.07035]	[0.02972]	[-1.95699]	[1.90587]	[-0.74293]	[-0.55431]
DNPLS(-7)	-0.83681	45.33241	3225.57917	-0.44464	-0.01654	-0.00598
	0.85260	136.45141	1670.44345	0.30117	0.16286	0.03533
	[-0.98148]	[0.33222]	[1.93097]	[-1.47637]	[-0.10159]	[-0.16915]
ROA(-1)	-1.47904	-400.66698	-11182.05088	-0.97087	-0.22125	1.83876
	3.28830	526.26461	6442.55186	1.16154	0.62812	0.13627
	[-0.44979]	[-0.76134]	[-1.73566]	[-0.83585]	[-0.35224]	[13.4933]
ROA(-2)	0.29680	219.78869	13665.12628	0.98950	0.97083	-0.93265
	6.97765	1116.71337	13670.84849	2.46475	1.33284	0.28916
	[0.04254]	[0.19682]	[0.99958]	[0.40146]	[0.72839]	[-3.22532]
ROA(-3)	0.30402	191.62621	-878.22145	2.59198	-1.15611	-0.73881
	7.36379	1178.51122	14427.38022	2.60115	1.40660	0.30517
	[0.04129]	[0.16260]	[-0.06087]	[0.99647]	[-0.82192]	[-2.42102]
ROA(-4)	-0.18738	-411.84949	-10335.76616	-6.54279	0.13008	1.43348
	5.82895	932.87327	11420.27083	2.05899	1.11342	0.24156
	[-0.03215]	[-0.44148]	[-0.90504]	[-3.17767]	[0.11683]	[5.93425]
ROA(-5)	-0.42707	287.59126	9453.58869	4.09625	1.59526	-0.72913
	7.27000	1163.50086	14243.62285	2.56802	1.38868	0.30128
	[-0.05874]	[0.24718]	[0.66371]	[1.59510]	[1.14875]	[-2.42012]
ROA(-6)	0.22277	-266.11960	-3457.87788	-1.90993	-1.91439	-0.10018
	7.06827	1131.21655	13848.39697	2.49676	1.35015	0.29292
	[0.03152]	[-0.23525]	[-0.24970]	[-0.76496]	[-1.41791]	[-0.34202]
ROA(-7)	1.29653	276.48095	1834.38214	1.43288	0.68696	0.14857
	3.36798	539.01670	6598.66348	1.18969	0.64334	0.13957
	[0.38496]	[0.51294]	[0.27799]	[1.20441]	[1.06781]	[1.06446]
C	0.02138	3.25150	24.12010	0.00560	-0.00377	0.00171
	0.01904	3.04732	37.30538	0.00673	0.00364	0.00079
	[1.12301]	[1.06701]	[0.64656]	[0.83238]	[-1.03556]	[2.16318]
R-squared	0.98751	0.70256	0.52659	0.85541	0.77050	0.98964



Adj. R-squared	0.97797	0.47542	0.16508	0.74500	0.59524	0.98172
Sum sq. resids	0.00880	225.41054	33781.71823	0.00110	0.00032	0.00002
S.E. equation	0.01265	2.02444	24.78332	0.00447	0.00242	0.00052
F-statistic	103.51139	3.09310	1.45664	7.74755	4.39644	125.06097
Log likelihood	317.52160	-179.87081	-425.34865	419.50239	479.75084	629.50169
Akaike AIC	-5.60248	4.54838	9.55814	-7.68372	-8.91328	-11.96942
Schwarz SC	-4.46826	5.68260	10.69236	-6.54950	-7.77906	-10.83520
Mean dependent	0.48543	0.26142	2.50000	0.00066	0.00043	0.01123
S.D. dependent	0.08522	2.79512	27.12295	0.00885	0.00380	0.00388
Determinant resid covariance (dof adj.)		0.00000				
Determinant resid covariance		0.00000				
Log likelihood		1268.43721				
Akaike information criterion		-20.62117				
Schwarz criterion		-13.81584				
Number of coefficients		258.00000				