

Relationship between Macroeconomic Indicators and Currency Crisis: A Case Study in Jordan

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Abstract:

The present study aimed to explore the relationship between macroeconomic indicators and currency crisis during the period (1999-2013) in Jordan. The targeted macroeconomic indicators are: (gross domestic product, inflation rate (IR), money supply (M2), current account to GDP rate, internal public debt to total public debt rate, & external public debt to total public debt rate). The dimensions of currency crisis are: (the real exchange rate, and the foreign exchange reserves). It was found that macroeconomic indicators don't have a statistically significant impact on the currency crisis measured by (real exchange rate). It was found that macroeconomic indicators have a statistically significant impact on the currency crisis measured by (the foreign exchange reserves). The researchers of the present study recommend increasing the extent of cooperation and collaboration between the Central Bank, the Ministry of Finance, and the Ministry of Planning & International Cooperation in Jordan. They recommend establishing an agency for anticipating financial crises. Such an agency should collect and analyse data and information about financial and economic indicators.

Keywords: *Macroeconomic Indicators, the Currency Crisis*

1. INTRODUCTION

During the last couple of decades, the world suffered from several financial and currency crises. Such crises include: the Great Depression of 1929, the debt crisis of 1980s, the Asian crisis during the period (1997-1998) and the global financial crisis of 2008. The latter crisis is considered the worst crisis. It is considered worse than the Great Depression of 1929. The impacts of the global financial crisis of 2008 are still existent. The latter crisis negatively affected the economy of all countries, including the economy of Arab countries. The impacts of the latter crisis were addressed by many well-known political, and economic figures and journalists.

After conducting several examinations and analysis for the global financial crisis of 2008, it has been proved that this crisis is attributed to the poor management and control enforced over financial markets. Effective control should be enforced over financial markets through enacting effective laws and legislations. That shall prevent the occurrence of financial crises. It shall reduce the severity of the financial crises in case they occurred. Hence, many

economic bodies and institutions identified economic indicators and developed systems for anticipating currency crisis. Such bodies and institutions include: the International Monetary Fund (IMF), Bank for International Settlements (BIS), and Financial Stability Board (FSB). The latter systems and indicators provide decision makers with information that enable them to make effective financial decisions. They enable policy developers and decision makers to take preventive measures to prevent financial crises from occurring. They enable policy developers and decision makers to take measures for reducing the losses derived from financial crises in case they occurred. In the light of the aforementioned information, the present study aimed to explore the relationship between macroeconomic indicators and currency crisis during the period (1999-2013) in Jordan.

2. STATEMENT OF THE PROBLEM:

The problem of this study is represented in the following question: (Do macroeconomic indicators have any statistically significant impact on the currency crisis?)

The following questions are derived from the main question:

Q.1. Do macroeconomic indicators (i.e. gross domestic product, inflation rate (IR), money supply (M2), current account to GDP rate, internal public debt to total public debt rate, and external public debt to total public debt rate) have any statistically significant impact on the currency crisis measured by the (real exchange rate)?

Q.2 Do macroeconomic indicators (i.e. gross domestic product, inflation rate (IR), money supply (M2), current account to GDP rate, internal public debt to total public debt rate, and external public debt to total public debt rate) have any statistically significant impact on the currency crisis measured by the (foreign exchange reserves)?

3. THE STUDY'S SIGNIFICANCE:

The present study is significant because there isn't any similar study conducted in the Arab world in general and Jordan in particular. It is significant because it provides results that are beneficial for decision makers and policy developers.

4. HYPOTHESES

H0.1: The targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (real exchange rate).

H0.2: The targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (foreign exchange reserves).

5. DEFINITIONS:

Macroeconomic indicators: In this study, they refer to the (gross domestic product, inflation rate (IR), money supply (M2), current account to GDP rate, internal public debt to total public debt rate, and external public debt to total public debt rate).

Currency crisis: This crisis occurs when having a significant drop in the value of the state's currency and the amount of the state's foreign exchange reserves of the central bank. During the currency crisis, individuals and institutions seek converting their financial assets that are in the national currency into a foreign currency. In this case, the government shall fail to raise the value the national currency (Al-Janabi, 2003: 281).

6. PREVIOUS STUDIES:

Al-Ameed (2010) aimed to explore the effectiveness of macroeconomic and microeconomic indicators in anticipating financial crises in Iraq during the period (2003-2009). A descriptive analytical approach was adopted. The latter researcher analysed several macroeconomic indicators (i.e. economic growth, inflation rate, exchange rate, interest rate, and deficit in current account). He analysed several microeconomic indicators (i.e. profit, revenue, liquidity, asset quality, and capital adequacy). It was found that macroeconomic indicators play a significant role in anticipating financial crises in Iraq. The latter researcher recommends collecting data about macroeconomic indicators by banks in a regular manner. Collecting such data shall enable bank to reduce the severity of the impact of financial crises. The latter researcher recommends establishing a database to save the data collected about macroeconomic indicators.

Jdaitawi (2008) aimed to develop an early warning system for anticipating currency crisis in Jordan during the period (1984-2008). This system enables public and private bodies to take measures to prevent crises and reduce the severity of the impacts of such crises on the Jordanian economy. A signal approach was adopted and a log it model was used. The researcher analyzed several economic indicators (i.e. economic openness level, trade rate, exports, current account balance, real exchange rate, inflation, employment, balance of trade, foreign exchange reserves at the Central Bank, money supply, domestic credit, political stability, budget deficit, and gross domestic product). It was found that all the targeted indicators—except for the budget deficit, and gross domestic product- can significantly anticipate the currency crisis within 6-24 months before it occurs.

Al-Tarawneh (2004) aimed to develop an early warning system for anticipating economic crisis in Jordan. Data was collected about the period (2003-1979). An analytical approach was adopted and a log it model was used. The latter researcher examined several economic indicators (i.e. the real exchange rate, foreign exchange reserves at the central bank, domestic credit, and external public debt to total public debt rate). It was found that the external public debt to total public debt rate plays the most significant role in anticipating a debt crisis. It was

found that the growth rate of foreign exchange reserves plays the most significant role in anticipating a deficit in the foreign exchange reserves. The growth rate of the real exchange plays a very significant role in anticipating a major drop in the exchange rate. The researcher recommends developing a center for collecting information about economic indicators. He recommends establishing a body for enforcing control over the economic sectors.

Al-Janabi (2003) aimed to explore the role of several macroeconomic indicators in anticipating financial crisis in Indonesia, Korea, Thailand, USA and Japan) during the 1970s and 1980s. He aimed to explore the losses incurred due to financial crises in developing and developed countries. He adopted a descriptive analytical approach. The targeted macroeconomic indicators (the change in the real exchange rate, current account deficit to gross domestic product rate, domestic credit to gross domestic product rate, money supply to foreign exchange reserves, and external debt to gross domestic product rate). It was found that macroeconomic indicators play a significant role in anticipating financial crises. The researcher recommends developing policies for analyzing the risks associated with the uncontrolled flow of foreign capital. He recommends enforcing controls on specific types of flow of foreign capital to prevent a currency crisis.

The present study differs from the aforementioned studies. For instance, it sheds a light on the Jordanian economy. It also sheds a light on a recent period of time (1999-2013). It conducts the multiple linear regression analysis.

METHODOLOGY

To meet the study's goals, a descriptive approach is adopted. The researchers used descriptive statistical methods. For instance, they calculated means and identified the maximum and minimum values. The analytical approach was adopted. For instance, they conducted the simple linear regression analysis, the multiple linear regression analysis, F-test and time series analysis. Microsoft Excel, E-views and SPSS were used.

POPULATION AND DATA SOURCES

The population is represented in the Jordanian economy. Data was collected about the macroeconomic indicators of the Jordanian

economy. It was collected through reviewing the reports issues by the Jordanian Central Bank and the International Monetary Fund (IMF) about the period (1999-2013).

The Study's Limits:

Temporal limits: This study was conducted during the period 1999-2013.

Spatial limits: This study was conducted in Jordan

Thematic limits: This study sheds a light on the relationship between macroeconomic indicators and currency crisis

Part one: Macroeconomic indicators and currency crisis

1) **Gross domestic product:** It is an indicator for economic growth. It represents all the market value of all the goods and services produced in a specific time period (Alwazni and Al-Refa'i, 2004: 43). It is used to analyse financial crises. The lower the gross domestic product rate, the higher the probabilities of experiencing a financial crisis (Al-Tookhi, 2008:9). It can be measured as follows:

The consumers' demand(C)+ the demand for investment(I)+ public demand(G) (Al-Ashkar, 2002:32).

2) **The inflation rate:** It is an indicator for measuring the extent of increase in the prices of services and products during a specific period in the state (Bakri and Zaki, 1995:218). It is a macroeconomic indicator. The high the inflation rate, the higher the probabilities of experiencing a financial crisis (Al-Ameed, 2010:10). It can be measured as follows:

The consumer price index in a specific year- the consumer price index in the year before/ (the consumer price index in the year before)*100% (Dawood, 2010: 167).

3) **The money supply (M2):** It affects economic growth. It involves M1 money supply + term deposits + saving accounts. M1 money supply is represented in the cash used in daily life and the money in (current accounts+ deposits on demand) (Al-Isami, 2011: 15-16). This index can be used for analysing financial crisis. The high the money supply is, the higher the probabilities of experiencing a financial crisis

4) **The public debt to total public debt rate:** The internal public debt refers to the direct and indirect liabilities that the state must pay off to lenders within the country in Jordanian Dinar. The external public debt refers to the direct and indirect liabilities that the state must pay off to lenders outside the state in a foreign currency (The Jordanian Central Bank, the Public Debt Law No. 26 of 2001).

A-The internal public debt to total public debt rate: It is used to analyze financial crises. The higher this indicators, the higher the probabilities of experiencing a financial crisis. This indicator is measured as follows:

(The amount of internal public debt /the amount of the total public debt)*100%.

B)-The external public debt to total public debt rate: It is used to analyze financial crises. The higher the external public debt is, the higher the probabilities of experiencing a financial crisis. This indicator is measured as follows:

(The amount of external public debt /the amount of the total public debt)*100%.

5) **The current account:** It is the most important element of the balance of payments. It involves the balance of trade, the balance of service, balance of payments, grants and the money transferred by the ones working board. The balance of trade refers to the difference between the monetary value of a nation's exports and imports over a certain time period. The balance of service refers to the difference between funds received by a country when exporting services and the funds paid for importing services. The balance of payments refers to the difference between all money flowing into the country in a particular period of time (e.g., a quarter or a year) and the outflow

of money to the rest of the world (Abed Al-Qader, 2011,125). The current account can be examined to analyse a financial crisis. The higher the deficit in the current account, the higher the probabilities of experiencing a financial crisis (Al-Ameed, 2010:10)

6) **Real exchange rate:** It refers to the number of foreign currency units needed to purchase one unit of national currency. It can be examined to analyse a financial crisis. The lower the real exchange rate, the higher the probabilities of experiencing a financial crisis (Khodor, 2012, 21-19) This indicator is measured as follows:(Al-Tarawneh, 2004,59).

$$Y) = \text{SPI}^F \times S) \div ((\text{CPI}^L \% 100 \times$$

Whereas Y is the real exchange rate and S is the nominal exchange rate in exchange for one unit in USD. CPI^F stands for the consumer price index in the United States. CPI^L stands for the consumer price index in Jordan.

7) **Foreign exchange reserves:** They include cash, account balance, and deposits in foreign currencies, and bonds that are held by the Central Bank. They don't include the deposits in commercial banks (The Jordanian Central Bank, the monthly statistical bulletin, the methodology and statistical terms guide). This indicator can be examined to analyze financial crises. The lower the foreign exchange reserves are, the higher the probabilities of experiencing a financial crisis shall be.

Part two: Descriptive statistical analysis for macroeconomic indicators and currency crisis:

The researchers presented below the results of conducting a descriptive statistical analysis for macroeconomic indicators, real exchange rates, and foreign exchange reserves.

Table (1): Macroeconomic indicators and currency crisis

Year	GDP		Inflation rate		Money supply (M2)		The internal public debt to total public debt rate	
	Million JDs	Growth rate%	Million JDs	Growth rate%	Million JDs	Growth rate%	Million JDs	Growth rate%
1999	5198	-	0.6	-	6747.6	-	16.49	-
2000	5418.7	4.25	0.7	16.7	7434.7	10.18	20.4819	24.22
2001	5704.2	5.27	1.8	157.1	7866.1	5.8	22.7532	11.09

2002	6034.1	5.78	1.8	0	8419.1	7.03	24.4269	7.36
2003	6285.2	4.16	1.6	-11.1	9465.7	12.43	25.1845	3.1
2004	6823.7	8.57	3.4	112.5	10571.4	11.68	28.0185	11.25
2005	7379.6	8.15	3.5	2.9	12364	16.96	32.7897	17.03
2006	7976.795	8.09	6.3	80	14109.7	14.12	36.3424	10.83
2007	8629.032	8.18	4.7	-25.4	15606.8	10.61	41.2941	13.62
2008	9253.148	7.23	13.9	195.7	18304.2	17.28	61.2506	48.33
2009	9759.874	5.48	-0.7	-105	20013.3	9.34	64.6828	5.6
2010	9985.459	2.31	5	-814.3	22306.7	11.46	63.3796	-2.01
2011	10243.762	2.59	4.4	-12	24118.9	8.12	69.0198	8.9
2012	10515.3	2.65	4.7	6.8	24945.2	3.43	71.9916	4.31
2013	10812.9	2.83	5.6	19.15	27363.4	9.69	65.0076	9.7-
Maximum value	10812.9	8.57	13.9	195.7	27363.4	17.28	71.99	48.33
Minimum value	5198	2.31	-0.7	-814.3	6747.6	3.43	16.49	-2.01
Year	The external public debt to total public debt rate		The current account to GDP rate		Real exchange rate of JDs		The growth rate of foreign exchange reserves	
	Million JDs	Growth rate%	Million JDs	Growth rate%	Million JDs	Growth rate%	Million JDs	Growth rate%
1999	83.51	-	0.5	-	1.422	-	1412	-
2000	79.5181	-4.78	0.7	40	1.4615	2.76	1959	38.74
2001	77.2468	-2.86	0	-100	1.4764	1.02	1828	-6.69
2002	75.5731	-2.17	3.8	0	1.473	-0.23	2478	35.56
2003	74.8155	-1	12.2	221.05	1.4723	-0.05	3361	35.63
2004	71.9815	-3.79	0.8	-93.44	1.4724	0.01	3420	1.76
2005	67.2103	-6.63	-17.4	-2275	1.4709	-0.1	3363	-1.67
2006	63.6576	-5.29	-11	-36.78	1.4288	-2.86	4326.7	28.66
2007	58.7059	-7.78	-16.8	52.73	1.4037	-1.75	4871.4	12.59
2008	38.7494	-33.99	-9.3	-44.64	1.2787	-8.91	5490.5	12.71
2009	35.3172	-8.86	-5.2	-44.09	1.2831	0.35	7713	40.48
2010	36.6204	3.69	-7.1	36.54	1.2422	-3.19	8679.1	12.53
2011	30.9802	-15.4	-10.2	43.66	1.2271	-1.22	7465.2	-13.99
2012	28.0084	-9.59	-15.2	49.02	1.1956	-2.56	4702.5	-37.01
2013	34.9924	24.94	10.00-	-34.21	1.1501	3.81-	8512	81.01
Maximum value	79.52	24.94	12.2	221.05	1.476	2.76	8679.1	81.01
Minimum value	28.0084	-33.99	-17.4	-2275	1.1501	-8.91	1412	-37.01

The following results can be concluded:

First: Gross domestic product: This indicator plays a significant role in analyzing and anticipating financial crises. Having a low GDP shall reduce the economic growth shall be. It shall reduce the ability of borrowers to pay off their loans. It increase the credit risks (Al-Ameed, 2010:10). The higher the

GDP is, the lower the the probabilities of experiencing a financial crisis. During the period (2000-2004), the GDP rate fluctuated. During this period, the GDP rates are within the range of (2.31%-8.57%) In 2004, the GPD rose and reached 8.57% which is the highest rate during this period. Such rise is attributed to the economic reforms

carried out by the Jordanian government since the 1980s in collaboration with international and regional institutions. It is attributed to the growth achieved by some economic sectors, such as: manufacturing, construction, transportation, and telecommunication sectors¹

The GDP rates during the period (2005-2007) are stable. In 2008, a financial crisis was experienced. Thus, the GDP rate dropped. In 2013, the GDP rate is 2.83%. Thus, the GDP rate plays a significant role in anticipating financial crises.

Second: The inflation rate: This indicator plays a significant role in analyzing and anticipating financial crises. Having a high inflation rate leads to having fluctuation in the prices. It shall make people turn their cash into assets. It shall lead to having an economic disruption. It shall lead to having a major gap between the prices of the production items and the prices of products and services. That shall negatively affect the economic stability (Al-Heety et al., 2010:3-9). The higher the inflation rate is, the higher the probabilities of experiencing a financial crisis shall be. During (1999-2006), the inflation rates are within the range of (0.7%-13.9%). The inflation rate rose gradually from 0.6% to 6.3%. Such rise is attributed to the rise of the prices of products and services during the period (2001-2002)². It is attributed to the administrative decisions that were taken in 2003. Such decisions include increasing the prices of oil products and the sale taxes on some food products³. Making such decisions led to increasing the prices of petrol, electricity, and transportations. Raising the public and private taxes rates led to increasing the prices of some food products in 2004⁴. The inflation rate increased because the sales taxes on tobacco and its products and alcoholic beverages increased in 2005⁵. In addition, it increased because the demand on services and goods increased. It increased because the government in 2006⁶ decided to increase the prices of petroleum derivatives. The inflation

rate can be used to anticipating crises. It rose gradually till it reached 13.9% in 2008. Such rise is attributed to the impact of the financial crisis on the Jordanian economy. Due to the financial crisis, the prices of basic goods, food items and petrol in the international markets. Due to the financial crisis, the prices of most of the Petroleum derivatives were decontrolled⁷. In the light of the aforementioned information, it can be concluded that this indicator can be used to anticipate financial crises.

Third: The money supply (M2): This indicator reflects the liquidity level. Having a high growth rate of liquidity indicates that the probabilities of experiencing a financial crisis is high (Al-Tarawneh, 2004: 56). The higher the money supply is, the higher the probabilities of experiencing a financial crisis. Based on the table above, the money supply rate fluctuated. The growth rate of money supply are within the range of 3.43%-17.28%. During the period (2000-2007), the money supply increased because the Central Bank adopted an indirect management approach for implementing the monetary policy. That was done through issuing deposit certificates to regulate liquidity⁸. During the latter period, the (M1 money supply) and near money increased⁹. During the global financial crisis in 2008, the money supply (M2) increased till it reached 17.28%. Such increase is attributed to the increase of the net local assets of the banking system and the reduction of net foreign assets¹⁰. During the period (2009-2012), the money supply decreased, because the Central Bank took measures to handle the global financial crisis and stopped issuing deposit certificates¹¹. During the latter period, the near money decreased and the money supply M1 decreased. That made people in markets¹² feel uncertain about the economic status. In 2013, the money supply M2 and the money supply M1 increased¹³. Based on the aforementioned information, the money supply (M2) can be

⁷The Jordanian Central Bank (2008). The Annual Report. P1

⁸The Jordanian Central Bank (2006). The Annual Report. P30

⁹The Jordanian Central Bank (2007). The Annual Report. P.28

¹⁰The Jordanian Central Bank (2008). The Annual Report. P.30

¹¹The Jordanian Central Bank (2009). The Annual Report. P.28-29

¹²The Jordanian Central Bank (2012). The Annual Report. P.28-30

¹³ The Jordanian Central Bank (2013). The Annual Report. P.25

¹The Jordanian Central Bank (2004). The Annual Report. P7

²The Jordanian Central Bank (2001). The Annual Report. P16

³The Jordanian Central Bank (2003). The Annual Report. P15

⁴The Jordanian Central Bank (2004). The Annual Report. P16

⁵The Jordanian Central Bank (2005). The Annual Report. P17

⁶The Jordanian Central Bank (2006). The Annual Report. P19

examined to anticipate a financial crisis.

Fourth: The internal public debt to total public debt rate: This indicator can be examined to anticipate a financial crisis. The higher this rate is, the higher the probabilities of experiencing a financial crisis. If this rate is high, it shall negatively some macroeconomic variables, such as: GDP, national income, interest rate, investment rate, and average prices of goods (Al-Waked, 1993, 14). That shall make the government experience a debt crisis that shall negatively affect economic activities, and stability. A debt crisis shall lead to unequal income distribution. It negatively affects several macroeconomic variables (Abu Mudalaleh and Al-Ajleh, 2013, 273). The higher this rate is, the higher the probabilities of experiencing a financial crisis. Based on this table, the internal public debt to total public debt rate is high. The growth rates of the internal public debt to public deb fluctuated. They are within the range of (9.7%-48.33%). During the period (2000-2007), the internal public debt to total public debt rate rose significantly. In 2008, it reached 61.25%. The latter rise may be attributed to the fact that the Jordanian government failed to reduce the budget deficit which is (692.7 million JDs). It is attributed to having a deficit in the treasury (i.e. 800 million JDs). In 2008, the Jordanian government sought borrowing money from local sources to reduce the deficit in the budget instead of borrowing money from foreign sources¹⁴.

Fifth: The external public debt to total public debt rate: It's suggested that this indicator can be examined to anticipate financial crises. It's suggested that the higher this rate is, the higher the probabilities of experiencing a financial crisis. Contrary to the internal debt, paying off the external public debt can't be postponed through a decision by the local authority. The public debt must be paid off on the agreed upon deadline. Failure to pay off the external public debt shall lead to increasing the interests. It shall lead to increasing the overall public debt and the inflation rates on the long term (Jaber, 2005:43). The external public debt to total public debt rates fluctuated. They are within the range of (33.99-24.94%). In 2008, it reached 38.75%. Three years prior to the financial crisis, this rate dropped. Such drop is attributed to the financial policy

adopted by the government. This policy is represented in borrowing money from local sources instead of borrowing from foreign sources. The latter drop is attributed to concluding contracts with Paris club. It is attributed to the rise in the real exchange rate of the currencies that Jordan obtained debts¹⁵. It can be noticed that the external public debt to total public debt rates are low during (1999-2013). That indicates that this indicator doesn't play a significant role in anticipating crisis.

Sixth: The current account to GDP rate: It's suggested that the current account to GDP rate play a significant role in anticipating and analysing financial crisis. The higher the deficit in the current account, the capability of the local lender to lend the government shall get weaker. That shall increase the credit risks. It's suggested that the higher this rate is, the higher the probabilities of experiencing a financial crisis (Al-Ameed, 2010:10). Based on the table above, the current account to GDP rates fluctuated. They are within the range of -17.40%-12.20%. During the period (2000-2004), there is a current account surplus. That is attributed to the high amount of foreign aids and current transfers and having a balance of service surplus¹⁶. During the period (2005-2013), there was a deficit in the current account. Such deficit is attributed to having low current receipt to current expenditure rate¹⁷. It's attributed to having a rise in the deficit in the trade balance, and having low current transfers and low foreign aids. It's attributed to having a rise in the deficit in the income account because the deficit in the net investment income rose¹⁸.

The deficit was experienced during (2005-2013). It was found that the current account to GDP rate plays a significant role in anticipating financial crises. It was found that the higher the deficit in the current account, the higher the probabilities of experiencing a financial crisis. Three years prior to the financial crisis, this rate rose. In 2013, it reached -10%. Having a deficit in the current account shall negatively affect the economy.

¹⁵The Jordanian Central Bank (2008). The Annual Report. P.45

¹⁶The Jordanian Central Bank (2003). The Annual Report. P.52

¹⁷The Jordanian Central Bank (2010). The Annual Report. P.72

¹⁸The Jordanian Central Bank (2012). The Annual Report. P.74-75

¹⁴The Jordanian Central Bank (2008). The Annual Report. P.45

Seventh: The real exchange rate: In 1995, the Jordanian Central Bank adopted a fixed exchange rate for JDs when converting it into USD. It's been proved that this decision positively affected the Jordanian economy and promoted trust in JDs. Making this decision increased the competitiveness of national exports. It encouraged many foreign and local investors to make investments¹⁹. It's suggested that the lower the real exchange rate, the higher the probabilities of experiencing a financial crisis (Al-Otoom and Rahahleh, 2002:65-57). Based on the table above, the real exchange rate fluctuated. They are within the range of -8.91-2.76%. During (2000-2005), they are high and stable. During (2006-2013), they started to drop. It was found that that the lower the real exchange rate, the higher the probabilities of experiencing a financial crisis

Eighth: Foreign exchange reserves: It's suggested that this indicator play a significant role in anticipating and analysing financial crises. This indicator significantly affects the trust of creditors in the government. Having a great amount of foreign exchange reserves shall attract foreign investors and create a good investment climate for foreign investors. It shall give stability to the real exchange rate of the state's currency. The lower the amount of foreign exchange reserves, the higher the probabilities of experiencing a financial crisis (Belqasem, 2009:45). Based on the table above, the growth rates of foreign exchange reserves fluctuated. They are within the range of (-37.01-81.07%). In 2000, the amount of foreign exchange reserves rose. That is because the Central Bank stopped taking commission on exchanging foreign currencies. The commission rate used to be 0.1%. The latter rose is attributed to increasing the minimum amount of foreign currency that the the Central Bank may buy or sell. It was 100,000 USD and became 1 million USD²⁰.

However, the amount of foreign exchange reserves dropped in 2001. Such drop is attributed to the increase of the interests on foreign loans increased (522 million USD) and the drop of the net sales of foreign currencies (369 million USD)²¹. During

(2002-2003), the foreign exchange reserves increased, because the foreign aids increased. It's because the money transferred by the Jordanian working abroad and the revenues gained from the tourism sector increased. It's because the revenues gained from exporting goods increased²². During (2004-2005), the amount of foreign exchange reserves dropped because the amount of imports increased and the foreign expenditures increased. Such expenditures include: foreign debts and money transferred to the Iraqi Development Fund²³. The latter drop is attributed to the drop of foreign aids and fall of investment flows²⁴. During (2006-2010), the amount of foreign exchange reserves increased. Such increase is attributed to the increase of foreign aids and revenues gained from privatization²⁵. It's attributed to purchasing foreign currencies from authorized banks²⁶ and the increase of the amount of the amount of inward remittance in foreign currencies²⁷. During (2011-2012), the amount of foreign exchange reserves dropped because the amount of funds paid for imports increased²⁸. The latter drop is attributed to the power crisis experienced by Jordan. Thus, much funds in foreign currencies were paid by the Jordanian government to import power²⁹. In 2003, the amount of foreign exchange reserves increased, because the power crisis was resolved. Based on the aforementioned information, the amount of foreign exchange reserves plays a significant role in analysing and anticipating financial crises. The lower the amount of foreign exchange reserves is, the higher the probabilities of experiencing a financial crisis. Before experiencing the financial crisis, the amount of foreign exchange reserves dropped. In 2008, the foreign exchange reserves rate reached 12.71%.

Section three: Case study:

First: Statistical Methods:

²²The Jordanian Central Bank (2003). The Annual Report. P.22

²³The Jordanian Central Bank (2004). The Annual Report. P.24

²⁴The Jordanian Central Bank (2005). The Annual Report. P.24

²⁵The Jordanian Central Bank (2006). The Annual Report. P.30

²⁶The Jordanian Central Bank (2007). The Annual Report. P.28

²⁷The Jordanian Central Bank (2009). The Annual Report. P.28

²⁸The Jordanian Central Bank (2011). The Annual Report. P.28

²⁹The Jordanian Central Bank (2012). The Annual Report. P.28

¹⁹ The Jordanian Central Bank (2011). The Annual Report. P.28

²⁰The Jordanian Central Bank (2000). The Annual Report. P.27

²¹The Jordanian Central Bank (2001). The Annual Report. P.24

Descriptive statistical methods were used to analyse independent and dependent variables. For instance, means, standard deviations, maximum values and minimum values were calculated. The Multi co linearity test was conducted through calculating Pearson correlation coefficient values. Autocorrelation analysis was conducted through conducting Durbin-Watson Test. Simple and multiple linear regression analysis was conducted to test the study's hypotheses:

Second: The Study's Model: The multiple linear regression analysis was conducted through using the equations listed below. Through this analysis, the researchers identified the impact of each independent variable on the real exchange rate and foreign exchange reserves

$$1) EXCHR = \beta_0 + \beta_1 QUICK + \beta_2 ROA + \beta_3 ROE + \beta_4 EPS + \beta_5 CAPAD + \beta_6 NONPERF + \beta_7 EMPLOY + e_i$$

$$2) INTDEP = \beta_0 + \beta_1 QUICK + \beta_2 ROA + \beta_3 ROE + \beta_4 EPS + \beta_5 CAPAD + \beta_6 NONPERF + \beta_7 EMPLOY + e_i$$

Whereas:

Abbreviation	Meaning
EXCHR	Real Exchange Rate
INTDEP	Foreign exchange reserves
β_i	Regression coefficients ($i=0,1,\dots,7$)
GDP	Gross Domestic Product
INFR	Inflation
MSR	Money Supply (M2)
ELR	Internal Public Debt To Total Debt
ILR	External Public Debt To Total Debt
CRRNT	Current Account To GDP
e_i	Error term.

The aforementioned regression model consists from 6 independent variables and 2 dependent variables. Those independent variables are: (gross domestic product, inflation rate (IR), money supply (M2), current account to GDP rate, internal public debt to total public debt rate, and external public debt to

total public debt rate). The dependent variables include: (the real exchange rate, and foreign exchange reserves).

Third: Description for the study's variables: This part presents a descriptive statistical analysis for the study's independent and dependent variables.

1)-The dependent variables: The researchers presented below the result of the descriptive statistical analysis for the dependent variables during (1999-2013):

Table (2): The results of the descriptive statistical analysis for statistical analysis for the dependent variables during (1999-2013)

Statistical analysis method	Currency crisis	
	Real exchange rate	Foreign exchange reserves (million JDs)
Mean	1.364	4638.76
Standard deviation	0.119	2457.569
Maximum value	1.476	8679.100
Minimum value	1.150	1412.000

Based on the table above, the following results can be concluded:

Currency crisis: The mean and the standard deviation of the real exchange rate during the period (1999-2013) are 1.364, and 0.119 respectively. The maximum value of the real exchange rate during this period is 1.476. The minimum value of the real exchange rate during this period is 1.150. The mean and the standard deviation of the foreign exchange reserves during the period (1999-2013) are 4638.760 million JDs and 2457.569 million JDs. The maximum value of the foreign exchange reserves during this period is 8679.100 million JDs. The minimum value of the foreign exchange reserves during this period is 1412.000 million JDs.

2)- Independent variables: The researchers presented below the results of the descriptive statistical analysis during the period (1999-2013).

Table (3): The results of the descriptive statistical analysis during the period (1999-2013)

Statistical analysis method	GDP (Million JDs)	Inflation rate	The money supply (million JDs)	The internal public debt to total public debt rate	The external public debt to total public debt	The current account to GDP rate,

					rate	
Mean	8001.318	3.820	15309.12	42.873	57.127	-5.613
Standard deviation	2011.366	3.465	7075.15	20.491	20.491	8.439
Maximum value	10812.900	13.900	27363.40	71.990	83.510	12.200
Minimum value	5198.000	-0.700	6747.60	16.490	28.010	-17.400

Based on the table above, the following results can be concluded:

- 1) Gross domestic product: During the period (1999-2013), the mean and standard deviation of the GDP are 8001.318 million JDs and 2011.366 million JDs respectively. During this period, the maximum value of the GDP is 10812.900 million JDs, and the minimum value of the GDP is 5198.000 million JDs.
- 2) The inflation rate: During the period (1999-2013), the mean and standard deviation of the inflation rate are 3.820 million JDs, and 3.465 million JDs respectively. During this period, the maximum value of the inflation rate is 13.900, and the minimum value of the inflation rate is -0.700.
- 3) The money supply: During the period (1999-2013), the mean and standard deviation of the money supply are 15309.12 million JDs, and 7075.15 million JDs respectively. During this period, the maximum value of the money supply is 27363.40 million JDs and the minimum value of the money supply is 6747.60 million JDs.
- 4) The internal public debt to total public debt rate: During the period (1999-2013), the mean and standard deviation of this rate are 42.873 and 20.491 million JDs respectively. During this period, the maximum value of this rate is 71.990

million JDs and the minimum value of this rate is 16.490 million JDs.

The external public debt to total public debt rate: During the period (1999-2013), the mean and standard deviation of this rate are 57.127 million JDs and 20.491 million JDs respectively. During this period, the maximum value of this rate is 83.510 million JDs and the minimum value of this rate is 28.010

The current account to GDP rate: During the period (1999-2013), the mean and standard deviation of this rate are -5.613 and 8.493 respectively. During this period, the maximum value of this rate is 12.200 and the minimum value of this rate is -17.400.

Fourth: Testing the validity of the model:

1)- The Multi co linearity test was conducted: Pearson correlation coefficient values were calculated to explore whether there is a Multi co linearity problem between the study's variables. The table below presents the correlation coefficient values for exploring the correlation between the study's independent values:

Table (4): The correlation coefficient values for exploring the correlation between the study's independent values:

Variable	GDP	Inflation rate	The money supply	The internal public debt to total public debt rate	The external public debt to total public debt rate	The current account to GDP rate
GDP	1					
Inflation rate	0.456**	1				
Money supply	0.561**	0.028**	1			
The internal public debt to total public debt rate	0.497**	0.436*	0.507**	1		
The external public debt to total public debt rate	-0.343	-0.292	-0.275	-0.727**	1	
The current account to GDP rate	0.386*	-0.069	0.464**	-0.153**	0.037	1

(**): This sign means that the value is statistically significant at the statistical significance level of ($\alpha \leq 0.01$).

(*): This sign means that the value is statistically significant at the statistical significance level of ($\alpha \leq 0.05$).

Based on the table above, the maximum correlation coefficient between the independent values is 0.727. This value represents the correlation between the (the internal public debt to total public debt rate) and (the external public debt to total public debt rate). Based on the table above, there isn't any multi co linearity problem between the study's independent variables. That is because all the values are lower than 0.80.

To test the validity of the latter result, the variance inflation factor (VIF) values were calculated. The latter values are presented in the table below:

Table (5): The variance inflation factor (VIF) values

Variable	The variance inflation factor (VIF) value
GDP	2.126
Inflation rate	1.791
Money supply	2.53
The internal public debt to total public debt rate	5.548
The external public debt to total public debt rate	3.713
The current account to GDP rate	1.354

Based on the table above, all the variance inflation factor (VIF) value are greater than 1 and less than 10. That means that there isn't any multi co linearity problem between the study's independent variables

Table (7): The results of testing the first hypothesis (H0.1)

Dependent variable	Correlation coefficient (R)	Determination coefficient (R ²)	Calculated F value	Sig.	Regression coefficients				
					value	B	Standard error	Calculate d t value	Sig.
Real exchange rate	0.589	0.347	1.856	0.136	GDP	0.381	0.277	1.374	0.184
					INFR	-0.001	0.002	-0.344	0.734
					MSR	-0.462	0.226	-2.093	0.048
					ELR	0.068	0.108	0.626	0.538
					ILR	0.016	0.131	0.125	0.902
					CRRNT	-0.001	0.001	-2.593	0.017
					Constant	1.407	1.831	0.768	0.451

(*): This sign means that the value is statistically significant at the statistical significance level of ($\alpha \leq 0.05$)

2)- Autocorrelation: Durbin-Watson Test was conducted to make sure that there isn't any autocorrelation problem. Through the latter test, tabulated D-W value was compared with the calculated D-W value. The tabulated D-W value is represented in the minimum value (di) and the maximum value and the minimum value (du). If the calculated D-W value is greater than the minimum value (du), it means that there isn't any autocorrelation problem in the collected data.. The results of Durbin-Watson test are presented in the table below

Table (6): The results of Durbin-Watson to detect any autocorrelation problem in the collected data.

Hypothesis	the calculated D-W value	Dl	du	Result
H01	2.053	0.951	1.959	There isn't any autocorrelation problem
H02	2.119	0.951	1.959	There isn't any autocorrelation problem

Based on table (6), it was found that there isn't any autocorrelation problem in the collected data.

Fifth: Testing the study's hypotheses:

H0.1: The targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the real exchange rate

Based on table (7), the following results were concluded:

- 1) The targeted macroeconomic indicators don't have a statistically significant impact on the currency crisis when measured by the real exchange rate. That is because the calculated F value is 1.856 and the significance value is 0.136 which is greater than 0.05. The correlation coefficient value (R) is 0.589. The determination coefficient value (R²) is 0.347. That indicates that 34.7% of the changes in the real exchange rate can be attributed to the targeted macroeconomic indicators.
- 2) The B value of the (GDP) is 0.381. The t-value of the (GDP) is 1.374 and the significance value (Sig.) is 0.184. That indicates that the GDP doesn't have a statistically significant impact on the currency crisis when measured by the real exchange rate.
- 3) The B value of the (inflation rate) is -0.001. The t-value of the (inflation rate) is -0.344 and the significance value (Sig.) is 0.734. That indicates that the (inflation rate) doesn't have a statistically significant impact on the currency crisis when measured by the real exchange rate.
- 4) The B value of the (money supply) is -0.462. The t-value of the (money supply) is -2.093 and the significance value (Sig.) is 0.048. That indicates that the (money supply) doesn't have a statistically significant impact on the currency crisis when measured by the real exchange rate
- 5) The B value of the (external public debt to total public debt rate) is 0.068. The t-value of the latter indicator is 0.626 and the significance

value (Sig.) is 0.538. That indicates that the (external public debt to total public debt rate) doesn't have a statistically significant impact on the currency crisis when measured by the real exchange rate

- 6) The B value of the (internal public debt to total public debt rate) is 0.016. The t-value of the latter indicator is 0.125 and the significance value is 0.902. That indicates that the (internal public debt to total public debt rate) doesn't have a statistically significant impact on the currency crisis when measured by the real exchange rate
- 7) The B value of the current account to GDP rate is -0.001. The t-value of the latter indicator is -2.593 and the significance value is 0.017. That indicates that the (current account to GDP rate) doesn't have a statistically significant impact on the currency crisis when measured by the real exchange rate.

Based on the aforementioned information, the first null hypothesis is accepted. That means that targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the real exchange rate. Based on the results, the following equation can be used to calculate the real exchange rate.

$$EXCHR = 1.407 + 0.381 * GDP - 0.001 * INFR - 0.462 * MSR + 0.068 * ELR + 0.016 * ILR - 0.001 * CRRNT + e_i$$

Dependent variable	Correlation coefficient (R)	Determination coefficient (R ²)	Calculated F value	Sig.	Regression coefficients				
					value	B	Standard error	Calculated t value	Sig.
Foreign exchange reserves	0.994	0.989	335.58	0.000	GDP	-1.589	0.297	-5.358	0.000
					INFR	0.026	0.007	3.766	0.001
					MSR	3.939	0.358	10.991	0.000
					ELR	2.761	0.132	20.884	0.000
					ILR	1.185	0.140	8.478	0.000
					CRRNT	0.020	0.001	24.079	0.000
					Constant	-11.527	4.024	-2.865	0.009

H0.2: The targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (foreign exchange reserves)

Table (8): The results of testing the second hypothesis (H0.2)

(*): This sign means that the value is statistically significant at the statistical significance level of ($\alpha \leq 0.05$).

Based on the table above, the following results were concluded:

- 1) The targeted macroeconomic indicators have a statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (foreign exchange reserves). That is because the calculated F value is 335.58 and the significance value is 0.000 which is less than 0.05. It's because the correlation coefficient value (R) is 0.994. It was found that the determination coefficient value (R^2) is 0.989. That indicates that the 98.9% of the changes in the (foreign exchange reserves) can be attributed to the targeted macroeconomic indicators.
- 2) The B value of the GDP is -1.589. The t-value of the latter indicator is 0.297 and the significance value (Sig.) is 0.00. That indicates that the gross domestic product has a statistically significant impact on the currency crisis measured by the (foreign exchange reserves).
- 3) The B value of the inflation rate is 0.026. The t-value of the latter indicator is 3.766 and the significance value (Sig.) is 0.00. That indicates that the inflation rate has a statistically significant impact on the currency crisis measured by the (foreign exchange reserves).
- 4) The B value of the money supply is 3.939. The t-value of the latter indicator is 10.991 and the significance value (Sig) is 0.00. That indicates that the money supply has a statistically significant impact on the currency crisis measured by the (foreign exchange reserves).
- 5) The B value of the (external public debt to total public debt rate) is 2.761. The t-value of the latter indicator is 0.132 and the significance value (Sig) is 0.00. That indicates that the (external public debt to total public debt rate) has a statistically significant impact on the currency crisis measured by the (foreign exchange reserves).
- 6) The B value of the (internal public debt to total public debt rate) is 1.185. The t-value of the latter indicator is 8.478 and the significance value (Sig) is 0.00. That indicates that the (internal public debt to total public debt rate) has a statistically significant impact on the currency crisis measured by the (foreign exchange reserves).
- 7) The B value of the current account to GDP rate is 0.020. The t-value of the latter indicator is 24.079 and the significance value (Sig) is 0.00. That indicates that the (current account to GDP rate) has a statistically significant impact on the currency crisis measured by the (foreign exchange reserves).

Based on the aforementioned information, the second null hypothesis is rejected. That means that targeted macroeconomic indicators have a statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (foreign exchange reserves). Based on the results, the following equation can be used to calculate the (foreign exchange reserves).

$$\text{INTDEP} = -11.527 - 1.589 * \text{GDP} + 0.026 * \text{INFR} + 3.939 * \text{MSR} + 2.761 * \text{ELR} + 1.185 * \text{ILR} + 0.020 * \text{CRRNT} + e_i$$

Sixth: Discussion

Discussion related to the first hypothesis

Based on table (7), it was found that the targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the real exchange rate. The latter result is inconsistent with the result concluded by Al-Tarawneh (2004) and Jdaitawi (2008). The latter researchers found that the real exchange rate plays a significant role in anticipating financial crises. It was found that Jordan didn't experience a currency crisis during the examined period. That is because the real exchange rate is high. The result indicate that Jordan enjoyed good competitiveness during the examined period which positively affected the macroeconomic indicators.

Discussion related to the second hypothesis: Based on table (8), the targeted macroeconomic indicators have a statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (foreign exchange reserves). The latter result is consistent with the results concluded by Al-Janabi (2003) and Al-Tookhi (2008). The latter researchers found that the having low amount of (foreign exchange reserves) shall lead to experiencing a currency crisis. It was found that Jordan didn't experience a currency crisis during the examined period. It was found that the growth of (foreign exchange

reserves) fluctuated during the targeted period. That is because amount of imports increased³⁰. Such fluctuation is attributed to the power crisis³¹.

CONCLUSION

The researchers concluded the following results

- 1) It was found that the targeted macroeconomic indicators don't have any statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the real exchange rate
- 2) It was found that the targeted macroeconomic indicators have a statistically significant impact –at the statistical significance level of ($\alpha \leq 0.05$)- on the currency crisis measured by the (foreign exchange reserves).

RECOMMENDATIONS

The researchers recommend increasing the extent of cooperation and collaboration between the Central Bank, the Ministry of Finance, and the Ministry of Planning & International Cooperation in Jordan. They recommend establishing an agency for anticipating financial crises. Such an agency should collect and analyse data and information about financial and economic indicators.

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