Financial Crisis and the fluctuations of the global crude oil prices and their impacts on the Iraqi Public Budget
“Econometric and analytical Study”

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ABSTRACT
The Iraqi economy is not isolated from the international economic influences and is influenced by international economic variables, and perhaps the recent global financial crisis cast a shadow over the Iraqi general budget, as the fall of the price of crude oil is one of the negative influences of this crisis, it is known that the revenue of the crude oil exports constitutes an important element in the GDP and also in the public revenue of Iraq and the major element of its annual budget, Thus the Iraqi economy generally suffering from the global financial crisis, And the public budget particular suffered from implications of the recent crisis.

1. Introduction:
One of the main features of the financial crises is their ability to transition from crisis country to other countries, especially in the context of Globalization, Financial liberalization, and Economic openness.

As part of the talk about the transmission mechanisms of the financial crisis, a lot of evidences confirm that the crisis affecting on the economic zones through its extension and hit other economies regions in the world, through what is called in the economics literature (Contagion Effect), and that this contagion transition is expressed (Domino Effect), in the global economic literature. Therefore one of the most notable negative impacts of Global Financial Crisis (GFC) is the remarkable increases in Governmental Budget Deficit (GBD), in both developed and developing, oil and non-oil countries. The findings of many studies have proved the existences of “Real Deficit”*, even in the cases of “Apparent Surplus” in GB) ;( David Colander, 2006), (Iraqi Ministry of Finance, 2009), (Safaa Ali, 2010); ....etc.

(*):- Real deficit refers to nominal deficit adjusted according of inflation; and we can measure by following equation:-
Real deficit= Nominal deficit – (Inflation rate x Aggregate dept)
2. Contents:-
2. The characteristics of the global financial crisis.
4. Determinants of economic dependency.
5. Crisis transmission channels to Iraqi governmental budget.
6. Some econometric application (OLS) method.
7. Conclusion.

3. Purpose of study:-
The study starts from the main question as follows:-
((What is the relative importance of the different channels (Fluctuations in crude oil prices, Real and Financial sectors) through which the GFC increase the GBD in Iraqi public budget?)�)

Hypothesis of study:-
The study will try proving or disproving the follow:-
((The global financial crisis leads to increase the real governmental budget deficit in Iraq even though the Iraqi public budget appears in surplus case)).

Objective of study:-
The study aims to:-
1- Identify on the transmission mechanisms of the financial crisis.
2- Identify on the relationship between the global financial crisis and fluctuations world oil prices and their impacts on the Iraqi governmental budget.

4. Methodology of study:-
The study depends on the inductive and deductive approaches, in order to prove or disprove the study’s hypothesis , as well as using the econometric approach to strengthening the study results.

Problem of study:-
This study addresses to the statement extent influence of Iraqi crude oil revenue during the previous time periods, and its acquisition of the most of the budget financing sources, which led to fails contribute other economic sectors in the budget financing.

Time dimension of study:-
This study based on the data obtained by researcher from various international, regional, and local institutes and organizations for period (2004-2009).

5. PREFACE
Did not stay a country in the world not affected by the evil consequences of the global financial crisis, that occurred in the United States of America in early 2008, directly or indirectly, partially or fully,
despite of the negative effects of this crisis on the global economies it at the same time revealed the kinks in these economies, laws and procedures need to be taken.

Hence, find that the global financial crisis and what followed economic and financial consequences have hit the Iraqi economy in the heart being the yield economy depends mainly on the production and export the crude oil, and the global financial crisis could struck by his implications the crude oil prices which reached to a peak (147$US) per barrel then down to (32$US) per barrel during a few months, Imagine then how will be these implications on the Iraqi public budget which facing many important requirements in the coming years.

I. Financial crisis ;Concepts and Types:-

There are many concepts of the financial crisis but this study depended on this concept as following:-

((Financial crisis mean a sharp decline in the financial markets , coupled with the failure in a large number of financial organizations and non-financial , with the sharp contraction in the levels of macroeconomic activity)).

Now There are three types of the financial crises:-

• Banking crisis which divided to two kinds.
  1- Credit crisis
  2- Liquidity crisis

• Accuracy or balance of payments crisis.

• Financial markets crisis. (Bubble case).

II. Characteristics of the financial crisis:-

There are many characteristics of the financial crisis as following:-

• Occur suddenly, violently, and increasingly.
• Complexity and overlapping in its factors and causes.
• Insufficient information about it led to disruption of Prediction mechanisms.
• Emergence of the phenomenon of spending reduction in general.
• Inability to pay the obligations at all levels.

III. Transmission mechanisms of the financial crisis:-

There are two main channels of financial crisis transmission from the crisis countries to other countries:-

• The trade or commerce channel.
• The financial markets channel.
Addition to presence of many secondary channels to the crisis transmission such as:-

- The exchange rate channel.
- The expectations channel.

But this study depends on the main transmission mechanisms to explain crisis transition mechanism from crisis countries to other countries.

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- The trade or commerce channel:-

Now to explain this mechanism let us assume that one the countries suffering from financial crisis, in the context of the globalization, financial liberalization, and the economic openness and also in the context of global trading overlapping, the crisis will transition from the country of crisis to other countries from trade or commerce operations this is from hand, on the other hand, mechanism of trade or commerce will help to transition this crisis from country of crisis to other countries; noting that the speed of transition and degree of impact will vary from country to country according to a number of factors will be touched upon in another part of this study; now let us know what will happen?

That the entry of the crisis to other countries from this channel will work to freezing the trade movement or import and export contracts, then that will leaves its impacts on the revenues of the exporter companies, on the other hand, impact on the stock prices and create a state of confusion in both financial and real markets, this situation lead to decline in both consumer and investment demand which leads accumulation of commodity stocks and a state of recession and beginning of the crisis “Fredric S.Mishkin, 2004”; to illustrate this mechanism look at figure (1).

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Figure (1):- Crisis Transmission Mechanism through trade or commerce channel *
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- The financial markets channel:

 Especially after the financial integration of the international markets and economic liberalization. Source of the contagion is (Asymmetric information), this from hand, on the other hand, that the decline in banking lending during the crisis period will lead to increase in the interest rates, and the result is increase in (Adverse selection problem), and (Hazard moral).

 To illustrate this mechanism look at figure (2).
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Figure (2):- Crisis transmission mechanisms through financial market channel *

(*):- Source: - Designed by Researcher.

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IV. Determinants of Economic Dependency:-

We mentioned earlier in this study that the speed of transition and the impact of crises, vary from one country to another, and also we mentioned these impacts depends on a combination of factors, and this factors as following "Taimur Baigan&H.L.Ahuja, 2006":-

- Trade openness.
- Financial involvement.
- Foreign aid.
- Foreign debt size.

(*):- Source: - Designed by Researcher.
Foreign exchange rate policy.
Economic and investment diversification.
Psychological factors.
Market failures cases.
Macroeconomic problems.

V. Crisis Transmission Channels to Iraqi governmental budget:-

After the world oil prices deterioration and their consequences of financial and economic crisis, it was port the crisis dangerous to the Iraqi economy generally, and on the Iraqi public budget especially, and not by the banking or credit system for the following reasons:-

- The oil is main source of public funds in Iraq.
- Iraq has not any portfolios or sovereign funds or investment.
- The Iraqi banking system does not overlap with the global banking system.
  So it will the main influence on the Iraqi public budget is falling in public revenues.

Therefore; study divides the transition channels of the financial crisis impact to the Iraqi public budget as following:-

1- The main channel:-
- Fluctuations in oil prices.

2- The minor channels:-
- Decrease in The cash flows for construction and investment international and local companies.
- Decrease in the International Aid and Grants.

Regarding to the minor transition channels, the decline in the inside cash inflows to the Iraqi economy its own reasons, because most of these companies which working in various Iraqi economic sectors especially in the oil sector, depends by (90%) in his financing on the loans which taken from the international banks which collapsed, because of the financial crisis; therefore this has led to reluctance of these companies to enter or work in Iraqi economy, this is hand, on the other hand, decrease in the international aid and grants will leave influential cannot be denied, because the Iraqi government has many future obligations this from side, on the other side, the Iraqi public budget depends on these aids and grants which were helping the process of Iraqi reconstruction and economic recovery. But it remains the strongest effect on the public budget is the volatility and fluctuations in the world crude oil prices for the reasons mentioned previously,"IMF annual report, 2008".

Now to prove this talk about dependence the Iraqi economy on the value of crude oil exports, look at schedule (1).
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<table>
<thead>
<tr>
<th>Year</th>
<th>Crude oil revenue (1)</th>
<th>GDP (2)</th>
<th>(3)=(1/2)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>17,456</td>
<td>36,487</td>
<td>48</td>
</tr>
<tr>
<td>2005</td>
<td>23,199</td>
<td>49,954</td>
<td>46</td>
</tr>
<tr>
<td>2006</td>
<td>29,708</td>
<td>64,805</td>
<td>46</td>
</tr>
<tr>
<td>2007</td>
<td>37,847</td>
<td>88,006</td>
<td>43</td>
</tr>
<tr>
<td>2008</td>
<td>61,884</td>
<td>133,022</td>
<td>49</td>
</tr>
<tr>
<td>2009</td>
<td>65,871</td>
<td>134,065</td>
<td>49</td>
</tr>
</tbody>
</table>


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The economic sectors contribution in composition of Iraqi GDP in 2009*

(*) :- Source: - Calculated by Researcher depends on Iraqi Ministry of Finance data “Department of accounting and budget 2009”.

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Note from the previous table and figure; the relative importance of value of the crude oil especially in composition the Iraqi GDP, therefore this confirms the general study hypothesis which confirmed that any change or fluctuation in global crude oil prices will reflect negatively on the revenues of the public budget and this will lead to increase in real deficit in the public budget, or by other words even if we assume that the public budget appears in the surplus case, this changes and volatilities in global crude oil prices will lead to decrease that surplus, and the result will be same “Safaa Ali, 2010 o.p. Cit”.
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Now the following schedule (2), will illustrates extent of the relative importance of crude oil revenue in the composition of the Iraqi public budget revenues:-

Table (2): Contribution of Iraqi crude oil in the Public Budget Revenues (2004-2009) million $US.*

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil Revenues (1)</th>
<th>Budget Revenues (2)</th>
<th>(3)=(1/2)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>17,456</td>
<td>22,762</td>
<td>77</td>
</tr>
<tr>
<td>2005</td>
<td>23,199</td>
<td>27,516</td>
<td>84</td>
</tr>
<tr>
<td>2006</td>
<td>29,708</td>
<td>33,258</td>
<td>89</td>
</tr>
<tr>
<td>2007</td>
<td>37,847</td>
<td>43,093</td>
<td>88</td>
</tr>
<tr>
<td>2008</td>
<td>61,884</td>
<td>67,000</td>
<td>92</td>
</tr>
<tr>
<td>2009</td>
<td>65,871</td>
<td>80,000</td>
<td>81</td>
</tr>
</tbody>
</table>


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Increase the percentage of revenue of the oil sector contribution in Iraqi public budget revenues composition for period (2004-2009)*

(*)- Source: - Calculated by Researcher depends on data of Iraqi Ministry of Oil, Department of Media and Public relations, Statistical years 2004-2009, and Iraqi Ministry of Finance; Department of accounting and budget 2004-2009.

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We can note through all the previous numbers and figures how important the role of oil revenues in the composition of the Iraqi governmental budget in both its (Operational and Investment), where noted in schedule (2), rising in contribution percentage from (77%) in 2004 to (92%) in 2008, the year that oil prices reached to a peak (147,27$US) per barrel, but in mid of 2008 oil prices started to decline because of the implications of the global financial crisis, then the decline in the oil prices continued that the price of a barrel to (32$US) per barrel at the beginning of 2009, and the following
chart illustrates the volatilities in the global crude oil prices for period (2005-2009):-

Fluctuations in global crude oil prices for period (2005-2009) $US

As a result, the estimated resources of Iraqi public budget, in 2009, decreased from $U.S 80 billion to $U.S 67 billion, and then to $ U.S 59 billion. And this confirms validity of the previous analysis. And also noted that the fluctuations in the global oil prices was the main reason to effect on the Iraqi public budget and loss of Iraqi fiscal policy the ability to face these volatilities or fluctuations in global crude oil prices, because the Iraqi economy depends by a higher percentage as noted on crude oil exports both GDP and Public budget revenues composition.

VI. Some Econometric applications (OLS) method:-

In order to strengthening and enhancing the previous analysis, study based on Econometric approach to monitor and measure the fluctuations of oil prices and their impacts on the Iraqi public budget; and also study focus on two sides as following:-

- Measuring the dependency of the developed, emerging, and developing countries to the U.S. economy. And all know that the Iraqi economy is a part from the developing countries, so it is expected that this economy is affected by the consequences of the global financial crisis, but despite of that appeared several writings which refers to the Iraqi economy was least affected countries by the crisis !!!; because the crisis started in the U.S. economy this is hand, on the other hand, the crisis also transition from U.S. economy to the other countries and because the Iraqi economy it has not a strong links with the U.S. economy, so it is natural to be less affected”Emanuele Baldacci, 2009”.

(36)
Therefore this study tried prove that all economies have a kind of subordination to the U.S. economy, but the degree and speed of vulnerability will be a different from country to other country depending on several factors have been mentioned earlier in this study.

Measuring the relationship between Iraqi public budget revenues and crude oil prices. As we noted that the fluctuations in global crude oil prices led to volatility

Estimate budget revenues in 2009, this indicates an association of some kind between oil prices fluctuations and volatility budget revenues.

1-Measuring the dependency of the developed, emerging, and developing countries to the U.S. economy.
   It is known that the U.S. economy play a pivotal role in the global economy, addition to fact the U.S. dollar the leadership currency in the world as well as the U.S. economy is the first globally in terms; volume of production, consumption, and import" WTO, 2008", which means that the U.S. economy has in a recession that will lead to declines in all other economies ,"H.L.Ahuja, 2010" , though to varying at different; as we have seen the transmission mechanisms of the crisis will work to transfer the crisis to all other economies.
   Based on this, study will measure the overlapping degree between the Iraqi economy and the U.S. economy, and also study depending on real GDP which measures by constant prices for U.S. economy and major international groups, and due to changes in the real activity level which refers to economic recession or expansion, therefore study depends on the real growth rates of the economic blocks as following:-

   1- USR Growth For U.S. Economy
   2- G7R Growth For Group of the seven
   3- DEVEMR Growth For Developing and emerging countries
   4- MER Growth For Middle East countries
   5- IRQ Growth For Iraqi Economy

And study depends on (IFS) data which took from (IMF) data base for all countries for the period (1980-2010). Schedule (3) illustrates the sample indicators for all groups of study period as following:-
Table (3)
The sample indicators for the period (1980-2010)

<table>
<thead>
<tr>
<th>The Economic Blocks</th>
<th>Sample size</th>
<th>Average of growth</th>
<th>S.D</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth of the G7 group</td>
<td>31</td>
<td>2.4887</td>
<td>1.18020</td>
<td>1.393</td>
</tr>
<tr>
<td>Growth of the Developing countries group</td>
<td>31</td>
<td>4.3269</td>
<td>1.83898</td>
<td>3.382</td>
</tr>
<tr>
<td>Growth of the Middle East countries group</td>
<td>31</td>
<td>3.5952</td>
<td>2.71501</td>
<td>7.371</td>
</tr>
<tr>
<td>Growth of the U.S.</td>
<td>31</td>
<td>2.8471</td>
<td>1.80642</td>
<td>3.263</td>
</tr>
</tbody>
</table>

From this schedule we note that the Developing countries group, achieved to higher growth average during the period (4.3%), followed by the Middle East group (3.5%), then U.S. (2.8%), and the G7 group (2.4%).

As for the stability of the economic activity level, the G7 group came to the fore has less variation (1.3), then U.S. (3.2), then Developing countries (3.3), and the last the Middle East countries (7.3).

We note that the Middle East group has a bigger variation, and that refers to deferent fluctuations and deferent crises; and this is due to the local and regional elements of stability rather than global.

Now for the estimate the global economies tangles with the U.S. economy, study uses this simple econometric equation as following:

\[ Yg = B0 + B1Xg + U \]

Since the:

\( Yg \) = Annual growth rate in real GDP of other countries and which supposed to be influenced by economic growth or recession in the U.S. economy (dependent variables).

\( Xg \) = Annual growth rate in real GDP of the U.S. economy and which supposed to be influenced on real growth rates to the other countries (independent variables).

\( B0, B1 \) = the unknown model parameters.

\( U \) = the random error.

Now to ensure that the estimate it will be Wright, study uses the (Augmented Dickey Fuller), to test the variables stationary or co-integration. “And must be attention here that the tests conducted presence of the constant and the general trade”. The next following schedule (4), illustrates the (ADF) results tests.
Table (4)

ADF results tests

<table>
<thead>
<tr>
<th>Variable level</th>
<th>(TAU) Value</th>
<th>Probability test (P-Value)</th>
<th>Results tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>USRGROWTH</td>
<td>-5.26048</td>
<td>0.000</td>
<td>REFUSE UNIT ROOTS</td>
</tr>
<tr>
<td>G7RGROWTH</td>
<td>-3.84948</td>
<td>0.002452</td>
<td>REFUSE UNIT ROOTS</td>
</tr>
<tr>
<td>DEVEMRGROWTH</td>
<td>-4.2981</td>
<td>0.01271</td>
<td>REFUSE UNIT ROOTS</td>
</tr>
<tr>
<td>MERGROWTH</td>
<td>-4.07954</td>
<td>0.00668</td>
<td>REFUSE UNIT ROOTS</td>
</tr>
<tr>
<td>IRQRGROWTH</td>
<td>-3.77612</td>
<td>0.08612</td>
<td>REFUSE UNIT ROOTS</td>
</tr>
</tbody>
</table>

The stability testing refers to refuse the unit roots for all variables that is mean the results of the (OLS) method by using these variables it will be a real and not dummy variables.

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Table (5)

The adjusted results estimation of (OLS) for the period (1980-2010)

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>G7RGROWTH</th>
<th>DEVEMRGROWTH</th>
<th>MERGROWTH</th>
<th>IRQRGROWTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>B0 Constant</td>
<td>0.98</td>
<td>4.47</td>
<td>3.48</td>
<td>20.55</td>
</tr>
<tr>
<td></td>
<td>(3.94)</td>
<td>(2.76)</td>
<td>(3.05)</td>
<td>(3.30)</td>
</tr>
<tr>
<td>B1 Propensity</td>
<td>0.54</td>
<td>0.20</td>
<td>0.23</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(10.27)*</td>
<td>(1.97)**</td>
<td>(0.98)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>R adjusted square</td>
<td>0.83</td>
<td>0.68</td>
<td>0.25</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Schedule (5) illustrates the adjusted results estimation and note that; the numbers between brackets refers to (t-Test), and the reference (*); means statistically significant at the (1%) level of significance, and (**) means statistically significant at the (5%) level of significance.

The results of the econometric estimation according to, that causal relations and real growth tangles of the main countries, that the economic activity levels for all countries affected directly proportional to the U.S. economic activity level, this confirms the assumption of the U.S. leadership.

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Analysis results

1-The proportional relationship is not statistically significant for the Middle East and specifically for Iraq. That’s mean that the real economic activity in the Middle East region and especially in Iraq is not greatly affected by the level of the U.S. real economic activity.
But of course this result not denying the vulnerability of the Middle East countries both financial and monetary.

2-The interrelationships between the G7 group, developing countries, emerging countries and the U.S. real economic level are strong and statistically significant. It can be seen from schedule (5); that the G7 group real activity affected immediate and stronger relatively to changes in the U.S. economic activity level.

These results support the transmission mechanisms of financial crises which described in the previous figures, and refer to that the economic Globalization phenomenon has succeeded in build financial and real tangles between the global economies even though varying degrees and speeds.

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((Measuring the relationship between Iraqi budget resources and Iraqi crude oil revenues))

Benefiting from the data in table (5), study has uses “Statistical Regression Method” to test the hypothesis, which suppose the existence of a strong relationship between the independent variable (crude oil revenues) and the dependent variable (public budget revenues). As following:-

\[ H_0 = a + bx = 0 \] \[ H_1 = a + bx = 0 \]

When:-

\( a = \) the constant
\( x = \) Independent variable

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>R square</th>
<th>R adjusted square</th>
<th>T test</th>
<th>F test</th>
<th>Variance</th>
<th>Standard error of estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Constant</td>
<td>0.995</td>
<td>0.989</td>
<td>1.811</td>
<td>438.408</td>
<td>0.00002</td>
<td>1993.071</td>
</tr>
<tr>
<td>b Propensity</td>
<td>0.991</td>
<td>0.995</td>
<td>20.938</td>
<td>438.408</td>
<td>0.00003</td>
<td>0.050</td>
</tr>
</tbody>
</table>

Analysis results

1- The calculated value, at level of significance 5%, is larger than the significance counterpart. Therefore the null hypothesis, equation 2, has been rejected.

2- The singe of independent variable is positive. It means that any increase in crude oil sales will lead to increase in the budget revenues.
VII. Conclusions:–

Finally this study reaches to some important conclusions as following:

- The fluctuations in world oil prices were the main reason for the high real budget deficit in Iraq. It has led to several changes in public budget revenues. As a result, Iraqi government didn’t get any flexibility in responding to global financial crisis.

- The high rate of oil sector contribution in financing Iraqi public budget means the failure of the other sectors, and the weakness of taxation system.

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6- Iraqi Ministry of Oil, *Department Media and Public relations; Statistics Years for period 2004-2009.*


