

# Unofficial Dollarization (Evidence from Jordan (1988-2007))

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## Abstract

This paper aims to investigate the presence of unofficial dollarization (mainly U.S dollar) and its determinants in Jordan, which considered as one of the most open economies in the Middle East.

A model is used (based on simple money supply function, inflation, and interest rate differentials; as the major determinates of unofficial dollarization), to analyze yearly data over the period 1988-2007.

Our empirical results indicated the presence of unofficial dollarization phenomenon in Jordan, mainly during the period 1988-1997.

Empirical results, also suggest that the depreciation of Jordanian dinar has resulted a decline in Jordanian dinar holding and increase in foreign currency (U.S. Dollar) holding by Jordanian residents.

**Keywords:** Dollarization, currency substitution, devaluation, inflation rate, Jordan

## 1. Introduction

Dollarization is a generic term occurs when replacing a foreign currency with U.S dollars. Various countries, specifically emerging countries, are already using dollarization to some extent or another due to the volatility of the purchasing power of the local currencies. Generally, using dollarization can reduce country risk and protect against inflation and devaluation.

Dollarization can fall into three categories:

1. Official Dollarization (where the dollar is the major legal currency and there is no domestic currency, as Panama).
2. Semi Dollarization (where both the dollar and the domestic currency are interchangeably as legal tender, as Lebanon).
3. Unofficial Dollarization (where the dollar is preferred by private agents over the domestic currency, but not considered as the major currency).

In many developing countries, unofficial Dollarization (mainly the U.S. dollar) is widely used in large private transactions (as a store of value, and medium of exchange) and in savings.

In general, unofficial dollarization arises when residents of a country have no longer confidence in the local currency as a consistent store of value, due to repeated serious of high inflation and currency depreciation. High inflation leads a country to quote prices in dollar rather than quoting them in local currency because it is easier (Mayer,2000).<sup>1</sup>

The existence of unofficial dollarization enables residents of a country to protect themselves against currency depreciation and high inflation.

Due to the advantages of unofficial dollarization; many countries around the world such as: Caribbean, Latin America (mainly Bolivia, Peru, and Argentina) Vietnam, Romania, and Turkey are using it.

In this study we examine the presence of unofficial dollarization (mainly U.S. dollar) in Jordan, since the devaluation of the Jordanian dinar.

We concentrate on the presence of U.S dollar (as anchor) in our study due to the followings:

First, the U.S dollar is a global currency that has been the dominant reserve currency since the end of World War II. Second, The U.S. dollar is considered to be the most important foreign currency used in Jordan in many private transactions due to the pegging of Jordanian dinar to the dollar.

The Jordanian dinar devaluated in 1988, as a result of increasing outside debt, decreasing foreign aid, declining remittance income, and reducing foreign currency reserves, which led Jordanian citizens to wary keeping their savings in Jordanian dinars<sup>2</sup>. Due to further devaluation of the Jordanian Dinar, it was pegged to a trade-weighted basket of currencies. In late 1995 till presence, the dinar has been pegged to U.S. dollar at 0.708 (buy) and 0.710 (sell) Dinar to the dollar<sup>3</sup>.

The major benefit of pegging the Jordan dinar to the US dollar is to limit exchange rate risk, to keep investors' confidence in the local currency, and to decrease inflationary pressure linked with currency depreciation.

With the Jordanian dinar pegged to the US dollar, Jordan has been able to pay more for its trade deficit with the outside world, which was around JD5.26 billion in 2006<sup>4</sup>. According to the **2010 International Monetary Fund report on Jordan**, the pegging of Jordanian dinar's to the U.S. dollar has offered an appropriate nominal anchor (fixing inflation expectation) and has provided financial stability in volatile region<sup>5</sup>.

This paper is organized as follows: section one, includes general introduction on unofficial dollarization. Section two, involves several previous researches providing evidences on the use of unofficial dollarization, mainly in developing countries. Section three, tests three main hypotheses used in the analysis of unofficial dollarization phenomenon in Jordan. Section four, provides a model used in this study. Section five, presents the main results of the research hypothesis. Section six, presents the analysis of the test results. Finally, section seven includes summary and concluding remarks.

## 2. Previous Research

The phenomenon of unofficial dollarization has been investigated and analyzed in many empirical literatures through the years.

Adom, Shama, and Morshed (2009) investigated the presence of currency substitution in eight African countries (mainly Egypt, Morocco, Nigeria, Ghana, Kenya, South Africa, Tunisia and Zambia) from 1976-2005, using both regional and US dollar as anchor currencies. Using US dollar as anchor currency, the authors found that no currency substitution in Ghana, Egypt, Tunisia, Kenya and Zambia;

<sup>1</sup> <http://www.cumber.com/content/travel/Dollarization.pdf>.

<sup>2</sup> <http://www.country-data.com/cgi-bin/query/r-7406.html>.

<sup>3</sup> [http://intl.econ.cuhk.edu.hk/exchange\\_rate\\_regime/index.php?cid=23](http://intl.econ.cuhk.edu.hk/exchange_rate_regime/index.php?cid=23)

<sup>4</sup> <http://www.zawya.com/story.cfm/sidZAWYA20080108033400>

<sup>5</sup> International Monetary Fund Report (Jordan) August 27,2010 <http://www.imf.org/external/pubs/ft/scr/2010/cr10297.pdf>

but however currency substitution is still observed in Nigeria and South Africa. In case of Morocco, there is a weak evidence of currency substitution when the US dollar used as anchor currency.

Kaplan, kalyoncu and yucel (2008) analyzed whether devaluation in Turkish lira caused currency substitution away from local currency. In the study, they tested a long run relationship between the followings factors: money supply, real income, nominal interest rate, and nominal effective exchange rate from January 1987 to August 2006. As a conclusion of their study, results indicate the existence of currency substitution due to devaluation in local currency.

Rennhack and Nozaki (2006) tested several explanation of financial dollarization with an emphasis on Latin America. This study, which built on previous study, found that currency depreciation and currency mismatches tend to contribute to high financial dollarization. This result provide evidence that financial dollarization is a rational response of inflation uncertainty.

In their study, Neanidis and Savva (2006) tested the effects of inflation and currency substitution for twelve emerging economies using the abivariate GARCH –in- Mean Model. They found that for the majority of countries in the sample, the variability of inflation exerts a positive influence on both average rate of inflation and currency substitution.

Shahin and Freiha (2005) empirically tested the state of dollarization mainly in North Africa and Middle East, case studies Egypt and Lebanon. In the case of Egypt, currency substitution was reversed for a period of time due to the pegging of Egyptian pound to the dollar. On the contrary, despite the decrease in inflationary expectations (which expected to lead to currency depreciation) and increase in real interest rate differential between domestic and foreign currencies, dollarization did not decrease by estimated amount in case of Lebanon.

Prock, Soydemir, and Abugri (2003) tested to which extend currency substitution exists in Argentina, Brazil, and Mexico using a vector error correction (VEC) model. They concluded that in the case of Brazil and Argentina currency substitution occurs to a greater extent than Mexico.

In their study, Bahmani-Oskooee and Techaratanachi (2001) estimated whether the depreciation in Thailand has caused in currency substitution away from the Thai baht. By using data from 1977-1990 and an  $M_2$  money demand function, they concluded depreciation of baht has caused in a decrease in baht holding in Thailand.

Awad (1997), examined the extent of currency substitution and the factors (as domestic interest rate, foreign interest rate, and policy change) affecting it in Jordan from 1980-1994. As a result, he found that these specific factors are significantly influencing currency substitution and accounted for most of its variations. Nonetheless, the elasticity of currency substitution is found to be low. The results also indicated that the devaluation of Jordanian dinar in 1988 and the subsequent floating of exchange rate had contributed strongly to the presence of currency substitution in Jordan.

In case of Argentina, Kamin and Ericsson (1993) developed new measure of dollar currency circulation; in order to analyze dollarization and currency substitution by distinguishing between dollar currency holdings and dollar deposits. They found a negative (Ratchet effect) between inflation and demand for peso.

El-Erian and Barney (1987) showed empirical analysis of currency substitution in both Egypt and Yemen Arab Republic from 1980 till 1986.

They indicated that residents, in both countries, exhibited a marked preference to substitute foreign money balances for domestic balances, as illustrated by their holdings of foreign currency deposits

In his study, Calvo (1985) indicated that weather a permanent decrease in domestic money growth leads to a temporary appreciation or depreciation in the real exchange rate depends on weather the elasticity of currency substitution is larger or small than the elasticity of substitution between consumption and liquidity.

Ortiz (1983) has studied the determinants of dollar –denominated deposits in Mexico, called Mex- dollar deposits. As a result, he strongly confirmed that anticipated depreciation is a major dominant of the extented dollarization.

In his study, Mills (1978) presented a model where residents hold both domestic and foreign currencies due to their contribution to the level of money services. He provided empirical analysis for Canada and U.S.A over the period (1960-1975). He indicated that the elasticity of substitution between Canadian dollar and U.S. dollar is significant during floating rate periods.

From the previous research, we conclude that currency substitution mainly exist in emerging economics to some extent or another.

### 3. Hypothesis

For the purpose of studying the presence of unofficial dollarization in Jordan, we tested the followings hypothesis:

H1= There is a relationship between the gross domestic product and the holding of domestic currency.

H2 = There is a relationship between the inflation rate and the holding of domestic currency.

H3 = There is a relationship between the expected rate of depreciation (in local currency) and the holding of domestic currency.

### 4. Methodology

Most of the empirical studies aimed at identifying the determinants of unofficial dollarization based on simple money demand function, inflation, and interest rate differentials as the major determinates of unofficial dollarization.

In this study, the econometrics analysis is based on the popular variable followed in many literatures such as Ortiz (1983), Fasano-Filho(1984), El-Erian ((1988), Ramirez- Rojars (1985).

#### 4.1. The Model

The model used in this paper is summarized as follows:

$$M = f(Y, INF, XT)$$

where:

Y = Real gross domestic product (GDP)

M = Real money balance (money supply) include: currency in circulation + demand deposits+ time and saving deposits

INF = Actual Inflation rate

XT = expected rate of depreciation

- The actual rate of inflation is measured by the general wholesale price index (WPI).
- The expected rate of depreciation is defined as follows:-

$$\ln XT = \ln WPIJ - \ln WPIU$$

- The WPIJ represents the wholesale price index in Jordan, while the WPIU represents the wholesale price index in the United States of America.

#### 4.2. Sample

Yearly data is used in the research over the period 1988 to 2007.

#### 4.3. Source of Data

For the sake of gathering the needed data, we use the data provided by Central Bank of Jordan and the International Financial Statistics from International Monetary Fund (IMF)

## 5. Results

The empirical analysis is consisted of a serious of OLS regression, which is utilizing the correlation technique for unknown Hetroskedasiaty of white (1980).

Table (1) Represents the obtained results from the used model:

**Table 1:** Regression Test Results (1988-2007)

<u>Variables</u>	<u>Coefficient Estimates</u>	<u>T-Statistic</u>
Constant	7.149	10.40***
Y	-0.143	-1.697**
INF	0.029	24.29***
XT	-2.077	-8.896**
<b>R<sup>2</sup> = 99%</b>		<b>F= 247.940</b>

\*\*\* Significant at 1% level

\*\* Significant at 5% level

\* Significant at 10% level

### 5.1. Hypotheses Testing

**H1= There is a relationship between the gross domestic product (GDP) and the holding of domestic currency.**

According to our test results, we observed a negative and a significant relationship between the gross domestic product (GDP) and the domestic currency holdings.

**H2 = There is a relationship between expected rate of depreciation (in local currency) and the holding of domestic currency.**

According to our test results, we observed a negative and a significant relationship between the expected depreciation in Jordanian dinar and the domestic currency holdings.

**H3 = There is a relationship between the expected inflation rate and the holding of domestic currency.**

According to our test results, we observed a positive, but relatively weak, and a significant relationship between the expected inflation rate and the domestic currency holdings.

### 5.2. Sensitivity Analysis

In this paper, the empirical test used the full sample that contains the multi-year observation for the period 1988-2007. The time series correlation between observations may yield to spurious regression results. To confirm our results, we examine the robustness of our regression results using sub-periods analysis.

In this section, we divide the full sample into two sub samples; the first sample with one comprising observation from 1988-1997, and the second sample with one comprising observation from 1998-2007. (Note: the regression is repeated using the above sub samples). Table 2 and table 3 show the results.

**Table 2:** Regression Test Results (1988-1997)

<u>Variables</u>	<u>Coefficient Estimates</u>	<u>T-Statistic</u>
Constant	11.744	4.022***
Y	-1.010	-1.918**
INF	0.059	3.179***
XT	-5.090	-2.809***
<b>R<sup>2</sup> = 93.91%</b>		<b>F= 14.940</b>

**Table 3:** Regression Test Results (1998-2007)

<u>Variables</u>	<u>Coefficient Estimates</u>	<u>T-Statistic</u>
Constant	7.745	24.923***
Y	-0.093	-2.424***
INF	0.020	8.790***
XT	-3.871	-6.665**
<b>R<sup>2</sup> = 99.8%</b>		<b>F= 449.144</b>

Based on the results in table (2 &3), we assure that the obtained results using the two sub samples are similar to those used in the full sample.

## 6. Analysis of Test Results

According to our test results (table 1) we conclude:-

- 1) In case of income increase in Jordan by 1%, Jordanian residents will transfer 0.14% to foreign currency (mainly U.S. dollar) and hold 0.86% in local currency (Jordanian dinar). **Increase in the level of income encourages holding foreign currency**
- 2) In case of expected higher inflation rate by 1%, Jordanian residents will transfer only 0.03% from foreign currency to local currency (Jordanian dinar). **Increase in expected inflation rate encourages holding local currency** this specific result contradicts the expectation, but complies with several previous studies such as (Shahin and Freiha(2005)).

We can justify this result, according to the following reasons:-

- A Generally, higher inflation rate will lead to common rise in the prices of goods and services. In order to coop with this increase, Jordanian residents need to hold more Jordanian dinar to obtain desired and needed goods and services.

On the contrary, Jordanian residents can not hold foreign currency (U.S. dollar) in case of higher inflation because foreign currency is not used as medium of exchange.

- B During the study period (1988-2007), the inflation rate was mainly moderate in Jordan, so it is considered a secondary factor in the unofficial dollarization design.

- 3) In case of expected depreciation in Jordanian dinar increase by 1%, Jordanian residents will transfer 2% of their local currency to foreign currency (mainly U.S. dollar). **Increase of expected depreciation in local currency encourages holding foreign currency**

To confirm our results, we used our sensitivity analysis (table 2&3) and we obtained the same results

Based on our analysis, we rank the followings determinants according to their influences on unofficial dollarization in Jordan:

- 1) Depreciation in Jordanian dinar had the most effect. Every 1% decrease in value of Jordanian dinar, cause an increase in the holding of U.S. Dollar by (2%, to 5%) during our study period. The most influence was mainly observed from (1988-1997) due to the devaluation of Jordanian dinar.
- 2) Increase in income had the second effect on the presence of unofficial dollarizaion in Jordan during the study period. Every 1% increase in income, cause an increase in the holding of U.S Dollar by 0.09% to 1.00%. During the period 1988-1997, the increase in income cased increase in holding of U.S dollar by 1.0% (which considered the first period of the study).
- 3) Increase in inflation rate had the least effect on unofficial dollarization in Jordan during the study period. An increase by 1% in inflation rate , caused an increase in holding of local currency by 0.2% to 0.6%.

## 7. Conclusion

In this paper, we examined the presence of unofficial dollarization phenomenon (Specifically U.S. dollar) in Jordan. Using OLS regression and sensitivity analysis over the period 1988 to 2007; we tested the long relationship between gross domestic product (GDP), inflation rate, and expected rate of depreciation of local currency along with the holding of local currency (Jordanian dinar).

Based on our empirical results, we found:

- There is a negative and significant relationship between GDP and holding of Jordanian dinar, and between expected depreciation in local currency and holding of Jordanian dinar
- There is a positive (but weak) and significant relationship between expected inflation and holding of Jordanian dinar.

To conclude, unofficial dollarization was presence in Jordan during our study period; however it was strongly observed over the period 1988-1997.

The expected depreciation in Jordanian dinar was the most important determinant, which obviously indicated the presence of unofficial dollarization (mainly U.S dollar) in Jordan during our study period 1988-2007.

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