A Comparison in Degree of Dollarization in Iran and Canada Economy

[1]Mohammad Lashkary and [2]Tooraj Sadeghi

[1]Moallem Avenue, Moallem71, Payam Noor University-Mashhad center
P.O. Box 91735-433, Mashhad, Iran
[2]Department of Business Management, Islamic Azad University-Neyshabur Branch,
Pajohesh Avenue, Zip code: 9319613668, Neyshabur, Khorasan Razavi, Iran

Abstract: Currency substitution "particularly Eurs or dollars" is considered as a phenomenon which the people of a country prefer to save them rather than domestic money in their portfolio. It has various reasons. The most important are continuous drop in value of national currency, continuous domestic sever inflation, economic in stability, the negative rates of interest, exit ion of capital because of legal and illegal immigration and increase in smuggle goods activities. This phenomenon is observed in both developed countries as well as developing countries. Currency substitution is both symmetrical and two- ways in developed countries, while it is one- way in developing countries. It has influenced on currency policy and has reduced the effects of currency policy. This paper tries to compare the degree of dollarization in Iran and Canada through estimating demands of domestic and foreign currency. It has been met by residents of both countries. In this research is followed the econometrics method. The result of this research shows that dollarization in Iran is one- way, i.e, foreign money has substituted instead of domestic money but there is not any demand for domestic money aboard, while dollarization in Canada's economy two ways. It means that foreign money has subsisted instead of domestic money. and there is demand for domestic money out of Canada.

Key words: Currency substitution · Dollarization · Demand for domestic money · Demand for foreign money. Iran · Canada · National currency demands

INTRODUCTION

The purpose of this paper is a comparison of currency substitution through estimating demand functions of domestic and foreign currency. Currency substation has important effects for production floating currency rates. If the degree of currency substitution is high the little changes in money supply causes great changes in exchange rate. beside, currency substitution will convey monetary disturbances effects from a country to another. also it ruins ability of floating exchange rate to create the monetary disturbances in dependence. At present paper we test experimental impotence of currency substitution in framework of demand money in Iran and Canada. If currency substitution is important expected change in exchange rate must be a important determinate in domestic money.

At this paper we do such a testing for demand money of Iran and Canada. There are noticeable witnesses that parallel market rate of exchange is a good measure of expected exchange rate. The research tests confirm this results for Iran's data from 1357 that distance of official exchange rate and parallel market exchange rate has increased. Using measure of parallel market rate exchange of we understand that expected change of exchange rate (Dollar of American to Rail of Iran) is a meaningful factor in demand money of Iran [1].

Using currency substitution theory the volume of currency dollars has met for years 1338-1384. In this paper by using volume of estimated dollars and volume of currency Rials we estimate two demand functions of domestic and foreign currency for Iran. Then we compare two demand functions of domestic and foreign currency for Canada with Iran by using Borddo's and chord's data (1999) and we test existence of foreign currency substitution phenomenon instead of domestic money in framework of demand money with portfolio approach in two countries [2].

Corresponding Author: Mohammad Lashkary, Moallem Avenue, Moallem71, Payam Noor University- Mashhad center
P.O. Box 91735-433, Mashhad, Iran, Zip Code: 9189899544. Tel: (+98)511-8683002-5 ;
Fax: (+98)511-8683936. Tel :(+98)9153033352 E-mail: Lashkarym@yahoo.com.

The portfolio approach examines currency substitution phenomenon by traditional demand function of money. with a difference that in demand function of domestic money, variables like the foreign rate of interest, the foreign inflation rate or the prices index of foreign consumers,that enter them in function as opportunity cost of money. using standard of the parallel market rate of exchange we understood the expected change of exchange Rate ($-R) is a meaningful factor in demand money of Iran [1].

This paper has organized as follows. In second section, we review in literature about the currency substitution, in third section is presented the model of foreign and domestic money. Forth section examines demand function of domestic money and fifth section examines the currency money in demand function of the currency substitution in foreign money in Iran and Canada. In sixth section is done the models test. Coefficient interpretation and their comparison will present in seventh section . In eighth section we will have research hypothesis test and in final part presents summary and conclusion of paper [3].

Literature Review : "If situation happens that currency money of country loose property of own liquidity, the large numbers of substitutions poke their nose into money's affairs, like short-run debts, foreign currency, jeweler, kinds of expensive metals and credit flows of bank to create money without bill that is said credit money" Keynes wrote the first time in 1936 [4].

The matter of currency substitution has entered in economic literature about three decades. Of course dollarization phenomenon has a longer precedence. For example in Mexico citizens could have currency deposits, even before the Mexico Bank was built in 1925 [5].

With due attention to the literature of currency substitution has had historic way, in this section is analyzed historic path theory and experimental basic of currency substitution and turning points of currency substitution are identified.

In this paper the currency substitution phenomenon is analysed with the portfolio approach. The portfolio approach examines the currency substitution phenomenon by using traditional demand function of money. With a difference that in demand function of domestic money, variables like the foreign rate of interest, the foreign rate of inflation, prices index of foreign consumers enter as a opportunity cost of storing domestic money in comparison foreign money.

Markowitz (1952:77:91) Divides Process of Portfolio Choice in Two Phases:

- The first phase that begins by observing and experience and it finishes by belief about future operation of available bond.
- The second step begins with believes That relates to future and finishes by selection of portfolio.

Linter (1965:587-615) examines value in share of person's portfolio. In his opinion value in share people's portfolio does not relate by linear relationship to its deviation of return simply. Investors try to make varity own risky assets. In his opinion the aim. Of these variety is not minimization the risk, but the best portfolio is optimum compound of risk and expectation return.

Gruble (1968:1298-1315) examines welfare profits of variation international portfolio that create by traditional commerce profits and increasing of productivity workforce by immigration. His model shows that international movements of capital not only is function of difference in rate of interest but also all assets growth that it is stored in both of countries [6].

Miles (1978:6-428) examines the matter of storing foreign currency and exchange costs of foreign purchase. In his opinion store of foreign currency has decreased the transaction costs of foreign purchase and difference of inflation rate's countries determines the degree of currency substitution.

At First Girton and Roper (1980:135-159) examine theory of traditional money that suppose is used only one unique money in every countries.(country zone) then they declare several kind of money are used in most of frontier locatitie of less developed countries in the world [7].

Girton and Roper (1981:12-29) present one model with two demand function for money, with exogenous supply of money and one barter asset. in their model demand for both domestic and foreign currency is a function of variables of real return rate both money, real return rate of barter asset and scale variable of wealth [8].

Meantime bordo and choudri (1999:48-57) criticize Miles, 1978 essay they know a mistake his specification function and they get different results by using of Miles, data and another methodology. Their Studies show the exchange rate is not important factor in money demand of Canada. So for a important country (Canada) that stores a lot of foreign currency, the substitution currency is not an important factor in demand function of money.

The money demand in Canad is a function of income and shot-long run rates. In their studies in flotation cycle of exchange rate the effect of expected return of foreign currency was insignificant on demand for domestic money [9].

Tanzi and 1. Blejer (1982:90-781) make examination in politics of interest rate and the currency substitution. Completely is supposed that demand for money not only depend on scale variable like wealth and income but also on return rate of monetary reserves ratio to return of other assets. It's expected that rate of return fairly higher in other assets like foreign currency decrease demand for domestic money [10].

Cuddington (1983:111-133) presents a model of the public portfolio's balance in which demand of domestic residents for foreign currency separate from demand of then for foreign barter assets. Investors through four kind of asset choose, the domestic money (Md), foreign money (Mf), domestic bond (Bd), foreign bond (Bf). Codington supposes four kinds of assets are gross substitution. In his opinion. It is expect that demand for domestic and foreign money increase with increasing in domestic income (Py) . If with increasing in transaction variable of income (Py) increase demand for foreign deposits happens currency substitution. If demand for foreign money could have inverse relationship with income change consideration (Py) of portfolio overcome in consideration of transaction.So economy has become dollarization [11].

Thomas (1985:57-337) supposes in money demand, economic factors have both stimulant of domestic and foreign store of money concurrently. Therefore variables like foreign rate of interest, foreign rate of inflation, expected changes of exchange rate affect in demand function of domestic money.

Melvin (1985:79-91) examines the currency substitution's phenomenon by portfolio approach in some of west europan countries. He believes that coefficient meeting of foreign interest rate in demand function of domestic money dose not show as well as it shows foreign currency institution instead of domestic money. Because in this case we can not separate the currency substitution from more expansion concept of capital mobility that includes institution between bond and money [12].

Guidotti and Rodriguez (1992:518-544) examine some of Latin American countries that have high rate of inflation and experience dollarization. Their model examine fundamentally phenomenon of currency substitution with compound of portfolio in condition that is capital mobility.Their fundamental assumption is that transaction demand functions of money have the same particularity of derived demand functions from consideration of portfolio [13].

Rojas suarez (1990:1-27) considers a model in which the money is only shape of wealth and residents of country could have compound of domestic and foreign money in own portfolio. In this model any consumer maximizes own utility function to find optimum compound of domestic and foreign money in attention to limitation of their budget. solving motter of maximization, ratio to store of national money to foreign money in stable state, expected rate's function of decrees in national money's value is gained.

Alami (2001:473-479): a process in which the profit of foreign deposits increases noticeably, he defines as the currency substitution by mention that expanded and moderated models of demand functions of domestic and foreign money separate currency substitution (foreign money as a factor of exchange) and dollarization (foreign money as store of value)

Change in Expected Rate of Exchange and Money Demand in Iran and Canada: In according with standard formula of demand for money is a function of a scale variable that shows income or wealth and a variables collection of opportunity cost's store of money . in this framework if foreign money is instead of domestic money, return rate of foreign money is affective factor in demand of domestic money. supposing that any interest is not paid to balances of foreign money, expected return rate of foreign money is equal with expected rate of increasing in exchange rate (it defines as price of foreign money). Therefore possibility of currency substitution can be tested through that expected change of exchange rate can be a meaningful determinate in domestic demand money [12].

Rate Scale of Exchange Forward in Canada and Rate Scale of Exchange Parallel Market: The market efficiency hypothesis states forward rate is a good scale of expected exchange rate. A simple shape of this hypothesis supposes the people are neutral risk and there is not any transaction cost. It points regarding all of information, forward rates present optimum foresight of future spot rates. This hypothesis is supported by noticeable witnesses for expanded area of countries and cycles and it shows forward rates present unbiased foresight of future spot rates and foresight error of information about spot rates and future is independent. Even though "the simple efficiency hypothesis'' does not cope all tests and data that present witnesses against it. Even if there is not

the simple shape and forward rate measures expected spot rate with a liltle systematic error (probably because of risk factors or transaction cost). If the error is a little, still the forward rate can be used as a good representative [14].

Forward rate was used about Canada but we confirm if some deviation of hypothesis happen, this measure is exposed to error.To encounter with such possibility we use instrumental variable method. In following tests we use relative distance of forward rates and 90-days spot for measuring expected rate of increase in exchange rate. There is not any statistic in forward rate of exchange for Iran.

Because there is not any exchange forward rate in Iran's economy and changes in official rate of exchange is slow therefore, foreign and domestic money demand is more affetate by parallel market rate of exchange as a replacement [15].

Witnesses of Demand Money in Iran and Canada: Using annual data for cycle (1338-1384) we have estimated demand for money in Iran. We estimated demand functions for M1 and M2. At first we examined several scale variable and at last we used real gdp amount. Both of domestic and foreign interest rates are long-run deposits of bank profit that considered as a opportunity cost of money store. Shape of linear logarithm function, is supposed double logarithm ratio to real gdp and semilog ratio to opportunity cost variables [16].

Using quarterly data of last cycle flexible exchange rate (1990/3-1999/3) Canada's money demand is estimated. Demand function is estimated for M1 and M2. we examined some scale variables and at last we decided to use amount. Of real income. Interest rates are presented short-run and long-run variables. We also use interest rate of save deposits as a own rate of interest. The shape of linear logarithm function is supposed double logarithm ratio to income and semilog ratio to opportunity cost variables. Adjustment delay for money demand can specify according to nominal or real stores. Decision about preferred mechanism is in change of data. Finally in regression equations that there is probability in serial autocorrelation of their residual error we used Cocran - orcat adjustment [17].

In table (5) at first we showed the goodness fit of money demand without expectation rate of increase exchange rate $\left(\hat{E}\right)$ for any definition of money. And then we introduced. $\left(\hat{E}\right)$ for effect of currency money's testing in equation. As is clear in table, the goodness fitted function for M1 is according to real adjustment mechanism that only includes short -run rate of interest. On the other hand the goodness fit of function for M2

has been used nominal adjustment mechanism and it includes long-run interest rate. The table also indicates the goodness fit of demand function for balances (M1-M2) that showing personal saved deposits. The shape of demand function for this balances is similar to demand function of M2. in every there cases when $\left(\hat{E}\right)$ is introduced it is meaningless. So there is not any evidence for currency substitution in demand for M1, M2 or (M1-M2).

As we discussed up it is possible $\left(\hat{E}\right)$ is measured with error and therefore its coefficient is with biased. To encounter with origin of this biased we estimate regression again (with entering $\left(\hat{E}\right)$) that has been shown in table (5) using of Durbin's rank variable (rank $\left(\hat{E}\right)$ in ascending grade) as a instrument for $\left(\hat{E}\right)$. In all of cases the coefficient of $\left(\hat{E}\right)$ remains meaningless. For example in explanatory regression of M1,M2, The value of t coefficient were in regular of - 1/25 and - 0/60.

Models: In traditional demand function of money domestic interest rate and inflation rate or price index of domestic consumer as a opportunity cost's variables of money store and income variable or national product as a scale variable are entered in demand function. This paper using Bordo and choudri's Model (Ibid) for testing existence of currency substitution we entered foreign interest rate in addition to variable of domestic interest rate [18]. We would enter domestic interest rate in demand function of foreign money. Then also we used variables of foreign and domestic price index, exchange rate and paused depended variable, in addition to variables of foreign and domestic interest for estimating of foreign and domestic money demand. Bordo and choudri's Model is as follows:

$$\text{Log md} = \beta_0 + \beta_1 \log Y_d + \beta_2 i_g + \beta_2 i_f$$

$$\log m_f = y_0 + y_1 \log y_F + y_2 i_d + y_3 i_f$$

That in which $m_d = M_d \setminus P_d$ is real demand for domestic money (with M1 and M2 definitions), $m_f = EM/P_d$ real demand for foreign money, Pd domestic price level and y domestic real income. Because in condition of exchange Transactions with complete arbitrage, id and if interest is showing storing price (opportunity cost) of md, mf for a cycle. Above equations can interpret simply such as that demand of every one of money depends on scale variable, own price and price of substituted currency. In appendix we showed this kind of demand functions can simply earn from a utility maximization model. If there were not currency substitution between md and mf, γ_2, β_3

coefficients (that shows substitution crossing effect) in (1) and (2) equations is equall with zero.

Bordo and choudri's results is opposed completely Mile's studying (1978:170-183) that reported high degree of currency substitution. In Canada they show Miles' results are built on a model with wrong specification. They show there are unsymmetrical and one-way currency substitution in Canada by using of Miles's data [19].

Currency Substitution in Demand Function of Domestic Money in Iran and Canada: (T) table at first we showed the goodness fit of domestic money demand in Iran without parallel market rate of exchange (PEX). Then we introduced PEX for testing of currency substitution effect in equation. (1) model and other models of (1) table indicate demand function for domestic money by residents of Iran country. In all models domestic money demand in Iran has a direct relationship with M1 or M2 definition by country's residents with, scale variable (real gdp) and with foreign interest rate and it has a inverse relationship with domestic interest rate.

3) $Lnmd (1/552+0/915 Lngdp-0/033id+0/009+0/841D1+0/48D2$

t (-3/44) (15/365) (-5/019) (1/818)(15/828) (6/866)

$\bar{R}^2 = 0/99$ n= 46 $\dot{D}.w = 1/75$ F=1178   (1338-1384)

Because domestic money demand has a inverse relationship with domestic interest rate and it has a direct relationship with foreign interest rate therefore there are currency substitution in demand function of Iran domestic money, i.e, people prefer to exchange domestic money To foreign money with increasing in opportunity cost of domestic money store [20].

The coefficient signal of exchange rate in demand function of domestic money is a experimental matter and we can not exactly indentify its sign before theorically, because exchange rate increasing, causes fairly decreasing in domestic money demand and increasing in foreign money demand, but if exchange rate increase a lot. Its demand decreases alike any other goods [21].

Difference of this increase and decrease determines its coefficient. Only elasticity of domestic money demand ratio to exchange rate is confirmatory of currency substitution. Totally, all of models, confirm hypothesis of currency substitution in demand function of Iran's domestic money.

In table (5) at first we showed the goodness of fit in money demand without expectation rate of exchange change $(\hat{E})$ for any definition of money in Canada. Then we introduced $(\hat{E})$ for test of currency substitution's effect in equation. (2) model and the other models in (5)

table indicate demand function for domestic money by inhabitants of country. In all of models domestic money demand with M1 or M2 definition by inhabitants of country has direct relation ship with scale variable (real gdp) and it has reversed relationship with domestic interest rate.

Lmd=-5.72+0.78Lngnp-11.4ic-1.39iu

t(-1/13)(2/72)(-4/35)(0/59)

$\bar{R}^2 = 0/83$ n=60 D.W=1/7 F=112

Coefficient of America's interest rate is nonsense in demand function of domestic money. So demand for Canada's dollar in Canada ratio to rate of America's interest is inelasticity, because Canada's dollar plays role of money in the other countries like America [22].

Currency Substitution in Demand Function of Foreign Money in Iran Canada: (7) and (8) models of (2) table show logarithm of foreign money demand according to dollar and (9) and (10) models indicate logarithm of nominal demand of foreign money by rial and (11) and (12) models show logarithm of real demand of foreign money according to rial in Iran. Following equation and the other models of (2) table show demand functions for foreign money by residents of country.

Lnmf =-9/199+1/212Lngdp+0/2257id-0/089if+2/807D1+1/211D2

t(-2/827) (2/938) (5/31) (-2/276) (8/005) (2/602)

$\bar{R}2 = 0/97$ n=46   D.W=1/137   F=263   (1338-1384)   (5)

In all of models foreign money demand by inhabitants of Iran has direct relationship with scale variable (real gdp), domestic interest rate and index of domestic price and it has inverted relationship with rate of foreign interest and index of foreign price. Because of these relationship, there is also currency substitution in demand function of foreign money, i.e, with increasing in opportunity cost of domestic moneys store people prefer to exchange domestic money to foreign money [23].

Logarithm of foreign money demand is met by American's dollar for Canada following equation and the other models of demand function for foreign money by Canada's residents indicates that there is demand of foreign money in Canada.

Lnms=-2/83+0/54Lngdp-1/054ic-0/11iu   (6)

(t 0/54) (2/15) (-2/71) (-0/03)

$\bar{R}$ 2=0/82 n=28 D.W=1/84 F=126

Coefficient of America's interest rate is meaningless in foreign money demand foreign money demand by residents of Canada has direct relationship with scale variable (currency gdp) and it has revers relationship with domestic interest rate. Because of these relationships and

unmeaningless of foreign interest rate's coefficient therefore there isn't currency substitution in demand function of Canada's foreign money, even though there is demand for foreign money (America's dollar). In the other word, because demand for America's dollar is not elasticity, so, currency substitution is symmetrical in Canada and Canada's dollar also plays role of money in the other countries consisting America [24].

Models Test: Models test was done although, any of depended and in depended variables are not stationary and their integration grade is different and more than Zero[1]. The terms of disturbance in all of regressions are regration of I zero rank. Granger (I bid) and Angel Granger (I bid) showed if every of two time series in integration of a rank, but, their linear composition is integration from lower rank, so, there is long-run equilibrium relationship between two these series.

For this purpose in this research generalized test of Dickie fuller was used. Results of test show all of variables are in stationary and they have unit root- Regarding that residual of models is integration of zero rank. So all of models variables are co integration and there is long-run equilibrium relationship between them. Therefore all of regressions are true and their coefficients are accordance with theory of traditional money demand and currency substitution. At first integration of variables from 3rank against 2 and then integration from 2 rank against 1 and then integration from 1 rank against zero was tested for testing of unit root.Durbin h-test, that confirms ostentation of autocorrelation in this models, was also conducted for regressions that paused depended variable entered model.

Interpretation of Coefficients: Comparison in logarithm of gross domestic product (lngdp) in foreign and domestic money demand in Iran and Canada.

In demand function of domestic money with M1 and M2 definition, coefficient signal of lngdp is positive in all of models and in both countries, therefore it is according to theoretical bases of traditional money demand. If with increasing in transaction variable of income (PY), demand for foreign money increases, currency substitution has happened. Codington (1983:111-133) mentioned about coefficient signal (lngdp) in demand function of foreign money. If demand for foreign money has inverse relationship with income change (PY), considerations of portfolio overcome transaction considerations, so economic has dollarizie, in demand function of foreign money by dollar (mf), by nominal rial (mfr) and according to real rial (mfr61), coefficient signal lngdp is positive in all of models, so with Codington analysis Iran's economy has

entered the phase of currency substation and it has passed the state of dollarization, because transaction motivations have overcome portfolio motivations. Currency substitution is also two-ways in Canada.

Comparison in Coefficient of Domestic Interest Rate (Id) in Foreign and Domestic Money Demand in Iran and Canada: Coefficient sign of domestic interest rate (id) of both countries is negative in all the models of demand functions of domestic money and it is positive in all the models of demand function of foreign money, that it is according to both traditional money's theories and currency substitutions, but coefficient of domestic interest rate is meaningless in Canada there for domestic interest rate increases in Iran, demand for domestic money decreases and demand for foreign money increases, because if we suppose other factors are fixed, increasing in domestic interest rate in creases store cost of domestic money ratio to store of foreign money. But foreign money demean in Canada is not elasticity ratio to domestic interest rate, then currency substitution is two-sided.

Comparison in Coefficient of Foreign Interest Rate (If) in Domestic and Foreign Money Demand in Iran and Canada: Coefficient signal of foreign interest rate (if) is positive in all models of demand function of Iran's domestic money and it is negative in all models of demand functions of Iran's foreign money that it is according to both traditional money and currency substitution theories, because when foreign interest rate increases, demand for domestic money increases and demand for foreign money decreases in Iran, because increasing of foreign interest rate decreases cost of domestic money store ratio to foreign money store. But coefficient of foreign interest rate is not meaningful in Canada and it doesn't affect on foreign and domestic money demand of Canada.

Comparison in Logarithm Coefficient of Exchange Rate (Ln Pex) in Foreign and Domestic Money Demand in Iran and Canada: Coefficient signal of exchange rate of parallel market is a experimental matter in demand function of foreign and domestic money and its signal can not be identified before, with both of traditional money and currency substitution theories, because when exchange rate start to increase, demand for domestic money decreases and for foreign money increases. But when exchange rate increases very much, demand for exchange equal any another economic goods decreases difference of these increasing and decreasing determines its signal. When domestic money demand has elasticity ratio to exchange rate and coefficient of exchange rate is

meaningful in demand function of domestic money, currency substitution phenomenon has happened. Coefficient of this variable is meaningful and negative in all models of demand functions of domestic money, that shows existence of currency substitution phenomenon. But coefficient of this variable in demand functions of domestic and foreign money is meaningless that shows existence of two-sides currency substitution.

Testing of Research Hypotheses
Hypotheses Have Been Considered in this Paper Consist Of:

- Currency substitution is unsymmetrical (one-way) in Iran.
- Currency substation is symmetrical (two-ways) in Canada.

The result of research show both of hypotheses are confirmed, because, currency substation is one-way in Iran and two-ways in Canada.

CONCLUSION

In this research the effect of foreign money return on demand for domestic money in Iran (1338-1384) was tested and it become obvious this effect is meaningful. So currency substitution is an important factor in demand function of foreign and domestic money by inhabitants, in our country that a lot of foreign money store. Because demand for foreign money has direct relationship with scale variable (gdp), so according to Cardington theory, Iran economy has entered stage of currency substitution and it has passed dollarization's state, because transaction motivations have overcome portfolio motivations.

In this research the effect of expected return of foreign money on demand for domestic money was tested in flexibility cycle of exchange rate (1990 decode) in Canada. It become clear this effect is insignificant. Therefore, currency substitution is not an important factor in demand function of money, at least for an important country (Canada) that store a lot of foreign money. In the some way demand for money is a key factor in making models of exchange flexibility rates, the results indicate the meaningless role of currency substitution in determining exchange floating rates.

These witnesses also don't support this matter that currency substitution limits ability of a country with floating exchange rate to follow independent money

policy so currency substitution is two-ways and symmetrical in Canada and Canada doesn't have the problem of economy dollarization.

Scientific yield of this paper is that domestic money demand in Iran ratio to foreign interest rate is elasticity and in demand function of domestic money, domestic interest rate must be entered in addition to foreign interest rate. Also demand for foreign money by people of Iran is elasticity ratio to domestic interest rate and in demand function of foreign money by Iran residents, domestic interest rate must be entered in addition to foreign interest rate. But foreign and domestic money demand is inelasticity ratio to foreign interest rate in Canada and currency substitution doesn't make any problem for its economy.

Defintion of Data and Sources of Canada Table 5:

M_1 : Money and demand deposits (adjustmented quarterly data, quarterly average of monthly data.

M_1 = M_2 addition to personal deposits and impersonal deposits (adjustmented quarterly data, quarterly average of monthly data) with fixed price.

P = adjustment of price GNP (1991=100 data is quarterly):

Y : GNP with fixed price of 1991 year. (data is quarterly):

Is = rate of 90- days financial provided. (annually rate-quarterly average of monthly data).

It = The rate of 5 years guaranteed investing certifications (annually rate- quarterly average of monthly data).

Io = The rate of non currency save deposits (annually rate, quarterly average of monthly data), 4 (F-S)/S=E, F is the rate of 90 days forward exchange and S is the rate of exchange, Canada Dollar ratio to America Dollar, final spot rates, quarterly average of monthly data.

Mu = The deposits kinds of Canada residents that are saved in America and Canada banks ratio to America dollar. (Data of quarter final).

MC = the deposit kinds and monies ratio to Canada dollar (M2 equal in addition to impersonal time deposits, data of monthly quarter end),

Ic = three- months rate of Canada treasury (annually percent, data of monthly quarter final),

Iu = three- months rate of America's treasury documents (annually percent, has been adjusted according to 365 days in odder to it become comparable with Canada rates, end month's data of quarter final.

E = exchange rate (Canada's dollar ratio to America dollar, data of quarter final),

Y = GNP with fixed price- 1991 (Data is quarterly).

Source = P and y source are Canada's statistics MU has been presented by mark Milez.

Canada bank is source of other data.

Table 1: Currency substitution in demand for domestic money (Rial) annually data 1960-2006.

Variable	Model					
	1	2	3	4	5	6
Dependence	Ln m1	Ln m1	Ln m1	Ln m1	Ln m2	Ln m2
C	-1/552 (-3/344)	-2/436 (-5/885)	-2/445 (-6/099)	-1/415 (-1/520)	-4/833 (-11/321)	-5/817 (-12/234)
Ln gdp	0/915 (15/365)	0/376 (6/605)	0/548 (7/662)	0/769 (6/731)	1/378 (25/250)	1/258 (20/908)
Id	-0/033 (-5/019)	-0/014 (-2/227)	-0/0122 (-1/969)	-0/051 (-3/240)	-0/038 (-6/448)	-0/024 (-2/947)
If	0/009 (1/818)	0/007 (1/484)		0/055 (4/887)	0/020 (3/677)	0/016 (2/932)
Ln cpii						-0/110 (-2/970)
Ln cpiu		0/828(3/944)	0/587(2/891)			0/667 (3/447)
Ln pex		-0/067(-2/712)	-0/103(-4/748)	0/227(5/989)		
Lag Dependence Variable		0/476(4/889)	0/402(4/094)			
D1	0/841(15/828)		0/361(4/949)		0/579(11/854)	0/381(4/346)
D2	0/480(6/866)			0/791(6/375)	0/324(5/075)	0/169(2/312)
D3		0/220(4/505)		0/286(2/074)		
$\bar{R}^2$	0/99	0/99	0/99	0/97	0/99	0/99
D-W	1/74	2/04	1/576	1/156	1/873	1/542
D-W h		-0/1795	1/747			

Note:

1. Numbers in parenthesis show measures of t

2. Depended variables show read demand logarithm of domestic money according to real m1 and m2

3. Other variables are introduced in Table 3.

Table 2: Currency Substitution in Demand for Foreign Money (Dollar) Annually data 1960-2006

Variable	Model					
	7	8	9	10	11	12
Dependence	Ln mf	Ln mf	Ln mfr	Ln mfr	Ln mfr61	Ln mfr61
C	-8/176(-15/729)	-11/111(-8/199)	-9/549(-3/065)	-9/199(-2/939)	-9/015(-2/757)	-7/641(-0/313)
Ln gdp	0/236(3/071)	0/944(5/478)	1/293(3/261)	1/212(2/939)	1/211(2/923)	0/554(6/436)
Id	0/024(2/012)	0/057(3/176)	0/208(5/011)	0/225(5/310)	0/227(5/318)	0/0458(3/057)
If	-0/017(-2/393)	-0/095(-4/548)	-0/143(-2/967)	-0/089(-2/276)	-0/089(-2/267)	-0/022(-2/445)
Ln cpii	1/54(15/04)					0/450(3/380)
Ln cpiu						-1/850(-8/374)
Ln pex	-1/271(-15/437)					-0/333(-2/039)
Lag Dependence Variable	0/827(11/892)					
D1		0/680(4/678)	2/807(8/005)	2/858(8/545)	2/813(7/976)	
D2	0/537(5/720)	1/509(7/767)	1/212(2/602)	1/244(2/785)	1/219(2/606)	0/433(3/251)
D3	0/342(4/857)					0/435(4/819)
$\bar{R}^2$	0/99	0/98	0/97	0/98	0/97	0/99
D-W	1/975	1/481	1/164	1/164	1/138	1/312
D-W h	0/8787					

Note:

1. Figures in parenthesis show measures of t.

2. depended variables show demand logarithm of foreign money according to dollar (mf), Rial (mfr) and real Rial (mfr1983)

3. Variables introduce in table 3.

Table. 3: Sources of Iran's data or method of their accounting

Symbol	Variable	Source of Information or Accounting Method
β	Coefficients vector	
γ	Coefficients vector	
cpii	Index of goods rate and consumption services in urban regions of Iran	Collected from different reports of Central Bank Republic Islamic of Iran
cpiu	Index of goods rate and consumption services in urban regions of America	IfS software of IMF (International Monetary Found)
D_1	Dummy variable of change shock	From 1978 then on it is 1 and in rest years it is equal zero
D_2	Dummy variable of petroleum shock	From 1973 then on it is equal with 1 and in rest years is zero
D_3	Dummy variable of structural defeat	In 1979 and 1980 it is equal with 1 and in rest years it is zero
gdp	Gross domestic product in fixed price of 1983 year.	Statistical collection of time series in economical and social statistics till 1987 planning and budget organization 1988
i_d	Domestic interest rate (profit of long-run deposits)	Collected from different reports of Central Bank Republic Islamic of Iran
i_f	Foreign interest rate (profits of long-run deposits case study of America)	fS software of IMF
Ln	Neprin logarithm	
M_1	Domestic money volume according to milliard rial	Collected from different reports of Central Bank Republic Islamic of Iran
M_2	Volume of domestic liquidity according to billion rial	Collected from different reports of Central Bank Republic Islamic of Iran
M_f	Volume of foreign currency money according to milliard dollar	Research pattern of comparison in dollariztion of Iran, Canada and Argentina (Mohammad lashkary 2006)
M_{fr}	Volume of currency dollars according to rial	Product of volume of currency dollars in exchange rate in parallel market.
M_{fr1983}	Volume of real currency dollars according to rial	Product of volume of currency dollars in exchange rate in parallel market that has adjustmented by domestic rates index.
N	Sample number	
Pex	America dollar rate in parallel market	Collected from different reports of Central Bank Republic Islamic of Iran

Table. 4: The Results of Unit Root Test

Test result

1(1)against 1(0)	1(2)against 1(1)	1(3)against 1(2)	Variable	Symbol
1(2)	1(3)		Logarithm of real money volume (1983=100)	Ln m1
1(2)			Logarithm of rea liquidity volume (1983=100)	Ln m2
1(2)	1(3)		Volume of currency dollars logarithm	Ln mf
1(2)	1(3)		Volume of currency dollars' logarithm according to domestic money	Ln mfr
1(2)	1(3)		Volume of real currency dollars' logarithm according to domestic money (1983=100)	Ln mfr 1983
1(2)	1(3)		Price index logarithm of domestic consumer (1983=100)	Ln cpii
1(2)	1(3)		Price index logarithm of foreign consumer. (America's case study) (1986=100)	Ln cpiu
1(2)	1(3)		Logarithm of real gross domestic product (1986=100)	Ln gdp
1(2)	1(3)		Exchange rate logarithm in parallel market	Ln pex
1(2)	1(3)		Bank profit rate of domestic long-run deposits	id
1(2)	1(3)		Profit rate of foreign long-run deposits of bank (America case)	if

Note:

M=restricted definition of money: M2=spread definition of money

P= price level y= real in come ; is = short -run interest rate:

il= long-run interest rate ; iO=own rate ; E = expectational rate of change in exchange rate;

All of rate are annually. Refer to appendix for more explanations.

*Shows meaningfulness in 5% level

**Show meaningfulness in 10% level. Coefficients of depended variables. (figures in parenthesis indicate t quantities)

Table. 5: Currency substitution in demand money of Canada   1990/4-1999/4

	Cycle	ConstantTerm	iu- ic	ic	Log y	R2	D- W	RhO	SEE
1	1980/4-1995/4	2/56 (18/34)*	4/98 (2/40)*			0/78	1/47	0/88	0/1323
		-5/72 (-1/13)	-1/39 (0/59)	-11/40 (-4/35)	0/78 (1/74)	0/83	1/70	0/85	0/1164
2	1980/4-1982/2								
	Addition to1990/3-1995/4	2/75 (21/15)*	6/67 (2/45)*			0/76	1/45	0/78	0/1476
		-2/83 (-0/54)	-0/11 (-0/03)	-10/52 (-2/71)*	0/54 (2/15)	0/82	1/84	0/78	0/1240

Note:

Log (Mc/EMu) is a depended variable. All of estimatings established cokran overcat method. Figures in parenthesis show t measures.

Refer to appendix for defining the words and sources.

*Shows meaningfulness in 5% level.

**Show meaningfulness in 10% level.

Table. 6: The second test of miles estimating about elasticity of currency substitution

Case	1	2	3	4	5	6
Dependence Variable						
Log(Xt/Pt)	X=M1	X=M1	X=M2	X=M2	X=M2-M1	X=M2-M1
Kind of Regression	OLSQ	OLSQ	CORC	CORC	CORC	CORC
Constant Term	-1/19(-1/92)**	-1/49(-2/27)*	-1/39(-1/72)**	-1/58(-1/87)**	-2/33(-7/79)**	-2/38(-2/73)**
Log y	0/08(1/86)**	0/11(2/21)*	0/11(1/75)**	0/13(1/89)**	0/19(2/77)	0/19(2/70)*
i_s	-0/65(-4/20)*	-0/67(-4/36)*				
i_l			-0/91(-2/71)*	-0/76(2/05)*	-1/01(-2/24)*	-0/96(1/93)**
i_o			0/72(4/07)*	0/65(3/27)*	1/11(4/56)*	1/08(4/04)*
Ê		-0/21(-1/26)		-0/08(-0/89)		-0/03(-0/23)
Log(Xt-1/Pt-1)	0/87(12/84)*	0/85(12/30)				
Log)Xt-1/Pt)			0/88(16/34)	0/87(15/47)	0/86(20/98)	0/85(20/20)
R2	0/926	0/930	0/997	0/997	0/998	0/998
SEE	0/0149	0/0148	0/0064	0/0064	0/0084	0/0085
D-W	2/32	2/39	1/71	1/70	1/79	1/79
	-1/07	-1/31				
Rho			0/224	0/235	0/282	0/295

REFRENCES

1. Agenor, Pierre-Richard and Mosin S. Khan, 1996. "Foreign Currency Deposits and the Demand for Money in Developing Countries", J. Development Economics, 50: 101-118.

2. Alami, Tarik, H., 2001. "Currency Substitution versus Dollarization a Portfolio Balance Model", J. Policy Modeling, 23: 473-479.

3. Arango, Sebastian and M. Ishaq Nadiri, 1981. "Demand for Money in Open Economies", J. Monetary Economics. 7: 69-83.

4. Bahmani-Oskooee, Mohsen and Margaret Malixi, 1991. " Exchange Rate Sensitivity of Demand for Money in Developing Countries", Applied Economics, 23: 1377-1384.

5. Berg andrew. and Eduardo Borensztein, 2000. "The Choice of Exchange Rate Regime and Monetary Target in Highly Dollarized Economies", IMF; Wp/00/29, pp: 1-29.

6. Blejer, Mario, I., 1978. "Black-Market Exchange Expectations and the Domestic Demand for Money; Some Empirical Results", J. Money Economics, 4: 767-773.

7. Bordo, Michael.D. and Ehsan Choudri, 2000. "Currency Substitu- tion and the Demand for Money: Some Evidence for Canada", J. Money Credit and Banking, 14: 48-57.

8. Brillembourg, Arturo and Susan M.Schadler, 1980. "A Model of Currency Substitution in Exchange Determination, 1973-78", IMF Staff Papers, 26: 513-42.

9.   Calvo, Guillermo, A. and Carlos, A. Vegh, 1992. "Currency Substitution in Developing Countries: An Introduction", IMF, WP/ 92/ 40,

10. Calvo, Guillermo A.,1985. "Currency Substitution and Real Exchange Rate: The Utility Maximization Approach", Journal of International Money and Finance, 4: 175-88.

11. Canto,Victor, A. and Marc. A. Miles, 1984. "Exchange Rates in a Global Monetary Model with Currency Substitution and Rational Expectations", In Bhandari, Jagdeep and Bluford H. Putnam With Jay H. Levin; Economic Interdependence and Flexible Exchange Rates, M.I.T Press; Second Printing,

12. Cohen, Benjamin J., " Dollarization : Pros and Cons ", Paper Prepared for the Workshop, Los Angeles, CA, pp: 1-13.

13. Dean James, W., De Facto Dollarization, Prepared for a Conference, To Dollarize: Exchange -Rate Choices for the Westwrn Hemisphere, Sponsored by the North-South Institute, Ottawa, Canada and Ocober 4-5, 2000.

14. Dornbusch, Rudiger, 1975. "A Portfolio Balance Model of the Open Economy", J. Economics, 1: 3-20.

15. Farzin-Vash, Asadollah and Lashkary, Mohammad, ((currency substitution and demand for money: Evidence from Iran)), Commercial, Research Bulletion, 1382(29): 1-51.

16. Feldman, Robert A., 1985. "Foreign Currency Options", Finance and Develop., 3: 38-41.

17. Fisher, Stanley, 1982. "Seigniorage and the Case for a National Money", J. Political Economy, 90(2): 295-313.

18. Frenkel, Jacob, A. and Carlos A. Rodriguez, 1980. "Portfolio Equilibrium and the Balance of Payment: A Monetary Approach", The American Economic Review, 65(4): 675-688.

19. Lashkary, Mohammad, An analysis of the currency substitution phenomenon and effective factors in Iran, Economic, Research Bulletion, 1383, 9 and 10 Number, pp: 89-110.

20. Lashkary, mohammad, "An analysis of currency substitution phenomenon and effective factore on that (Iran case), Doctgoral dissertation of economic sciences, tarbiat Modarres University, pp: 1382.

21. Lashkary, Mohammad, Currency Substitution, Payame- Noor University Publications, pp: 1385.

22. Lashkary, Mohammad, Research project with this title: ((Dollarixation of Iran economy in comparison with Argentina dollarization, after hyperinflation and.

23. Lashkary, Mohammad and Arab- Mazar, Abbas, ((The rank of Iran's currency substitution degree, between 27 world countries)), Nameh mofid 1383(45N): 25-44.

24. Lashkary, Mohammad and Farzin- vash, Asadalloh, estimating of currency dollars volume and measurement of currency substitution degree in Iran, economic research's J. Tehran University, Nu. Special. pp: 1382.