

# Association Activities of Exchange Rate, Interest Rate and Currency Mismatch's Structure Mutation and Conduction<sup>1</sup>

## ACTIVITÉS DE L'ASSOCIATION DES TAUX DE CHANGE, DE TAUX D'INTÉRÊT ET DE MUTATION. LA STRUCTURE D'ASYMÉTRIE DE DEVISES ET DE CONDUCTION

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**Abstract:** The leading role of exchange rate's structure mutation is itself endogenous structural, the interest rate's structure mutation is the result of the accelerating process of interest rate marketization, and there is no significant correlation between the time dynamic mutation of the currency mismatch and exchange rate's structure mutation, exchange rate's structure mutation is the exchange rate has an indirect effect through the interest rate, interest rate's mutation is ahead of currency mismatch's mutation. After eliminating the structure mutation factors, currency mismatch's response of exchange rate's impact is no regularity at all, short-term response is more intense, and then gradually decreased, the impact of currency mismatch from the exchange rate's fluctuations continue a long time, currency mismatch's response of exchange rate's impact is stronger than the interest rate. The exchange rate and the interest rate are almost consistent ability to the currency mismatch's explanation, interest rate's explanatory degree stronger than exchange rate in short-term, in the long term the exchange rate's explanatory ability has actually strengthened, means interest rate's predictive ability about currency mismatch is transient, but exchange rate is long-term.

**Key words:** Currency mismatch; Structure mutation; Identification; Retreating trend treatment VAR model

**Résumé** Le rôle prépondérant de la mutation la structure des taux de change est lui-même endogène structurelles, la mutation la structure du taux d'intérêt est le résultat de l'accélération du processus de marchandisation de taux d'intérêt, et il n'y a pas de corrélation significative entre la mutation du temps dynamique de l'asymétrie de devises et de taux de change de mutation structure de la mutation structure de taux de change, est le taux de change a un effet indirect par le taux d'intérêt, la mutation de taux d'intérêt est en avance d'une mutation non-concordance monnaie. Après l'élimination des facteurs de mutation structure, la réponse d'asymétrie de devises de l'impact du taux de change est pas de régularité à tous, réponse à court terme est plus intense, puis a diminué progressivement, l'impact de l'asymétrie de devises contre les fluctuations du taux de change continuent longtemps, d'asymétrie de devises de réponse de l'impact du taux de change est plus forte que le taux de change d'intérêt rate. The et le taux d'intérêt sont la capacité presque constante à l'explication de l'asymétrie de devises, diplôme explicative des taux d'intérêt est plus fort que le taux de change à court terme, à long terme du taux de change explicatives la capacité a effectivement renforcé signifie la capacité prédictive des taux d'intérêt à propos d'asymétrie de devises est transitoire, mais le taux de change est à long terme.

**Mots clés:** L'asymétrie de devises; La mutation de structure; D'identification; Se retirant du traitement tendances modè de VAR

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## INTRODUCTION

For many years, due to changing degree of the economy marketization, the economic system and the policy transformation, in the formation mechanism of exchange rate and interest rate structure mutation is very easy to appear, simultaneously exchange rate and interest rate's structure mutation tend to impact accumulation and change direction of the currency mismatch, thus making it possible to make a structural mutation of currency mismatch. Therefore, when analyzes their mutual impact influence, it is necessary to consider the influence of the structure mutation factors. For example, when carries on the test of stationary and the cointegration analysis of the variable serial, if the serial has the structure mutation structure mutation the traditional testing and analysis may get the biased conclusions' often present a "pseudo-cointegration" problem. Look at the present domestic and foreign research situation, there are more research about interest rate's structure mutation (XIANG, PAN, 2010; XIAO, WANG, 2009; CHEN, ZHENG, 2009), but there is less research about problems of currency mismatch's structure mutation. Therefore, this article attempts to explore after currency mismatch influenced by exchange rate and interest rate's structure mutation, the mutation condition of currency mismatch and the differences of their transfer effects and so on.

### 1. IDENTIFICATION OF STRUCTURE MUTATION POINT

Generally there are exogenous structure mutation point and endogenous structure mutation point two ways to test structure mutation, test of exogenous structure mutation point must pre-known the structure mutation point, with a strong subjective. Therefore, people often use test methods about the endogenous unknown structure mutation point. Banerjee (1992), who gives the several test methods about endogenous structure mutation point, first one is recursive test, second one is trundle test, third one is sequential test, and fourth one is retreating trending method. They pointed out that we should use usual ADF statistic or use ADF statistic calculated of all the sub-sample of recursive, trundle and sequential methods, use the minimum of them to determine the mutation point, the following use the sequential and retreating trending method, the characteristic of this kind test method is to ensure high test power, and select the test model shows with the ARMA structure and a single mutation point at the same time, like model (1).

$$\Delta y_t = \rho y_{t-1} + \alpha_0 + \beta_0 t + \alpha_1 D_t + \beta_1 D_t t + \sum_{i=1}^p \gamma_i \Delta y_{t-i} + u_t \dots\dots (1)$$

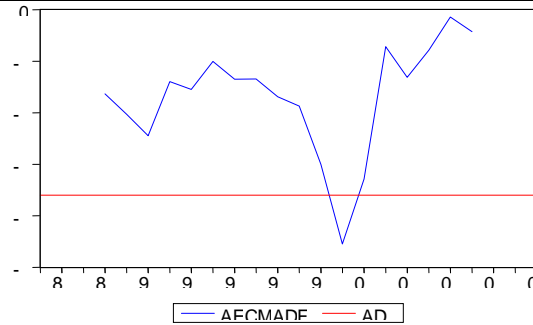
And  $Y_t$  is tested time series,  $t$  is time variable,  $D_t$  is dummy variable, the known mutation point is  $t_b$ . When  $t \leq t_b$ ,  $D_t = 0$ , When  $t > t_b$ ,  $D_t = 1$ . In the tests, usually take the range of mutation point as  $k = [0.15N, 0.85N]$  (CHU, LI, MA, ZHOU, 2005), and the  $K$  is rounded number,  $N$  is the sample size, that is, from the 15th% time series points to 85th% time series points test all time series points one by one, this transform possible endogenous structure mutation point as the known point. Obtains the ADF statistics, compare with corresponding critical value, to determine the existence of mutation point, also to determine the mutation point belongs to the trending stabilization of structure mutation or the structure mutation unit root process.

If in the model (1),  $\alpha_1 = 0$ , the production process of the data is the trending mutation, if  $\beta_1 = 0$ , the production process of the data is intercept mutation, if  $\alpha_1 \neq 0$  and  $\beta_1 \neq 0$ , the production process of the data both with trending mutation and intercept mutation, such models could be expanded to more than two mutation points.

a. Endogenous test of currency mismatch's structure mutation point. Data range is from 1985 to 2008 comments. Calculate and program by Eviews, and then compare the trending mutation and average value mutation changes in the sequential test, at last select the trending mutation in the sequential test, the model is:

$$\Delta AECM_t = -0.06104AECM_{t-1} + 3.6649 - 0.219267 t + 0.14897D_t t - 0.128299\Delta AECM_{t-1} \dots\dots (2)$$

Obtains the following examination value graph. Figure 1.



**Figure 1: Endogenous Test of Currency Mismatch's Structure Mutation Point**

AECMADF is the ADF statistic of the AECM possible structure mutation point,  $ADF(-3.6)$  is critical value of DF statistic of 5%. therefore, AECM structure mutation point is in 1999. mutation region of the trending stable is from 1998 to 2000 at 5% error, and the mutation belongs to the process of structure mutation trending stabilization.

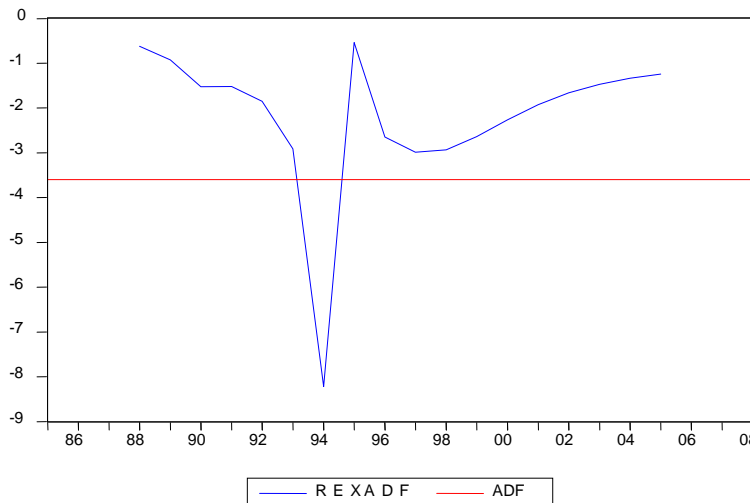
The test results show that: currency mismatch's structure mutation appears in the Asian financial crisis period (from 1997 to 2000). The financial crisis in Asia has attacked the RMB exchange rate, in the situation of maintaining RMB not to devalue, leading to high accumulation of currency mismatch, and then obviously decreased the following years. Forms a structure mutation point, but the strong impact of this major event does not change the long-term fundamental stable operation trends of the potential data production process of the currency mismatch.

b. Endogenous test of exchange rate's structure mutation point.

The final test model of exchange rate's structure mutation point is chosen as:

$$\Delta REX_t = -0.209114 REX_{t-1} + 1.216477 + 0.040977t - 0.274713D_t + 5.15115D_t \dots (3)$$

Examination value of exchange rate's structure mutation point are in the Figure 2.



**Figure 2: Test of Exchange Rate's Structure Mutation Point**

From the test results, shows that the exchange rate's structure mutation point is in 1994, this mutation point belongs to the process of structure mutation trending stabilization, which is consistent with conclusions of Liu Chuanzhe and Wang Chunping's study (2007), while the difference is that mutation point is the unit root process or the trending stationary process, because this article selects the nominal exchange rate of RMB, while Liu Chuanzhe and Wang Chunping select real effective exchange rate, shows that the real effective exchange rate has the characteristic of unit root.

Why a structure mutation point appears in 1994? China's exchange rate policy experienced the two obvious big turning points from 1985 to 2008, exchange rate system transferred from two-track exchange rate system into a single managed floating exchange rate system after January 1994, and further evolved to a single floating exchange rate system pegged to the US dollar, transferred to a with the basis of market supply, referencing a basket of currencies to demand, a managed floating exchange rate system after July 2005. In initial period of 1985, China maintained stability of RMB exchange rate caused RMB overvalued, then because the impacts of decentralization of foreign trade, promotion of self-financing mechanisms and trade deficit and other factors, overvalued RMB embarked on the devaluation road, the yuan against the U.S. dollar is from 2.94:1 in 1985 to 8.7:1 in 1994. In the two large exchange rate mutations, the mutation in 1994 is particularly prominent. In January 1, 1994, the official exchange rate of RMB merged with foreign exchange swap market rates, the exchange rate reduced from 5.80 yuan / US dollar to 8.70 yuan / US dollar suddenly, one-time reduction

achieved to 50%, achieve the highest depreciation in 1994. After merged exchange rate based on the basis of market supply and a single floating exchange rate system pegged to the US dollar, coupled with monetary policy changing and long-term potential of China's economic growth, gradually changed the long-term depreciation trend, began a steady appreciation road from 1995. Shows that

policy mutation has caused the exchange rate endogenous structure mutation. However, during Asian financial crisis in 1997-1998, China has firmly maintained the policy which RMB did not devalue, making no RMB exchange rate structure mutation during the Asian financial crisis period, in fact through the test also confirmed this point. On the other hand, the two exchange rate mutations in 1994 and 2005, only the former one become the exchange rate structure mutation point, the latter has not become the structure mutation point, mainly due to exchange rate system is a extension of a single floating exchange rate system pegged to the US dollar, despite the using of the reference of a basket of currencies, in fact the dollar peg policy is unchanged. Therefore, structure mutation is real reflecting the exchange rate endogenous mutation condition.

c. Endogenous test of interest rate's structure mutation point.

The final test model of interest rate's structure mutation point is chosen as:

$$\Delta I_t = -0.219016I_{t-1} + 2.796499 - 0.15572t + 0.075812D_t \dots \dots (4)$$

Examination value of interest rate's structure mutation point are in the Figure 3

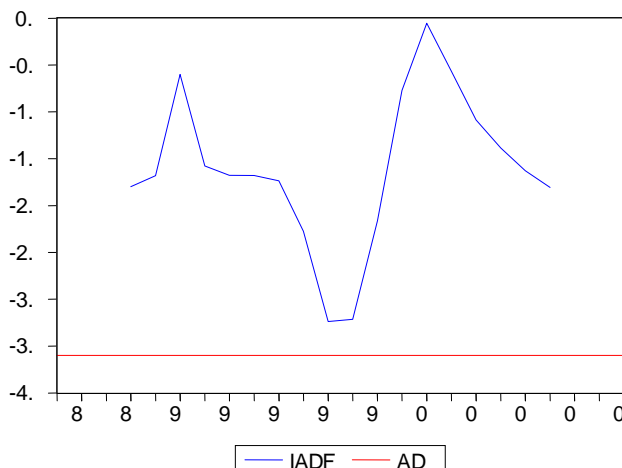


Figure 3: Test of Interest Rate's Structure Mutation Point

The interest rate's structure mutation point is in 1996, this mutation point belongs to a unit root process of structure mutation. Mutation region is from 1996 to 1997. Why did the interest rate develop to a structure mutation in 1996?

Traced, the People's Bank of China has been steadily advancing the interest rate reform, since the People's Bank of China introduced a series of interest rate policy in 1996, interest rate marketization has been noticeably accelerated. For example, all of the inter bank offered business need to operate through a unified national inter bank offered network from January 1996, China market benchmark interest rate called Chibor has the preliminary formation. The inter-bank interest rate officially open in June 1996.

Although Asian financial crisis began in 1997 make a greater impact on China's exchange rate, due to the implementation of the policy not to devalue the RMB, it did not result the exchange rate structure mutation. And the interest rate structure mutation happens one year ahead of financial risk, shows that interest rate is one of the leading indicators of financial risk.

## 2. CORRELATION OF ACEM WITH EXAMINATION VALUE OF REX STRUCTURE MUTATION AND I STRUCTURE MUTATION

In order to investigate correlation of the dynamic mutation process of every variable series structure mutation, following further calculate cross correlation of examination value of aecm, Rex, and i structure mutation (which respectively record as aecmadf, rexadf and iadf), in table 1.

Whatever consider about the pilot or the lag of the exchange rate, there is no obvious correlation of the time dynamic relationship between currency mismatch and exchange rate's structure mutation. Exchange rate's structure mutation in 1994 did not immediately lead to a currency mismatch's structure mutation. What has a truly effect is the interest rate's

structure mutation impact currency mismatch's structure mutation, both have some correlation and be more direct, and the interest rate structure mutation happens two years ahead of currency mismatch's structure mutation, the ahead correlation value gets the maximum value in 2 years at 0.6768, on the one hand, generally, when RMB interest rate decline, if the RMB interest rate is lower than other countries, it will attract a large number of domestic capital outflow,

foreign capital inflows decrease, looking at the macro level, will reduce the foreign exchange reserve property, while the foreign currency liabilities change is uncertain; On the other hand, when RMB interest rate arise, if the interest rate level is higher than other countries, will cause in reduction of domestic capital outflow, foreign capital inflows increases, by now will cause the foreign exchange reserve property increase. In either case will cause the fluctuations in net foreign currency assets or liabilities, thus the level of currency mismatch will change.

**Table 1: Correlation of Acem with Examination Value Of Rex Structure Mutation And I Structure Mutation**

aecmadf, rexadf(-i)	aecmadf, rexadf(+i)	i	lag	lead	aecmadf, iadf(-i)	aecmadf, iadf(+i)	i	lag	lead
*	*	0	0.1145	0.1145			0	0.0002	0.0002
*		1	0.1080	-0.0275	*****	****	1	0.5890	-0.3663
**		2	0.1561	-0.0110	*****	****	2	0.6768	-0.3988
*	*	3	0.0975	-0.1187	*****	****	3	0.6323	-0.3571
*		4	0.1394	0.0347	***	**	4	0.3360	-0.2606
*****	**	5	0.4814	-0.1649		*	5	-0.0283	-0.1018
*****	**	6	0.3554	-0.1635	***	*	6	-0.2515	0.0826
***		7	-0.2609	-0.0188	***	**	7	-0.2737	0.1694
**		8	-0.2171	0.0355	***	**	8	-0.3537	0.1610
***		9	-0.2674	0.0471	*****	*	9	-0.4524	0.0994
*****		10	-0.4447	0.0462	**		10	-0.1557	-0.0257
*****		11	-0.4512	0.0315	**	*	11	0.1877	-0.0605

### 3. THE ANALYSIS OF VAR MODEL AFTER STRUCTURE MUTATION RETREATING TREND TREATMENT

In order to investigate the long-term impact conduction effects and interaction relationship among currency mismatch, exchange rate and interest rate, it is necessary to eliminate structure mutation factors of every variable, and then analysis with VAR model. Because there is only one structure mutation point  $t_b$ , the mutation trend model set as( $t$  is time,  $D_t$  is

$$\text{dummy variable, } D_t = \begin{cases} 0 & \text{when } t < t_b \\ 1 & \text{when } t \geq t_b \end{cases} \text{ when } t < t_b \text{ when } t > t_b: y_t = \alpha_0 + \beta_0 t + \alpha_1 D_t + \beta_1 D_t t + \sum_{i=1}^p \gamma_i y_{t-i} + u_t \dots (5)$$

After comparing the various models we get :

The first one, the currency mismatch's structure mutation point is in 1999, after testing by model relationship model, get its trend model(6).

$$\hat{aecm}_t = 0.83638t - 0.518672D_{1999} * t + 0.53518aecm_{t-1} \dots (6)$$

T Statistic (5.4796) (-5.5652) (5.426)

$R^2=0.918$ , adj.  $R^2=0.91$ , S.E=1.66, D.W=2.8, AIC=3.96. n=23.

The second one, the exchange rate's structure mutation point is in 1994, After screening and testing models screening get its trend model(7).

$$\hat{rex}_t = 2.51877 + 0.36251t + 6.74172D_{1994} - 0.42791D_{1994} * t \dots (7)$$

T Statistic (12.51) (10.13) (19.07) (-10.85)

$R^2=0.983$ , adj.  $R^2=0.98$ , S.E=0.28, D.W=0.85, F=394.9, AIC=0.42. n=24.

The third one, the interest rate's structure mutation point is in 1996,so its trend model is(8).

$$\hat{I}_t = 0.185282t - 3.418358D_{1996} + 0.891122I_{t-1} \dots (8)$$

T Statistic (3.55) (-3.86) (19.188)

$R^2=0.91$ , adj.  $R^2=0.90$ , S.E=1.08, D.W=1.82, AIC=3.11. n=23.

Series of currency mismatch, exchange rate and interest rate after retreating trend treatment are these:

$$yaecm_t = \frac{aecm_t}{aecmf_t}, yrex_t = \frac{rex_t}{ref_t}, yi_t = \frac{i_t}{if_t}.$$

In the models aecmf, rexf and if are fitted values from model(6),(7)and(8).

The characteristics of series eliminate structure mutation trend, knows from the table 2, although aecm, rex and I is non-stationary, unit root is exist, but in fact, aecm, rex are the false non-stationary series, because of the unit root comes from structure mutation, eliminate structure mutation the trend will be stationary, while i is the real unit root, is not caused by structure mutation. Moreover sees, after eliminating structure mutation series yaecm, yrex, yi are first-order single whole I (1). Further from Table3 which is the test of Johansen cointegration there is co-integration among the three series.

**Table 2: Results of Unit Root Test**

Variable	Test results from original series			Series after eliminating structure mutation trend			
	Test model (I,T,L)	ADF value	TLV 5%	Variable	Test model (I,T,L)	ADF value	TLV 5%
Aecm (non-stationary, with unit root)	(1,0,1)	-1.98	-3.005	Yaecm (stationary)	(1,0,0)	-3.70	-3.005
Rex (non-stationary, with unit root)	(1,T,1)	-0.305	-3.62	Yrex (stationary)	(1,0,1)	-4.38	-3.005
I (non-stationary, with unit root)	(1,T,1)	-2.5	-3.62	Yi (non-stationary, with unit root)	(1,0,1)	-2.71	-3.012
				$\Delta Yi$ (stationary)	(0,0,1)	-4.56	-1.95

Note: I,T mean whether the series have constant (1 means yes)and trend(0 means no),L is lagging strand.

**Table 3: Johansen Test of Johansen Cointegration**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.791780	54.22777	42.91525	0.0026
At most 1	0.545479	22.84453	25.87211	0.1138
At most 2	0.297925	7.074309	12.51798	0.3368

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

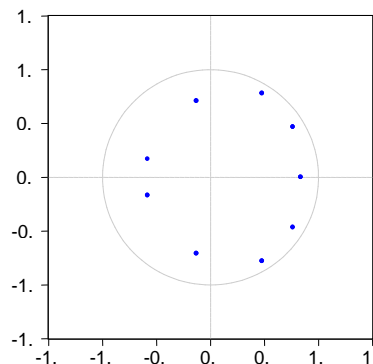
\*\*MacKinnon-Haug-Michelis (1999) p-values

Note: \*means at 95% significance level refuse original surmise.

Establishment and Analysis of VAR model

After five tests of LR, PRE, AIC, SC and HQ methods, VAR model lag identified as 3, while all the roots of VAR model characteristic polynomial are less than 1 (Figure 4), indicating that the VAR model lag identified as 3 is reasonable.

Inverse Roots of AR Characteristic Polynomial



**Figure 4: Graph of VAR Model Stability Test**

After structure mutation retreating trend treatment VAR model is the following one,

$$yaecmt=0.24003yaecmt-1 +0.236195yeamt-2-0.447733yaecmt-3+2.1366yrex-1-3.777018yrex-2$$

$$T \text{ Statistic } (1.51) \quad (1.38) \quad (-2.67) \quad (2.49) \quad (-3.85)$$

$$+0.822252yrex-3+0.557423yit-1-1.273928yit-2+0.790333yit-3+1.714056 \quad \dots\dots(9)$$

$$(1.11) \quad (2.93) \quad (-5.77) \quad (4.77) \quad (1.49)$$

$$R^2=0.82, \quad F=5.03, \quad S.E=0.073.$$

$$yrex=-0.08815yaecmt-1 +0.017749yeamt-2+0.051061yaecmt-3+1.243192yrex-1-0.83071yrex-2$$

$$T \text{ Statistic } (-1.09) \quad (0.206) \quad (0.7) \quad (2.9) \quad (-1.69)$$

$$-0.231529yrex-3+0.146522yit-1-0.189011yit-2+0.050859yit-3+0.830158 \quad \dots\dots(10)$$

$$(-0.71) \quad (1.55) \quad (-1.71) \quad (0.62) \quad (1.45)$$

$$R^2=0.64, \quad F=2.0, \quad S.E=0.036.$$

$$yit=-0.110229yaecmt-1 +0.287648yeamt-2 +0.031715yaecmt-3-1.626328yrex-1+1.62165yrex-2$$

$$T \text{ Statistic } (-0.34) \quad (0.83) \quad (0.1) \quad (-1.1) \quad (0.82)$$

$$+1.611086yrex-3+0.415737yit-1-0.355574yit-2-0.025728yit-3-1.562513 \quad \dots\dots(11)$$

$$(1.2) \quad (1.08) \quad (0.8) \quad (-0.2) \quad (-0.67)$$

$$R^2=0.72, \quad F=2.8, \quad S.E=0.146.$$

Function response generalized pulse Function response Generalized pulse is used to describe the impact on other variables' current and future value from a standard deviation impact of random disturbance term of the equation, which the dynamic response and the interaction among the endogenous variables can be seen more intuitively. This function first proposed by Koop (1996), and formatted after further improved by Pesaran and Shin (1998), the impulse response result form this function is the only one, eliminate the problem that order of endogenous variables may affect impulse response results. Improve the stability and reliability of estimates. Function response Generalized pulse is defined as:

$$GIX(n, \delta_j, \Omega_{t-1}) = E(X_{t+n} | \epsilon_j t = \delta_j, \Omega_{t-1}) - E(X_{t+n} | \Omega_{t-1})$$

And  $\delta_j$  represents the impact from the  $j$  variable,  $n$  is the impact response time,

$\Omega_{t-1}$  represents all the available collection information when this impact occurs we may obtain, obeys 0 average values, covariance matrix is the random variables of  $N$ -dimensional multivariate normal distribution of  $\Sigma$ . Makes  $\delta_j$  to be equal to a standard deviation impact, the conditional expectation value of the impact is,

$$E(\epsilon_t | \epsilon_j t = \delta_j) = (\sigma_{1j}, \sigma_{2j}, \dots, \sigma_{mj})' \sigma^{-1} \delta_j = \Sigma \epsilon_j \sigma^{-1} \delta_j$$

Is the unit vector of element  $j$  when element  $j$  is 1 while other elements are 0. Thus the GIRF expression of the unit impact from the variable  $k$  is  $\psi_j(n) = \Sigma \epsilon_j \sigma^{-1} \delta_j$ .

Impulse response of the impact After eliminate the structure mutation factors,

graph of generalized pulse impact when currency mismatch impact a standard deviation of itself, exchange rate and interest rate shown in Figure 5.

Looking at the impact effect, no matter the responses of the exchange rate, interest rate or the currency mismatch itself impact a unit standard deviation of currency mismatch is not more irregular than the responses with the structure mutation factors (FAN, ZUO, 2010), but the reactions of the former four are more intense. Look at the impact on exchange rate, the first two issues are positive, which means that the impact of exchange rate depreciation causes the a sudden increase of the accumulation of currency mismatch, but becomes to negative in the third period, when the exchange rate depreciation change the direction of the accumulation of currency mismatch to opposite, the negative effect achieves to the maximum in the fourth issue, transferred to positive in the eighth issue, this kind of positive and negative alternating is the results of the elimination of trend mutation, response of currency mismatch lasting eight issues approximately, starts to tend to zero after the 11th issue. After eliminating

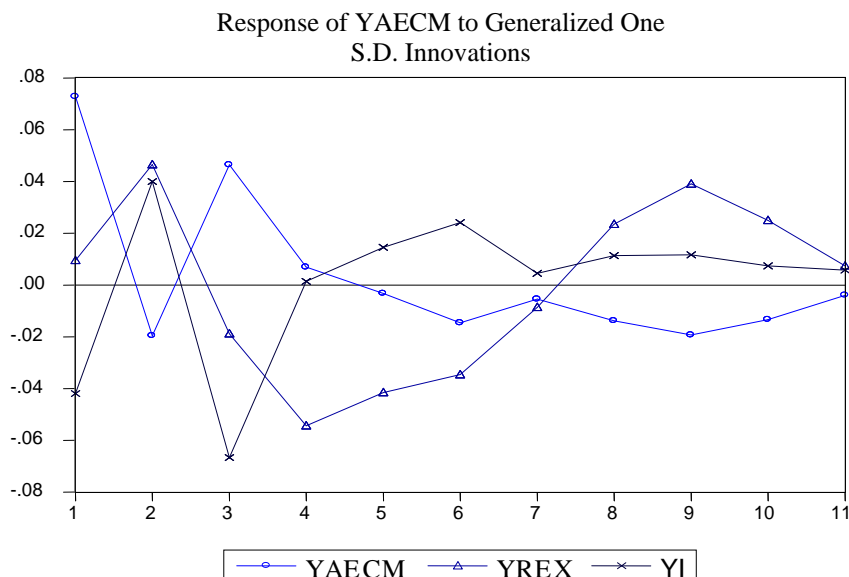
structure mutation results the impact from exchange rate is weaken, but conducts a longer time, be delayed is not obvious. The impact of exchange rate depreciation and appreciation has not caused the accumulation of currency mismatch continuing increasing, but causes the level of the accumulation of currency mismatch become up and down to zero balance. This is because the RMB has not yet achieved internationalization, is unable to free flow in the international market, thus Renminbi can not be exercised the creditor's rights outward, China can only adopt the foreign currency to value net foreign assets, making the exchange rate system impacting currency mismatch a lot, the impact of exchange rate

including the structure mutation impact the currency mismatch must inevitably immensely, but once stabilized the exchange rate system, for example, exchange rate system of pegged to the US dollar from the beginning of 1994, caused our country's exchange rate system basically stable, it is difficult to make China's economic subject realize the foreign exchange risk, so its impact on the currency mismatch can be sustained.

After currency mismatch impacting by a positive standard deviation from interest rate, changes are uncertain in the first four phases, from the fourth to eleventh are positive response, then a positive response that close to zero. This shows that, first, under the current situation of China's net foreign currency assets, the result of short-term interest rate adjustment is uncertain. That is, if raising interest rates, although it will reduce the present value of economic entities' currency liabilities, it will simultaneously also strengthen expectations of currency appreciation, thus reducing the present value of economic entities' foreign currency assets, the two effects will balance, the effects results of interest rate policy is difficult to determine.

If reduce the local currency interest rate, it will increase the present value of the foreign currency assets valued by local currency, but increase the value of local currency debt, so the results are difficult to determine. Second, in the long-term, there is some

China's interest rate and currency mismatch change in the some same direction, the higher interest rate will expand the currency mismatch, and the lower interest rate will reduce the accumulation and conduction of currency mismatch. In addition, looking at the whole impact process of the reaction, exchange rate is much stronger than the interest rate, thus the impact of interest rate after eliminating the structure mutation factors is weaken, after eliminating the structure mutation factors the direct effect of balance exposure from interest rate fluctuation has a obvious deactivation, the impact of the interest rate on the currency mismatch has a big relation with the structure mutation mainly. This is different from the response of interest rate is stronger than the response of exchange rate before eliminating the structure mutation factors (FAN, ZUO, 2010).



**Figure 5: Responses of Generalized Pulse Impact of Currency Mismatch from Itself, Exchange Rate and Interest Rate**

Decomposition and explanatory ability of variance From the view of the analysis of variance , the 8.46%, 30.33% and 41.21% accumulation of China's currency mismatch are respectively caused by exchange rate, interest rate and the endogenous fluctuations of currency mismatch itself, and the ratios were 24.56 % , 30.17% and 45.27% before doing the structure mutation treatment (LIU, WANG, 2007), indicating that the structure mutation factors of currency mismatch, exchange rate and interest rate have enlarged currency mismatch' own explanatory ability virtually, reducing the share of exchange rate's explanation on currency mismatch, but the explanatory ability of interest rate on currency mismatch has no big change around structure mutation, suggesting that, First, the impact of interest rate on currency mismatch is stable and long-term, the impact of structure mutation is only temporary. Through the changes from the interest rate policy impact the changes in balance sheet to impact he accumulation of currency mismatch, but the transmission of the impact of the interest rate policy on currency mismatch is affected by a lot of factors, the association does not have the cyclical mobility, therefore, trying to through the structural adjustment of the interest rate policies to solve the problem of currency mismatch, there are lots of difficulties, the impact of interest rate policy on currency mismatch is uncertain in the short term, in the long term, interest rate policy and currency mismatch have a certain positive correlation, the impact of the interest rate policy on currency mismatch is relatively stable.



Second, why does the explanatory ability of exchange rate on currency mismatch enhance after eliminating the structure mutation factors? This is because the impact of exchange rate on currency mismatch is long-term and stable, the elimination of the structure mutation factors shows the long-term fluctuations of exchange rate dominate the currency mismatch fluctuation tendency more. Explanatory ability of interest rate and exchange rate on currency mismatch are basically same. Explanatory ability of exchange rate is slightly weaker than interest rates, but the two almost equal. The explanatory ability of interest rate on currency mismatch is stronger than exchange rate in the first several issues, but the explanatory ability of exchange rate has actually strengthened in the later period, showing that the prediction ability of interest rate on currency mismatch is short-term, but the prediction ability of exchange rate is long-term. In addition, the currency mismatch's own inertia plays a dominant role in its fluctuations.

**Table 4: Variance Decomposition After Retreating Trend Treatment of Currency Mismatch'S Structure Mutation**

Variance Decomposition of YAECM				
Period	S.E.	yaecm	yrex	yi
1	0.072799	100.0000	0.000000	0.000000
2	0.108819	48.00765	20.63379	31.35856
3	0.137353	41.57293	16.29243	42.13464
4	0.149533	35.28819	27.69010	37.02171
5	0.155238	32.78831	32.84613	34.36555
6	0.159498	31.90532	35.39977	32.69491
7	0.159804	31.90082	35.51573	32.58345
8	0.163206	31.30905	36.49043	32.20052
9	0.170741	29.88616	39.35833	30.75551
10	0.173759	29.45196	40.39898	30.14906
Average		41.21	28.46	30.33

Holesky Ordering: yaecm,yrex,yi

## CONCLUSION

(1) The exchange rate's own endogenous mutation is the leading role of its structure mutation, the interest rate's structure mutation is the result of the process of interest rate marketization speeds up, but there is no obvious correlation between currency mismatch and the temporal dynamics of exchange rate's structure mutation, exchange rate play an indirect role through the interest rate in currency mismatch's structure mutation, interest rate's structure mutation is ahead of currency mismatch's structure mutation about 2 years. Meanwhile, there are many factors impact currency mismatch, the transmission mechanism of the impact of each factors on currency mismatch is complex, a factor's mutation has some impact on the mutation of accumulation of currency mismatch, but it is difficult to change the trend of the long-term fundamental stable operation of the accumulation of currency mismatch. If you want to adjust the accumulation of currency mismatch, it must be the result of superposition of multiple policies.

(2) After eliminating the structure mutation factors, currency mismatch and exchange rate present a trend steady characteristic, while interest rate is unit root characteristic.

(3) After eliminating the structure mutation factors, there is no regularity in the impact of exchange rate on currency mismatch, but the short-term response is more strongly. The impact of exchange rate's fluctuations did not make the accumulation of currency mismatch continue increasing, but causes the accumulation of currency mismatch fluctuate in the direction of the zero balance. The present situation is clear, first, exchange rate system is an important factor which cause currency mismatch, the fixed exchange rate system is easy to make economy subject to relax vigilant to the currency risk, then move to a more flexible managed floating exchange rate system can effectively reduce currency risk exposure, which is a policy options tendency can be considered. Second, in the same time, the currency mismatch is not only a domestic economy problem, but also a international financial issues importantly, it is natural need a more international policy options, such as make the RMB into the international wholesale monetary system as soon as possible, increase the role of SDR (Special Drawing right) in the international financial system, thus weakening dependent of international financial assets liabilities on US dollar, speed up the tests work of RMB settlement of cross-border trade and settlement of overseas RMB direct investment, make the RMB regionalizing and even the internationalization and so on, mitigate the problem of China's currency mismatch by going out strategies.

(4) The strong reaction of currency mismatch impacted by interest rate is in the top four issues, the subsequent reaction is basically a positive direction, while the reaction of currency mismatch impacted by exchange rate is much stronger than the interest rate. As the conduction of interest rate policy impact currency mismatch is impacted by many factors, especially the impact of interest rate policy on currency mismatch is uncertain in the short term, therefore, it is difficult to attempts to carry out structural adjustment on interest rate policy to address the currency mismatch problem. But in the

long term, there is some positive correlation between interest rate policy and currency mismatch, influence of interest rate policy on currency mismatch is relatively stable.

(5) The explanatory ability of exchange rate on currency mismatch is weaker than interest rate, but the two almost equal. The explanatory ability of interest rate on currency mismatch is stronger than exchange rate in the short term, but to the long term the explanatory ability of exchange rate is stronger, showing that the prediction ability of interest rate on currency mismatch is short-term, but the prediction ability of exchange rate is long-term.

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**Notes:** A. Formula of AECEM(Aggregate Effective Currency Mismatch) index of currency mismatch:

$$AECEM = \frac{NFCA}{MGS} \cdot \frac{FC}{TD}, \quad \text{When } NFCA > 0$$

$$AECEM = \frac{NFCA}{EXP} \cdot \frac{FC}{TD}, \quad \text{When } NFCA < 0$$

NFCA means net foreign currency positions, FC means the total of China's foreign debt, TD means the level of China's total debt, EXP and MGS mean exports and imports of goods or services respectively. Data come from the statistics (IFS) of the International Monetary Fund (IMF), over years China Financial Yearbook, the People's Bank of China, over years China Statistical Yearbook, the State administration of Foreign Exchange, Statistics website of China Bureau, the Federal Reserve Web site.

B. Exchange rate is nominal RMB exchange rate, using indicators of direct quotation. Data come from over years China Statistical Yearbook.

C. Interest rate is one-year RMB deposit interest rate. Data come from over years China Financial Yearbook, every year, when interest rate is adjusted calculate interest rate with weighted the adjustment month.

D. Short-term debt balance comes from over years China Statistical Yearbook, do foreign debts statistics with the new standard in 2001 and subsequent, the registration of the debt balance increased trade within 3 months than it in 2000 and before. Short-term external debt is short-term debt funding within one year.