The Relationship between Openness and Inflation in Asian 4 and G 7

Chung-Shu Wu[*] and Jin-Lung Lin[**]

June 2006

[*] Research Fellow, The Institute of Economics, Academia Sinica; Joint-appointment Professor, Department of Economics, National Cheng chi University; Adjunct Professor, Department of Economics, National Taiwan University.

[**] Research Fellow, The Institute of Economics, Academia Sinica; Joint-appointment Professor, Department of Economics National Cheng chi University.

I Introduction

Investigating a sample of 114 countries, Romer (1993) found a significant negative relationship between openness and inflation. For a cross-section data set which covers so many countries, it is hard for a researcher to understand the economic situation of every country in the sample set. If it includes some countries which have a special economic structure, the empirical results might be significantly distorted. In this paper, we investigate the relatively familiar economies such as Asian 4 and G 7 to verify the robustness of Romer's findings. Our empirical results show that openness and inflation do not have a regular relationship as stated by Romer (1993).

Romer (1993) interpreted his findings by using the time consistency theory of inflation which states that the more open economies, the higher risk they will have by adopting a loosing monetary policy, therefore, the monetary authorities in these countries tend to take a more conservative policy than those of less open economies. Since this argument has import implications not only on the validity of time consistency policy, but also on economic cooperation and integration, many researchers have followed his step to continue discussing the relationship between openness and inflation. Among them, Lane (1997) built a small open economy model which has a monopolistic distortion and nominal price rigidity in the

non-traded sector to illustrate that the gains at a surprising monetary expansion are lower in a more open economy. In his empirical results, Lane (1997) also found a significant inverse relationship between openness and inflation. However, by dividing the Romer's sample into four groups of countries according to the indebtedness level, Terra (1998) found a significant negative relationship between openness and inflation only in the severely indebted countries. Moreover, using a variety of measures of the trade-off between output and inflation (the slope of Phillips curve), Temple (2002) could not find a stable correlation between the trade-off and openness, which cast doubts about the argument raised by Romer (1993).

Though the existed literatures do not have a consensus view about the relationship between openness and inflation, most of them derived their results based on a period averaged cross-section data. It is clear that a country's openness or inflation may vary dramatically during a certain period. To represent a country's characteristics by period averaged indexes may not reflect the actual phenomenon. Moreover, traditionally, researchers use share of imports in GDP or GNP as a proxy for openness. It is quite possible that for some countries have a very high imports share because of geographical or other reasons, and have a low inflation due to other factors (it may or may not be explained by the time consistency theory). If we include these data into a sample which do not have regular relationship between

openness and inflation, it is very likely for us to find a spurious "significant relationship" result. However, it is not because the theory is right but because we have not taken into account the problem of extreme value. To compare the empirical results between Romer (1993) and Temple (2002), it can be noticed that the difference may results from excluding some countries with special property in Temple (2002).[1] In this paper, we use a panel data set which includes Asian 4 (Hong Kong, Korea, Singapore and Taiwan) and G 7 (Canada, France, Germany, Italy, Japan, U.K. and U.S.) to reinvestigate the relationship between openness and inflation. Since the number of countries we discussing is only eleven, it is relatively easy for us to go through the patterns of openness and inflation of each country. Therefore, we can check the robustness of our empirical results to the extreme value problem. In addition, using the panel data, we can verify the time consistency theory by examining the corollary of the theory that the effect of a monetary expansion on output is smaller in a more open economy.

The rest of the paper is organized as follows. Section Ⅱ describes the historical patterns of openness and inflation of Asian 4 and G 7. Section Ⅲ investigates the relationship between openness and inflation using annual panel data. Section Ⅳ presents the empirical results of a time series approach to the relationship

[1] Country with high openness and low inflation such as Singapore and Lesotho are not included in the sample set of Temple (2002).

for each individual country. Section Ⅴ is the conclusions.

Ⅱ Historical Patterns of Openness and Inflation of Asian 4 and G 7

The historical patterns of imports(imports/GDP) shares and annual growth rate of GDP deflator of eleven countries are plotted in Figure 1 and Figure 2. From Figure 1 it can be noticed that for some countries such as Canada, Hong Kong, Italy, Korea, Taiwan, and United States have a significant upward trend for imports shares. However, for some countries like Japan, Singapore, and United Kingdom the imports shares do not show an obvious trend.[2] Nevertheless, to our knowledge, Japan and Singapore have been steadily opening their capital market and restructuring their tariff system. The imports shares seems can not appropriately reflect the actual "openness" condition for those countries. Moreover, It can be seen from Table 1 that compared to G 7 countries, Asian 4 have a relative high imports shares. Especially for Hong Kong and Singapore, their period averaged imports shares are as high as 89.6% and 152.2% respectively. Since Hong Kong is an international harbor and Singapore is a city country, it is not strange for them to have such high imports shares.

If we compare the openness and inflation in the relative high openness Asian 4 countries, it is easily noticed that Singapore who has the highest openness but enjoys the lowest inflation is the standard model that fulfills the argument of time

[2] Different definitions of openness such as exports/GDP share or (exports + imports)/GDP share have a similar pattern. In addition, the empirical results of this paper are robust to the openness definition.

consistency theory. However, there exist some cases which are not satisfied the theory. Hong Kong has a much higher openness than Taiwan, its inflation is higher than Taiwan though. If we examine the relationship among G 7 countries, we can find the same phenomena. For some comparisons, they accord with Romer's findings, such as Germany vs. Italy, and Canada vs. France. In contrast, for some comparisons, they are obvious not fit the theory, e.g. United Kingdom vs. United States, and France vs. Japan. If we compare the two different regions' countries, it is easy to find some Asian countries like Hong Kong and Korea whose openness are higher than most G 7 countries, also have higher inflation, which contradicts the time consistency theory.

There exists many reasons to account for the contradiction. For example, it can be seen from Table 1 that Taiwan has a lower inflation than Hong Kong and Korea. One of the factors that can be attributed to the low inflation is that in the late 1940 Taiwan experienced a hyperinflation period, and whole country suffered a lot from that.[3] Since then Taiwan government pay much attention to inflation when executing monetary or fiscal policy. As to Singapore from Figure 2 we can see that in the mid 1980s Singapore economy experienced a 3 to 4 years economic recession which caused a serious deflation. Therefore, if we use the period averaged inflation rate to

[3] In early 1920s Germany also experienced a hyperinflation episode.

represent the inflation condition, a country who have been experienced deflation naturally would have a lower inflation. However, deflation is not a desire of Singapore central bank.

From the above discussion, it can be noticed that the extent of one country's openness is determined by geographic condition, traditional culture, economic development policy, etc. The difference of inflations among countries also is determined by many factors may or may not related to time consistence theory. If we investigate the relationship between openness and inflation without taking into account those factors, we might get an inappropriate result. Especially, using a period averaged data which includes a period existed an abnormal event, we may have a wrong description about country's monetary policy, which may seriously distort the interpretation of empirical results.

III Empirical analysis of panel data

From figure 1 it can be seen that for some countries their openness (imports/GDP shares) have been steadily increasing. If there exists an inverse relationship between openness and inflation, the empirical result will be enhanced by using panel data. In this section we collect the panel data of eleven countries to verify the relationship.[4]

[4] The data of Asian 4 and G 7 have different properties. Quarterly data from Asian 4 is seasonal unadjusted, whereas, data from G 7 is seasonal adjusted. In order to avoid the seasonality problem, we use the annual data to engage in panel estimating.

In order to compare, we adopt the empirical model suggested by Romer (1993) which is of the from:

$$\pi_{it} = a_0 + a_1 OPEN_{i,t} + a_2 y_{i,t} + \varepsilon_{i,t}, \quad i = 1,2,\Lambda,11 \quad t = 1,2,\Lambda,n$$

where π_{it} is country i's inflation at period t; $OPEN_{i,t}$ is country i's openness at period t which is measured by imports/GDP share; $y_{i,t}$ is country i's real per capita Gross Domestic Product at period t.

Table 2 shows the empirical results of panel data regression of eleven countries. Since we argue that each country has its own characteristic about inflation, we include different constant terms for different countries. It can be noticed that constant terms for Germany, Hong Kong, Singapore and Taiwan are smaller than other countries. Column 1 is the model proposed by Romer (1993). It can be seen that there exists a positive in stead of negative sign in front of openness, though the per capita real output and real growth rate have the right signs.[5] In addition, this result is robust to different inflation definitions and estimating periods.[6] If we compare our empirical model with Romer (1993), the only difference is that we take into account different constant terms. In order to check whether it is appropriate to restrict those constant terms to be the same, we do a wald test for the restriction. The result shows, for all

[5] Romer (1993) choose real per capita income to serve general measure of development. However, this variable has different order from other variables such as inflation or imports share. Therefore, we use the change of real GDP as an alternative.

[6] Though Hsu & Wu (1993) pointed out that the dynamic structure of wholesale price index is different from consumer price index. In this paper we have estimated the case of wholesale price index, and got similar results.

cases, a significant rejection of the null hypothesis that those constants are the same. However, for verifying that imposing the constant constraint will have different empirical results of the coefficients on openness, we re-estimate our model and show the empirical results in Table 3. It is surprising to find from the table that if we constrain the constant terms to be the same, the sign on openness is consistent with Romer's argument, i.e. openness and inflation has an inverse relationship.

By dividing the sample into developing and developed countries, Romer (1993) found that the inverse relation between openness and inflation is significant in developing countries, but not in developed countries. In Table 4 and Table 5 we restrict the constant and estimate two different groups which are Asian 4 and G 7. From tables we can see that openness has an significant negative relationship with inflation in Asian 4, but have mixed results in G 7. For the period year 1973to 1990 which is the same sample period as Romer (1993) the sign on imports/GDP share is positive rather than negative in the case of developed countries, and this result is consistent with Romer (1993). However, when we extend our sample period to 2001, for some cases, the sign on imports share of developed countries become significant negative. This result might cause by the relative high openness country, Germany, has experienced a sharp declining of inflation rate due to the weakening economy.[7]

[7] In 2003, Germany, Hong Kong, Japan and Taiwan was selected by IMF as countries have serious deflation problem.

To check the robustness of empirical results to constant restriction, we re-estimate the models and show results in Table 6 and Table 7. It can be seen from tables that the signs on imports share are not any more significant negative. On the contrary, for some case, they have significant positive sign. As to the G 7 countries, the empirical results of without restriction on constants are similar to the case with restriction.

It can be noticed from Table 1 that Singapore is the country with the highest period averaged openness and the lowest period averaged inflation among Asian 4. If we regard it as an outlier and take it out of the sample, in Table 8 and Table 9, it can be shown that even with constant constraint, in most cases the openness has a positive in stead of negative relationship with inflation.[8]

From the above discussion, it is quite clear that the empirical results of the relationship between openness and inflation is sensitive to the mode selection and sample set. Under the more flexible models without constant constraint, or eliminating the country with special characteristics, the Romer's argument is not supported.

IV Time Series Approach

It can be seen from Figure 1 that for some countries such as Hong Kong, Korea,

[8] In Romer (1993) footnote 8 pointed out that "re-estimating the regression with Singapore and Lesotho exclude, however, lowers the t-statistic on openness only modestly." Nevertheless, our empirical results show a different aspect.

Taiwan, Canada, France, Italy and United States have an upward trend of imports share. Theoretically, they are good examples for verifying the relationship between openness and inflation by using the time series.[9]

From Table 10 to 20 we show the empirical results of time series regression of the inflation model for each individual country. It can be seen that only few cases show a significant negative sign on imports share. The cases that have a significant positive sign on imports share are outnumber those have a negative sign. Even in countries who have an upward trend of imports share do not have more outcomes of negative sign on imports shore's coefficient.

Thought the empirical cross-section model proposed by Romer (1993) may not an appropriate empirical model for time series approach, it provides an alternative to verify the relationship between inflation and openness. There exists a lot of room for improving the time series empirical model, and we believe that different models may have different results. However, under our current framework, we can not find a strong support for the time consistency theory.

V Money supply and Real Output

Romer (1993) based on a partial rigidity price model to derive a reverse

[9] We include seasonal dummies into the model whose data is seasonal unadjusted, and only dummies significantly different from zeroes are reported in tables.

relationship between openness and inflation. From that model we also can derive a corollary that the effect of a monetary expansion on output is smaller in a more open economy. Since we have quarterly time series, it is convenient for us to verify this hypothesis. In this section, we adopt VAR model to do the impose response analysis which can show the impacts of money supply on real output.[10, 11]

It is well-known that the impose response analysis is significantly affected by variable ordering. Pesaran and Shin (1988) proposed a procedure which can solve the ordering problem. In this section, we follow the approach of Pesaran and Shin (1988), and Lin (2003) to do the impose response analysis. Since variables in our VAR model are stationary (first difference of logarithm money supply and logarithm real GDP), it is appropriate for us to ignore the cointegration problem raised by Phillips (1998).

In figure 3 we show the impulse response of money growth on real GDP growth according to the order of degree of openness. From the Figure, it is hard to find a regularity between openness and the impacts of money supply. Singapore has the highest openness, and its money supply also has the most significant impacts on real output among the Asian 4. Germany has a similar situation as Singapore, who has

[10] Alternatively, we may use transfer function analysis to discuss the dynamic structure between money supply and output. However, in that analysis we have to assume there exists no feedback effect between variables, which is inappropriate to our model. See Liu (1987), Liu and Hudak (1985).
[11] The VAR impulse response analysis is widely used by researchers to investigate the relationship between monetary policy and economy, e.g. Juselius (1998), Oxley (2000), Wu and Hu (2000), Morsink and Bayoumi (2001), Fung (2002).

the highest openness among G 7. However, She also has a relative significant impacts of money supply. Interestingly, France, Japan, and United States who have a relative low openness among eleven countries, have a relative insignificant impacts of money supply.

VI Conclusion

Romer (1993; 1998) argued that the more open economies, the higher cost for them to adopt a stimulative policy, hence they will choose a more conservative policy than those closed economies. Therefore, there exists a reverse relationship between openness and inflation. Since one country's openness is determined by geographic condition, historical experience, economic development policy, etc., and inflation can be attributed to factors may or may not related to time consistency theory. If we investigate the relationship between openness and inflation without taking into those factors, we may have an inappropriate interpretation about the empirical results. In this paper, we re-examine the relationship by discussing more familiar economies i.e. Asian 4 and G 7, which can provide us more information about empirical findings.

Our empirical results show that for a panel data set of eleven countries, models with or without constant constraint which reflects the special characteristic of each country have different correlations between openness and inflation. In addition,

leaving out some countries with special structure, the empirical results also change significantly. When we take the time series approach to analyze the relationship of each individual country, for most cases the negative relationship between openness and inflation can not be supported even in those countries who have an obvious upward trend of imports share. Moreover, we employ a VAR model to check the corollary of Romer (1993) that the impacts of money on real output is smaller in a more open economy. From the results of impulse response function, we can not find a regular relationship between openness and the impacts of money supply.

Each country has her own characteristics including geographic, cultural and historical background, and through time, many factors drive the changing patterns of openness and inflation of the country. It is hard for a period averaged data to reveal those information, and show a stable regularity between openness and inflation. Though, our empirical results are not accorded with the findings of Romer (1993; 1998), it does not mitigate the importance of the time consistency theory. The main purpose of this paper is to point out that perhaps researchers should pay more attention to the reasons why openness and inflation have different correlations among countries in stead of trying to find a uniform relationship.

Table 1. Related Indexes of Openness and Inflation of Eleven Countries

Unit: %

	DPGDP	DCPI	RIM	REX
Hong Kong	6.9917	7.2346	89.6044	98.3448
Korea	15.3112	10.8758	24.6221	18.7075
Singapore	3.1605	3.1902	152.2349	119.8601
Taiwan	6.6071	5.8404	31.4050	32.1387
Canada	4.8495	4.5137	21.4962	22.0869
France	6.5207	6.2828	16.7178	16.7232
Germany	3.8793	2.7597	25.5415	27.0160
Italy	9.5481	6.9579	17.2957	16.2913
Japan	4.9407	5.3463	10.5405	11.5072
Untied Kingdom	6.5759	6.3590	23.6716	23.0988
United states	3.8239	4.0219	7.1594	6.7772

Notes: DPGDP is the period averaged annual growth rate of Gross Domestic Product deflator; DCPI is the period averaged annual growth rate of Consumer Price Indexes; RIM is the period averaged imports/GDP share; REX is the period averaged exports/GDP share.

Table 2. Panel Regression of Asian 4 and G 7（without constant restriction）

model / variable	Period Ⅰ (1973~1999)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C_CA	0.3396	0.0417	0.4187	0.0335	0.5062	0.0463	0.4640	0.0408
C_FRA	0.3531	0.0551	0.4310	0.0443	0.5118	0.0535	0.4697	0.0469
C_GER	0.2910	0.0037	0.3619	-0.0143	0.4789	0.0291	0.4327	0.0168
C_HK	0.2401	-0.0343	0.2340	-0.1515	0.5262	0.0614	0.4420	-0.0088
C_ITA	0.4071	0.1031	0.4783	0.0851	0.5533	0.0905	0.5047	0.0782
C_JAP	0.3629	0.0416	0.4622	0.0553	0.5368	0.0257	0.5023	0.0364
C_SING	0.0598	-0.1963	0.0311	-0.3455	0.4767	0.0198	0.3771	-0.0628
C_SKOR	0.3518	0.1017	0.3865	0.0788	0.5167	0.0953	0.4535	0.0792
C_TW	0.2534	0.0204	0.3055	0.0162	0.4494	0.0398	0.4062	0.0397
C_UK	0.3618	0.0638	0.4363	0.0457	0.5267	0.0699	0.4823	0.0594
C_US	0.3927	0.0496	0.5012	0.0627	0.5662	0.0388	0.5315	0.0505
RIM	0.1490*** (3.3039)	0.1486*** (3.2903)	0.2140*** (3.9259)	0.2566*** (4.8419)	-0.0176 (-0.6389)	-0.0034 (-0.1160)	0.0251 (0.7289)	0.0659* (1.8329
ARGDP	-0.0308** (-2.4766)		-0.0401*** (-2.9819)		-0.0452*** (-6.4075)		-0.0420*** (-5.7953)	
DGDP		-0.2788** (-2.3299)		-0.7822*** (-5.9143)		0.1211 (1.2570)		-0.2549** (-2.4823)
$\overline{R}^2$	0.3460	0.3435	0.2746	0.3673	0.2780	0.1845	0.2104	0.1377

Notes: t-statistics are in parenthesis; C_X represents the constant term in X country; RIM is the imports/GDP share; ARGDP is the real per capita GDP; DGDP is the annual growth rate of real GDP; *, **, ***, denote significance at 10%, 5%, and 1% significant level, respectively.

Table 3. Panel Regression of Asian 4 and G 7（with constant restriction）

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.2203*** (4.3779)	0.0833*** (12.3994)	0.1855*** (3.5740)	0.0940*** (13.7390)	0.2762*** (7.5527)	0.0552*** (11.1795)	0.2219*** (6.1276)	0.0634*** (12.9850)
RIM	-0.0262*** (-2.6280)	-0.0121 (-1.2231)	-0.0308*** (-2.9647)	-0.0081 (-0.8094)	-0.0274*** (-3.9213)	-0.0176** (-2.4050)	-0.0252*** (-3.6324)	-0.0095 (-1.3290)
ARGDP	-0.0136*** (-2.7717)		-0.0103** (-2.0253)		-0.0209*** (-5.9271)		-0.0158*** (-4.5027)	
DGDP		-0.0510 (-0.4217)		-0.4134*** (-3.2050)		0.1973** (2.1347)		-0.1275 (-1.3463)
$\overline{R}^2$	0.0400	0.0026	0.0381	0.0664	0.1036	0.0173	0.0685	0.0172

Table 4. Panel Regression of Asian 4（with constant restriction）

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.0355 (0.2727)	0.1269*** (5.5966)	0.1590 (0.9937)	0.1598*** (6.2205)	0.2963*** (3.1815)	0.0779*** (5.1038)	0.2895*** (3.1384)	0.0918*** (5.8445)
RIM	-0.0457*** (-2.8620)	-0.0425*** (-2.8800)	-0.0342* (-1.9297)	-0.0392** (-2.5344)	-0.0243** (-1.9911)	-0.0360*** (-3.2562)	-0.0152 (-1.2682)	-0.0278** (-2.5187)
ARGDP	0.0092 (0.6137)		-0.0070 (0.7100		-0.0233** (-2.2157)		-0.0242** (-2.3140)	
DGDP		-0.1484 (-0.6791)		-0.7681*** (-2.9308)		0.1893 (1.2624)		-0.2079 (-1.2889)
$\overline{R}^2$	0.0868	0.0880	0.0516	0.1696	0.1127	0.0863	0.0867	0.0526
D.W.	0.7793	0.7719	1.1982	1.1918	0.6484	0.6745	0.9986	0.9011

Table 5. Panel Regression of G 7（with constant restriction）

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-0.0451 (-0.3017)	0.0661*** (4.4180)	-0.0811 (-0.5467)	0.0784*** (5.3740)	0.4833*** (5.5222)	0.0469*** (4.5045)	0.4339*** (4.9683)	0.0598*** (5.9076)
RIM	0.2036* (1.7471)	0.1082* (1.1814)	0.2053* (1.7774)	0.0717 (1.2370)	-0.2231*** (-3.3329)	0.0482 (1.1471)	-0.2139*** (-3.2021)	0.0199 (0.4869)
ARGDP	0.0075 (0.5992)		0.0111 (0.8883)		-0.0370*** (-5.0621)		-0.0323*** (-4.4312)	
DGDP		-0.5112*** (-2.6213)		-0.6566*** (-3.4556)		-0.1506 (-0.9626)		-0.3754** (-2.4697)
$\overline{R}^2$	0.0324	0.0809	0.0214	0.1023	0.1110	0.0018	0.0819	0.0216

Table 6. Panel Regression of Asian 4（without constant restriction）

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C_HK	0.4030	-0.0429	0.3985	-0.1459	0.5605	0.0320	0.3917	-0.0423
C_SING	0.2128	-0.2035	0.1905	-0.3391	0.4997	-0.0200	0.3170	-0.1061
C_SKOR	0.5017	0.0912	0.5309	0.0870	0.5622	0.0809	0.4314	0.0676
C_TW	0.3941	0.0100	0.4424	0.0245	0.4909	0.0229	0.3809	0.0250
RIM	0.1487** (2.5929)	0.1466** (2.4807)	0.2043*** (2.7236)	0.2576*** (3.5104)	0.0025 (0.0761)	0.0170 (0.4702)	0.0556 (1.2607)	0.0914* (1.9799)
ARDGP	-0.0477** (-2.1061)		-0.0560** (-2.1297)		-0.0510*** (-4.6132)		-0.0406*** (-3.4756)	
DGDP		-0.1369 (-0.7105)		-0.8910*** (-3.7510)		0.2309 (1.6259)		-0.2097 (-1.3173)
$\overline{R}^2$	0.3333	0.2920	0.2455	0.3535	0.3087	0.1912	0.2117	0.1292

Table 7. Panel Regression of G 7（without constant restriction）

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C_CA	0.1796	0.0495	0.2242	0.0140	0.5378	0.1149	0.5639	0.1030
C_FRA	0.1951	0.0614	0.2410	0.0276	0.5266	0.1065	0.5540	0.0950
C_GER	0.1363	0.0094	0.1705	-0.0340	0.5075	00933	0.5284	0.0754
C_ITA	0.2458	0.1101	0.2856	0.0679	0.5673	0.1434	0.5890	0.1261
C_JAP	0.1962	0.0510	0.2747	0.0429	0.5156	0.0537	0.5618	0.0599
C_UK	0.2019	0.0693	0.2392	0.0260	0.5562	0.1352	0.5800	0.1192
C_US	0.2174	0.0568	0.3063	0.0525	0.5447	0.0679	0.5932	0.0750
RIM	0.1925 (1.2018)	0.1474 (0.9568)	0.3663** (2.2341)	0.3179** (2.0467)	-0.2815*** (-3.1493)	-0.2278** (-2.4467)	-0.2195** (-2.4367)	-0.1479 (-1.5812)
ARDGP	-0.0158 (-1.0862)		-0.0243 (-1.6345)		-0.0410*** (-4.3859)		-0.0451*** (-4.7876)	
DGDP		-0.5115*** (-3.1829)		-0.6416*** (-3.9594)		-0.0520 (-0.3665)		-0.3155** (-2.2132)
$\overline{R}^2$	0.3560	0.4014	0.3057	0.3737	0.2732	0.2017	0.2343	0.1649

Table 8. Panel Regression of Ten countries with constant restriction（exclude Singapore）

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.1848*** (3.4215)	0.0748*** (10.0200)	0.1488** (2.5603)	0.0847*** (10.6695)	0.2642*** (6.8225)	0.0515*** (9.2611)	0.2102*** (5.4069)	0.0594*** (10.5549)
RIM	0.0112 (0.5953)	0.0401** (2.1835)	0.0072 (0.3084)	0.0471** (2.2945)	-0.0139 (-1.2218)	0.0038 (0.3253)	-0.0094 (-0.7850)	0.0124 (1.0564)
ARGDP	-0.1106** (-2.1412)		-0.0075 (0.1736)		-0.0201*** (-5.4254)		-0.0150*** (-4.0320)	
DGDP		-0.1833 (-1.4523)		-0.5257*** (-3.9242)		0.1509 (1.5319)		-0.1685* (-1.6529)
$\overline{R}^2$	0.0310	0.0176	0.0065	0.0798	0.0887	0.0034	0.0501	0.5415

Table 9. Panel Regression of Asian 3 with constant restriction (exclude Singapore)

model / variable	Period Ⅰ (1973~1990)				Period Ⅱ (1973~2001)			
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.0916 (0.5206)	0.1324*** (4.2789)	0.2836 (1.3338)	0.1866*** (5.0487)	0.3712*** (2.8717)	0.0811*** (3.9495)	0.4494*** (3.4202)	0.0979*** (4.3981)
RIM	-0.0197 (-0.4426)	-0.0228 (-0.6896)	0.0298 (0.5509)	-0.0349 (-0.9015)	0.0090 (0.3539)	-0.0259 (-1.3099)	0.0385 (1.5067)	-0.0183 (-0.8746)
ARGDP	0.0015 (0.0709)		-0.0245 (-0.9397)		-0.0333** (-2.1948)		-0.0447*** (-2.8963)	
DGDP		-0.3236 (-1.2613)		-1.1095*** (-3.4587)		0.0997 (0.5368)		-0.3352 (-1.5845)
$\overline{R}^2$	-0.0336	-0.0025	-0.0260	0.1847	0.0550	0.0042	0.0793	0.0095

Table 10. Time Series Regression---the Case of Hong Kong

model / variable	1968:Q1~1990:Q4		1973:Q1~1990:Q4		1986:Q1~2001:Q4		1973:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-0.0746 (-0.1242)	0.2003*** (2.8670)	0.1750 (0.8032)	-0.0217 (-0.6500)	4.3948*** (4.1741)	0.0243 (0.4584)	0.0466 (0.3381)	0.0140 (0.2025)
RIM	-0.0634 (-1.0304)	-0.0842 (-1.4902)	0.0093 (0.6520)	0.1054*** (3.8736)	-0.0509* (-1.7633)	0.0006 (0.0320)	0.0080 (0.7094)	0.0078 (0.6517)
RGDP	0.0229 (0.3862)		-0.0019 (-0.1041)		-0.4017*** (-4.1198)		-0.0014 (-0.1166)	
DGDP		-0.1532 (-1.5360)		-0.3181*** (-7.3923)		-0.2637*** (-2.8466)		-0.0945 (-1.4449)
DUM11	0.0517** (2.7929)	0.0479*** (2.8558)						
DUM12					-0.0245*** (-3.1581)	-0.0233*** (-2.9485)		
S1					-0.0421*** (-3.9285)			
S2				-0.0101** (-2.2826)	-0.0277*** (-3.3752)			
AR(1)			0.9598*** (21.3422)		1.2385*** (17.5231)	1.2142*** (14.6747)	1.2045*** (23.4790)	1.1938*** (17.9927)
AR(3)					-0.3382*** (-5.0620)	-0.2570*** (-3.0626)		
AR(4)							-0.2354*** (-4.3419)	-0.2158*** (-2.9816)
$\overline{R}^2$	0.2437	0.3601	0.9647	0.8894	0.9604	0.9564	0.9734	0.9751
Q_p	0.258	0.203	0.654	0.132	0.192	0.243	0.102	0.114

Notes: DUM11 is a dummy variable which sets 1989:Q2 to be one, the other periods to be zeroes;
DUM12 is a dummy variable which sets 2000:Q2 to be one, the other periods to be zeroes;
S1 and S2 are seasonal dummies; AR(i) is the ith order serial correlation correction of residual;
Q_p represents the significance level of Liung-Box Q statistics.

Table 11. Time Series Regression---the Case of Korea

model / variable	1965:Q1~1990:Q4		1970:Q1~1990:Q4		1961:Q1~2001:Q4		1970:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.5127**	0.1498***	0.0933	0.1071***	0.6669***	0.1344***	0.1353	0.0812***
	(2.0948)	(4.3615)	(0.2692)	(3.4326)	(3.4196)	(4.5490)	(0.5010)	(3.0355)
RIM	-0.1243	0.0018	0.0064	0.0227	-0.1712***	-0.0116	-0.0019	0.0281
	(-1.5757)	(0.0316)	(0.0889)	(0.8237)	(-2.6610)	(-0.2359)	(-0.0338)	(1.2163)
RGDP	-0.0246		0.0005		-0.0356***		-0.0039	
	(-1.4861)		(0.0204)		(-2.7467)		(-0.2204)	
DGDP		-0.1695*		-0.1713**		-0.1518**		-0.1859***
		(-1.9427)		(-2.4355)		(-2.0648)		(-3.4070)
DUM21	0.1063***	0.1217***			0.1136***	0.1165***		
	(3.3553)	(3.4141)			(3.7847)	(3.7767)		
DUM22						-0.0389*		
						(-1.6888)		
AR(1)	0.5765***	0.5086***	1.3570***	1.3443***	0.6497***	0.6531***	1.3273***	1.3037***
	(6.2744)	(5.7166)	(12.9571)	(12.6985)	(8.4161)	(8.2529)	(15.6937)	(15.1225)
AR(2)	0.5232***	0.3676***	-0.4448***	-0.4318***	0.4390***	0.4255***	-0.4061***	-0.3734***
	(5.5402)	(4.1214)	(-4.2393)	(-4.0810)	(5.0745)	(4.7410)	(-4.8014)	(-4.3211)
AR(3)	-0.2735***				-0.2804***	-0.1949**		
	(-2.9903)				(-3.5957)	(-2.4258)		
$\overline{R}^2$	0.7209	0.7069	0.9007	0.9082	0.7707	0.7715	0.9085	0.9167
Q_p	0.703	0.235	0.125	0.474	0.535	0.310	0.467	0.194

Notes: DUM21 is a dummy variable which sets 1963:Q4 to be one, the other periods to be zeroes;

DUM22 is a dummy variable which sets 1973:Q2 to 1973:Q3 to be ones, the other periods to be zeroes.

Table 12. Time Series Regression---the Case of Singapore

model / variable	1975:Q1~1990:Q4		1975:Q1~1990:Q4		1975:Q1~2001:Q4		1975:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-0.4522	-0.1722***	-0.1390	-0.0344	0.2938	-0.1292***	0.0294	-0.0429
	(-1.5407)	(-5.4946)	(-0.4619)	(-1.1971)	(1.1370)	(-6.1970)	(0.1994)	(-2.7638) ***
RIM	0.1205***	0.1101***	0.0396**	0.0337**	0.0384	0.0834***	0.0307***	0.0396***
	(5.0950)	(5.5385)	(2.5419)	(2.0513)	(1.5907)	(5.9487)	(2.9675)	(4.1591)
RGDP	0.0216		0.0077		-0.0250		-0.0042	
	(0.9902)		(0.3379)		(-1.4065)		(-0.3901)	
DGDP		0.2622**		0.0923		0.3005***		0.0718**
		(2.6123)		(1.1711)		(4.1136)		(2.0010)
DUM31					-0.0259**	-0.0298**		
					(-2.1142)	(-2.2219)		
AR(1)	0.5436***	0.4138***	1.3487***	1.3311***	0.9193***	0.6302***	1.3601***	1.4127***
	(4.4767)	(3.3001)	(12.3295)	(11.3798)	(13.3240)	(7.6761)	(16.5466)	(14.8733)
AR(2)			-0.5474***	-0.5298***			-0.5469***	-0.6867***
			(-5.1593)	(-4.6374)			(-6.7728)	(-6.3456)
AR(4)					-0.2197***	-0.2246***		0.1046*
					(-3.2543)	(-2.7411)		(1.8544)
$\overline{R}^2$	0.7525	0.7707	0.8793	0.8797	0.7808	0.8003	0.8846	0.8995
Q_p	0.278	0.186	0.580	0.603	0.412	0.441	0.505	0.146

Notes: DUM31 is a dummy variable which sets 1999:Q1 to be one, and the other periods to be zeroes.

Table 13. Time Series Regression---the Case of Taiwan

model / variable	1965:Q1~1990:Q4		1965:Q1~1990:Q4		1965:Q1~2001:Q4		1965:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.4895***	0.0200	0.4531**	0.0031	0.4789***	0.0201	0.3783***	0.0065
	(2.9592)	(0.8015)	(2.4125)	(0.0967)	(3.2260)	(0.8363)	(3.5205)	(0.2398)
RIM	0.2187***	0.0951*	0.2774***	0.1749***	0.0256	0.0725	0.1999***	0.1141**
	(3.4860)	(1.8781)	(3.3891)	(2.6465)	(0.7483)	(1.5867)	(3.2285)	(2.0310)
RGDP	-0.0511***		-0.0498**		-0.0420***		-0.0394***	
	(-3.0262)		(-2.5288)		(-2.9356)		(-3.6095)	
DGDP		-0.0610		-0.2418		-0.1066		-0.1425**
		(-0.5787)		(-1.5804)		(-1.4596)		(-1.1765)
DUM41	0.0841***	0.0874***	0.1547***	0.1674***	0.0208*	0.0342**	0.1543***	0.1576***
	(5.0614)	(5.0806)	(5.6928)	(6.4968)	(1.6836)	(2.4566)	(6.6874)	(6.9758)
DUM42	0.0493***	0.0338**			0.0364***	0.0409***		
	(2.9974)	(2.0599)			(3.4616)	(3.3253)		
S1	0.0073**					0.0048**		
	(2.2113)					(2.0477)		
AR(1)	0.9291***	0.9643***	0.6949***	0.6937***	1.4023***	1.2946***	0.7203***	0.7763***
	(15.9983)	(17.0267)	(7.0301)	(7.3111)	(19.8565)	(17.2904)	(8.8436)	(9.7567)
AR(2)			0.2138*	0.2550**	-0.5536***	-0.4235***	0.2090**	0.2129***
			(1.9098)	(2.3709)	(-7.9637)	(-5.6398)	(2.2470)	(2.2739)
AR(4)	-0.2006	-0.1739***	-0.3039***	-0.2674***			-0.2914***	-0.2423***
	(-3.5642)	(-3.1465)	(-3.8112)	(-3.4137)			(-4.4825)	(-3.7199)
$\overline{R}^2$	0.8915	0.8706	0.8411	0.8423	0.8994	0.8787	0.8449	0.8385
Q_p	0.201	0.080	0.121	0.101	0.166	0.217	0.121	0.213

Notes: DUM41 is a dummy variable which sets 1973:Q4 to 1974:Q3 to be ones, and the other periods to be zeroes;

DUM42 is a dummy variable which sets 1980:Q4 t to be one, and the other periods to be zeroes.

Table 14. Time Series Regression---the Case of Canada

model / variable	1957:Q1~1990:Q4		1957:Q1~1990:Q4		1957:Q1~2001:Q4		1957:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.1550 (0.3904)	0.0184 (0.8018)	-0.2241 (-0.7175)	0.0354 (1.7709)	0.8599** (2.1260)	0.0242 (0.8560)	0.2114 (0.5916)	0.0328 (1.2699)
RIM	0.1588* (1.7417)	0.1770** (1.9886)	0.0779 (1.1172)	0.0837 (1.1952)	0.0815 (1.0634)	0.0755 (0.9925)	0.0224 (0.3356)	0.0268 (0.4280)
RGDP	-0.0136 (-0.3404)		0.0260 (0.8292)		-0.0830** (-2.0615)		-0.0176 (-0.4986)	
DGDP		-0.1065** (-2.3151)		-0.0134 (-0.3770)		-0.1347*** (-3.1555)		-0.0532 (-1.4717)
AR(1)	1.1155*** (25.3718)	1.1116*** (25.8635)	1.1424*** (29.5047)	1.1437*** (29.4026)	1.1724*** (24.5530)	1.1891*** (25.3315)	1.3317*** (18.2016)	1.3172*** (17.8196)
AR(2)							-0.3579*** (-4.9012)	-0.3421*** (-4.6340)
AR(3)					-0.2086*** (-4.4333)	-0.2185*** (-4.5737)		
AR(4)	-0.1691*** (-3.8555)	-0.1664*** (-3.9012)	-0.1907** (-4.8604)	-0.1842** (-4.7482)				
$\overline{R}^2$	0.948	0.951	0.968	0.968	0.979	0.952	0.961	0.962
Q_p	0.288	0.255	0.108	0.079	0.140	0.195	0.194	0.141

Table 15. Time Series Regression---the Case of France

model / variable	1970:Q1~1990:Q4		1970:Q1~1990:Q4		1970:Q1~2001:Q4		1970:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	3.0077** (2.5920)	0.1196*** (2.9163)	1.205** (1.512)	-0.103 (-0.2790)	3.2116*** (6.5134)	0.0285 (0.3116)	-0.4496 (-1.5346)	-0.0435 (-0.7087)
RIM	-0.2082* (-1.7626)	-0.2116* (-1.8380)	0.3794 (5.1157)	0.3621*** (4.7449)	-0.1478 (-1.4806)	-0.0185 (-0.1864)	0.3311*** (5.7627)	0.3122*** (5.3361)
RGDP	-0.2802** (-2.4821)		-0.1178 (-1.5178)		-0.3011*** (-6.3425)		0.0361 (1.4737)	
DGDP		-0.2561** (-2.3210)		-0.0212 (-0.3333)		-0.2684*** (-3.4870)		0.0181*** (0.5377)
AR(1)	1.0720*** (13.3607)	1.1050*** (13.7182)	1.5134*** (15.5783)	1.5250*** (15.2432)	0.7998*** (8.1788)	0.6642*** (6.2583)	1.47138*** (18.3382)	1.4703*** (17.9590)
AR(2)			-0.5513*** (-5.7213)	-0.5461*** (-5.3794)	0.2794** (2.2600)	0.3212*** (3.0304)	-0.4781*** (-5.9357)	-0.4799*** (-5.8270)
AR(3)	-0.1437* (-1.9449)	-0.1378* (-1.6931)						
AR(4)					-0.1695** (-2.4361)			
$\overline{R}^2$	0.936	0.937	0.976	0.975	0.950	0.940	0.985	0.985
Q_p	0.474	0.444	0.393	0.396	0.461	0.346	0.437	0.672

Table 16. Time Series Regression---the Case of Germany

model / variable	1970:Q1~1990:Q4		1970:Q1~1990:Q4		1970:Q1~2001:Q4		1970:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.8438*** (3.4831)	0.0829*** (3.1309)	0.5317* (1.8695)	-0.0011 (-0.0476)	3.2116*** (6.5134)	0.0285 (0.3116)	-0.4496 (-1.5346)	-0.0435 (-0.7087)
RIM	-0.1237 (-1.3726)	-0.1659* (-1.6696)	0.1398** (2.2689)	0.1496** (2.4227)	-0.1478 (-1.4806)	-0.0185 (-0.1864)	0.3311*** (5.7627)	0.3122*** (5.3361)
RGDP	-0.0864*** (-3.0801)		-0.05290* (-1.8730)		-0.3011*** (-6.3425)		0.0361 (1.4737)	
DGDP		-0. 1507*** (-2.6642)		-0.0556* (-1.9091)		-0.2684*** (-3.4870)		0.0181*** (0.5377)
AR(1)	0.7795*** (10.5156)	0.8924*** (17.4260)	1.4010*** (13.8850)	1.4070*** (13.7283)	0.7998*** (8.1788)	0.6642*** (6.2583)	1.47138*** (18.3382)	1.4703*** (17.9590)
AR(2)			-0.4534*** (-4.5425)	-0.4364*** (-4.2514)	0.2794** (2.2600)	0.3212*** (3.0304)	-0.4781*** (-5.9357)	-0.4799*** (-5.8270)
AR(3)								
AR(4)					-0.1695** (-2.4361)			
$\overline{R}^2$	0.865	0.869	0.959	0.959	0.950	0.940	0.985	0.985
Q_p	0.202	0.126	0.138	0.182	0.156	0.188	0.562	0.139

.

Table 17. Time Series Regression---the Case of Italy

model / variable	1970:Q1~1990:Q4		1970:Q1~1990:Q4		1970:Q1~2001:Q4		1970:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.5590***	0.1490***	0.0710	0.0823**	0.5189***	0.1410***	0.0526	0.0617*
	(3.5515)	(2.5721)	(1.4992)	(2.2528)	(4.6148)	(3.0339)	(1.2781)	(1.9128)
RIM	-0.3337	-0.2713	0.0187	0.0500	-0.2697	-0.3047	0.0253	0.0547
	(-1.0405)	(-1.0834)	(0.1429)	(0.3910)	(-1.1461)	(-1.6060)	(0.2627)	(0.5808)
RGDP	-0.0253***		0.0011*		-0.0249***		0.0009	
	(-6.3254)		(0.6985)		(-7.4059)		(0.7112)	
DGDP		-0.0250***		0.0015		-0.0246***		0.0016**
		(-10.7506)		(1.4390)		(-12.4849)		(1.7281)
AR(1)	1.1982***	1.0372***	1.4132***	1.4277***	1.2023***	1.0894***	1.4247***	1.4401***
	(13.0128)	(20.6760)	(17.0534)	(16.9853)	(15.4502)	(20.8344)	(20.1264)	(20.1769)
AR(2)			-0.4530***	-0.4672***	-0.2292***		-0.4545***	-0.4697***
			(-5.4716)	(-5.5754)	(-2.9740)		(-6.4169)	(-6.5876)
AR(3)						-0.1510***		
						(-2.9030)		
AR(4)		-0.1075**						
		(-2.1854)						
$\overline{R}^2$	0.876	0.916	0.961	0.961	0.888	0.924	0.968	0.968
Q_p	0.597	0.223	0.143	0.119	0.548	0.205	0.160	0.210

Table 18. Time Series Regression---the Case of Japan

model / variable	1957:Q1~1990:Q4		1957:Q1~1990:Q4		1957:Q1~2001:Q4		1570:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-0.5941***	0.0058	0.0736	-0.0145	-0.5090**	0.0331	0.0431	-0.0068
	(-3.0361)	(0.1933)	(0.6777)	(-0.6837)	(-2.3799)	(1.0524)	(0.3624)	(-0.2692)
RIM	0.8307***	0.4736**	0.6244***	0.5755***	0.8830***	0.4293*	0.6783***	0.6128***
	(3.5647)	(2.2050)	(3.7342)	(3.3690)	(3.2447)	(1.7021)	(3.4511)	(3.0113)
RGDP	0.0370***		-0.0065		0.0321***		-0.0042	
	(2.8647)		(-0.9023)		(-7.4059)		(-0.5233)	
DGDP		-0.4231***		-0.0628		-0.4515***		-0.0618
		(-7.3753)		(-1.5451)		(-6.5948)		(-1.3066)
AR(1)	0.9377***	0.9456***	1.0591***	1.0634***	0.8941***	0.9013***	1.0514***	1.0512***
	(32.9554)	(35.1905)	(25.5683)	(25.6401)	(21.3187)	(23.4567)	(27.7950)	(21.6786)
AR(2)								
AR(3)								
AR(4)			-0.1442***	-0.1347***			-0.1519	-0.1460***
			(-3.5167)	(-3.3206)			(-3.2289)	(-3.0708)
$\overline{R}^2$	0.819	0.856	0.925	0.925	0.748	0.804	0.907	0.908
Q_p	0.394	0.768	0.142	0.132	0.249	0.596	0.144	0.114

Table 19. Time Series Regression---the Case of United Kingdom

model / variable	1957:Q1~1990:Q4		1957:Q1~1990:Q4		1957:Q1~2001:Q4		1957:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.3053 (0.4526)	0.1423*** (3.7239)	1.4922** (2.4270)	0.1026*** (3.4221)	0.5996 (1.2266)	0.1434*** (4.3308)	1.3461*** (2.7521)	0.0804*** (2.8915)
RIM	-0.2376* (-1.7528)	-0.2522* (-1.8837)	-0.0748 (-0.7511)	-0.0832 (-0.9066)	-0.2690** (-2.3641	-0.2959*** (-2.6489)	-0.0483 (-0.5999)	-0.0557 (-0.7799)
RGDP	-0.0218 (-0.2520)		-0.1772** (-2.2822)		-0.0590 (-0.9526)		-0.1604*** (-2.6168)	
DGDP		-0.1566* (-1.8874)		-0.2613*** (-5.2336)		-0.1721** (-2.2942)		-0.2430*** (-5.7732)
AR(1)	1.1059*** (24.3318)	1.0982*** (23.3210)	1.4412*** (18.0107)	1.4495*** (18.4602)	1.0916*** (27.2808)	1.0839*** (26.0568)	1.4468*** (21.2505)	1.5331*** (21.2714)
AR(2)			-0.4669*** (-5.8504)	-0.4995*** (-6.3678)			-0.4778*** (-7.0735)	-0.6522*** (-6.9790)
AR(3)								
AR(4)	-0.1743*** (-3.7736)	-0.1696*** (-3.5632)			-0.1528*** (-3.8005)	-0.1481*** (-3.5500)		0.0831* (1.9694)
$\overline{R}^2$	0.912	0.951	0.944	0.953	0.918	0.920	0.951	0.959
Q_p	0.185	0.141	0.665	0.538	0.106	0.119	0.591	0.122

Table 20. Time Series Regression---the Case of United States

model / variable	1957:Q1~1990:Q4		1957:Q1~1990:Q4		1957:Q1~2001:Q4		1957:Q1~2001:Q4	
	DPGDP		DCPI		DPGDP		DCPI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	-0.1404 (-0.4996)	0.0288** (2.0325)	-0.1991 (-0.6311)	0.0127 (0.9300)	0.0806 (0.3317)	0.0214 (1.3054)	0.2341 (0.8057)	-0.0026 (-0.1482)
RIM	0.2436** (2.4662)	0.2205** (2.1597)	0.4721*** (3.3175)	0.4940*** (3.600)	0.2216*** (2.6794)	0.1889** (2.2507)	0.4986*** (4.1296)	0.4881*** (4.0264)
RGDP	0.0167 (0.5906)		0.0215 (0.6677)		-0.0063 (-0.2627)		-0.0236 (-0.8117)	
DGDP		-0.0305 (-1.2113)		-0.0217 (-0.5944)		-0.0432** (-2.0233)		-0.0288 (-0.9024)
AR(1)	1.4985*** (19.6544)	1.4767*** (19.1525)	1.3694*** (15.4683)	1.3500*** (15.0022)	1.4821*** (22.0789)	1.4662*** (21.7594)	1.3787*** (17.9582)	1.3817*** (17.8074)
AR(2)	-0.5286*** (-6.9224)	-0.5061*** (-6.5668)	-0.2999** (-2.5313)	-0.2757** (-2.3103)	-0.5017*** (-0.4884)	-0.4849*** (-7.1774)	-0.3072*** (-3.0078)	-0.3093*** (-3.0053)
AR(3)								
AR(4)			-0.1260** (-2.4455)	-0.1306** (-2.5189)			-0.1076** (-2.4249)	-0.1006** (-2.2562)
$\overline{R}^2$	0.977	0.9776	0.971	0.972	0.979	0.980	0.971	0.971
Q_p	0.102	0.157	0.130	0.115	0.297	0.521	0.122	0.105

Figure 1. Historical Patterns of Imports/GDP Shares of Eleven Countries

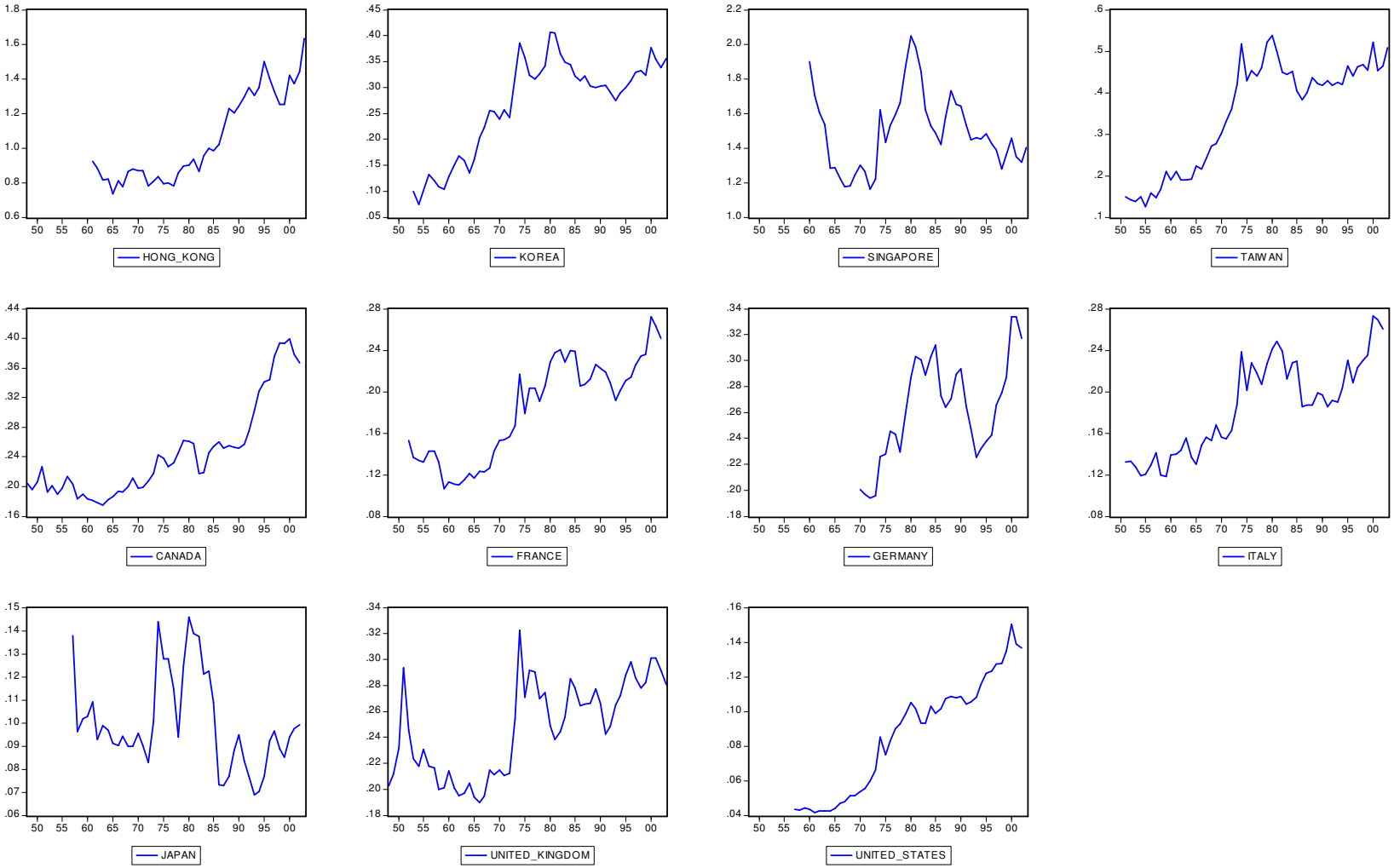


Figure 2. Historical Patterns GDP Deflator Growth Rates of Eleven Countries

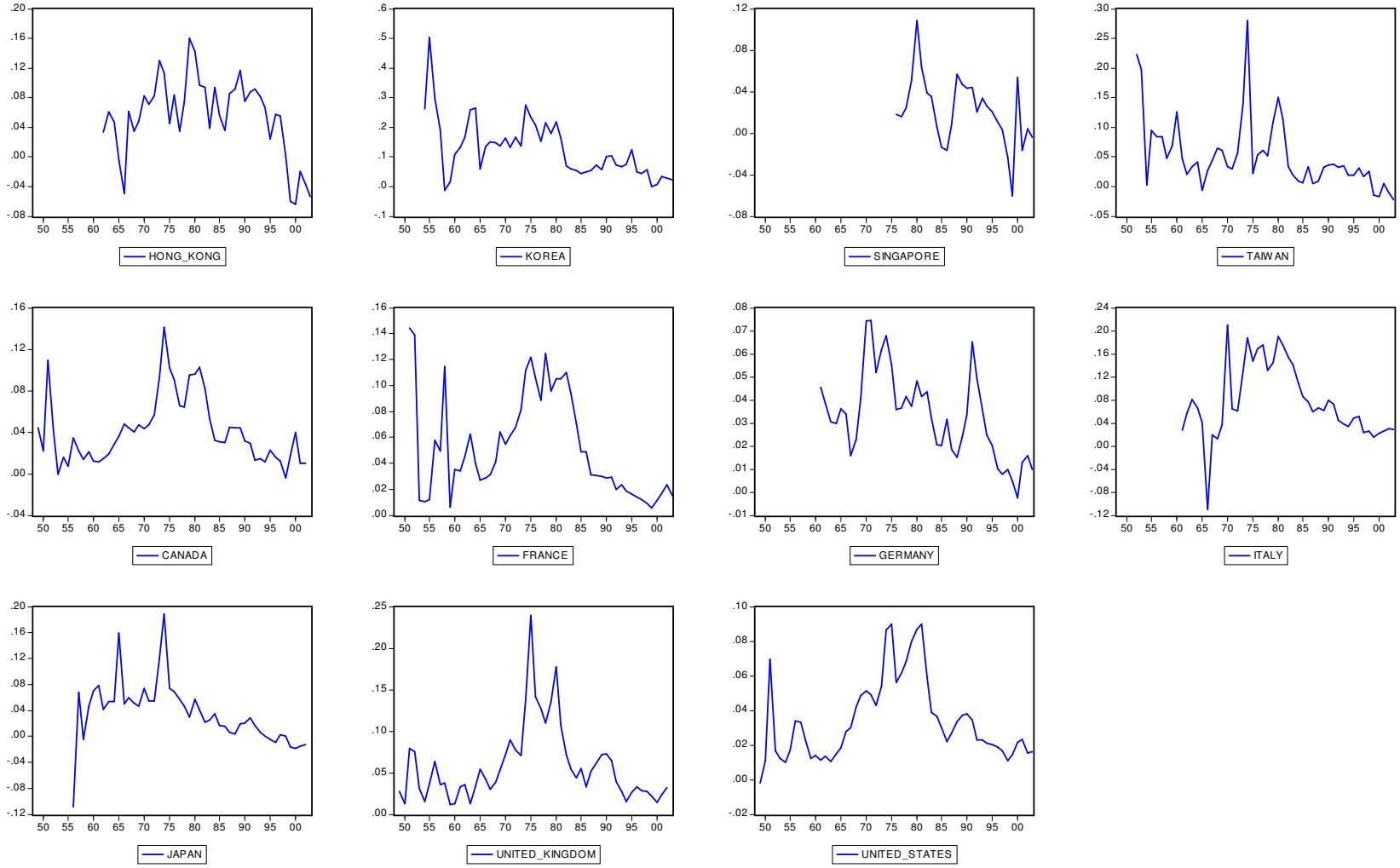
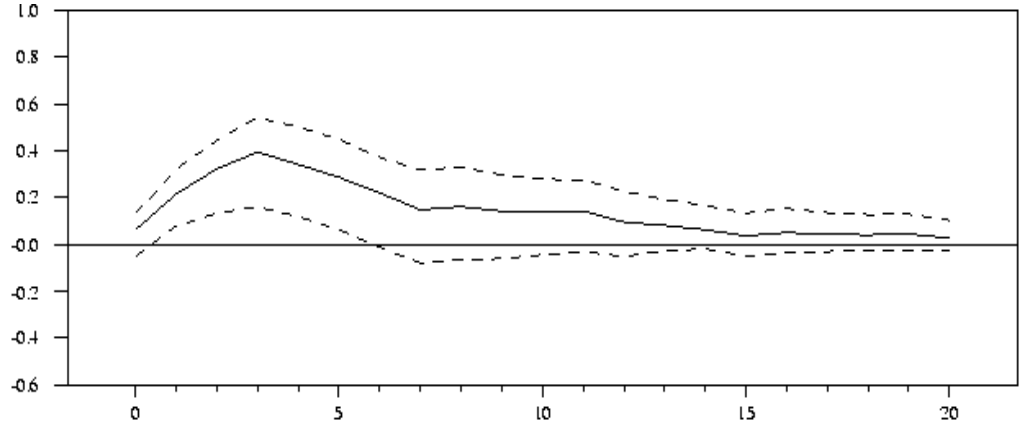
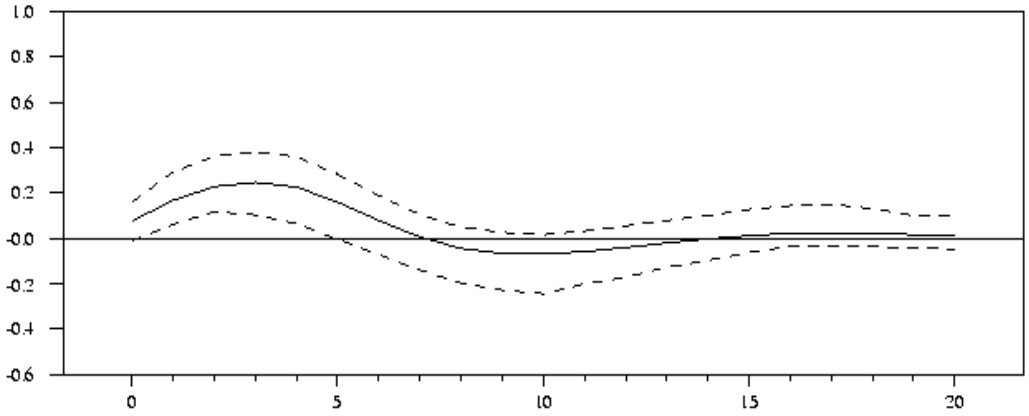


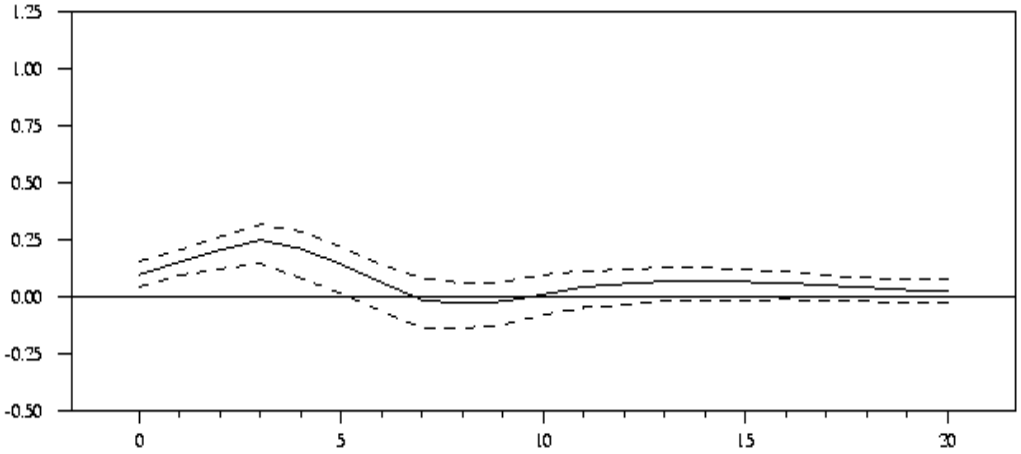
Figure 3. Impulse Response of Money Growth on Real GDP Growth



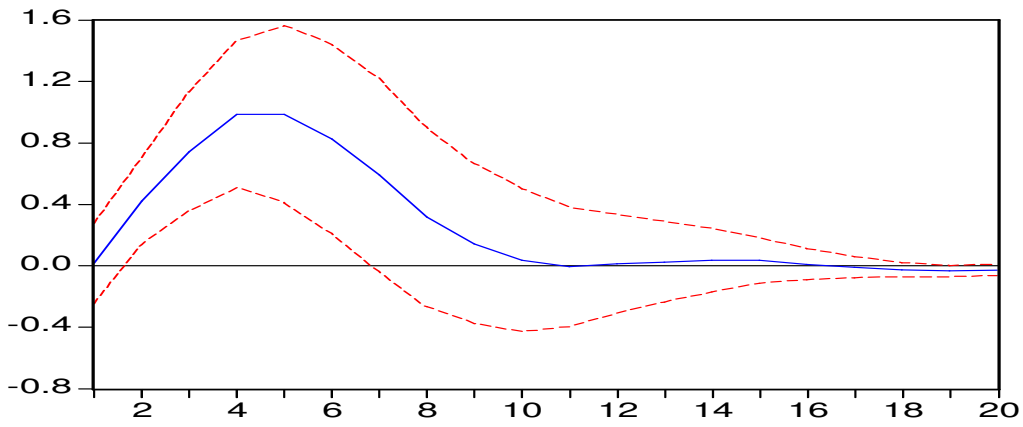
(a) Singapore



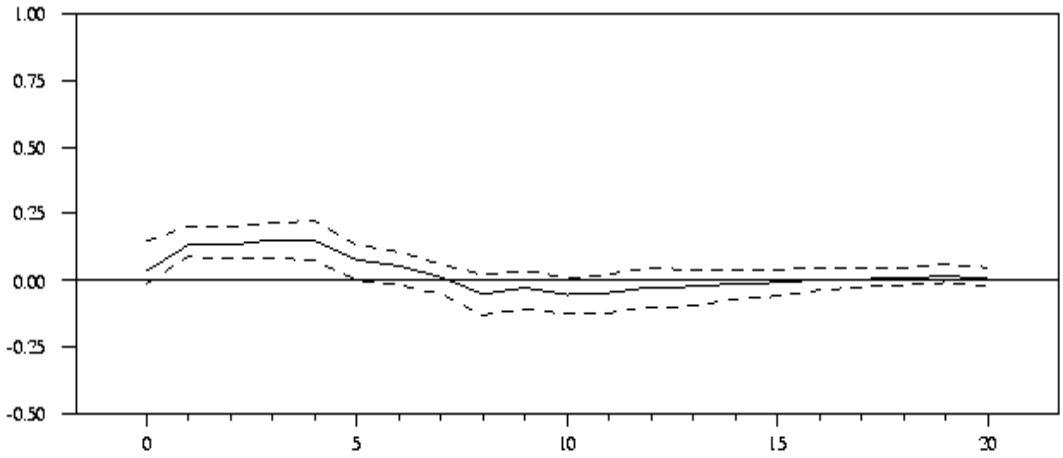
(b) Hong Kong



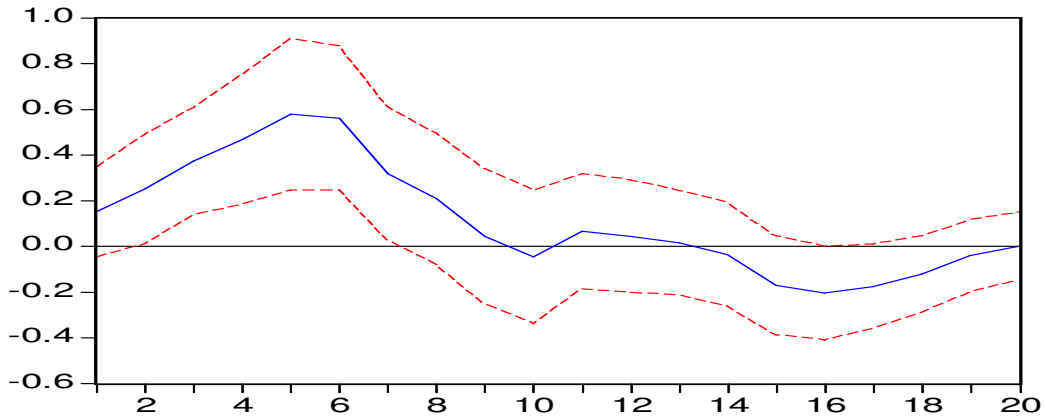
(c) Taiwan



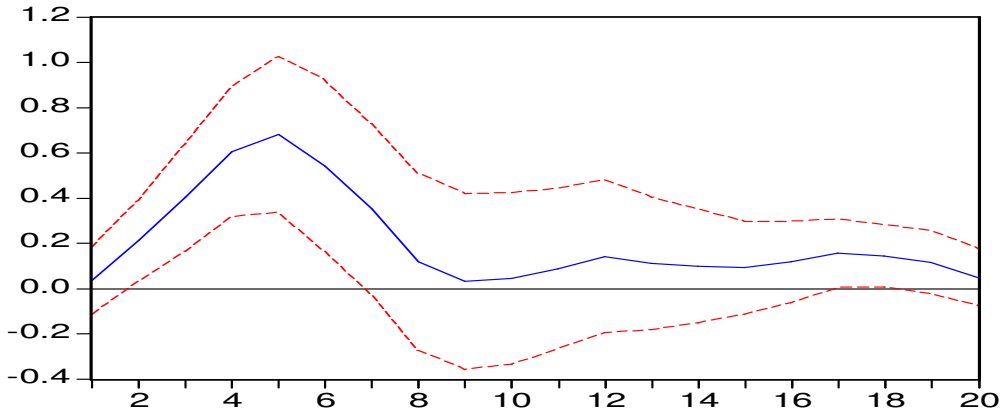
(d) Germany



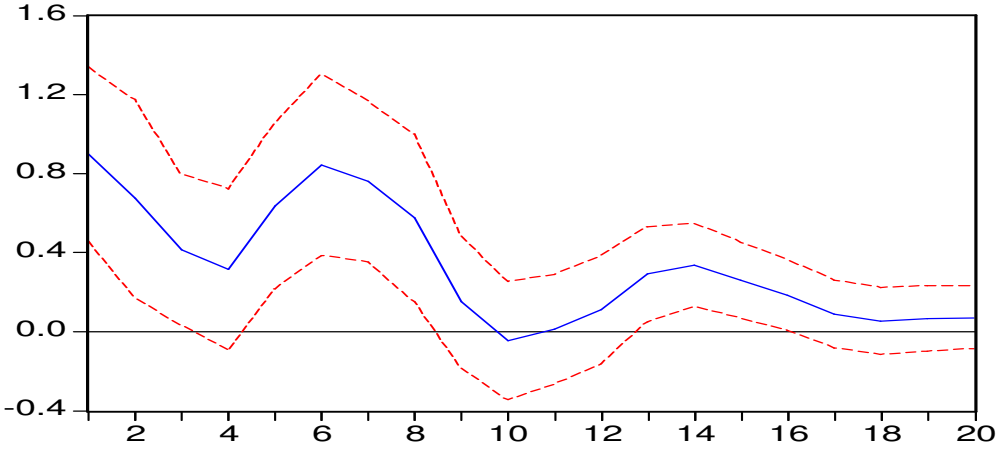
(e) Korea



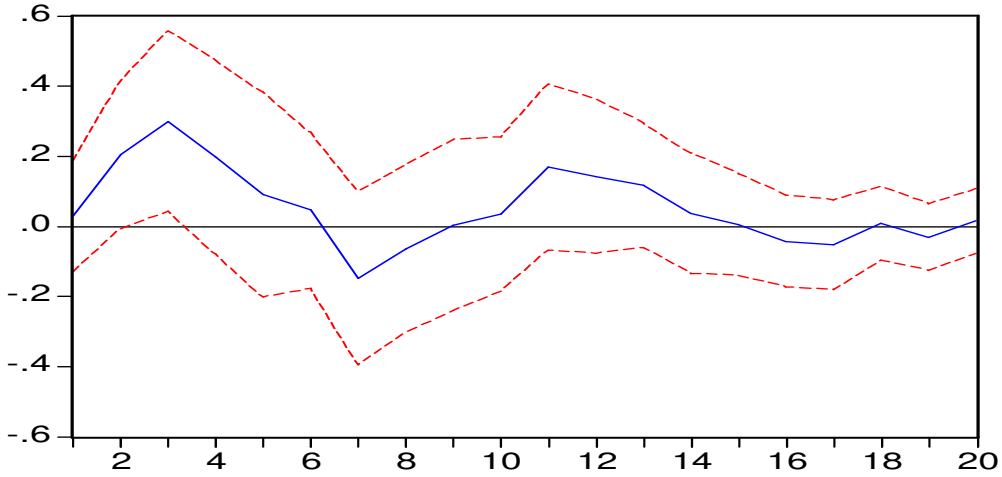
(f) United Kingdom



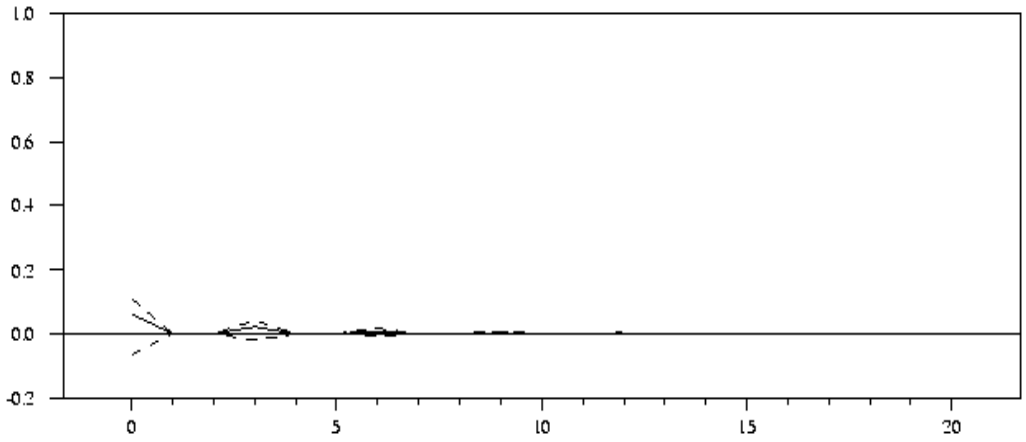
(g) Canada



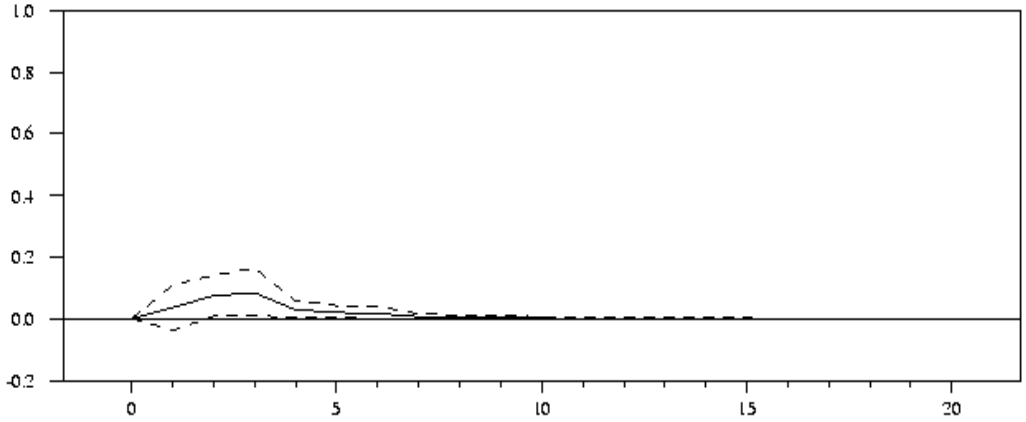
(h) Italy



(i) France



(j) Japan



(k) United States

Reference

1. Fung, B. S. C (2002), "A VAR Analysis of the Effects of Monetary Policy in East Asia," *BIS Working Paper*, p.119.
2. Hsu, J. D. and C. S. Wu (1993), "Current Prices and Policy," Research Report of Research, Development and Evaluation Commission, Exective Yuan, 1-151. (in Chinese)
3. Juselius, K. (1998), "Changing Monetary Transmission Mechanisms within the EU," *Empirical Economics*, 23(1), 455-481.
4. Lane, P. R. (1997), "Inflation in Open Economies," *Journal of International Economics*, 42, 327-347.
5. Lin, J. L. (2003), "An Empirical Investigation of Interest Rate Policy Transmission Mechanism and Its Impacts on Macroeconomic and Financial System," *Quarterly Journal of Central Bank*, 25(1), 5-47. (in Chinese)
6. Liu, L. M. (1987), "Sales Forecasting Using Multi-Equation Transfer Function Models," *Journal of Forecasting*, 6, 223-238.
7. Liu, L. M. and G. B. Hudak (1985), "Unified Econometric Model Building Using Simulations Transfer Function Equations," *Time Series Analysis: Theory and Practice*, 7, 277-288, Amsterdam: Elsevier Science Publishing.
8. Morsink, J. and Tamim Bayoumi (2001), "A Peek inside the Black Box: The Monetary Transmission Mechanism in Japan," *IMF Staff Papers*, 48(1), 22-57.
9. Oxley, L. (2000), "Identifying an Interest Rate Transmission Mechanism for New Zealand", *manuscript*.
10. Pesaran, H. H. and Y. Sin (1988), "Generalized Impulse Response Analysis in Linear Multivariate Model," *Economic Letters*, 58, 17-29.
11. Phillips, P. C. B. (1998), "Impulse Response and Forecast Error Variance Asymptotics in Nonstationary VARS," *Journal of Econometrics*, 83, 21-56.

12. Romer, D. (1993), "Openness and Inflation: Theory and Evidence," *Quarterly Journal of Economics*, 108, 869-903.

13. Romer, D. (1998), "A New Assessment of Openness and Inflation: Reply," *Quarterly Journal of Economics*, 113, 649-652.

14. Temple, J. (2002), "Openness, Inflation, and the Phillips Curve: A Puzzle," *Journal of Money, Credit and Banking*, 34(2), 450-468.

15. Terra, M. C. T. (1998), "Openness and Inflation: A New Assessment," *Quarterly Journal of Economics*, 113, 641-648.

16. Wu, C. S. and S. C. Hu (2000), "Interest Rates, Credit Rationing and Banking Deregulation in Taiwan," *Deregulation and Interdependence in the Asia-pacific Region*, *edited by T. Ito and A. O. Krueger* , 255-276.