# Budget Deficits and Inflation in Thirteen Asian Developing Countries

**Muzafar Shah Habibullah (Corresponding Author)**
Faculty of Economics and Management, Universiti Putra Malaysia
Serdang, 43400,Selangor,Malaysia
E-mail: muzafar@econ.upm.edu.my

**Chee-Kok Cheah**
Faculty of Economics and Management, Universiti Putra Malaysia
Serdang, 43400,Selangor,Malaysia

**A. H. Baharom**
School of Accounting and Finance, Taylors University
Subang Jaya, 47500,Selangor,Malaysia

## Abstract

*In this study we attempt to determine the long-run relationship between budget deficit and inflation in thirteen Asian developing countries, namely; Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal and Bangladesh. Using annual data for the period 1950-1999 our Granger causality within the error-correction model (ECM) framework suggest that all variables involved (budget deficits, money supply and inflation) are integrated of order one. Our ECM model estimates indicate the existence of a long-run relationship between inflation and budget deficits. Thus, we conclude that budget deficits are inflationary in Asian developing countries.*

**Keywords:** Granger Causality; Asian Countries; Budget Deficit

## *I. Introduction*

Are deficits in the government's budget inflationary? In the monetarist framework, deficits tend to be inflationary. This is because when monetization takes place, it will lead to an increase in money supply and, *ceteris paribus*, increase in the rate of inflation in the long run (Gupta, 1992). This quantity theory result is widely accepted and need not be explored in further detail. Politically, it has been a strong concept that high amount of budget deficit is unacceptable. Usually, many political leaders think that the current budget deficit to be unacceptably high because it will attract serious attention from opposite parties and citizens. Academically, the concern of the existing body with empirical evidence regarding the issue does not resolve the controversy. The controversies deal with the importance of budget deficits to find out its effect on inflation, money growth, interest rates and others economics variables. However, studies are full of contradictions. The empirical evidence on government deficits is inconclusive due to the inconsistency of the theoretical framework and data sets. For the United States, Niskanen (1978); Hamburger and Zwick (1981); Dhakal et al. (1994) present evidence supportive of the effects of budget deficits on inflation. Whereas Dwyer (1982), Karras (1994), Abizadeh and Yousefi (1998) find no connection between budget deficits and inflation. For the developing countries, Aghevli and Khan (1978) found a positive relationship between inflation and budget deficit. Chang (1994) concludes that fiscal deficits caused slight inflation due to the issue of public bonds in Taiwan. In Turkey, Metin (1998) shows that budget deficit significantly affects inflation.

Hondroyiannis and Papapetrou (1994) suggest that there is a long-run relationship between government budget and price level and support the hypothesis of a bi-directional causality between the two variables. The analysis is employed in analyzing the government budget-inflation relationship in Greece. On one hand, Protopapadakis and Siegel (1987) found no evidence between the government debt growth and the inflation, and on the other hand, Hondroyiannis and Papapetrou (1997) do not find any direct impact of the budget deficit on inflation in Greece. However, Darrat (2000) suggests that besides controlling for money growth, higher budget deficits have also played a significant and direct role in the Greece inflationary process. No doubt a plethora of studies have been conducted on the developed nations, particularly the U.S. and the evidence from those studies are mixed (Dejtbamrong, 1993), and thus, it is imperative that a similar study be conducted on several Asian developing economies. Therefore, this study is an attempt to investigate the effects of budget deficits on inflation in thirteen Asian developing economies, namely; Bangladesh, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Singapore, South Korea, Sri Lanka, Taiwan and Thailand.

The objective of this study is to determine the long-run relationship between budget deficits and inflation in the thirteen Asian developing countries. This study uses annual data for the period of 1960 to 1999, and employs the error-correction framework to analyze the relationship between budget deficit and inflation. In the analysis, we have taken into consideration the role of money supply by examining its impact on inflation. By identifying the causal direction among the three variables, it provides an additional piece of evidence on the growing body of literature on the budget deficits-inflation nexus. It also provides some guideline for the central government in the implementation of economic plans, especially the monetization of deficits.

## *II. Review and Related Literature*

Generally, there is substantial literature on this topic for the developed countries, especially for the United States. However, the evidence is quite limited for developing countries, in particular, the Asian developing countries. Table 1 provides a summary of the findings from the previous literature. Generally, the results are mixed. Chang (1994), Metin (1995, 1998) and Darrat (2000) provide the empirical results that show the significant impact of budget deficits on inflation. In addition, Hondroyiannis and Papapetrou (1994) provide bi-directional causality between the two variables. Furthermore, Rahman et al. (1996) present indirect empirical evidence by giving conclusion to long run and short run unidirectional Granger causality from the budget deficits to the real exchange rates, and from the real exchange rates to the inflation rates. However, Dwyer (1982), Brown and Yousefi (1996), Hondroyiannis and Papapetrou (1997), Abizadeh and Yousefi (1998) provide the results that there is no empirical relationship between budget deficits and inflation. Dwyer (1982) tests three general hypotheses, which can explain the positive correlation of deficits and inflation in his paper. The test procedure is based on an examination of the reduced form relationships.

The major advantage of these reduced form tests is that the results are not conditioned on the complete specification of the behavioral equations. While the major disadvantage is that it is not possible to test if unexpected changes in the debt affect the relevant variables. From the study, no evidence is found that larger government deficits increase prices, spending, interest rates, or the money stock. Neither is any evidence found that the Federal Reserve acquires more debt when deficits are larger. Evidence found that debt issued by the government and acquired by the public is a function of past inflation rates and other variables. However, Chang (1994) presents theoretical forecast of the regional input-output models by using the pool technique to estimate intermediary transactions in Taiwan for the national development program, and the Box-Jenkins univariate time series models were applied to the component of final demand as well as the sector of employment. These models examine the effect of inflation, output, employment and income distribution under three levels of public bond policies. In general, the result indicates that fiscal deficits caused slight inflation due to the issue of public bonds. Hondroyiannis and Papapetrou (1994) employ analysis in analyzing the government budget-inflation relationship in Greece by using annual data for period 1960-1992.

They considered the relationship between cointegration and causality and used tests of cointegration as pre-test for Granger tests of causality. They employed the public sector net borrowing requirements as percentage of gross domestic product as measure of budget deficit. Empirical evidence suggests that there is a long run relationship between government budget and price level and supported the hypothesis of a bi-directional causality between the two variables. Metin (1995) analyzes inflation using a general framework of sectoral relationships and found that fiscal expansion was a determining factor for inflation in Turkey. He suggested that the excess demand for money affected inflation positively, but only in the short-run. A key implication of Metin (1995) is that "Turkish inflation could be reduced rapidly by eliminating the budget deficit." Rahman et al. (1996) apply the well-known cointegration approach to explore a possible long run pairwise relationship between (i) US real budget deficits and real exchange rates, and (ii) US inflation rates and real exchange rates.

The estimates of the error-correction models offer evidences to long run/short run unidirectional Granger causality from the real budget deficits to the real exchange rates and from the real exchange rates to the inflation rates. Recently, evidence on the relationship between inflation and central bank independence (CBI) suggests that there is a negative relation between CBI and both the rate and variance of inflation (Cukierman, 1992). These empirical findings lend support to the view that a high degree of CBI helps mitigate the inflationary bias of policy and increase the credibility of the stable monetary policies. Based on the concept of central banks' independence, deficit should Granger cause inflation in developing countries since the central bank are not autonomous (Brown and Yousefi, 1996). They began with a monetarist's premise that excessive injection of money into the income stream, in which the rate of growth of money supply exceeds the economy's rate of growth of output, is inflationary in the long run. The absence of political independence of central banks, particularly in LDCs, implies that monetary policy and price stability are undermined in these countries.

On the other hand, the political independence of central banks implies that this central bank can refuse to finance government deficits and thus, provide more financial stability than would otherwise be possible. Brown and Yousefi (1996) chose ten developing countries from a list of countries given in Cukierman et al. (1992) study. Namely, the countries are India, Indonesia, Israel, Mexico, Pakistan, Philippines, South Africa, Thailand, Turkey and Venezuela. The empirical analysis rejects a causal relationship between inflation and deficits in these countries. They explained the results by suggesting the possibility that inflation in these countries is largely attributed to external shocks and inflation may be structural. Furthermore, Abizadeh and Yousefi (1998) confirm the above result, which found that real consolidated deficits have no bearing on the rate of inflation. The model used is derived from a comprehensive IS-LM analysis that incorporates a foreign trade sector and a general price adjustment mechanism. They tested the model by using time series data for the Unites States from 1951-1986. Metin (1998) examines the empirical relationship between the public-sector deficit and inflation for the Turkish economy using a multivariate cointegration analysis.

The system cointegration analysis suggests three stationary relationships. An increase in the scaled budget deficit immediately increases inflation. Real income growth has a negative immediate effect and positive second-lag effect on inflation and the monetization of the deficit also affects inflation at a second lag. The major finding of this paper is that budget deficits significantly affect inflation in Turkey. In a recent paper, Hondroyiannis and Papapetrou (1997) employ an inflation model for Greece and using annual data for the period 1957-1993, they concluded that large and rising deficits by themselves have no direct impact upon inflation. On the other hand, Darrat (2000) revisits the issue of the inflationary consequences of higher budget deficits in Greece. By using similar data sample (1957-1993) and model structure from Hondroyiannis and Papapetrou (1997), he claims that their evidence lacks weight owing to several modeling and estimation problems. By correcting these problems, the results consistently suggest that, besides money growth, budget deficits have also played a significant and direct role in the Greek inflationary process.

## *III. Methodology*

Recent developments in cointegration and error-correction suggest that the Engle-Granger's two-step test for cointegration has low power. Banerjee et al. (1986) show that the Engle-Granger estimates of the cointegrating vector have large finite sample biases. Kremers et al. (1992) have argued that standard *t*-ratio for the coefficient on the error-correction term in the dynamic equation is a more powerful test for cointegration than those of the Dickey-Fuller type tests. In our case, say y is inflation and x is deficit, thus, for a bivariate case, the following 'conditional model' for $\Delta y_t$ is estimated directly,

$$\Delta y_t = c_0 + \sum_{i=1}^{q} \phi_i \Delta y_{t-i} + \sum_{j=1}^{p} \lambda_j \Delta x_{t-j} + \gamma \omega_{t-1} + \varepsilon_t \quad (1)$$

where $\omega_{t-1}$ is the lagged residuals saved from running the static cointegrating regression with y on a constant and x. The hypothesis that x does not *Granger cause* y must be rejected if the coefficient on the error-correction term $\gamma$ is significant, regardless of the joint significance of the $\lambda_j$ coefficients. Our point of interest is that $\gamma<0$ and significantly different from zero implies that x and y are cointegrated. Furthermore, Banerjee et al. (1986) and Kremers et al. (1992) show that standard asymptotic theory can be used when conducting the test in the context of an error correction model; specifically, the *t*-statistic on the error-correction term coefficients $\gamma$ have the usual distribution. To determine the long-run relationships between inflation and deficit, the first step is to verify the order of integration of each of the series involves. Furthermore, following Hondroyiannis and Papapetrou (1994, 1997), Metin (1995), Brown and Yousefi (1996) and Darrat (2000), in this study we have also included money supply, M2, as the third variable.

The standard procedure for determining the order of integration of a time series is the application of augmented Dickey-Fuller test (Dickey and Fuller, 1979) which requires regressing $\Delta y_t$ on a constant, a time trend, $y_{t-1}$ and several lags of the dependent variables to render the disturbance term white-noise. And after determining that the series are of the same order of integration, we then test whether the linear combination of the series that are non-stationary in levels are cointegrated. To conduct the cointegration test, we follow the popular Engle and Granger (1987) two-step procedure for testing the null of non cointegration. The first step of the Engle and Granger's procedure is to determine $\alpha$ as the slope coefficient estimate from the OLS regression of y on a constant (c) and x. A test of cointegration is then that the residuals $\omega_t$ (i.e. $y_t$-c-$\alpha x_t$) from the 'cointegrating regression' be stationary. So in the second step, the ADF unit root test is conducted on the residual $\omega_t$ so as to reject the null hypothesis of integration (of order 1) in favour of stationarity.

**Data Description**

This study employs annual data for the period of 1950 to 1999 for thirteen Asian developing countries. Namely, the developing countries are Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal and Bangladesh.

All the data are obtained from International Financial Statistics Yearbook, 2000 published by the International Monetary Fund. This study uses the consumer price index (CPI) as the price level, government expenditure (G) minus government revenue (T) as the proxy of the total of budget deficits (BD), and M2 as the measure for money stock. All variables were transformed into natural logarithm for the analysis throughout the study.

## *IV. Empirical Results and Discussions*

### Results of Unit Root Tests

Table 2 presents the result of the augmented Dickey-Fuller (ADF) test for all series involved in the analysis in logarithmic form in levels and first-differenced. Our results indicate that non-stationarity cannot be rejected for the levels at the 5 percent significance level based on the ADF test. When the series are differenced once, non-stationarity can be rejected for all series. The ADF statistics suggest that all three series – budget deficits, money supply and consumer price index are integrated of order one, whereas the first-differences are integrated of order zero. Therefore, all series is best characterized as difference-stationary process instead of trend-stationary process.

### Results of the Cointegration Tests

The results of the cointegration tests are presented in Table 3. The results of the unit root test on the residuals of the cointegrating regressions suggest that the null hypothesis of non-cointegration can be rejected at the 5 percent significance level. After determining that the three variables – inflation, budget deficits and money supply are cointegrated, it is appropriate to estimate an error-correction model. Results of the error-correction models are presented in Tables 5 to 17 for each of the thirteen Asian countries, respectively: Bangladesh, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Singapore, South Korea, Sri Lanka, Taiwan and Thailand.

### Results of the Error-Correction Models

The final error-correction models estimated were derived according to the Hendry's 'general-to-specific' specification search. The congruency of the models with the data generating process is observed from a battery of diagnostic tests which include the test for serial correlation, heteroskedasticity, and normality of the residuals. Generally, the diagnostic tests indicate well-fitting error-correction models that fulfil the condition of serial non-correlation, homoskedasticity, and normality of residuals. In all equations estimated the error-correction term exhibit correct negative sign and is statistically significant at the 5 percent level, thus providing further support for the hypothesis of cointegration. The significance of the error-correction term suggest that both money and budget deficits *Granger cause* inflation in the long run. The error-correction term also indicates the speed with which deviations from long-run equilibrium will be corrected. This would appear to take place quite slowly ranging from 32 percent for India to 13 percent for Sri Lanka in which the deviation from the long-run equilibrium are eliminated or generally after about less than two quarters for all countries under study. In this study we endeavor to estimates the short-run causality between inflation and budget deficits. Out of the 13 countries estimated, only in the cases of Bangladesh, South Korea and Sri Lanka that we found budget deficits *Granger cause* inflation in the short-run. For all other selected Asian countries, the null hypothesis that budget deficits *Granger cause* inflation are rejected at the 5 percent level of significance.

## *V. Concluding Remarks*

In this study we attempt to determine the long-run relationship between budget deficits and inflation in thirteen Asian developing countries, namely; Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal and Bangladesh. Using annual data for the period 1950 – 1999 and applying cointegration and the error-correction model approach we conduct the long-run and short-run Granger causality tests. The results of this study are as follows: (1) The empirical results suggest that all variables – budget deficits, money supply and inflation are integrated of order one, or I(1) processes; (2) Our ECM model estimated indicate the existence of a long-run relationship between inflation and budget deficits (with the presence of money supply as a third variable); (3) The diagnostic checking tests suggest no evidence of non-normality of the residuals, autocorrelation, and heteroscedasticity. This evidence supports the robustness of the estimated models in this study; and (4) Finally, based on the empirical evident, we can conclude that budget deficits are inflationary in the selected Asian developing countries covered in the study.

## *References*

Abizadeh, S. and Yousefi, M. (1998). Deficits and Inflation: An Open Economy Model of the United States. *Applied Economics*, 30, 1307-1316.

Aghveli, B.B. and Khan, M.S. (1978). Government Deficits and the Inflationary Process in Developing Countries. *International Monetary Staff Papers*, 25(3), 383-415.

Banerjee, A., J.J. Dolado, D.F. Hendry and Smith, G.W. (1986). Exploring Equilibrium Relationship in Econometric through Static Models: Some Monte Carlo Evidence. *Oxford Bulletin of Economics and Statistics*, 48, 253-277.

Brown, K.H. and Yousefi, M. (1996). Deficits, Inflation and Central Banks' Independence: Evidence from Developing Nations. *Applied Economics Letters*, 3, 505-509.

Chang, H.J. (1994). Impact of Inflation, Output, Employment, and Income Effect in Budget Deficits for Taiwan: A forecast of Regional Input-Output Approach. *Journal of Policy Modeling*, 16(3), 345-351.

Cukierman, A., Webb, B. and Neyapti, B. (1992). The Measurement of Central Bank Independence and its Effect on Policy Outcomes. *World Bank Economic Review*, 6(September), 353-398.

Darrat, A.F. (2000). Are Budget Deficits Inflationary? A Reconsideration of the Evidence. *Applied Economics Letters*, 7, 633-636.

Dhakal, D., Kandil, M., Sharma, S.C. and Trescott, P.B. (1994). Determinants of the Inflation rate in the United States: A VAR Investigation. *The Quarterly Review of Economics and Finance*, 34(1), 95-112.

Dejtbamrong, T (1993). *The Budget Deficit: Its Impact on Money Supply and Output in Selected SEACEN Countries*. Kuala Lumpur:The SEACEN Centre.

Dickey, D.A. and Fuller, W.A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74, 427-431.

Dwyer, G. P. Jr. (1982). Inflation and Government Deficits. *Economic Inquiry*, 20, 315-329.

Engle, R.F. and Granger, C.W.J. (1987). Cointegration and Error-Correction: Representation, Estimation and Testing. *Econometrica*, 49, 1057-1072.

Gupta, K.L. (1992). *Budget Deficits and Economic Activity in Asia*, London and New York: Routledge.

Hambunger, M.J. and Zwick, B. (1981). Deficits, Money and Inflation: Reply. *Journal of Monetary Economics*, 7, 141-150.

Hondroyiannis, G. and Papapetrou, E. (1994). Cointegration, Causality and the Government Budget-Inflation Relationship in Greece. *Applied Economics Letters*, 1, 204-206.

Hondroyiannis, G. and Papapetrou, E. (1997). Are Budget Deficits Inflationary? A Cointegration Approach. *Applied Economics Letters*, 4, 493-496.

International Monetary Fund. (2000). *International Financial Statistic Yearbook 2000*. Washington, D.C.: IMF.

Karras, G. (1994). Macroeconomic Effects of Budget Deficits: Further International Evidence. *Journal of International Money and Finance*, 13(2), 190-210.

Kremers, J.J.M., N.R. Ericsson and J.J. Dolado. (1992). The Power of Cointegration Tests. *Oxford Bulletin of Economics and Statistics* 54(3): 325-348.

MacKinnon, J. (1991). Critical Values for Cointegration Tests. In R.F. Engle and C.W.J. Granger (eds.). *Long-Run Economic Relationships: Reading in Cointegration*. New York: Oxford University Press.

Metin, K. (1995). An Integrated Analysis of Turkish Inflation. *Oxford Bulletin of Economic and Statistic*, 57,513-533.

Metin, K. (1998). The Relationship Between Inflation and the Budget Deficit in Turkey. *Journal of Business & Economic Statistics*, 16(4), 412-422.

Niskanen, W.A. (1978). Deficits, Government Spending, and Inflation. *Journal of Monetary Economics*, 4, 591-602.

Protopapadakis, A.A. and Siegel, J.J. (1987). Are money Growth and Inflation related to Government Deficits? Evidence from Ten Industrialized Economics. *Journal of International Money and Finance*, 6, 31-48.

Rahman, M., Mustafa, M. and Bailey, E.R. (1996). U.S. Budget Deficits, Inflation and Exchange Rate: A Cointegration Approach. *Applied Economics Letters*, 3, 365-368.

**Table 1:** Results of causality tests between budget deficit and inflation

| Authors | Country | Period of study | Direction of causality |
|---|---|---|---|
| Dwyer (1982) | United States | 1952-1981 | No Relationship |
| Chang (1994) | Taiwan | 1990-1997 | BD => P |
| Hondroyiannis-Papapetrou (1994) | Greece | 1960-1992 | BD <=> P |
| Metin (1995) | Turkey | 1950-1987 | BD => P |
| Rahman *et al.* (1996) | United States | 1947.1-1992.2 | BD => EX => P |
| Brown-Yousefi (1996) | India | 1950-1993 | No Relationship |
| | Indonesia | 1950-1993 | No Relationship |
| | Israel | 1950-1993 | No Relationship |
| | Mexico | 1950-1993 | No Relationship |
| | Pakistan | 1950-1993 | No Relationship |
| | Philippines | 1950-1993 | No Relationship |
| | South Africa | 1950-1993 | No Relationship |
| | Thailand | 1950-1993 | No Relationship |
| | Turkey | 1950-1993 | No Relationship |
| | Venezuela | 1950-1993 | No Relationship |
| Hondroyiannis-Papapetrou (1997) | Greece | 1957-1993 | No Relationship |
| Metin (1998) | Turkey | 1950-1987 | BD => P |
| Abizadeh-Yousefi (1998) | United States | 1951-1986 | No relationship |
| Darrat (2000) | Greece | 1957-1993 | BD => P |

Notes: BD = Budget Deficits, P = Inflation, EX = Exchange Rate.

**Table 3:** Results of Cointegration Tests

| Country | ADF on residuals |
|---|---|
| Bangladesh | -5.36(1)* |
| India | -4.01(1)* |
| Indonesia | -2.22(1)* |
| Malaysia | -2.71(1)* |
| Myanmar | -2.94(1)* |
| Nepal | -3.57(1)* |
| Pakistan | -3.08(1)* |
| Philippines | -2.49(1)* |
| Singapore | -2.16(1)* |
| South Korea | -2.72(1)* |
| Sri Lanka | -1.98(1)* |
| Taiwan | -2.40(1)* |
| Thailand | -2.61(1)* |

Notes: Asterisk (*) denotes statistically significant at the 5% level. The critical value at 5% level of significance is -1.954. (See MacKinnon, 1991). Lags truncation are in parentheses.

**Table 4:** Summary – Diagnostic, Long-run Causality and Short-run Causality Results

| Country | Diagnostic tests | Impact of Budget Deficits on Inflation: Long-run causality | Short-run causality |
|---|---|---|---|
| Bangladesh | Passed | Yes | Yes (negative) |
| India | Passed | Yes | No |
| Indonesia | Passed | Yes | No |
| Malaysia | Passed | Yes | No |
| Myanmar | Passed | Yes | No |
| Nepal | Passed | Yes | No |
| Pakistan | Passed | Yes | No |
| Philippines | Passed | Yes | No |
| Singapore | Passed | Yes | No |
| South Korea | Passed | Yes | Yes (positive) |
| Sri Lanka | Passed | Yes | Yes (negative) |
| Taiwan | Passed | Yes | No |
| Thailand | Passed | Yes | No |

Notes: Summarized from Tables 5 to 17.

**Table 5:** Results of error-correction model for Bangladesh

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta M2(-1) + \gamma_4 \Delta BD(-1)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.00021 | -0.02691 |
| ECT(-1) | -0.16995 | -2.80742* |
| ΔCPI(-1)) | 0.637496 | 8.138295* |
| ΔM2(-1)) | 0.209433 | 2.071071 |
| ΔBD(-1)) | -0.1072 | -2.44301* |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.846620 | |
| Normality test | 0.801992 | |
| Serial Correlation LM test | 0.193216 | |
| ARCH LM test | 0.597419 | |
| Wald Test: | | |
| $H_0$: $\gamma_4 = 0$ | 0.023054* | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticly distributed as $\chi$-square.

**Table 6:** Results of error-correction model for India

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta M2(-1) + \gamma_4 \Delta M2(-3) + \gamma_5 \Delta BD(-6)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | 0.006743 | 0.631182 |
| ECT(-1) | -0.3221 | -3.12523* |
| ΔCPI(-1)) | 0.492379 | 3.462108* |
| ΔM2(-1)) | 0.665828 | 3.207712* |
| ΔM2(-3)) | -0.51316 | -2.40728* |
| ΔBD(-6)) | 0.149497 | 1.909317 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.386848 | |
| Normality test | 0.217926 | |
| Serial Correlation LM test | 0.712518 | |
| ARCH LM test | 0.832752 | |
| | | |
| Wald Test: | | |
| $H_0: \gamma_5 = 0$ | 0.063999 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 7:** Results of error-correction model for Indonesia

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta M2 + \gamma_3 \Delta CPI(-1) + \gamma_4 \Delta BD(-3) + \gamma_5 \Delta M2(-1)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.02884 | -1.4164 |
| ECT(-1) | -0.23202 | -2.19362* |
| ΔM2) | 0.6161 | 4.674591* |
| ΔCPI(-1)) | 0.459065 | 2.523672* |
| ΔBD(-3)) | 0.049881 | 0.34278 |
| ΔM2(-1)) | -0.06462 | -0.3434 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.611405 | |
| Normality test | 0.515412 | |
| Serial Correlation LM test | 0.463751 | |
| ARCH LM test | 0.787482 | |
| | | |
| Wald Test: | | |
| $H_0: \gamma_4 = 0$ | 0.735171 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 8:** Results of error-correction model for Malaysia

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-2) + \gamma_4 \Delta M2(-1) + \gamma_5 \Delta CPI(-2) + \gamma_6 \Delta CPI(-3)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.00155 | -0.40734 |
| ECT(-1) | -0.23963 | -2.3807* |
| ΔCPI(-1)) | 0.540558 | 3.922177* |
| ΔBD(-2)) | -0.05212 | -1.26933 |
| ΔM2(-1)) | 0.158539 | 2.13986* |
| ΔCPI(-2)) | -0.21034 | -1.3493 |
| ΔCPI(-3)) | 0.138579 | 1.004942 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.589362 | |
| Normality test | 0.566761 | |
| Serial Correlation LM test | 0.834607 | |
| ARCH LM test | 0.385588 | |
| | | |
| Wald Test: | | |
| $H_0$: $\gamma_3 = 0$ | 0.214416 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 9:** Results of error-correction model for Myanmar

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-3) + \gamma_4 \Delta BD(-4) + \gamma_5 \Delta M2(-1)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.00143 | -0.16084 |
| ECT(-1) | -0.15905 | -2.11405* |
| ΔCPI(-1)) | 0.663724 | 5.331168* |
| ΔBD(-3)) | -0.15975 | -1.65995 |
| ΔBD(-4)) | -0.15997 | -1.68647 |
| ΔM2(-1)) | 0.203484 | 2.246315* |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.539991 | |
| Normality test | 0.665868 | |
| Serial Correlation LM test | 0.220427 | |
| ARCH LM test | 0.409525 | |
| | | |
| Wald Test: | | |
| $H_0$: $\gamma_3=\gamma_4=0$ | 0.141521 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 10:** Results of error-correction model for Nepal

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-2) + \gamma_3 \Delta CPI(-4) + \gamma_4 \Delta BD(-1) + \gamma_5 \Delta M2(-1)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | 0.010097 | 0.8216 |
| ECT(-1) | -0.2371 | -2.33736* |
| ΔCPI(-2)) | -0.08997 | -0.68403 |
| ΔCPI(-4)) | -0.03238 | -0.25404 |
| ΔBD(-1)) | 0.128121 | 2.012729 |
| ΔM2(-1)) | 0.381629 | 2.786759* |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.315289 | |
| Normality test | 0.974779 | |
| Serial Correlation LM test | 0.651967 | |
| ARCH LM test | 0.928184 | |
| | | |
| Wald Test: | | |
| $H_0: \gamma_4 = 0$ | 0.052899 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticly distributed as χ-square.

**Table 11:** Results of error-correction model for Pakistan

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-1) + \gamma_4 \Delta M2(-1)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.00321 | -0.48022 |
| ECT(-1) | -0.26094 | -3.77964* |
| ΔCPI(-1)) | 0.710472 | 6.167727* |
| ΔBD(-1)) | 0.079904 | 1.381112 |
| ΔM2(-1)) | 0.202273 | 2.256253* |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.528709 | |
| Normality test | 0.088244 | |
| Serial Correlation LM test | 0.604787 | |
| ARCH LM test | 0.999834 | |
| | | |
| Wald Test: | | |
| $H_0: \gamma_3 = 0$ | 0.175530 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticly distributed as χ-square.

**Table 12:** Results of error-correction model for Philippines

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta M2(-2) + \gamma_4 \Delta CPI(-3) + \gamma_5 \Delta BD(-3) + \gamma_6 \Delta BD(-4) + \gamma_7 DUMMY(1984=1, Otherwise=0)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | 0.028427 | 2.330236* |
| ECT(-1) | -0.13892 | -2.57757* |
| ΔCPI(-1)) | 0.348764 | 2.935045* |
| ΔM2(-2)) | -0.16332 | -1.3186 |
| ΔCPI(-3)) | 0.202905 | 1.463392 |
| ΔBD(-3)) | -0.15779 | -1.21244 |
| ΔBD(-4)) | -0.05662 | -0.48223 |
| ΔDUMMY(1984=1, Otherwise=0) | 0.115576 | 4.281591* |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.527253 | |
| Normality test | 0.600004 | |
| Serial Correlation LM test | 0.716248 | |
| ARCH LM test | 0.121373 | |
| | | |
| Wald Test: | | |
| $H_0: \gamma_5=\gamma_6=0$ | 0.463252 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 13:** Results of error-correction model for Singapore

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-2) + \gamma_4 \Delta M2(-4)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.00438 | -0.50449 |
| ECT(-1) | -0.24152 | -2.73156* |
| ΔCPI(-1)) | 0.66013 | 4.143303* |
| ΔBD(-2)) | -0.02394 | -0.6697 |
| ΔM2(-4)) | 0.163386 | 1.233338 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.332591 | |
| Normality test | 0.146874 | |
| Serial Correlation LM test | 0.208471 | |
| ARCH LM test | 0.130282 | |
| | | |
| Wald Test: | | |
| $H_0: \gamma_3 = 0$ | 0.508739 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 14:** Results of error-correction model for South Korea

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-1) + \gamma_4 \Delta M2(-2) + \gamma_5 \Delta CPI(-3) + \gamma_6 \Delta M2(-3)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | 0.01354 | 1.785192 |
| ECT(-1) | -0.15686 | -2.35826* |
| ΔCPI(-1)) | 0.720846 | 5.836044* |
| ΔBD(-1)) | 0.15663 | 2.989892* |
| ΔM2(-2)) | 0.219776 | 3.127695* |
| ΔCPI(-3)) | -0.15291 | -1.77886 |
| ΔM2(-3)) | -0.17786 | -2.58142* |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.590578 | |
| Normality test | 0.270464 | |
| Serial Correlation LM test | 0.438945 | |
| ARCH LM test | 0.741662 | |
| | | |
| Wald Test: | | |
| $H_0$: $\gamma_3 = 0$ | 0.005081* | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 15:** Results of error-correction model for Sri Lanka

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-1) + \gamma_4 \Delta CPI(-2) + \gamma_5 \Delta M2(-2) + \gamma_6 \Delta CPI(-3) + \gamma_7 \Delta M2(-3) + \gamma_8 \Delta CPI(-4) + \gamma_9 \Delta BD(-4) + \gamma_{10} \Delta M2(-5)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | 0.004568 | 0.913001 |
| ECT(-1) | -0.13053 | -2.48291* |
| ΔCPI(-1)) | 0.390053 | 2.45668* |
| ΔBD(-1)) | -0.02535 | -1.95384 |
| ΔCPI(-2)) | 0.303949 | 1.826876 |
| ΔM2(-2)) | 0.089676 | 0.979548 |
| ΔCPI(-3)) | -0.11126 | -0.68769 |
| ΔM2(-3)) | 0.072564 | 0.773716 |
| ΔCPI(-4)) | 0.144542 | 1.007037 |
| ΔBD(-4)) | -0.02936 | -2.74802* |
| ΔM2(-5)) | -0.11365 | -1.34474 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.585556 | |
| Normality test | 0.170820 | |
| Serial Correlation LM test | 0.356039 | |
| ARCH LM test | 0.393577 | |
| | | |
| Wald Test: | | |
| $H_0$: $\gamma_3=\gamma_9=0$ | 0.009574* | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 16:** Results of error-correction model for Taiwan

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-1) + \gamma_4 \Delta M2(-1) + \gamma_5 \Delta CPI(-2) + \gamma_6 \Delta BD(-2) + \gamma_7 \Delta M2(-2) + \gamma_8 \Delta CPI(-3) + \gamma_9 \Delta BD(-3) + \gamma_{10} \Delta M2(-3) + \gamma_{11} \Delta CPI(-4) + \gamma_{12} \Delta BD(-4) + \gamma_{13} \Delta M2(-4) + \gamma_{14} \Delta CPI(-5) + \gamma_{15} \Delta BD(-5) + \gamma_{16} \Delta M2(-5)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | -0.01875 | -1.64826 |
| ECT(-1) | -0.1385 | -2.4465* |
| ΔCPI(-1)) | 0.953076 | 5.184647* |
| ΔBD(-1)) | -0.10931 | -1.14458 |
| ΔM2(-1)) | -0.23722 | -1.62392 |
| ΔCPI(-2)) | -0.11163 | -1.6221 |
| ΔBD(-2)) | 0.084808 | 0.876877 |
| ΔM2(-2)) | 0.255631 | 1.70966 |
| ΔCPI(-3)) | 0.142421 | 2.106098 |
| ΔBD(-3)) | 0.008806 | 0.096489 |
| ΔM2(-3)) | 0.399474 | 2.774521* |
| ΔCPI(-4)) | -0.0672 | -0.96634 |
| ΔBD(-4)) | -0.01464 | -0.16106 |
| ΔM2(-4)) | -0.23407 | -1.44173 |
| ΔCPI(-5)) | 0.113427 | 1.476167 |
| ΔBD(-5)) | 0.019078 | 0.251622 |
| ΔM2(-5)) | 0.044245 | 0.28499 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.758521 | |
| Normality test | 0.748461 | |
| Serial Correlation LM test | 0.375154 | |
| ARCH LM test | 0.665244 | |
| | | |
| Wald Test: | | |
| $H_0$: $\gamma_3=\gamma_6=\gamma_9=\gamma_{12}=\gamma_{15}=0$ | 0.693040 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

**Table 17:** Results of error-correction model for Thailand

The estimated model: $\Delta CPI = \gamma_0 + \gamma_1 ECT(-1) + \gamma_2 \Delta CPI(-1) + \gamma_3 \Delta BD(-4) + \gamma_4 \Delta M2(-2)$

| Independent Variable | Estimated coefficient | *t*-statistics |
|---|---|---|
| Constant | 0.002365 | 0.307487 |
| ECT(-1) | -0.15027 | -2.83299* |
| ΔCPI(-1)) | 0.501907 | 3.851121* |
| ΔBD(-4)) | -0.09127 | -1.64172 |
| ΔM2(-2)) | 0.127238 | 1.002118 |
| | | |
| *Summary statistics* | *p-values* | |
| $R^2$-adjusted | 0.425326 | |
| Normality test | 0.214484 | |
| Serial Correlation LM test | 0.518739 | |
| ARCH LM test | 0.312398 | |
| | | |
| Wald Test | | |
| $H_0$: $\gamma_3 = 0$ | 0.108488 | |

Notes: Asterisk (*) denotes statistically significant at the 5% level. Δ is the first-difference operator. ECT = error-correction term; CPI = consumer price index; BD = budget deficits; M2 = money supply M2. LM is the Breusch and Godfrey's Lagrange multiplier tests for first-order serial correlation. Arch (1) is the first-order autoregressive conditional heteroscedasticity test of Engle (1982). Normality (2) is a test for the normality of the residuals based on Jarque and Bera (1980). These tests are asymptoticlly distributed as $\chi$-square.

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

| Country & Series | | Augmented Dickey-Fuller (ADF)[1] Level | First difference | Country & Series | | Augmented Dickey-Fuller (ADF) Level | First difference |
|---|---|---|---|---|---|---|---|
| Bangladesh: | CPI | -1.23 (1) | -3.20(1)* | Philippines: | CPI | -2.69(3) | -4.40(1)* |
| | BD | -1.44(2) | -3.76(2)* | | BD | -2.17(3) | -3.41(3)* |
| | M2 | 0.26(3) | -3.35(2)* | | M2 | -3.36(3) | -3.69(3)* |
| India: | CPI | -3.22(1) | -4.38(3)* | Singapore: | CPI | -1.69(3) | -4.84(1)* |
| | BD | -2.88(3) | -3.95(3)* | | BD | -0.92(1) | -6.00(1)* |
| | M2 | -0.70(2) | -3.21(2)* | | M2 | -2.15(3) | -3.78(3)* |
| Indonesia: | CPI | -1.93(3) | -3.89(3)* | South Korea: | CPI | 0.63(3) | -3.14(3)* |
| | BD | -3.22(3) | -3.69(3)* | | BD | -2.45(3) | -7.08(1)* |
| | M2 | -3.20(1) | -3.93(3)* | | M2 | -0.77(3) | -4.78(3)* |
| Malaysia: | CPI | -2.75(3) | -3.41(2)* | Sri Lanka: | CPI | -2.60(1) | -3.15(1)* |
| | BD | -2.07(3) | -3.75(3)* | | BD | -3.10(1) | -4.23(1)* |
| | M2 | -2.47(3) | -3.50(1)* | | M2 | -1.62(3) | -3.15(1)* |
| Myanmar: | CPI | 0.06(3) | -3.67(1)* | Taiwan: | CPI | -1.01(3) | -4.92(1)* |
| | BD | -2.23(1) | -3.63(3)* | | BD | -3.44(1) | -3.89(3)* |
| | M2 | 0.60(3) | -3.28(1)* | | M2 | -2.11(1) | -3.23(1)* |
| Nepal: | CPI | -2.18(3) | -4.18(3)* | Thailand: | CPI | -2.19(3) | -4.14(1)* |
| | BD | -2.71(3) | -4.98(3)* | | BD | -2.25(3) | -3.59(3)* |
| | M2 | -1.33(3) | -6.63(1)* | | M2 | -2.19(3) | -3.68(3)* |
| Pakistan: | CPI | -2.50(3) | -3.04(1)* | | | | |
| | BD | -2.41(1) | -3.77(3)* | | | | |
| | M2 | -2.34(3) | -4.75(1)* | | | | |

Notes: [1]Run series in level with trend and intercept, and first-difference with intercept only. Asterisk (*) denotes statistically significant at the 5% level. The critical value (With trend) at 5% level of significance is -3.506; The critical value (Without trend) at 5% level of significance is -2.924 (See MacKinnon, 1991). Lags truncation are in parentheses.