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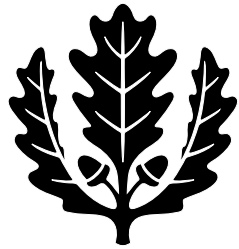
Countervailing Duties in the USA

Jai S. Mah
Dankook University

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Countervailing Duties in the USA

Jai S. Mah
Dankook University

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341 Mansfield Road, Unit 1063
Storrs, CT 06269-1063
Phone: (860) 486-3022
Fax: (860) 486-4463
<http://www.econ.uconn.edu/>

Abstract

This paper reveals the characteristics of the ITC's decisions on countervailing duties, which have seldom been studied. The empirical evidences based on time series data show that there is a long run equilibrium relationship between affirmative countervailing decisions and macroeconomic variables such as economic growth rates and import penetration ratios. The error correction models show that there is a unidirectional causality from affirmative countervailing decisions to slower economic growth.

Journal of Economic Literature Classification: F13

Keywords: trade protection, countervailing duties, ITC

I. Introduction

Authorities of the importing countries may impose countervailing duties on imported products which were subsidized by the government of the exporting country. Advocates of countervailing duties argue that they are levied to level the playing field in international trade, although their opponents suggest that they may be contrary to the consumers' interests in the importing country. To prevent excessive use of countervailing duties, it is necessary to have trade regulations governing subsidies and countervailing measures in the global trading system, which are found in the Uruguay Round Agreement on Subsidies and Countervailing Measures as well as the General Agreement on Tariffs and Trade (GATT).

This paper reveals the characteristics of the United States' countervailing duties, considering that it has been the world's heaviest user of the countervailing duties. Despite the theoretical and institutional differences between antidumping and countervailing duties, most international economists working on empirical aspects of trade remedy measures have focused on the former and have seldom distinguished the characteristics of these from those of the latter, which are summarized in Blonigen and Prusa (2001). Baldwin and Steagall (1994), who can be regarded as an exception in the literature, compared the antidumping duties with countervailing duties. However, they did not think of the possibility of spurious regression arising from use of non-stationary data. Nor did they consider the relationship between countervailing duties and macroeconomic situation, either. This paper examines whether macroeconomic variables have long run equilibrium relationships with the U.S. International Trade Commission's (ITC's) countervailing decisions and reveals causal relationships between those variables by the error correction model.

The structure of the paper is organized as follows. In the next section, the countervailing decision making process in the United States is explained. Section III presents the models used to analyze the stationary properties, the cointegration nature and the causal relationships between the concerned variables. In section IV, the practices of countervailing duties, data and empirical evidences following from the models are provided. The final section summarizes the overall results.

II. Institutional Background

Although most economists do not refute the superiority of free trade over protection in improving national welfare, policy makers in most countries have actively practised some policy measures to protect the domestic industries. Considering the impact of subsidies in the sense of injury to the domestic industry of importing country, they have been regulated by the current global trading system. The GATT has allowed imposition of the countervailing duties to counteract subsidies. GATT Article VI.3 defines the countervailing duty as "a special duty levied for the purpose of offsetting any bounty or subsidy bestowed, directly, or indirectly, upon the manufacture, production or export of any merchandise." It also stipulates that "no countervailing duty shall be in excess of an amount equal to the estimated bounty or subsidy." The GATT Article VI.6 stipulates the basic conditions for imposition of countervailing duties in the sense that it cannot be levied if it does not "cause or threaten material injury to an established domestic industry, or is such as to retard materially the establishment of a domestic industry."

The new Agreement on Subsidies and Countervailing Measures, SCM Agreement hereafter, as a result of the Uruguay Round modified the prior Tokyo Round Subsidies Code in several important aspects. Although the Tokyo Round Subsidies Code dealt with unilateral responses to subsidies, there was no clear definition of a countervailable subsidy. Because of the Code's silence on this issue, countries were given a great deal of latitude in defining 'subsidy' for countervailing duty purposes (Trebilcock and Howse (1995)). The Subsidies Code tried to provide some measure of substantive regulation in a field which is at the heart of the industrial policy debate (domestically) and that of the unfair trade one (internationally) (Zampetti (1995)).

There is no precise definition of 'material injury' in the Tokyo Round Subsidies Code nor in the Uruguay Round SCM Agreement. Meanwhile, in determining material injury, Article 15.4 of the Uruguay Round SCM Agreement specifies that the examination of the impact of the subsidized imports on the domestic industry should include an evaluation of all relevant economic factors and indices having a bearing on the state of the industry. Since there is yet no definition of material injury in the Agreement, its interpretation can still be done arbitrarily. Regarding the causal

linkage, there is no precise definition of causation in the Uruguay Round SCM Agreement, either.

The United States has led the above-described evolution of the subsidies-related regulations in the multilateral trading system. In the United States, laws dealing with unfair foreign subsidization date back to the Tariff Act of 1897. However, the use of the U.S. countervailing duties did not become widespread until it was revised in the Trade Act of 1974. The most important change was to make automatic the private right of action in seeking countervail redress. This, in turn, led to a dramatic increase in the number of countervail cases in the United States, and hence escalated international concern (Collins-Williams and Salembier (1996)). The current law regarding the countervailing duties is found in the Trade Agreements Act of 1979, which is an amendment of the Tariff Act of 1930.

Decisions relating to countervailing duties in the United States involve several steps. When the Department of Commerce (DOC) receives a complaint of foreign subsidies, the International Trade Administration of the DOC evaluates whether subsidies have been granted. The ITC must then determine whether or not the complainant industry is either materially injured or threatened with material injury as a result of the subsidized goods. Both agencies must make preliminary and final determinations. If the ITC's preliminary determination is negative, the investigation is to be terminated. If it is affirmative, the DOC should finish a preliminary and final determination of subsidies. In a case where the DOC has made an affirmative final determination, the ITC is required to make a final determination of injury. If both the DOC's and the ITC's decisions were affirmative, then a countervailing duties order is issued. According to Marvel and Ray (1995), the injury test is more important than the subsidy test in the sense that the DOC determined that countervailable subsidies were present in most cases.

The ITC's decisions on material injury can be made quite subjectively. Section 771 of Title VII defines material injury as harm which is not inconsequential, immaterial, or unimportant. It also illustrates the factors that the Commission shall consider, which comprise all relevant economic factors which are likely to have a bearing on the state of the industry in the United States. All of the illustrated injury factors are those restricted to the concerned domestic industry, which do not reflect the overall macroeconomic conditions.

Aware of the potential for lobbying, the Congress designed the ITC to remain insulated from outside pressure. The six Commissioners of the ITC are appointed by the President, approved by the Senate and serve a nonrenewable 9-year term. No more than three Commissioners may be members of a single political party. The voting process relating to countervailing duties is the same as that relating to antidumping duties. A negative ITC decision occurs only when a majority of the ITC Commissioners votes that the imports have not caused material injury.

Until 1979, the United States interpreted injury as one exceeding '*de minimis* injury' (Folsom and Gordon (1995)). The material injury condition was added in the 1979 Antidumping Act as a consequence of the Tokyo Round. In 1979, the House Ways and Means Committee and the Senate Finance Committee opined that the causality condition in the case of imposing countervailing duties is less strict than that required for safeguard measures. In consequence, as from 1980, it was more likely that the number of imposition of countervailing duties and the probability of affirmative injury decisions would be higher (Schoenbaum (1987)).

The current U.S. countervailing duty law is subject to the Uruguay Round SCM Agreement. Some procedural changes such as filing the countervailing duties petitions were made and the sunset review provision was included in the 1994 Uruguay Round Agreements Act. However, little changes were introduced with respect to injury and causation.

III. The Models

Many provisions of the Subsidies Code in the GATT/WTO have been too vague. The injury determination procedure may be interpreted in different ways. In the United States, the ITC's injury determination in countervailing duties cases can be made by subjective judgment. The Commissioners' decisions can be related with the macroeconomic situation as well, since the Commissioners' decisions are likely to affect their job prospects, particularly if one hopes to be appointed to another federal position requiring the nomination of the President. Given the President's views towards the situation of the macroeconomy in tandem with those towards protecting against injurious imports, the Commissioners may be tempted to find that deciding in a

protectionist direction facing deterioration in the economic situation is helpful in gaining a federal position in the future (Baldwin and Steagall (1994)).

Regarding the empirical examination of administered protection measures, authors such as Finger, Hall and Nelson (1982), Herander and Schwartz (1984), Moore (1992), Baldwin and Steagall (1994), Hansen and Prusa (1996), Mah (2000a), and Lee and Mah (2003), among others, used regression analysis to examine the effects of domestic as well as international economic variables on the Commissioners' antidumping decisions. Leidy (1997) used first-differenced data to avoid problems arising from use of non-stationary data. Mah (2000b) revealed the cointegrating vector regarding antidumping duties and macroeconomic variables. However, none of those works except for Baldwin and Steagall (1994) revealed the determinants of countervailing duties, despite the difference between antidumping and countervailing duties. Since Baldwin and Steagall (1994) did not consider the possibility of spurious regression arising from use of non-stationary time series data, this paper tries to reveal the relationship between countervailing decisions and macroeconomic variables in the United States. Specifically, the Commissioners' countervailing decisions are assumed to be related with the macroeconomic situation of the overall economy such as import penetration ratio as the international economic factor and real GDP growth rates as the domestic economic factor. That is, their affirmative countervailing decisions might have long run equilibrium relationships with macroeconomic variables.

Since regression analyses using non-stationary variables may lead to spurious regression, it is necessary to check the stationarity of the concerned variables. The variables under consideration include the percentage of the Commissioners' final affirmative decisions or votes with respect to countervailing petitions in each year as well as import penetration ratios and real GDP growth rates. The variables appearing in this paper denote the following: AD = the ratio of final affirmative decisions divided by total final decisions; AV = the ratio of final affirmative votes (= the number of affirmative votes divided by that of all votes); IP = import penetration ratio; and GY = real GDP growth rate. The data set covers annually observed data for the period 1980 - 1999. This paper starts from testing the stationarity applied to these variables. Augmented Dickey-Fuller tests are performed with respect to these variables. Data for IP and GY are constructed from IMF,

International Financial Statistics Yearbook, and data for AD and AV are observed from the *Annual Reports of the U.S. International Trade Commission, 1980 - 1999*.

In a case where the concerned variables are integrated of the same order, it is necessary to check whether there exist(s) long run equilibrium relationship(s) between the concerned variables, using cointegration tests. If there exist(s) at least a cointegrating vector between the concerned variables, we can conclude that there are long run equilibrium relationship(s) between these variables even if they are non-stationary. This paper uses Johansen's (1988, 1991) method to reveal the cointegrating relationship and to provide the cointegrating vectors. The cointegrating relationship between the countervailing decisions and macroeconomic variables can be shown in the following manner:

$$f(\text{AD (or AV), IP, GY}) = 0 \quad (1)$$

Engle and Granger's (1987) Representation Theorem says that there exists an error correction model if the concerned variables are cointegrated. The error correction model regards the differenced dependent variable as a function of the error correction term as well as the differenced explanatory variables. It can reveal the causal relationships between concerned variables. In a case where there exist cointegrating relationships between the concerned variables, generally used Granger or Sims causality tests are not useful for testing the causal relationships. Although the existence of the cointegrating relationship can tell us that of the causal relationship, it cannot tell anything about the direction of the causality. Meanwhile, the error correction model can tell us this. By using the error correction model, we can check the problems of two-way causality. For instance, the ITC's affirmative countervailing decisions may increase with slowdown in the economic growth rate. On the other hand, it is also possible that its countervailing decisions may harm the performance of the economy by distorting the resource allocational mechanism.

We can form the error correction models in the following manner:

$$(1-L)x_t = a_1 + b_1z_{1t-1} + A(L)(1-L)x_t + B(L)(1-L)y_t + e_{1t} \quad (2)$$

$$(1-L)y_t = a_2 + b_2z_{2t-1} + C(L)(1-L)y_t + D(L)(1-L)x_t + e_{2t} \quad (3)$$

where L denotes the lag operator. The variables e_{1t} and e_{2t} are assumed to be the disturbance terms with white noise properties. The error correction terms in equations (2) and (3), z_1 and z_2 , denote

those arising from regressing x on y , and y on x , respectively.

Granger (1988) showed that one of the methods for testing the causal direction is to examine the statistical significance of the error correction term. Where there exists a cointegrating relationship between two variables, at least one of the error correction terms should be statistically significant. If b_1 is statistically significant, the causal relationship runs from y to x , and if b_2 is significant, it runs from x to y .

IV. Empirical Evidences

Unlike antidumping actions, the United States was the only main user of the countervailing duties. For instance, between 1979 and 1988 the United States initiated 371 actions while all other countries initiated only 58 (Trebilcock and Howse (1995)). That is, the United States alone shared 86 percent of initiation of countervailing duties in the concerned period. Although the share of the other countries initiating countervailing duties increased recently, the United States has been by far the leader in initiating them. For instance, the United States alone has shared about 40 percent of initiation of countervailing duties since 1995.

Countervailing duties cases, once filed, have proven more difficult to carry to imposition of duties than have antidumping petitions. For the period 1980-1999, as is shown in Table 1, less than 73 percent of countervailing duty petitions resulted in successful preliminary U.S. ITC determinations, compared with 81 percent in case of antidumping cases. Such a difference is more conspicuous in case of final decisions and the Commissioners in the ITC tend to consider more cautiously in case of final decisions. That is, during the same period, some 47 percent of countervailing duties petitions resulted in final affirmative injury decisions, compared with 63 percent in the case of antidumping duties.

[Insert Table 1]

When the ratios of the U.S. ITC Commissioners' affirmative votes out of total votes are

compared, during 1980 - 1999 the ratio of affirmative votes in case of countervailing duties is six to twelve percent lower than that in the case of antidumping duties, as is shown in Table 2. These evidences are plausible in the sense that, since countervailing duties relate to governmental subsidies, the Commissioners tend to consider diplomatically unlike antidumping duties which deal with the private firms' practices.

[Insert Table 2]

To reveal the determinants of the Commissioners' decisions on countervailing duties, it is necessary to examine the statistical properties of the concerned variables. Among others, the augmented Dickey-Fuller test is used to examine how stationary the series are. The unit root test results show that the levels of the concerned variables are in general not stationary. Therefore, I examine whether the first differenced forms of the concerned variables are stationary or not. Table 3 shows that it is not unrealistic to assume that the variables GY, IP, AD, and AV are integrated of order one.

[Insert Table 3]

The existence of long run equilibrium relationships among the concerned variables is checked by Johansen cointegration procedure. Regarding the long run equilibrium relationship between AD and macroeconomic variables, Table 4 demonstrates that there exists at least a cointegrating vector between AD and GY, although such a vector does not exist between AD and IP at 5 percent level of significance. Therefore, for AD and GY there surely exist error correction models like equations (2) and (3) that capture the dynamic adjustment process.

[Insert Table 4]

Based on the data for the Commissioners' votes, Table 5 reconfirms the long run

relationship between the ITC's countervailing decisions and macroeconomic variables. According to the results, there exists at least a cointegrating vector between AV and GY, although such a vector does not exist between AV and IP at 5 percent level of significance. Summarizing the evidences in Tables 4 and 5, we can be sure that there exists a cointegrating vector between the ratio of affirmative countervailing decisions or votes and real GDP growth rate. According to the coefficient of GY in the cointegrating vector, there appears to be a negative relationship between GY and the final affirmative decisions or votes on countervailing duties.

[Insert Table 5]

The results of the error correction models following from the cointegrating equations are shown in Table 6. They show that there exist bi-directional causal relationships between GY and AD at 5 percent level of significance. Regarding the causal relationship between GY and AV, there exists a unidirectional relationship running from AV to GY at 1 percent level of significance. That is, regardless of the measures of countervailing duties, increase in the ratio of affirmative countervailing decisions tends to slow down the economic growth rate in the United States, even if such trade remedy measures may protect the domestic industry for a while. For the causal relationship from GY to AV, the evidence is not so clear. That is, we cannot be sure that countervailing decisions or votes are caused by the economic growth rate.

[Insert Table 6]

As Blonigen and Prusa (2001) summarized, most of the previous literature on antidumping duties showed that the antidumping decisions were influenced by macroeconomic conditions; for instance, Moore (1992), Leidy (1997), Mah (2000a, 2000b), Lee and Mah (2003)). Unlike those, the current study on countervailing duties show that there is no significant evidence that the ITC Commissioners' decisions on countervailing duties are influenced by macroeconomic variables. They would be more concerned about the situation of the concerned industry. Meanwhile, where

affirmative countervailing decisions are made, imposition of such additional duties increases the cost of the intermediate products, which is plausible in the sense that, as Marvel and Ray (1995) explained, countervailing duties tend to be applied to intermediate goods rather than finished goods. Consequently, they tend to reduce the production and sales of the final products, resulting in the slower economic growth rates.

V. Conclusion

Most of the previous literature on the ITC's decisions on trade remedies against the exporters' unfair practices overlooked the differences between antidumping and countervailing duties and most international economists have focused on antidumping duties in dealing with such trade remedies. Since the United States has led the imposition of countervailing duties, this paper reveals the characteristics of the ITC's decisions on countervailing duties.

The empirical evidences in this paper show that the variables relating to its countervailing decisions are not stationary. Johansen's cointegration test shows that there is a long run equilibrium relationship between the percentage of affirmative countervailing decisions (or votes) and economic growth rates; however, such a relationship is not found between the former and import penetration ratios, which is different from the results in the literature on antidumping duties. The error correction models show that there is a unidirectional causality from affirmative countervailing decisions to slower economic growth. That is, imposition of countervailing duties increases the prices of imported intermediate products and tends to reduce the production and sales of the domestic final products, which slows down economic growth. Although imposition of countervailing duties may protect the concerned domestic industry producing the same or like products for a while, it would distort the resource allocational mechanism, resulting in the less efficient functioning of the overall economy.

References

Baldwin, Robert E. and Jeffrey W. Steagall, "An Analysis of ITC Decisions in Antidumping, Countervailing Duty and Safeguard Cases", *Weltwirtschaftliches Archiv*, 1994, Band 130, Heft 2, pp. 290-308.

Blonigen, Bruce A. and Thomas J. Prusa, "Antidumping", NBER working paper, No. 8398, 2001.

Collins-Williams, Terry and Gerry Salembier, "International Disciplines on Subsidies", *Journal of World Trade*, February 1996, Vol. 30, No. 1.

Engle, Robert F. and Clive W. J. Granger, "Co-integration and Error Correction: Representation, Estimation, and Testing", *Econometrica*, 1987, Vol. 55, pp. 251-276.

Finger, J. M., Hall, H. Keith, and Douglas R. Nelson, "The Political Economy of Administered Protection", *American Economic Review*, June 1982, Vol. 72, No. 3, pp. 452-466.

Folsom, Ralph H. and Michael W. Gordon, *International Business Transaction*, West Publishing Co.: St. Paul, 1995.

Granger, Clive W. J., "Some recent developments in a concept of causality", *Journal of Econometrics*, 1988, Vol. 58, pp. 199-211.

Hansen, Wendy L., and Thomas J. Prusa, "Cumulation and ITC Decision-making: The Sum of the Parts Is Greater than the Whole", *Economic Inquiry*, October 1996, Vol. 34, No. 4, pp. 746-769.

Herander, Mark G., and J. Brad Schwartz, "An Empirical Test of the Impact of the Threat of U.S. Trade Policy: The Case of Antidumping Duties", *Southern Economic Journal*, July 1984, Vol. 51, No. 1.

Johansen, S., "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamics and Control*, 1988, pp. 231-254.

Johansen, S., "Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models", *Econometrica*, 1991, pp. 1551-1580.

Lee, Kyung-Ho, and Jai S. Mah, "Institutional Changes and Antidumping Decisions in the United States", *Journal of Policy Modeling*, September 2003.

Leidy, Michael P., "Macroeconomic Conditions and Pressures for Protection Under Antidumping

and Countervailing Duty Laws: Empirical Evidence from the United States", *International Monetary Fund Staff Papers*, March 1997, Vol. 44, No. 1, pp. 132-144.

Mah, Jai S., "The United States antidumping decisions against the Northeast Asian dynamic economies", *World Economy*, May 2000 (2000a), Vol. 23, No. 5, pp. 773-785.

Mah, Jai S., "Antidumping decisions and macroeconomic variables in the USA", *Applied Economics*, September 2000 (2000b), Vol. 32, pp. 1701-1709.

Marvel, Howard P. and Edward John Ray, "Countervailing Duties", *Economic Journal*, November 1995, Vol. 105, pp. 1576-1593.

Moore, Michael O., "Rules or Politics? An Empirical Analysis of ITC Antidumping Decisions", *Economic Inquiry*, July 1992, Vol. 30, No. 3, pp. 449-466.

Schoenbaum, Thomas J., "Antidumping and Countervailing Duties and the GATT: An Evaluation and a Proposal for a United Remedy for Unfair International Trade", *German Yearbook of International Law*, 1987, Vol. 30, pp. 177-204.

Trebilcock, Michael J. and Robert Howse, *The Regulation of International Trade*, Routledge: London, 1995.

Zampetti, Americo B., "The Uruguay Round Agreement on Subsidies", *Journal of World Trade*, December 1995, Vol. 29, No. 6.

Table 1. The Ratio of the U.S. ITC's Affirmative Decisions

/Total Decisions, 1980-1999

Cases	Preliminary Decisions	Final Decisions
Antidumping Duties	613/758 (80.9%)	307/490 (62.7%)
Countervailing Duties	208/287 (72.5%)	100/215 (46.5%)

Source: U.S. ITC, *Annual Report*, 1980-1999

**Table 2. The Ratio of the Commissioners' Affirmative Votes/Total Votes
, 1980-1999**

Cases	Preliminary Votes	Final Votes
Antidumping Duties	2,980/3,739 (79.7%)	1,578/3,063 (51.5%)
Countervailing Duties	1,045/1,418 (73.7%)	392/980 (40.0%)

Source: U.S. ITC, *Annual Report, 1980-1999*

Table 3. Unit Root Test Results on the Variables Relating to Countervailing Duties - Augmented Dickey-Fuller Tests

Variables	level form	first differenced form
real GDP growth rates (GY)	-3.098*	-4.696**
import penetration ratio (IP)	-0.073	-2.900
ratio of final affirmative decisions/total decisions (AD)	-1.815	-6.915**
ratio of final affirmative votes/total votes (AV)	-2.301	-7.257**

Notes: * (**) denotes statistical significance at 5 (1) % level of significance.

Optimal lags in case of the Augmented Dickey-Fuller tests are chosen by Schwarz selection criterion.

Table 4. Johansen's Cointegration Test Applied to the U.S. ITC's Final Countervailing Decisions

Null hypothesis: r = number of co- integrating vectors	Likelihood ratio statistic	Estimated cointegrating vectors			Log likeli- hood
		AD	cons- tant	GY IP	
r = 0	15.510*				-47.176
r =< 1	6.047*	1.0	3.630	-1.174 (2.507)	
r = 0	12.393				78.929
r =< 1	0.105	1.0	1.508	-10.493 (7.376)	

Notes: * (**) denotes statistical significance at 5 (1) % level of significance. Values within the brackets under the calculated cointegrating vectors denote the standard errors.

**Table 5. Johansen's Cointegration Test Applied to the U.S. ITC Commissioners' Final
Votes Relating to Countervailing Duties**

Null hypothesis: r = number of co- integrating vectors	Likelihood ratio statistic	Estimated cointegrating vectors			Log likeli- hood
		AV	cons- tant	GY IP	
r = 0	20.584**				-40.749
r =< 1	9.153**	1.0	1.109	-0.239 (0.179)	
r = 0	14.186				85.206
r =< 1	0.027	1.0	0.760	-3.055 (4.230)	

Notes: * (**) denotes statistical significance at 5 (1) % level of significance. Values within the brackets under the calculated cointegrating vectors denote the standard errors.

Table 6. Results from the Error Correction Models

$$dAD_t = 0.033 + 0.272^* EC_{t-1} - 1.038dAD_{t-1} - 0.650dAD_{t-2} - 0.037dGY_{t-1} + 0.022dGY_{t-2}$$

$$(0.504) (2.683) (-4.903) (-3.319) (-1.223) (0.743)$$

$$dGY_t = 0.120 - 1.316^{**} EC_{t-1} + 0.355dGY_{t-1} + 0.335dGY_{t-2} - 2.345dAD_{t-1} - 2.120dAD_{t-2}$$

$$(0.317) (-4.385) (1.518) (1.556) (-1.931) (-1.805)$$

$$dAV_t = 0.195 + 0.003EC_{t-1} - 0.954dAV_{t-1} - 0.626dAV_{t-2} - 0.049dGY_{t-1} - 0.013dGY_{t-2}$$

$$(1.925) (1.280) (-4.630) (-3.619) (-1.908) (-0.426)$$

$$dGY_t = 0.157 - 1.349^{**} EC_{t-1} + 0.371dGY_{t-1} + 0.287dGY_{t-2} - 3.589dAV_{t-1} - 1.967dAV_{t-2}$$

$$(0.432) (-4.585) (1.628) (1.358) (-2.303) (-1.284)$$

Notes: The superscripts ***(**)** appearing right after the estimated coefficient of the error correction term (= EC) denote statistical significance at 5 (1) % level of significance. Values within the brackets under the estimated coefficients indicate the calculated t statistics. The notation **d** appearing in front of other variables denotes the first differenced form of the concerned variables.