Cyclical Symmetry and Asymmetry of Fiscal Policy in APEC Countries*

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Abstract

This paper analyzes whether symmetry and asymmetry exist in APEC countries. A country's fiscal stance reflects two aspects: a cyclical component and a long-run trend component. To analyze symmetry and asymmetry of fiscal policy, both aspects should not be forgotten. Applying this idea to APEC countries, this paper finds a significant asymmetry in the reaction of fiscal policy to positive and negative cyclical conditions. In some countries and areas, fiscal rule has been introduced. This paper analyzes its effects and finds that fiscal rule has not been successful in stabilizing economies.

Keywords : APEC, debt, fiscal policy, stabilization

1. Introduction

The Asia-Pacific Economic Cooperation (APEC) was established in 1989. Its goal is to advance the economic dynamism and the sense of community in the Asia-Pacific region. APEC member countries are remarkably different from each other in many respects. This diversity provides mutually beneficial trade and investment potential, which is in stark con-

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trast to the European Union (EU), North American Free Trade Agreement (NAFTA), Association of South-East Asian Nations (ASEAN), Mercado Comun del Cono Sur (MERCOSUR), and other economic alliances. However, such diversity, compounded by a legacy of colonialism and political or military conflicts, also makes cooperation difficult.

The aim of this paper is twofold. One is to analyze whether a significant symmetry and asymmetry exist in APEC countries. The other is to analyze the effects of fiscal policy rule, which some countries have introduced recently.

There has been much dispute regarding symmetry in fiscal policy stance. Most evidence in EU countries shows that asymmetric behavior is provided as illustrated by Buti, Franco, and Ongena (1998) and Korkman (2001). However, little research exists regarding this effect in other areas and countries. In spite of the fact that little attention has been paid to symmetry in academic fields, some countries, including the EU, have suffered large deficits and debt since the 1980s and need to rethink their fiscal policy stance. Countries may have had a role in determining the dispersion of budgetary situations we now observe.

Deficits did not decrease during periods of high economic growth. Countries offset the effects of automatic stabilizers via tax cuts or expenditure increases. Such fiscal relaxation in good times in turn necessitated a tightening during economic downturns. It should be noted that if discretionary tightening in bad times matches discretionary loosening in good times, this tendency, though negative for the stability of the economy, would not support the notion that fiscal policy contributes to debt accumulation. People and in some cases politicians do not notice or neglect this problem condition. Melitz (2002) stated that the explosion of debt/output must be explained independently of the economic cycle. This is a real-world occurrence that disagrees with the traditional economic

textbook thinking on the matter. However, we should question why this circumstance has occurred repeatedly.

There seem to be two factors that should be taken into account. One is a cyclical factor. The other is a long-term structural factor. This paper analyzes the presence of symmetry and asymmetry in the conduct of fiscal policy in APEC and assesses whether symmetrical or asymmetrical fiscal policy have contributed to the growth of public debt. Little research has attempted to account separately for fiscal policy reactions to positive and negative phases of the economic cycle.

This paper is structured as follows. The following section provides the stylized framework underlying the empirical tests. Results of tests for the presence of cyclical symmetry in the conduct of fiscal policy are then reported. The final analysis considers government debt accumulation. Finally, this paper ends with a brief summary.

2. Theoretical Framework

Fiscal policy can and should be analyzed with regard to cyclical factor and long-term structural and trend factors. First, the budget balance ratio to GDP is split into a long-term component and a cyclical component (Balassone & Francese, 2004) as shown in (1).

$$b_t = b^l_t + b^c_t \quad (1)$$

b_t is a budget balance ratio to GDP. If $b_t > 0$, a deficit exists. b^l_t is a long-term component of b_t and b^c_t is a cyclical component of b_t.

The long-term component is assumed to be a linear adjustment process toward the government's preferred balance b^* and debt d^*. Both are ratios to GDP.

$$b_t = b_{t-1} + \alpha (b^* - b_{t-1}) + \beta (d^* - d_{t-1}) + u_t \quad \alpha, \beta > 0; \; ut \sim NID (0, \sigma_u) \quad (2)$$

Note that in the long-run, $d = b^*/g$, where g is the equilibrium nominal GDP growth.

These can be thought of as the result of the optimization of an objective function linking electoral support to a number of macroeconomic variables that are subject to constraints imposed by one's preferred model of the economy, and b^* and d^* may be seen as the government's preferred solution for satisfying the present value budget constraint (see Alesina, 1987; Balassone & Francese, 2004; Nordhaus, 1975).

The cyclical component is proportional to the expected difference between actual GDP and trend GDP (i.e., the GDP gap, GAP) as shown in (3).[1]

$$b^c_t = \gamma E [GAP_t] + v_t \quad v_t \sim NID (0, \sigma_v) \quad (3)$$

The coefficient γ in (3) includes both the automatic reaction of the budget to the cyclical conditions (budget elasticity to the cycle) and the discretionary action undertaken by fiscal authorities.[2] The cyclical component can be asymmetric, that is, γ can be different depending on whether GAP_t is positive or negative.

$$b^c_t = \gamma_p E [GAP^P_t] + \gamma_n E [GAP^N_t] + v_t \quad v_t \sim NID (0, \sigma_v) \quad (4)$$

The suffixes P and N in equation (4) indicate whether the coefficient applies to positive or negative GDP gap. $E [GAP^P_t] = q_t E [GAP_t]$ and $\gamma_n E [GAP^N_t] = (1-q_t) E [GAP_t]$, where q_t is a dummy variable identifying positive and negative GDP gap, such that $q_t = 1$ if $E [GAP_t] > 0$, $q_t = 0$ if $E [GAP_t] < 0$ (Balassone & Francese, 2004). The variable plays an important role in empirical estimation.

Substituting (2) and (4) in (1), produces equation (5).

$$Bt = \alpha_0 + \alpha_1 d_{t-1} + \alpha_2 b_{t-1} + \gamma_p E[GAP_t^P] + \gamma_n E[GAP_t^N] + \varepsilon_t \quad (5)$$

where $\alpha_0 = (\alpha + \beta/g)b^*$, $\alpha_1 = -\beta$, and $\alpha_2 = (1-\alpha)$, and $\varepsilon_t = (u_t + v_t) \sim NID(0, \sigma_\varepsilon)$

A consistent stabilization policy would require γ_p, $\gamma_n < 0$, that is, an expected slowdown in economic activity implying that $E[GAP_t] < 0$ indicates a worsening of the budget while an expected expansion, implying $E[GAP_t] > 0$, indicates an improving budget.

An index of asymmetry in the conduct of fiscal policy is equation (6).

$$INDEX = \gamma_n - \gamma_p \quad (6)$$

INDEX < 0 indicates that the impact of a downturn is deterioration of budget balances that is stronger than the improvement, if any, caused by an upturn. An upward impulse to debt accumulation follows. If INDEX = 0, fiscal behavior is symmetric with respect to cycle.

3. Empirical Analysis

APEC data are used for estimation. The sample period is 1995Q1 to 2004Q4. Of course, there are some missing data such that only available data are used. Sample periods are different for each country.

The budget balance (b_t) is defined as general government net borrowing/lending, and the debt (d_t) is measured by the nominal value of general government gross financial liabilities.

The estimating equation is

$$Bt = \alpha_0 + \alpha_1 d_{t-1} + \alpha_2 b_{t-1} + \gamma_p GAP_t^P + \gamma_n GAP_t^N + \varepsilon_t \quad (7)$$

Table 1 Estimated Results: APEC

α_0	1.022 (0.869)
α_1	-0.033 (12.334)
α_2	0.845 (42.318)
γ_p	-0.048 (-36.316)
γ_n	-0.502 (-40.124)
Asymmetry index ($\gamma_n - \gamma_p$)	-0.454
Test: INDEX = 0 (p-value in brackets)	-3.127 (0.009)
F value	124.284
D.W.	2.110
adj.R^2	0.852

Note: Brackets are t value. *** is significant at 1%, ** is 5%, and * is 10% level.

where GAP_t^P and GAP_t^N are ex-post evaluations of the GDP gap rather than expected values as in the equation (5).

The results are in Table 1.

The estimated coefficient of lagged debt is -0.033, which is significant and negative as expected. The coefficient of the lagged deficit is 0.845, which is also significant and less than 1 and thus consistent with long-run convergence of the equation.

The results reveal a significant asymmetry in the conduct of fiscal policy.[3] The difference between the coefficients is statistically different from zero and implies an asymmetry coefficient.

In the EU, currency integration has been achieved. In regard to fiscal policy, strict rules have been followed since implementation of the Maastricht Treaty in 1993. The whole fiscal policy framework changed for the European countries when the Treaty entered into force. Almost all of the countries devoted much effort to cutting deficit and debt and have obtained good results. Deficit and debt have decreased rapidly since the end of 1990s. To introduce a common currency, the Euro, each country in the EU must maintain strict rules of deficit and debt. However,

Table 2 *Estimated Results: EU, OECD, and G8*

	EU	OECD	G8
α_0	0.905 (0.701)	1.085 (0.933)	0.762 (0.505)
α_1	-0.040 (14.259)	0.020 (4.574)	0.018 (3.934)
α_2	0.938 (45.681)	0.512 (40.336)	0.565 (42.022)
γ_p	-0.0500 (-39.205)	-0.0122 (-8.125)	-0.0265 (-10.029)
γ_n	-0.643 (-49.152)	-0.110 (-30.185)	-0.0205 (-32.222)
Asymmetry index ($\gamma_n - \gamma_p$)	-0.593	-0.0978	0.006
Test: INDEX=0 (p-value in brackets)	-4.605 (0.005)	-1.045 (0.120)	0.003 (0.185)
F value	148.519	73.205	69.145
D.W.	2.045	1.911	1.985
adj.R^2	0.941	0.793	0.829

Note: Brackets are t value. *** is significant at 1%, ** is 5%, and * is 10% level.

fiscal policy has caused asymmetry in this area, which promises dire problems now and in the future. One of the important criteria of optimum currency area is not satisfied. In the EU, economic conditions have been strained. In three large countries (United Kingdom, Denmark, and Sweden), citizens are not eager to join the EU. They think that joining the currency union would imperil economic status, especially economic growth.

An interesting comparison can be made by estimating conditions in other areas to compare with the APEC. The estimated areas are EU (excluding Luxemburg), OECD, and G8. Table 2 presents the results.

It is interesting to note that asymmetry exists in both APEC and the EU. Asymmetry cannot be found in OECD and G8. Strict fiscal rules have been evaluated and surely have prevented high interest rates and brought economic growth in part; however, there are problems from the perspective of symmetry and asymmetry of fiscal policy as a whole in APEC and EU.

Table 3 *Estimation Results: EU2*

α_0	1.435 (1.158)
α_1	-0.040 (14.195)
α_2	0.708 (36.123)
γ_p	-0.0512 (-40.025)
γ_n	-0.699 (-56.204)
Asymmetry index ($\gamma_n - \gamma_p$)	-0.187
Test: $\phi = 0$ (p-value in brackets)	-4.688 (0.003)
F value	150.104
D.W.	2.096
adj.R^2	0.912

Note: Brackets are t value. *** is significant at 1%, ** is 5%, and * is 10% level.

As mentioned above, the Maastricht Treaty was implemented in the EU in 1992. It is important to revisit equation after introduction of the treaty to determine its effects. The sample period is from 1992 to present. The results are in Table 3.

The "asymmetry effect" is larger than in the previous analysis. Asymmetry of fiscal policy has been increasing. The economic downtrend seems to be related to fiscal policy. There should be much room for policy authorities to rethink fiscal policy. Cutting fiscal expenditure is of course important; however, the timing and methods should be considered carefully.

4. Debt Dynamics

The previous section produced interesting results. Finally, this paper estimates predicted values of the debt-to-GDP ratios for the latest year (2004) for each country in the sample by substituting the predicted values of the overall deficit in the following dynamic equation.

Table 4 *Actual and Simulated Debt*

Country	Actual debt (2002)	Simulated debt in 2002 with asymmetric fiscal policy	Simulated debt in 2002 with symmetric fiscal policy	Debt accumulation due to asymmetric fiscal policy
Australia	57.72	55.66	50.82	4.84
Canada	56.81	49.38	45.83	3.55
Japan	141.22	120.21	115.67	4.54
Mexico	24.08	22.29	21.35	0.94
New Zealand	32.05	26.40	22.73	3.67
Papua New Guinea	63.98	60.52	58.01	2.51
Russia	99.10	90.55	88.76	1.79
United States	34.87	30.26	28.39	1.87

$$d_t = d_{t-1}/(1+h_t) + b_t + a_t \qquad (8)$$

where ht is nominal GDP growth and at is the actual value of stock-flow adjustment in each year. The results are shown in Table 4. The predicted values are very close to the actual ones.

Next, I compute the debt ratios that would have occurred under symmetrical fiscal policy . Symmetry may be simulated in different ways as a benchmark, γ . The result is in Table 5.

The results confirm that the debt accumulation induced by asymmetric fiscal policy is sizeable. Traditional stance and methods should be abolished. We should learn the experience of the EU in this regard.

5. Conclusions

This paper shows that fiscal policy in APEC countries reacts symmetrically to cyclical conditions as a downturn is usually accompanied by deterioration in the budget balance, while an upturn does not entail an improvement in the balance. Fiscal policies reacted counter-cyclically to

Table 5 *Debt Accumulation owing to Symmetric Fiscal Policy*

Country	$\eta_p=\eta_n=-1.0$	$\eta_p=$ estimated η_n (-0.50)	$\eta_p=\eta_n=0$	$\eta_p=$ estimated η_n (0.50)	$\eta_p=\eta_n=1.0$
Australia	6.12	6.66	6.90	7.12	7.54
Canada	9.23	10.12	11.02	12.34	12.96
Japan	18.04	17.23	12.65	9.85	7.92
Mexico	4.35	5.02	6.01	7.37	9.93
New Zealand	4.93	5.54	7.02	8.48	10.02
Papua New Guinea	6.72	8.03	10.03	11.77	13.17
Russia	15.55	14.20	12.93	10.24	7.95
United States	5.12	6.99	7.20	9.54	10.55

adverse macroeconomic conditions. The experience of the EU is illustrative. Moreover, asymmetry has contributed significantly to debt accumulation.

There is little possibility, at least in the near future, that common currency will be introduced. However, economic linkage in APEC will increase. Trade barriers, including import taxes, will decrease or extinguish in the future. The Free Trade Agreement (FTA) among countries in APEC will be conducted more and more in each country. Capital movement will increase more and more. In such a situation, fiscal policy stance should be carefully considered form the view of common economic growth. In particular, the fiscal responsibility of large countries such as the United States and Japan will grow.

With regard to the introduction of a common currency, fiscal policy stance should be examined carefully. Little attention has been paid to this factor. Policy authorities should clarify the necessary policies and conduct by right method despite the difficulties inherent in such an undertaking.

Notes

1. This formation assumes that there is no systemic error in GDP gap forecasts by the government; however, Larch and Salto (2003) found that there is a tendency to overestimate growth, especially during slowdowns. Recently it seems that the tendency has been decreasing. This specification is based on Balassone and Francesse (2004).
2. Some economists say that both the automatic and the discretionary component of the fiscal reaction to the cycle should reflect not only expected but also past GDP gap.
3. To test for the presence of structural breaks in connection with the establishment of APEC in 1989, I introduced dummy variables for both the constant term and the slope coefficients; however, they do not suggest any changes.

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