

Current Account and Fiscal Deficits Evidence of Twin Divergence from Selected Developing Economies of Asia

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Abstract

Questions concerning the relationship between the fiscal policy and the current account are of great analytical and empirical interest. This paper empirically investigates the relationship between current account deficits and fiscal deficits while controlling variables such as inflation, exchange rates, interest rates and trade openness for ten developing economies of Asia in the period of 1985 – 2012. Based on the panel differenced GMM Arellano-Bond estimator and the PMG estimation-based error correction model, the study finds out that (1) the speed of adjustment in the short run to reach the equilibrium level in the long run is 40.47%/year; (2) a twin divergence between fiscal deficits and current account deficits in 10 Asian countries.

Keywords: Current Account Deficits, Fiscal Deficits, Twin Deficits, Twin Divergence, PMG Estimation, Panel Differenced GMM Estimation, Asian Countries

1. Introduction

The issues concerning budget deficits and current account deficits have been in the economic spotlight during the last two decades. The dramatic increases of both fiscal and current account deficits, popularly referred to as the “twin deficits”, have led many economists to posit a causal linkage between the two variables (Tallman et al., 1991). However, the empirical evidence in some Asian countries is very interesting because it seems to contradict the well-known theory of twin deficits. In fact, the recent experience of the selected economies of Asia seems to corroborate the empirical findings by Kim & Roubini (2008) about what they call “twin divergence” in the United States. That is, when the public budget worsens the current account improves and vice versa (see also Corsetti & Müller, 2007, and Cavallo, 2005 and 2007, on this issue).

Most of selected Asian countries have high relatively fiscal deficits as governments increase spending to foster economic growth and create employment. The average share of budget deficits to GDP in 2012 in selected countries is -4.01% in which the highest ratios belong to Pakistan (-6.64%), Sri Lanka (-6.4%) and Bangladesh (-4.56%) (ADB, 2013). Contrary to high relatively fiscal deficits, the shares of current account deficits to GDP in these countries are however improved. In fact, the average share of these countries is -0.67% in which Malaysia, Vietnam, Philippines, Bangladesh and Thailand have surplus in current account balance (6.4%, 5.82%, 2.58%, 1.5% and 0.71%). According to these figures, it is therefore likely there exists a negative relationship between the fiscal deficits and the current account deficits in selected economies of Asia. By new econometric tools, the study will determine whether the relationship between two variables in these countries is twin deficits or twin divergence.

The purpose of this paper is to apply the panel differenced GMM Arellano-Bond estimation and the PMG-based error correction model to empirically investigate the relationship between current account deficits and fiscal deficits with controlling variables such as inflations, exchange rates, interest rates and trade openness in countries such as Bangladesh, Cambodia, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam in the period of 1985-2012.

The remainder of this paper will proceed as follows: Section 2 will be a review of literature on fiscal and trade deficits; Section 3 outlines the theoretical framework; Section 4 describes the methodology; Section 5 presents the used data and obtained results and final section is the conclusion and policy implications.

2. Literature review

Although there are so many studies in the literature on twin deficits hypothesis, there hardly exists any consensus. Most of the analyses of these two deficits have tests in one of few frameworks. The first is that budget deficits have a considerable impact on current account deficits. This is the Twin Deficits Theory and the alternative to this is Ricardian Equivalence Hypothesis.

In the first group, Smith & Hsing (1995) tested this and came to the conclusion that trade deficits are caused by budget deficits because increasing budget deficits increase interest rates. This in turn makes a depreciation of the domestic currency, which enlarges the trade deficits.

Vamvoukas (1999) analyzed the relationship between the two deficits by co-integration analysis for Greece using 1948-1994 annual data and found a positive relationship. Mohammad (2000), took the sample of 67 countries and used the cross-sectional data. His study period was from 1975-1995. His study was important to show the significant relationship between the trade deficits and budget deficits. He concludes that there is positive relationship between the budget surplus and the trade balance. Piersanti (2000) analyzed the relationship between the budget and current account deficits for almost all OECD countries excluding Turkey, Switzerland, Portugal, Iceland, Belgium, New Zealand and the last entering countries using causality tests. The econometric results signaled a strong positive effect of expected future budget deficits on trade deficits for OECD countries. Another pair of researchers performed a test for Turkey similar to the test that was performed by Alkswani for Saudi Arabia. Utilizing data from years 1987 – 2001, Akbostanci & Tunc (2002) also tested using co-integration and included an error correction model. Upon completion of their testing, they determined that the Twin Deficits Theory holds. That is to say, that budget deficit has a considerable impact on current account deficits. Funke & Nickel (2006) using 1970-2002 panel data

of G7 countries' fiscal policy and trade balance showed statistically that an increase in government expenditure had a significantly positive effect on goods and services import.

In the second group, when applied to budget deficits to test this hypothesis, Barro (1989) argues that movement between taxes and budget deficits have no effect on the real interest rates or the current account balance. In other words, there is no relationship between the two deficits.

Bilgili & Bilgili (1998) employing USA, Singapore and Turkish data for 1975-1993 period showed that for each country budget deficit had no causal effect on current account deficit. Kuştepelı (2001) using VAR type co-integration and causality analysis for 1975-1995 data period for Turkey found no causal relationship from budget to current account deficits. Kim & Roubini (2008) address the issue of endogenous movements of the fiscal and the current account deficits and argue that a "twin divergence" is more probable; the current account deficit can improve when the fiscal deficit worsens. These findings are attributed to two factors; first, a partial Ricardian movement of private saving (private saving increases) and second, an investment crowding out effect (investment declines) caused by an increase in the real interest rate. Second, when the two balances are affected by an output and/or a productivity shock, "twin divergence" also seems to be more likely.

3. The theoretical framework

From the national income identity: $Y = C + I + G + (X - M)$ (1)

Here the national income, Y , equals consumption C , investment I , government expenditures G plus the net exports $(X - M)$.

On the other hand, individuals dispose of income Y , either as consumption C , savings S , and taxes T : $Y = C + S + T$ (2)

When combining two equations, it is: $C + S + T = C + I + G + (X - M)$ (3)

After substituting, equation (3) yields: $(X - M) = (T - G) + (S - I)$ (4)

Equation (4) states that the trade or current account deficit, $(X - M)$, is equal to budget deficit, $(T - G)$, plus the saving - investment gap, $(S - I)$.

If the savings – investment gap remains the same or stable, changes in policies that worsen the budget deficit will widen the trade or current account deficit and vice versa, an increase in trade or current account deficit will worsen budget deficit. This is the traditional twin deficit relationship. This model shows there is a bi-direction relationship between the budget deficit and trade deficit. They move together and in the same direction. However, in the context of an open economy where international financial markets are available for investment, the relationship may not necessarily exist, even if it exists, they may not move together and in the same direction. This model is the basis for attempting to understand the relationship between these twin deficits and how they may affect each other.

4. Methodology

The dynamic panel GMM estimation uses the appropriate lags of the instrumented variables to generate internal instruments and employs the pooled dimension of the panel data. So it does not put restrictions on the length of each individual time dimension in the panel. This enables use of suitable lag structure to exploit the dynamic specification of the data. However, this approach still has some important shortcomings (Anshasy, 2012). First, it only allows the intercepts – not slopes – to vary across groups. Pesaran *et al.* (1997, 1999) argued that the assumption of homogeneity of slope parameters may not be proper when the time dimension of the panel is short. Second, cross-sectional dependence is not addressed. Therefore, this paper follows Pooled Mean Group (PMG) estimation.

Pesaran *et al.* (1997, 1999) proposed the PMG estimator that allows the short-term parameters to be heterogeneous between groups while imposing homogeneity of the long-term coefficients between countries. It is one advantage of PMG estimator. Furthermore, the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The heterogeneity of short-run slope coefficients allows the dynamic specification to differ across countries.

The PMG estimation – based error correction model requires an existence of co-integration between dependent variable and explanatory variables. So, the study first tests the stationary of the variables by using the

Fisher tests, developed by Maddala & Wu (1999) and then applies the co-integration test of Westerlund (2007).

The panel differenced GMM Arellano-Bond estimation

$$Y_{it} = \alpha Y_{it-1} + \beta X_{it} + \eta_i + \xi_{it}; i = 1, 2, 3, \dots, N; t = 2, 3, \dots, T \quad (5)$$

Where Y is the share of current account deficits to GDP; X is a vector including variables such as share of fiscal deficits to GDP, inflations, interest rates, exchange rates and trade openness (sum of shares of exports and imports to GDP); η_i is an unobserved time-invariant, country-specific effect and ζ_{it} is an observation-specific error term.

The dynamic characteristics in (5) show that the country-specific fixed effects can be correlated with the lagged dependent variable and some explanatory variables may be endogenous. It can make OLS inconsistency and estimates bias. However the panel differenced Generalized Method of Moments (GMM) estimator, developed by Arellano & Bover (1995), and Blundell & Bond (1998), tackles these problems. It utilizes the lagged differences of the predetermined variable as instruments for their levels and the differences of the strictly exogenous variables (as in the standard IV procedure).

The PMG estimation – based error correction model

$$\Delta Y_{it} = \phi S_{it-1} + \sum_{j=1}^p \delta_{ij} \Delta X_{it-j} + \eta_i + \xi_{it} \text{ where } S_{it-1} = Y_{it-1} - \theta X_{it-1} \quad (6)$$

Where Y is the share of current account deficits to GDP; S_{it-1} is the deviation from long-run equilibrium at any period for group i , and ϕ is the error-correction (speed of adjustment) coefficient. The vector θ captures the long-run coefficients which do not vary across groups; these coefficients represent the long-run elasticity of current account deficits with respect to each variable in X_{it-1} . The short-run responses of the X variables are captured by the vector δ . η_i is an unobserved time-invariant, country-specific effect and ζ_{it} is an observation-specific error term.

In addition, based on the information criteria BIC and AIC, the study uses lag orders $K = 2$ identical for all cross-units, respecting the condition $T > 5 + 2K$, which is important to guarantee the validity of the proposed tests, even with short T samples (see Hurlin, 2004).

5. Data and obtained results

5.1 The used data

The data are extracted from ADB annual data (Key Indicators for Asia and the Pacific) for ten Asian countries, namely Bangladesh, Cambodia, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam in the period of 1985-2012. The primary data include fiscal deficits (share of GDP; negative value of fiscal balance), current account deficits (share of GDP; negative value of current account balance), inflations, interest rates, exchange rate (domestic currency per one unit of foreign currency (US\$)), exports (share of GDP) and imports (share of GDP). From the primary data, the study transfers into the secondary data including variables FIBA (fiscal deficits, percentage), CUBA (current account deficits, percentage), INF (inflations, percentage), INTE (interest rates, percentage), lnEXC (exchange rates, in natural logarithm form) and OPEN (trade openness, percentage) in which lnEXC is defined in form of natural logarithm of exchange rates multiplied with 100 and OPEN is the sum of shares of exports and imports to GDP.

The matrix of Pearson correlation coefficients is summarized in Table 1. The results show that the pair (inflations, interest rates) has the biggest coefficient (0.6151). According to Evans (1996), the correlation level between them is relatively strong while that of others are moderate and weak. However, for the time series in finance, the correlation coefficient lower than 0.8 is acceptable. Therefore, the study decides to use these all variables in the model.

Table 1 The matrix of Pearson correlation coefficients

	FIBA	CUBA	INF	INTE	lnEXC	OPEN
FIBA	1.0000					
CUBA	0.0062	1.0000				
INF	-0.0784	-0.2620***	1.0000			
INTE	-0.0277	-0.4286***	0.6151***	1.0000		
lnEXC	0.2203***	-0.2146***	0.2168***	0.2838***	1.0000	
OPEN	0.1579**	0.3237***	-0.2323***	-0.3827***	-0.0291	1.0000

***, **: statistically significant at 1% and 5%.

5.2 Panel differenced GMM Arellano-Bond estimation results

The results of the panel differenced GMM Arellano-Bond estimation in Table 2 show that all variables except for inflations have statistically significant effects on the current account deficits. Accordingly, the impact of the fiscal deficits, interest rates and trade openness is negative while that of inflations and exchange rates is positive.

Table 2 Panel differenced GMM Arellano-Bond estimations

Dependent variable: Current account deficits

	Coeff	Std	Prob
Current account deficits (-1)	.5439768	.1157549	0.000***
Fiscal deficits	-.5242218	.1671822	0.002***
Inflations	.0659019	.0512268	0.200
Interest rates	-.1805911	.1084886	0.097*
Exchange rates	.049803	.0127499	0.000***
Trade openness	-.0888493	.0262145	0.001***
Obs		230	
Sargan test		0.167	
AR(2) test		0.868	

***, **, *: statistically significant at levels of 1%, 5% and 10% respectively.

Table 3 Descriptive statistics of Net export (1985-2012)

Variable	Obs	Mean	Std. Dev.	Min	Max
Net exports (= exports-imports)	260	-2.059508	7.774993	-18.586	25.052

The average net exports of Asian countries under survey from 1985 to 2012 is negative (Table 3). It means that the import of products and services in these countries is larger than the export of that. So, a depreciation of the domestic currency makes the value of net exports go down. This leads to the increase in trade deficits and hence current account deficits are worse. This is an evidence of a J-curve effect in the long-run equilibrium in these Asian

countries. According to this effect, a devalued domestic currency means imports are more expensive, and on the assumption that the volume of imports and exports change little immediately, this causes a depreciation of the current account. Ng Yuen-Ling et al. (2008), in attempts to identify the relationship between the real exchange rate and trade balance in Malaysia from year 1955 to 2006, did not find a J-curve effect in Malaysia while Stučka (2004) showed a J-curve effect in long run in Croatia and Petrović & Gligorić (2010) found a J-curve effect in the short run for Serbia case.

Unlike exchange rates, the interest rates are negative correlated with current account deficits. Accordingly, increasing of interest rates helps to improve the current account deficits. It is easily understandable that an increase in domestic interest rates reduces the countries' consumption and investment, of which large parts come from the imports. Therefore, the current account improves.

Similar to interest rates, trade openness also helps to improve current account deficits. There are two reason: (i) being export-based economies, governments of these countries always adjust policies benefiting exports; (ii) in order to foster economic growth, open-door policies are implemented to attract effectively FDI flows and FDI in turn improves current account deficits.

To investigate the reverse causality from current account deficits to fiscal deficits, the study continues to apply the panel differenced GMM Arellano-Bond estimation. The results in Table 4 turn out the impact of current account deficits on the fiscal deficits is statistically negative while trade openness has positive effect on the fiscal deficits.

In order to promote the exports and attract the FDI inflows, these Asian governments have to improve the institutions and policies. Governments have to increase budget expenditure in reform of regulations and law, in investment of infrastructure,.. to make sure that the process of improvement is effectively conducted. Hence, it leads to increasing budget deficits. This proved the positive impact of trade openness on the fiscal deficits.

Table 4 Panel differenced GMM Arellano-Bond estimations

Dependent variable: Fiscal deficits

	Coeff	Std	Prob
Fiscal deficits (-1)	-.1871947	.0734598	0.011***
Current account deficits	-.2869389	.0826707	0.001***
Inflations	-.0665591	.0525984	0.207
Interest rates	.0400254	.089139	0.654
Exchange rates	-.0107814	.010471	0.304
Trade openness	.0621968	.0184782	0.001***
Obs		230	
Sargan test		0.154	
AR(2) test		0.352	

***, **, *: statistically significant at levels of 1%, 5% and 10% respectively.

Contrary to most of previous studies about twin deficits, this paper, however, turns out different. Most of studies suggest that the relationship between the fiscal balance and the current account is positive. It means that fiscal balance can improve (or worsen) as the current account improves (or worsens) and vice versa. In the case of Asian countries, the results of analysis in Table 2 and 4 show a twin divergence (a negative relationship between the fiscal and current account deficits). In fact, this is a situation by which the fiscal balance can improve (or worsen) as the current account worsens (or improves) and vice versa. This is a characteristic of these Asian countries and the study suggests an explanation as follows: most of Asian countries under survey have a high rate of national gross savings. Under any situation of economy, Asian people often save a given amount of money from their income for the future. Indeed, according to the Key Indicators for Asia and the Pacific of ADB (2013) average share of national gross savings to GDP is 30% and the highest rates of savings belong to Philippines, Indonesia and India at amount of 42.3%, 34.1% and 32.9% respectively.

During economic depressions (or high rates of economic growth), output falls (or rises) and the fiscal balance worsens (or improves). At the same time, the current account will improve (or worsen) when the fall (or rise)

in output leads to a fall (or rise) in investment that is sharper than the fall in national gross savings. So the fiscal balance can improve (or worsen) as the current account worsens (or improves). In the reverse direction, during high rates of economic growth (or economic depressions), there will be a rise (or fall) in investment that will tend to worsen (or improve) the current account. At the same time, this high growth of economy (or economic depressions) will lead to an improvement (or deterioration) of the fiscal balance (given automatic stabilizers on the tax revenue and spending side). Therefore, the current account can improve (or worsen) as the fiscal balance worsens (or improves). In short, a twin divergence rather than a twin deficit is observed for the relationship between the fiscal deficits and the current account deficits in Asian countries under survey. The main driver of the two balances is an output shock (which depends on the situation of economy (depression or high growth)).

5.3 Panel co-integration and PMG estimations results

As mentioned in the section 4 of Methodology, this paper continues to follow the PMG estimation – based error correction model to check the negative relationship between the fiscal deficits and the current account deficits. Before carrying out it, the stationary tests and co-integration tests need to be done.

Table 5 Fisher type unit root tests with lags = 2

Variables	ADF test		PP test	
	Prob > chi2		Prob > chi2	
	Without trend	With trend	Without trend	With trend
Fiscal deficits	0.1164	0.5261	0.0002***	0.0006***
Current account deficits	0.6932	0.8134	0.1170	0.2231
Inflations	0.0096	0.0696	0.0000***	0.0000***
Interest rates	0.4221	0.0237	0.2173	0.3010
Exchange rates	0.5176	0.9732	0.0000***	0.0504**
Trade openness	0.6778	0.9972	0.5644	0.6516
Δ Current account deficits	0.0000***	0.0000***	0.0000***	0.0000***
Δ Interest rates	0.0000***	0.0000***	0.0000***	0.0000***
Δ Trade openness	0.0014***	0.0000***	0.0000***	0.0000***

***, **, *: statistically significant at 1%, 5% and 10% respectively.

The panel unit root tests by Augmented Dickey Fuller (ADF) – based or Philips-Perron (PP) – based fisher tests with lags of 2 with or without trend are outlined in Table 5. The results show that variables fiscal deficits, inflations and exchange rates are significantly stationary at level of 1% so they have integrations of zero order $I(0)$ while the variables current account deficits, interest rates and trade openness are significantly stationary in first difference at 1% level, so they have integrations of first order $I(1)$. Due to different integrations among variables, the study has to apply the Westerlund tests for co-integration between dependent variable and explanatory variables.

Table 6 Westerlund panel co-integration tests

Normalized variable: Current account deficits

Covariates	G_t	G_a	P_t	P_a
Fiscal deficits	0.005***	0.005***	0.000***	0.000***
Inflations	0.183	0.064*	0.136	0.000***
Interest rates	0.132	0.244	0.572	0.021**
Exchange rates	0.000***	0.000***	0.000***	0.000***
Trade openness	0.000***	0.008***	0.002***	0.001***

***, **, *: statistically significant at 1%, 5% and 10% respectively.

Table 6 presents Westerlund panel co-integration tests. When four tests reject the null of no co-integration, a covariate is considered co-integrated with current account deficits. So the results show that fiscal deficits, exchange rates and trade openness co-integrated with current account deficits.

The estimation of PMG-based error correction model is expressed in Table 7. The results of long run coefficients show that there is a high consistency about sign and statistical significance between the panel differenced GMM estimations and PMG techniques, especially the long-run elasticity of fiscal deficits (the same). This allows the study to confirm that the results of the panel differenced GMM Arellano-Bond estimations are quite robust.

In short run, the increase of interest rates or the depreciation of the domestic currency improves the current account deficits while that of fiscal

deficits and trade openness makes it worse. It turns out that except for interest rates, sign effects of fiscal deficits, exchange rates and trade openness on current account deficits in short run are contrary to those in long run. In addition, the error correction coefficient is significantly negative at level of 1%, confirming that there exists a co-integration long run relationship in at least one of the panel countries. Accordingly, the speed of adjustment in the short run to reach equilibrium level in the long run is 40.47%/year.

Table 7 Error Correction Model (PMG estimations, 1985-2012)

Long run co-integrating vectors			
Dependent variable: Current account deficits			
Variables	Coeff	Std	Prob
Fiscal deficits	-.5254826	.1882339	0.005***
Inflations	-.0581743	.0917862	0.526
Interest rates	-.4657986	.1361872	0.001***
Exchange rates	.2581391	.0631562	0.000***
Trade openness	-.2179805	.0490428	0.000***
Short run dynamics (mean countries)			
Dependent variable: Δ Current account deficits			
Error correction	-.404786	.0816478	0.000***
Δ Fiscal deficits	.3370358	.1148404	0.003***
Δ Inflations	.0592972	.0962435	0.538
Δ Interest rates	-.5705935	.2622496	0.030**
Exchange rates (-1)	-.0659802	.0243805	0.007***
Trade openness (-1)	.0745332	.0403979	0.065*
Cons	-26.72671	22.49176	0.235
Obs		250	
Log likelihood		-455.9233	

***, **, *: statistically significant at levels of 1%, 5% and 10% respectively.

6. Conclusions and policy implications

This paper applied the panel differenced GMM Arellano-Bond estimation and the PMG-based error correction model to empirically investigate the relationship between current account deficits and fiscal deficits with controlling variables such as inflations, exchange rates, interest rates and trade openness for ten developing economies of Asia between 1985 and 2012. The results show that the speed of adjustment in the short run to reach equilibrium level in the long run is 40.47%/year. Contrary to suggestions of previous studies about the twin deficits, our empirical results show a twin divergence between the fiscal deficits and the current account deficits.

The empirical results suggest some policy implications as follows:

(i) Unlike our conventional belief about exchange rates that exchange rates can improve the current account balance, a depreciation of the domestic currency in Asian countries under survey can make the current account deficits worse.

(ii) Better open-door policies can improve the current account balance.

(iii) An increase in the fiscal deficits in ten Asian countries due to increasing public expenditure to foster the economic growth and reduce the rate of unemployment do not worsen the current account deficits. However, the main driver of the two balances is an output shock which depends on the situation of the economy. Therefore, in the context of public debt crisis in European countries, Asian countries' governments should be careful with fiscal deficits and should invest in more effective projects to develop economies sustainably.

The findings of twin divergence are made on the panel data of ten countries. However, in future, with adequate statistical data and better estimation techniques, investigations should be carried out for each individual country.

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