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External debt sustainability and vulnerabilities: Evidence from a panel of 24 Asian countries and prospective analysis

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ADB Working Paper Series

**EXTERNAL DEBT SUSTAINABILITY
AND VULNERABILITIES:
EVIDENCE FROM A PANEL
OF 24 ASIAN COUNTRIES AND
PROSPECTIVE ANALYSIS**

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Abstract

The purpose of this empirical study is first to assess the external debt sustainability in a panel of 24 Asian emerging and developing countries divided into four sub-panels, namely the regions of Southeast Asia, Southwest Asia, Central Asia, and the Pacific over the period 1993–2014.

We use the present-value methodology to determine whether a country satisfies its intertemporal external constraint, namely whether its external debt is sustainable in the long run. According to such methodology, we study the panel stationarity of external debt, current account, imports, and exports, then the cointegration between these two last variables. We employ unit root and cointegration tests, the first and second generation tests, to take into account cross-sectional dependence. Our findings imply that the external debt in our panel of 24 Asian emerging and developing countries is sustainable in the long run.

Finally, we analyze the vulnerabilities, factors, and risks in the region due to different external debt criteria (the debt currency composition, share of the short-term external debt, amount of reserves, and debt service). We conclude this study by establishing different prospective scenarios on the Asian emerging and developing countries according to the degree of economic slowdown (i.e., a “soft” or “hard” landing) in the People's Republic of China.

JEL Classification: C33, F32, F34, O53

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1. INTRODUCTION

Since the 1980s, most Asian countries have pursued processes for economic liberalization at the internal and external levels (openness to foreign trade and capital flows). The implementation of such programs especially implies that governments carry out a substantial stabilization of their external deficits. The main objective of these measures is for external deficit to become sustainable in the long run in order to avoid the negative consequences of large external deficits and debt crises.

As the issue of public debt sustainability has gained in importance in Asia (as reflected in a book by Ferrarini, Ramayandi, and Jha [2012] on this topic), external debt sustainability has become important too, following the 1997 financial Asian crisis and the 2008–2009 global financial and economic crisis. External debt sustainability is a relevant topic in the region for several reasons: (i) to maintain foreign investor confidence in the economy; (ii) to address the adverse effects¹ on the external debt position; (iii) to prevent a debt crisis; and (iv) because of the current high level of uncertainty in this period of the People's Republic of China's (PRC) "soft landing" growth, which is inducing a decline in some commodity prices and a decline in international trade flows between Asian countries.

As a result, we explore the external debt sustainability issue by employing a panel approach on 24 Asian emerging and developing countries over the period 1993–2014. A panel approach is appropriate given the strong economic, trade, and finance links among the economies of the region. The interests of this study are many and varied.

First, we consider a total panel of 24 emerging and developing Asian countries,² which has never been used in the literature, and we divide this sample into four sub-panels, namely Southeast Asia, Southwest Asia, Central Asia, and the Pacific (corresponding to the country classifications made for instance by the International Monetary Fund or the World Bank). Second, we take into account a recent period, 1993–2014, which includes the impacts of the 1997 Asian crisis and the 2008–2009 global financial crisis on external debt sustainability over the four sub-panels. Third, to test the external sustainability, we employ both first and the second generation panel unit root and cointegration tests to take into account cross-sectional dependence among countries.

In these conditions, we use the present-value methodology to determine whether the country satisfies its intertemporal external constraint, namely whether the external debt is sustainable in the long run. Such a methodology requires studying the panel stationarity of external debt, the current account, imports, and exports, and the cointegration between these two last variables.

To our knowledge, no paper has tackled the issue of external debt sustainability in these 24 emerging and developing Asian countries by applying recent econometric methods for panel data.

¹ Such as a sudden currency depreciation, which increases the amount of external debt denominated in foreign currency, or a rise in external debt interest rates.

² The People's Republic of China and Mongolia; Southeast Asia (Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam); Southwest Asia (Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka); Central Asia (Armenia, Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, and Tajikistan); the Pacific (Fiji, Papua New Guinea, Samoa, Solomon Islands, and Tonga). The case of Asian developed countries, such as Japan, Singapore, and the Republic of Korea, is not considered in this study.

The outline of this article is as follows: Section 2 presents a brief survey of the external debt sustainability literature. Section 3 outlines the intertemporal approach to the current account. Section 4 provides a description of the data and reports the econometric findings. Section 5 analyzes the vulnerabilities, factors, and risks in the region by using different external debt indicators, such as the debt service, the share of the short-term external debt, the amount of total reserves, or again the debt currency composition. Finally, we conclude this study by establishing different prospective scenarios on the Asian emerging and developing countries according to the degree of the PRC economic slowdown (a “soft” or “hard” landing).

2. SURVEY OF THE EXTERNAL DEBT SUSTAINABILITY LITERATURE

The basic issue concerning the sustainability of external deficits has gained importance in developing countries as well as among political leaders, academic economists, and researchers in international institutions. Indeed, debt sustainability has become a highly important topic for governments because it requires the adoption of responsible policies in order to assure macroeconomic stability.

As a result, extensive theoretical and empirical literature has emerged on this topic since the 1990s. In most cases, time-series methods have been employed to examine whether the external deficit of a nation is effectively consistent with its intertemporal external constraint in present-value terms. Moreover, most of the empirical studies have focused on the United States and other industrial countries: the United States (Trehan and Walsh 1991; Husted 1992; Wickens and Uctum 1993; Ahmed and Rogers 1995; Fisher 1995; Hakkio 1995; Leachman and Francis 2000; Takeushi 2010; Christopoulos and Leon-Ledesma 2010), the United States and Canada (Otto 1992; Wu, Fountas, and Chen 1996), and the G7 countries (Liu and Tanner 1996). The results of these studies generally reveal that external deficits are not sustainable for several major developed countries. However, relatively few papers (Sawada 1994; Coakley and Kulasi 1997; Fève and Henin 1998; Pattichis and Kanaan 2001; Jha 2003; Lau and Baharumshah 2003; Sun 2004; Berthomieu et al. 2004; Önel and Uctulu 2006; Yilanci and Özcan 2008; Kim et al. 2009; Boengiu et al. 2011) have applied similar econometric tests to assess the sustainability of external deficits in developing countries. In short, the findings established by these studies suggest that external sustainability conditions are hard to meet in a number of developing countries.

Recently, some papers have investigated the issue of external sustainability by adopting unit-root and/or cointegration tests for panel data. We can quote the work of Wu (2000) and Wu, Chen, and Lee (2001) studying current account sustainability among industrial countries. In addition, applying an augmented Dickey-Fuller panel data unit-root test within a seemingly unrelated regression, Holmes (2006) finds that external debt is sustainable for at least 12 Latin American countries. Ehrhart and Llorca (2007) focus on a panel of seven South Mediterranean countries and use first generation panel unit-root tests (Im, Pesaran, and Shin 2003; Maddala and Wu 1999; Choi 2001) and of cointegration tests (Predoni 1999). Nasir and Noman (2012) apply a two-step nonlinear framework to investigate the stationary property of the debt-to-external earnings ratio for 36 countries and the current account-to-gross national income ratio for 55 countries. Another method was developed on a panel of 19 Asian countries from 1981 to 2010 by studying the mean-reverting behavior of the external debt (Lau, Baharumshah, and Soon 2013). Finally, Lin (2014) examines

the sustainability of external debt for 21 Organisation for Economic Co-operation and Development countries by using a quantile regression model.

3. THEORETICAL FRAMEWORK: THE INTERTEMPORAL APPROACH TO THE CURRENT ACCOUNT

Econometric tests of current account sustainability consist of investigating whether the country satisfies its intertemporal external constraint. In other words, empirical studies about this issue are based on the intertemporal approach to the current account.

Husted (1992) provides a simple small-economy framework in which a representative household is able to borrow and lend freely in international financial markets at a given world rate of interest.

The representative agent faces the following current period budget constraint:

$$C_0 = Y_0 + B_0 - I_0 - (1 + r_0) B_{-1} \quad (1)$$

where C_0 , Y_0 , B_0 , and I_0 represent current consumption, output, international borrowing, and investment; r_0 is the one-period world interest rate; and $(1 + r_0) B_{-1}$ is the initial debt of the representative agent, corresponding to the country's external debt.

Equation (1) must hold for every time period. Iterating (1) forward yields the economy's intertemporal budget constraint (see Husted [1992: 160]):

$$B_0 = \sum_{t=1}^{\infty} \delta_t TB_t + \lim_{n \rightarrow \infty} \delta_n B_n \quad (2)$$

where $TB_t = X_t - M_t = Y_t - C_t - I_t$ represents the trade balance in period t , X_t equals the exports, M_t is the imports, and δ_t is the discount factor.

A necessary and sufficient condition for external sustainability is that as $n \rightarrow \infty$, the discounted value of the external debt converges asymptotically to zero. This transversality condition can be expressed as

$$\lim_{n \rightarrow \infty} \delta_n B_n = 0 \quad (3)$$

Equation (3) implies that a country cannot borrow (lend) indefinitely in global capital markets to finance its trade account deficit (surplus). If this transversality condition holds, then the amount of country borrows (lends) in international financial markets equals the present-value of the future trade surplus (deficits).

After several manipulations, we finally get a testable equation:

$$M_t - X_t = \sum_{j=0}^{\infty} \lambda^{j-1} [\Delta X_{t+j} - \Delta Z_{t+j}] \quad (4)$$

Given the right-hand variables from equation (4) are first-difference stationary, the left-hand side of equation (4) must be stationary in order to satisfy the present-value external constraint. Thus, M_t and X_t must be examined for stationarity. If M_t and X_t are $I(1)$, then they must be cointegrated so that the left-hand side of equation (7), i.e., the current account deficit, is stationary.

Thus, a test for the sustainability of the external debt can check for the cointegration of these two variables, M_t and X_t , if they are $I(1)$. This cointegration regression takes the following form:

$$X_t = a + bM_t + u_t \quad (5)$$

Formally, if M_t and X_t are $I(1)$, the null hypothesis is that M_t and X_t are cointegrated and $\beta = 1$. If the null hypothesis is not rejected, then the external debt is said to be sustainable.

4. EMPIRICAL INVESTIGATION

4.1 Sample and Data

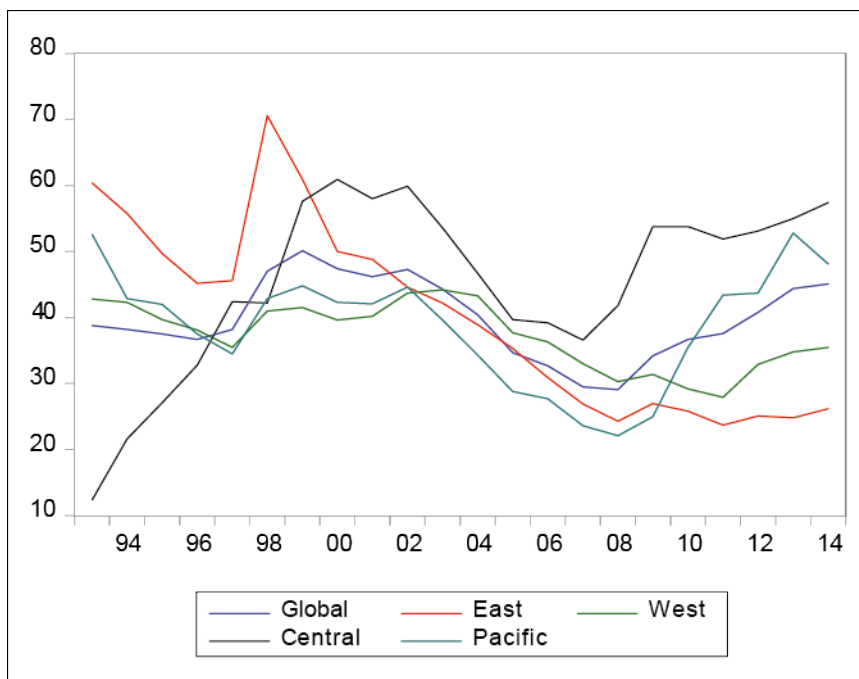
The sustainability of external debt is assessed in a sample of 24 Asian emerging and developing countries.³ We use annual data collected from the World Bank's World Development Indicators. The sample covers the period 1993–2014 for the current account, external debt, imports, and exports variables. The current account balance is the sum of the net exports of goods, services, net income, and net current transfers. External debt is the debt owed to non-residents, repayable in foreign currency, goods, or services. Our measure of exports includes the exports of goods and services. Our measure of imports only comprises the imports of goods and services since the data on net transfer payments and net interest payments are not available. All variables are measured in terms of their ratio to nominal GDP.

4.2 Features of the External Position of Asian Emerging and Developing Countries

First, we notice that external debt has fallen slightly over the last 2 decades in the global panel of 24 emerging and developing Asian countries (see Table 1 and Figure 1). However, we can see different paths according to the sub-panel group: a strong decrease by more than half of the external debt in Southeast Asia, a decline of 10 percentage points of GDP in Southwest Asia, and a slight decrease in the Pacific; meanwhile, the external debt-to-GDP ratio shows an increase by 20 percentage points in Central Asia.

³ However, data for exports and imports in the cases of Papua New Guinea and Samoa are missing, so we do not include these two countries in the study of the cointegration relationship, and we cannot constitute the Pacific panel for this step.

Figure 1: External Debt Evolution in Emerging and Developing Asian Countries (% of GDP)



Source: World Bank’s World Development Indicators.

Specifically, if we consider the external debt evolution by country (Appendix, Table A.1, we notice that four countries (the PRC, India, Azerbaijan, and Fiji) have a low level of external debt (less than 20% of GDP), whereas seven nations (Mongolia, Bhutan, Armenia, Georgia, Kazakhstan, the Kyrgyz Republic, and Papua New Guinea, namely four countries from Central Asia) have a high level of external debt (more than 60% of GDP). Thus, in the four countries from Central Asia, external debt grew sharply from 2000 to 2014, whereas all the other countries in the panel reduced their external indebtedness over these 2 decades, sometimes at a sustained pace (by more than 20 percentage points of GDP for the Philippines, Bangladesh, Tajikistan, Samoa, and Solomon Islands; by more than 30 percentage points of GDP for Indonesia, Thailand, and Nepal; and even by more than 70 points of GDP for Viet Nam).

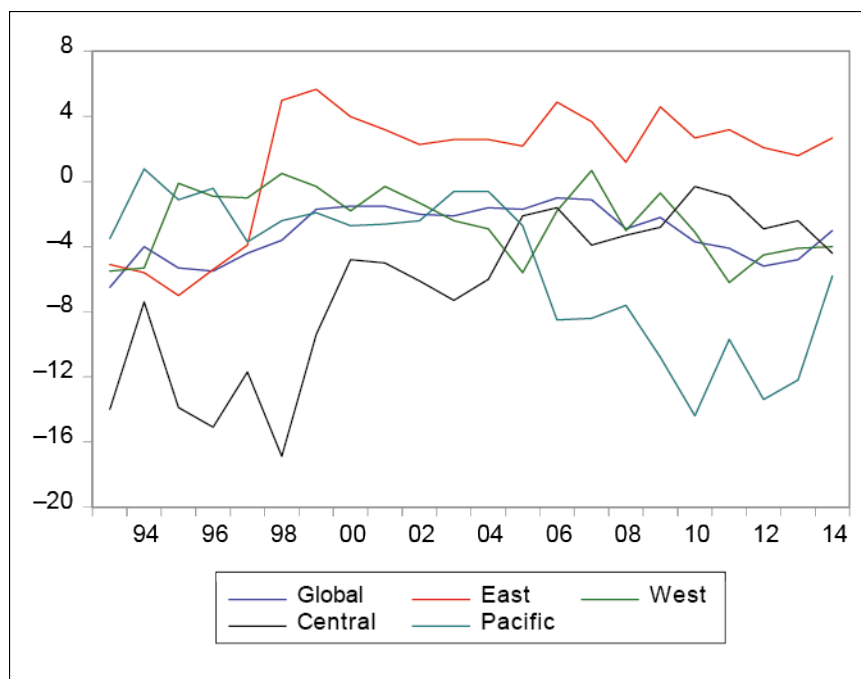
Table 1: External Debt Evolution in Asian Emerging and Developing Countries (% of GDP)

Panel	1993–1999	2000–2007	2008–2014	Average
Southeast Asia	55.5	39.8	25.3	40.2
Southwest Asia	40.2	39.8	31.7	37.3
Central Asia	33.7	49.3	52.4	45.3
Pacific	42.5	35.4	38.7	38.7
Global panel	41.0	40.3	38.3	39.9

Source: Author’s calculations from the World Bank’s World Development Indicators.

Second, the current account position for the global panel improved during the second period between 2000 and 2007 to an average of -1.6% of GDP, then deteriorated to an average of -3.7% of GDP between 2008 and 2014 (see Table 2 and Figure 2).

Figure 2: Current Account Evolution in Emerging and Developing Asian Countries
(% of GDP)



Source: World Bank's World Development Indicators.

From the sub-panels, we can notice the different current account positions: a significant surplus in Southeast Asia since the second period and a strong reduction of the current account deficit in Central Asia between 2000 and 2007, but a deterioration of the current account during the last period in Southwest Asia and an even more critical deterioration in the Pacific.

Table 2: Current Account Evolution in Asian Emerging and Developing Countries
(% of GDP)

Panel	1993–1999	2000–2007	2008–2014	Average
Southeast Asia	-2.3	3.2	2.6	1.3
Southwest Asia	-1.8	-1.9	-3.7	-2.5
Central Asia	-12.8	-4.6	-2.5	-6.5
Pacific	-1.8	-3.6	-10.6	-5.2
Global panel	-4.5	-1.6	-3.7	-3.2

Source: Author's calculations from the World Bank's World Development Indicators.

Pacific countries have a very high level of current account deficit during the last period, more than 10% of GDP for Solomon Islands and even more than 20% for Papua New Guinea. Similarly, some Central Asian countries (Georgia, the Kyrgyz Republic, and Armenia), and Bhutan and Mongolia have a current account deficit higher than 10% of GDP between 2008 and 2014. Meanwhile, among countries accumulating current account surpluses, we have Azerbaijan (with a surplus of more than 20% of GDP during the last period), Malaysia (with a surplus of around 10% of GDP on average since 2000), and the PRC, the Philippines, and Thailand with surpluses higher than 3% of GDP during the last period.

Finally, according to the global panel, exports and imports (Appendix C) have increased gradually with a higher increase in Southeast Asia than in Southwest Asia and Central Asia (and even a slight decrease for imports in the latter sub-panel).

4.3 Empirical Results

Most empirical tests of external sustainability study whether the observed characteristics of the external debt-related variables satisfy the solvency condition in equation (3). As in time series studies, in the case of panel data analysis, the econometric methodology employed to test this solvency condition consists mainly of two steps.

In the first step, the stationary properties of the current account, exports, imports and stock of external debt are studied using unit-root tests for panel data. External debt sustainability requires that these external variables be integrated of order zero.

If imports and exports are found to be integrated of order one (non-stationary), it is important to investigate in a second step whether there is a cointegration relationship between imports and exports. Cointegration among these variables is a necessary condition for external sustainability.

4.3.1 Unit Root Results

The unit root tests can be classified into two groups, depending on whether they account for cross-sectional dependence or not. The first generation panel unit root tests (Im, Pesaran, and Shin 2003; Maddala and Wu 1999; Choi 2001) have been criticized because they assume cross-sectional independence. This hypothesis is rather restrictive and unrealistic since macroeconomic time series exhibit significant cross-sectional correlation among countries in a panel (Baltagi 2008), and co-movements of economies are often observed in the majority of macroeconomic applications of unit root tests (Hurlin and Mignon 2005). The presence of cross-sectional correlation of errors in panel data applications in economics is likely to be the rule rather than the exception (Chudik and Pesaran 2015). Moreover, correlation across units in panels may have significant consequences on the first generation of tests assuming cross-sectional independence. When applied to cross-sectionally dependent panels, such panel unit root tests can generate substantial size distortions (O'Connell 1998). As a result, alternative (second generation) panel unit root tests (Bai and Ng 2004; Chang 2002, 2004; Choi 2002; Moon and Perron 2004; Phillips and Sul 2003; Pesaran 2007) have been proposed to take into account cross-sectional dependence.

The results of the Pesaran test of cross-sectional dependence are shown in Table 3.

Table 3: Pesaran (2004) Test for Cross-sectional Dependence

Panel	Variables (% of GDP)	CD-test	P-value
Global panel	Current account	4.83	0.000
	External debt	3.35	0.000
	Imports	0.89	0.372
	Exports	1.18	0.235
Southeast Asia	Current account	6.42	0.000
	External debt	6.75	0.000
	Imports	0.16	0.865
	Exports	3.69	0.000
Southwest Asia	Current account	16.22	0.000
	External debt	6.38	0.000
	Imports	2.87	0.004
	Exports	-2.69	0.006
Central Asia	Current account	14.64	0.000
	External debt	7.81	0.000
	Imports	-1.50	0.133
	Exports	-0.28	0.778
Pacific	Current account	0.76	0.444
	External debt	1.29	0.193

CD = cross-sectional dependence, GDP = gross domestic product.

Notes: CD reports the Pesaran (2004) cross-sectional dependence statistic. Under the null hypothesis of cross-sectional independence $CD \sim N(0,1)$.

Source: Author's calculations.

As shown in Table 3, we obtain different results: first, the cross-sectional dependence (CD) test accepts the null hypothesis of cross-sectional independence in the Pacific, so we must employ the first generation panel unit root test (Im, Pesaran, and Shin 2003; Maddala and Wu 1999; Choi 2001). Second, the CD test strongly rejects the null hypothesis of cross-sectional independence in Southeast Asia and Southwest Asia, suggesting the presence of cross-sectional dependence in these two sub-panels. To study the issue of external sustainability, it is necessary to employ second generation panel unit root tests (Pesaran 2007) allowing for this cross-country dependence in Southeast Asia and Southwest Asia. Finally, we propose to use both first and second generation unit root tests for the global panel and for Central Asia because the CD test reveals opposite results between the variables of external debt-current account and exports-imports.

As shown in Table 4 (see also Appendix, Tables 5 and 6), the panel unit root tests indicate that for the global panel and Central Asia, the current account and external debt variables are stationary in level (or integrated of order 0), according to the first generation test, which is a condition necessary (but insufficient) for external sustainability. However, for the sub-panels, Southwest Asia and the Pacific,⁴ the current account and external debt variables are stationary in first difference (integrated of order 1). In addition, imports and exports are integrated of the same order in the global panel and for Southeast Asia, Southwest Asia, and Central Asia, so we can proceed to the next step in the study of external sustainability, namely the panel cointegration tests.

⁴ However, we cannot say that external debt is not sustainable in this region because we cannot proceed to the cointegration tests between imports and exports due to missing data on these variables for Papua New Guinea and Samoa.

Table 4: Summary of Panel Unit Root Test for Asian Panels

Panel	Variables (in % of GDP)	Panel Unit Root Test	Results
Global panel	Current account	First and second generation	I(0)-I(0)
	External debt		I(0)-I(1)
	Imports		I(0)-I(1)
	Exports		I(0)-I(1)
Southeast Asia	Current account	Second generation	I(1)
	External debt		I(0)
	Imports		I(1)
	Exports		I(1)
Southwest Asia	Current account	Second generation	I(1)
	External debt		I(1)
	Imports		I(1)
	Exports		I(1)
Central Asia	Current account	First and second generation	I(0)-I(1)
	External debt		I(0)-I(0)
	Imports		I(1)-I(0)
	Exports		I(1)-I(0)
Pacific	Current account	First generation	I(1)
	External debt		I(1)

GDP = gross domestic product.

Note: I(0) and I(1) signify integration of order 0 and 1, respectively.

Source: Author's calculations.

4.3.2 Panel Cointegration Tests

In the second step, provided that imports and exports are found to be nonstationary, it is relevant to investigate whether these two trade variables are cointegrated. Cointegration among the trade variables is a necessary condition for external sustainability.

Panel cointegration tests can be carried out using either tests proposed by Pedroni (1999, 2004) or error correction tests suggested by Westerlund (2007).

Pedroni's (1999, 2004) first generation panel unit root test suggests seven test statistics for the null hypothesis of no cointegration, with four panel cointegration statistics and three group mean cointegration statistics (Table 5). Westerlund's test (2007) takes into account the presence of cross-sectional dependence.

Except for the panel variance test and the group and panel ρ tests, all the tests indicate a rejection of the null hypothesis of no cointegration between export and import ratios at the 1% significance level for the two panels. However, Monte Carlo simulations carried out by Pedroni (2004) show that in short samples ($T=22$, in our case), panel t-statistics and group t-statistics generally perform best, followed by panel ρ statistics. Panel-v and group ρ statistics perform worst in this specific case. According to these results, we can conclude that the null hypothesis of no cointegration between export and import ratios is rejected. The findings imply that in a panel perspective, external debt is sustainable in the long run in the global panel and in the sub-panel for Central Asia. Moreover, using the Westerlund panel cointegration tests (second generation panel unit root tests) for the global panel, Central Asia, Southeast Asia, and Southwest Asia, all the panel tests reject the null hypothesis, so external debt is sustainable, too, in these four panels.

Table 5: Pedroni Panel Cointegration Test for Export and Import Ratios**Global panel**

Panel Variance Test	Panel ρ Test	Panel t -test (Non-parametric)	Panel t -test (Parametric)	Group ρ Test	Group t -test (Non-parametric)	Group t -test (Parametric)
0.58	-1.40*	-1.99***	-1.72***	-0.08	-1.88**	-2.97***

Central Asia

Panel Variance Test	Panel ρ Test	Panel t -test (Non-parametric)	Panel t -test (Parametric)	Group ρ Test	Group t -test (Non-parametric)	Group t -test (Parametric)
-0.23	-1.24	-2.71***	-2.10***	-0,13	-4,51***	-2,38***

Note: *** and * denote rejection of the null hypothesis of no cointegration at the 1% and 10% levels, respectively.

Source: Author's calculations.

Table 6: Westerlund Panel Cointegration Tests

Statistics	Global Panel Value	Central Asia Panel Value	Southeast Asia Panel Value	Southwest Asia Panel Value
G_τ	-3.040***	-3.081***	-3.729***	-2.208**
G_α	-16.345***	-16.602**	-21.053***	-16.150**
P_τ	-13.021***	-6.689**	-6.028**	-7.008***
P_α	-13.943***	-12.897**	-17.878***	-11.476

Notes: G_τ and G_α are the group mean statistics. P_τ and P_α are the panel statistics. Westerlund's panel cointegration tests take no cointegration for all countries in the panel as the null hypothesis.

Source: Author.

Our findings imply that external debt in our panel of 24 Asian emerging and developing countries is sustainable in the long run.

5. VULNERABILITY FACTORS AND RISKS IN ASIAN EMERGING AND DEVELOPING COUNTRIES: A PROSPECTIVE ANALYSIS

Following this analysis of the external debt in Asian emerging and developing countries over the past 2 decades, it is relevant, too, to consider the future path of the external debt. We propose analyzing the vulnerabilities, factors, and risks associated with the external debt of Asian countries.

Thus, four external debt criteria must be taken into account to assess the risk of future financial turmoil on the external debt of an Asian country: the debt currency composition, the share of the short-term external debt, the debt service, and the amount of total reserves.

The first external vulnerability factor is the debt currency composition. Indeed, since May 2014 and the appreciation of the US dollar against Asian currencies, exchange rate movements have increased the external debt burden denominated in US dollars. This is notably the case for Central Asian countries (such as the Kyrgyz Republic and Tajikistan) or even India, Indonesia, Thailand, and the Philippines, which have high exposure to the appreciation of the US dollar against their local currencies. On the

contrary, countries indebted in a foreign currency that depreciates against their local currencies can benefit from a decrease in their external debt burden. This is the case for Kazakhstan and Georgia, which are massively indebted in pounds sterling (by, respectively, 96% and 70% of their external debt). Indeed, they benefitted from the depreciation of the pound sterling since the United Kingdom's Brexit decision on 23 June 2016.

The share of short-term external debt can constitute a second factor for external vulnerability in times of tension on external debt. However, all the emerging and developing Asian countries have low levels of short-term external debt as a percentage of their total external debt, except for Thailand and Malaysia with around 40%–50% of short-term external debt and the PRC with more than 70%.

The third criterion is the level of debt service, expressed as a percentage of export revenue. Indeed, we can notice that some Asian developing and emerging countries are constrained by their debt service, reaching more than 20% of exports in 2014 for Pakistan, Indonesia, and Georgia and even more than 30% in Armenia, Kazakhstan, and Tajikistan. On the other hand, countries such as the PRC, Viet Nam, Azerbaijan, Bangladesh, Thailand, Malaysia, and the Philippines have higher margins (or space) due to low debt servicing and their high levels of exports revenue.

Finally, the last indicator to focus on is the amount of total reserves, expressed as a percentage of total external debt or in months of imports. On the one hand, some countries are well protected against external adverse events (such as financial crises in the region). These include the PRC, Azerbaijan, Thailand, the Philippines, Bhutan, Bangladesh, and India due to their high levels of reserves accumulated since 2000. On the other hand, Central Asian countries, with the exception of Azerbaijan, have a weak position. A notable example is Tajikistan with a very low amount of reserves in months of imports.

According to these four external debt criteria (Appendix, Table A.7), we can expect an important threat to the future path of the external debt of Central Asian countries (except Azerbaijan), notably for Tajikistan, the Kyrgyz Republic, and, to a lesser extent, Georgia. In addition, with the decline in the commodity prices over the current period, the Central Asian countries cannot accumulate enough reserves to face a future crisis. However, the external debt prospects are better in Southeast Asia and Southwest Asia, where countries have important reserves at their disposal to act as shock absorbers in the case of a crisis.

As a result, in this time of uncertainty in the world and in the region, we must consider two alternative scenarios in Asia and their consequences on the external debt position of Asian countries.⁵

The first optimistic scenario is based on a PRC “soft landing” (with a growth of around 6%–6.5%) with a stabilization at the current level of the oil Brent price (\$ 50 per barrel). In this context, countries that are most integrated with the PRC, through international trade channels, will register a decrease in their exports to the PRC and so will have less export revenue to finance their external debt. Similarly, we can expect that the PRC will reduce its foreign direct investment flows to Asian countries, resulting in less income to finance external deficits. In such a situation, Southeast Asian countries, such as Thailand, will be the most affected. However, because of their levels of reserves accumulated over the past years, there is no worry about the financing of their external

⁵ These uncertainties include the PRC's economic slowdown, movements in commodity prices, volatility of financial markets and exchange rates, the gradual increase of the Federal Reserve rate, the appreciation of the US dollar, and other external events such as the Brexit decision or political risks.

position. Even in the case of a strong appreciation of the US dollar (induced by the future increase of the Federal Reserve rate, for instance), the external debt burden denominated in US dollars will increase. Moreover, Asian countries that produce commodities, including Indonesia, Malaysia, and some Central Asian countries, will be affected negatively by the current commodity cycle and be unable to accumulate enough reserves for the future. The situation for Central Asian countries (except Azerbaijan) is even more troubling, particularly for Kazakhstan, because of their external debt situations and their trade and financial integration with the PRC through the new “Silk Road.” Indeed, the PRC slowdown could report in the future some projects or financing of this development strategy affecting Kazakhstan and their external account.

The second scenario is based on a “hard landing” for the PRC (with a growth rate less than 5%), resulting notably from the high level of PRC domestic private debt and the increase of non-performing loans affecting the PRC’s banking and shadow banking sector. In this worst-case scenario, the entire region will be affected through international trade and finance channels. In this period of financial stress, we can expect outflows of portfolio investment and foreign direct investment so that the weakest countries in terms of reserves must use their reserves to face the external crisis. Moreover, a “hard landing” for the PRC would induce a slowdown in the use of its raw materials, and so commodity prices would decline, affecting countries that produce natural resources more severely.

Amid a financing “crunch”, Asian countries can use their accumulated reserves from the last decade to face the economic and financial shocks. However, countries with insufficient levels of reserves—such as the Central Asian countries, Pakistan, Sri Lanka, or even Viet Nam—will be affected by a negative dynamic to finance their external deficits and debt.

6. CONCLUSION

In this study, we conducted a formal test of whether the external debt in 24 emerging and developing Asian countries is sustainable in the long run. We performed recent panel unit-root and cointegration tests for panel data for the period 1993–2014 to examine whether the external positions have been coherent with their inter-temporal external constraints. Moreover, we divided our sample into four sub-panels—Southeast Asia, Southwest Asia, Central Asia, and the Pacific—to identify specific external trade and debt trends.

We find that over the last 2 decades, external debt has been sustainable in the region and in the sub-panels considered. The economic implication of this result is that imports and exports move together in the long run. Moreover, Southeast Asian and Southwest Asian countries benefited from their export revenues during the 2000s to accumulate reserves that can be used in the future to buffer strong external shocks.

As a result, by taking into account four criteria of external vulnerabilities (the debt currency composition, share of short-term debt, debt service, and amount of reserves), the external debt position in emerging and developing Asian countries is not worrying, contrary to the current external positions of some African (Angola, Mozambique, Ghana, Congo) or Latin American countries (Venezuela, Brazil, Argentina). However, it is important to be vigilant and monitor the external situation of some Central Asian countries (Tajikistan, the Kyrgyz Republic, Kazakhstan) due to the deterioration of their external deficits in the recent period of declining oil prices and the appreciation of the US dollar against their local currencies.

Finally, with the current changing cycle of commodities prices, it is important for Asian countries that produce commodities to diversify their economic structure and avoid the Dutch disease prophecy⁶. Similarly, Asian countries that are closely integrated with the PRC must diversify their international trade relationships with trading partners, such as India.

⁶ Such mechanism was used to describe the economic situation of the Netherlands during the 1960s when they discovered gas fields in the North Sea. It is defined as the negative effects resulting from an increase in important commodities export in a country.

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APPENDIX

Table A.1: External Debt Evolution in Asia and Pacific Countries
(% of GDP)

Country	1993–1999	2000–2007	2008–2014	Average
People's Republic of China	12.5	7.3	3.2	7.6
Mongolia	37.5	50.7	91.5	59.5
Indonesia	54.6	44.0	23.8	41.0
Malaysia	32.3	36.6	32.0	33.8
Philippines	49.1	55.9	24.3	43.7
Thailand	40.3	31.0	17.2	29.5
Viet Nam	101.0	31.3	29.3	52.8
Bangladesh	37.8	30.8	19.4	29.4
Bhutan	40.3	69.2	69.1	60.0
India	24.2	17.4	15.4	18.9
Nepal	51.0	43.0	22.4	39.0
Pakistan	35.1	32.4	25.2	31.0
Sri Lanka	52.6	46.0	38.9	45.8
Armenia	24.5	36.8	51.7	37.6
Azerbaijan	6.6	13.7	10.3	10.4
Georgia	35.4	33.6	61.0	42.9
Kazakhstan	15.6	67.3	69.5	51.6
Kyrgyz Republic	54.8	87.1	77.4	73.8
Tajikistan	65.4	57.4	44.5	55.8
Fiji	8.2	8.5	13.5	10.0
Papua New Guinea	56.4	43.3	76.7	58.1
Samoa	76.2	46.6	44.2	55.2
Solomon Islands	42.0	44.4	21.6	36.4
Tonga	29.7	34.2	37.5	33.8
Total average	41.0	40.3	38.3	39.9

Source: Author's calculations from the World Bank's World Development Indicators.

Table A.2: Current Account Evolution in Asia and Pacific Countries
(% of GDP)

Country	1993–1999	2000–2007	2008–2014	Average
People's Republic of China	3.0	4.5	3.7	3.9
Mongolia	0.1	-1.7	-16.6	-5.8
Indonesia	-0.4	2.7	-0.9	0.6
Malaysia	-0.2	11.2	9.4	7.0
Philippines	-3.2	1.2	3.2	0.5
Thailand	-0.9	2.9	2.3	1.5
Viet Nam	-7.1	-1.8	-0.8	-3.2
Bangladesh	-1.1	0.0	0.7	-0.1
Bhutan	2.6	-12.1	-14.7	-8.3
India	-1.1	0.0	-2.8	-1.3
Nepal	-2.3	3.4	2.3	1.2
Pakistan	-3.6	0.2	-2.9	-2.0
Sri Lanka	-5.4	-3.1	-4.7	-4.3
Armenia	-13.7	-7.0	-11.6	-10.6
Azerbaijan	-17.8	-3.5	23.6	0.6
Georgia	-13.3	-10.2	-11.8	-11.5
Kazakhstan	-4.5	-2.6	1.5	-1.9
Kyrgyz Republic	-14.7	-1.2	-11.5	-8.8
Tajikistan	-12.7	-3.4	-4.9	-6.8
Fiji	-2.0	-8.2	-8.6	-6.3
Papua New Guinea	5.7	4.1	-20.2	-3.1
Samoa	-2.4	-7.2	-5.8	-5.3
Solomon Islands	-4.5	-3.4	-12.8	-6.8
Tonga	-5.5	-3.3	-5.6	-4.7
Total average	-4.5	-1.6	-3.7	-3.2

Source: Author's calculations from the World Bank's World Development Indicators.

Table A.3: Exports Evolution in Asian Emerging and Developing Countries
(% of GDP)

Panel	1993–1999	2000–2007	2008–2014	Average
Southeast Asia	50.8	63.0	57.3	57.3
Southwest Asia	21.4	22.0	21.5	22.0
Central Asia	36.3	42.1	37.4	39.0
Global panel	35.5	40.2	38.1	38.2

Source: Author's calculations from the World Bank's World Development Indicators.

Table A.4: Imports Evolution in Asian Emerging and Developing Countries
(% of GDP)

Panel	1993–1999	2000–2007	2008–2014	Average
Southeast Asia	52.0	59.1	54.7	55.4
Southwest Asia	28.2	30.1	33.9	31.0
Central Asia	53.2	52.2	51.2	52.2
Global panel	45.0	47.4	48.0	46.9

Source: Author's calculations from the World Bank's World Development Indicators.

Table A.5: Summary of Pesaran (2007) CIPS Panel Unit Root Test for Asian Panels

Panel	Variables (in % of GDP)	Variables in Level
Global panel	Current account	-3.554*** (0.000)
	External debt	1.943 (0.974)
	Imports	0.626 (0.734)
	Exports	-1.269 (0.102)
Southeast Asia	Current account	0.609 (0.729)
	External debt	-3.156*** (0.001)
	Imports	2.549 (0.995)
	Exports	2.267 (0.988)
Central Asia	Current account	-2.888*** (0.002)
	External debt	0.274 (0.608)
	Imports	-1.203 (0.115)
	Exports	-0.137 (0.446)
Southwest Asia	Current account	0.443 (0.671)
	External debt	3.666 (1.000)
	Imports	3.010 (0.999)
	Exports	-0.860 (0.195)

Notes: The null hypothesis of the Pesaran (2007) test is that all series are nonstationary. The alternative assumption is that only a fraction of the individual series in the panel is stationary. We report the standardized Z-tbar statistics, which are compared with the critical values provided by Pesaran (2007). P-value is in parenthesis. *** indicates statistical significance at the 1% level.

Source: Author's calculations from the World Bank's World Development Indicators.

Table A.6: Summary of IPS, MW, and Choi Unit Root Tests for Asian Panels

Panel	Variables (in % of GDP)	Variables in Level		
		IPS	MW	Choi
Global panel	Current account	-4.412***	96.441***	83.683***
	External debt	-2.989***	97.84***	310.422***
	Imports	-3.105***	79.92***	72.918***
	Exports	-4.039***	82.81***	51.025
Central Asia	Current account	-3.370***	78.454***	81.614***
	External debt	-1.785***	20.331**	13.25
	Imports	-1.026	19.09	20.803*
	Exports	-1.267	16.588	19.933*
Pacific	Current account	-1.271	13.92	30.854***
	External debt	0.633	6.04	17.742**

Notes: IPS, MW and Choi represent the Im, Pesaran, and Shin (2003), Maddala and Wu (1999) and Choi (2001) panel unit-root tests. All three tests examine the null hypothesis of non-stationarity. The alternative hypothesis is that at least one of the individual series in the panel is stationary. ** and *** indicate statistical significance at 5% and 1% levels, respectively.

Source: Author's calculations from the World Bank's World Development Indicators.

Table A.7: External Debt Indicators of Asian Emerging and Developing Countries in 2014

Country	External Debt Denominated in US Dollars (% of total external debt)	Short-term Debt (% of total external debt)	Total Debt Service (% of exports of goods, services, and primary income)	Total Reserves (% of total external debt)	Total Reserves (months of imports)
Armenia	63.57	10.62	31.69	17.42	2.92
Azerbaijan	70.73	16.47	5.23	125.26	7.33
Georgia	15.91	15.91	23.33	19.40	2.93
Kazakhstan	6.34	6.34	35.12	13.66	3.25
Kyrgyz Republic	76.56	4.31	14.21	24.87	3.19
Tajikistan	79.38	0.56	38.25	4.19	0.37
Bangladesh	47.09	11.89	5.24	62.38	5.18
Bhutan	15.37	0.54	12.07	67.66	11.89
India	83.08	18.47	18.60	65.51	6.13
Pakistan	55.35	8.91	19.14	18.99	2.55
Sri Lanka	73.99	16.99	14.75	16.78	3.49
Indonesia	74.61	15.88	23.07	37.09	5.59
Malaysia	38.05	49.25	5.85	54.35	5.65
Philippines	69.72	20.92	7.47	92.79	9.45
Thailand	87.26	41.70	5.22	111.38	6.43
Viet Nam	55.04	18.16	4.16	47.56	2.53
People's Republic of China	93.71	71.22	1.88	402.20	18.46
Mongolia	69.74	11.40	21.25	7.40	2.32

Source: International Debt Statistics, World Bank World Development Indicators.