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## Are China and India Decoupling from the United States?

**Summary:** After the 2008 global economic crisis, there has been an attention on decoupling conditions between emerging and advanced economies in the economic literature. There have been different conclusions about decoupling. In this study, we analyzed the conditions decoupling China and India from the United States. We used the autoregressive distributed lag (ARDL) bounds testing approach for the period of 1960-2014. According to the results of the analysis, the U.S. gross domestic product (GDP), export, and import indicators have no long-term relationship with China's and India's GDP.

**Key words:** Decoupling, China, India, United States, ARDL bounds testing.

**JEL:** C01, E32, F42.

Strong linkages of international trade between countries may cause business cycles to synchronize with each other. Because trade linkages can prompt the spillover of aggregate demand shocks, business cycle similarities occur through the channel of aggregate demand shocks (Jeffrey A. Frankel and Andrew K. Rose 1996). Cesar Calderon, Alberto Chong, and Ernesto Stein (2003) pointed out that trade integration has more effect on business cycles in advanced economies than in emerging economies. During the 2008 global crisis period, emerging market economies (EMEs) sustain their growth performance and this evidence brings questions in the context of business cycle transmission (M. Ayhan Kose, Christopher Otrok, and Eswar S. Prasad 2012, p. 512). In this respect, it is implied that emerging economies' business cycles are less affected than advanced economies and this situation is named "decoupling". Decoupling means that the economy can grow in a sustainable phase without negative pressures of other economies. Decoupling is commonly taken into account by Asian countries and developed countries, especially the United States. It is generally suggested that Asian economies are integrated in their region and that these economies are less affected from the negative conditions of advanced economies (Çiğdem Akın and Kose 2007; Jarko Fidrmuc and Iikka Korhonen 2010; Werner Pascha and Jihee Yoon 2011; Dilip Nachane and Amlendu Kumar Dubey 2013; Antonio Pesce 2014).

This study departs from the related decoupling literature with respect to using trade variables in the analysis. Decoupling is commonly analyzed using real gross domestic product (GDP) growth rate, stock market prices, and industrial production

indexes in the literature. This study also departs from other studies in the point of the methodology that is used. We used cointegration analysis, especially the rolling window procedure.

The aim of this study is to examine the decoupling conditions of China and India from the United States and to investigate the stability of the decoupling conditions. For that purpose, we analyzed whether the U.S. GDP, export, and import indicators have a long-term effect on China's and India's GDP by means of the autoregressive distributed lag (ARDL) bounds testing approach and the rolling window approach to the bounds test for the period of 1960-2014.

## 1. Theoretical Perspective

Some views assert that there is an interdependent economic relation between the United States and emerging Asian economies. The context of interdependence formed by the United States is that it is an export region for Asian economies. Also, the excessive saving rates of Asian economies finance the U.S. current account deficits (Yan Liang 2010). Contrary to these views, some argue that Asian economies established an internal demand-driven economy and prevent their economies from economic crisis, which was generated by the United States. Supporters of this approach indicate the growth performances and resilient financial market conditions of Asian economies (Yung Chul Park and Kwanho Shin 2009).

Some studies in terms of East Asian business cycle synchronization imply that trade integration in the region stimulates business cycle similarities among East Asian countries (Shin and Yunjong Wang 2003; Masanaga Kumakura 2006; Pradumna B. Rana 2007; Fabio Moneta and Rasmus Ruffer 2009). In contrast to these approaches to the linkage between trade and business cycle synchronization, Kose and Kei-Mu Yi (2001) asserted that high trade relations are relevant to low business cycle synchronization.

The emerging Asian region turns into an interdependent one in the world economy and interdependence conditions are formed by intraregional trade. The volume of the intraregional trade of East Asian economies has considerably increased over the last decade. Also, East Asian economies integrated in the other forms of economic terms such as direct investment and financial flows (Soyoung Kim, Jong-Wha Lee, and Cyn-Young Park 2011). China's import from emerging Asian economies has a positive effect on these countries' growth rates. During the global crisis period, Asian countries maintained their growth potential by exporting to China (Donghyun Park and Kwon Shin 2011). Equity market linkages are strong between China and other Asian countries, and this situation reveals increasing business and trade relations in the region (Reuven Glick and Michael Hutchison 2013). Maria Jesus Herrerias and Javier Ordóñez (2014) found the decoupling conditions between China and the United States. They associated this finding with the fact that the policymakers of China focus on national policies much more than policies that are against the external shocks. Abdul Abiad et al. (2015) pointed out that emerging market and developing economies have improved their economic performance over the past 20 years using effective policies and these countries are less affected from external shocks.

Especially, emerging Asian economies stand out with their increasing trade shares in the world economy. The largest Asian economies, China and India, contribute to the faster global growth. In contrast to the globalization of the world economy, business cycle synchronization between developed and emerging Asian countries seems usually independent and this independence is mentioned as the decoupling of business cycles (Fidrmuc and Korhonen 2010). This is because EMEs have had important place in the world economy with their great share of global growth. Influential growth rates of EMEs, especially China and India, seem not to be affected by industrial countries' weak growth performances. These growth evidence of EMEs and industrial countries lead to decoupling conditions, which means tight linkages of business cycles between EMEs and industrial countries (Kose, Otrok, and Prasad 2012; Nachane and Dubey 2013).

Kose, Otrok, and Prasad (2012) asserted that industrial countries converge in the scope of business cycle with each other; on the contrary, emerging economies' business cycle converge with each other as well. However, there is a decoupling condition between industrial countries and emerging economies in terms of business cycle convergence. Pierre-Richard Agénor, C. John McDermott, and Prasad (2000) reached different results about decoupling conditions between advanced economies and emerging economies. Two country groups have similarities and differences with respect to macroeconomic fluctuations. Kose, Prasad, and Marco E. Terrones (2003) indicated that trade and financial integration have a stronger effect on advanced economies' macroeconomic fluctuations. Shruthi Jayaram, Ila Patnaik, and Ajay Shah (2009) found out that India's business cycle synchronization is related to advanced economies and the United States. However, India's business cycle fluctuations are more relevant to advanced countries' business cycles rather than the United States. However, Akin and Kose (2007) and Fidrmuc and Korhonen (2010) reach decoupling finding for India. Tze-Haw Chan and Wye L. R. Khong (2007) stated that Asia Pacific countries' economies are more correlated with Japan rather than with the United States. Aziz N. Berdiev and Chun-Ping Chang (2015) concluded that the business cycles of China, Japan, and the United States are synchronized with other Asia Pacific economies. James Yetman (2011) asserted that, in the economic recession periods, the real GDP of countries' comovement occurs among countries. In the other periods, the comovements of real GDP are indistinguishable. Lillie Lam and Yetman (2013) found a comovement evidence between Asia and other countries and this comovement depends largely on trade and financial integration.

## 2. Literature Review

Akin and Kose (2007) investigated the growth linkages between developed (north) countries and developing (south) countries in the globalization concept. They used extensive data that include macroeconomic and sectoral variables for 106 countries in the panel regression and correlation analyzes during the period of 1960-2005. Also, they divided south countries into two groups: the emerging south and the developing south. According to the analysis results, developed countries' economic effects on the emerging south decreased (including China and India) during the globalization

period. Conversely, growth linkages between developed north countries and developing south countries are steady in the same period.

Park and Shin (2009) studied the decoupling conditions of East Asian countries from the United States and the European Union countries. They used GDP, trade, and stock market price data in the panel regression analysis. According to the result of this analysis, intraregional trade between East Asian countries has increased. In this respect, East Asian countries depart from the other regions of the world. However, East Asian countries' stock prices follow those of the United States, and East Asian stock markets are affected from subprime mortgage crisis. This effect is caused by the expectations of global investors.

Michael Dooley and Hutchison (2009) examined the decoupling hypothesis between the United States and 14 emerging markets. They found that emerging markets decoupled from the U.S. financial markets improved from early 2007 to the summer of 2008. Conversely, after mid-2008, financial and real economic news that occurred in the United States affected the emerging markets. Ultimately, financial markets recoupled in the financial shock period.

Fidrmuc and Korhonen (2010) examined the decoupling conditions between emerging Asian economies (China and India) and the Organisation for Economic Cooperation and Development (OECD) countries. They used quarterly GDP data of the period between 1990 and 2008 and foreign trade data related to the period of 1995-2006. According to the panel regression and dynamic correlation analysis results, business cycles in China and India have had different patterns from the OECD countries. This finding is consistent with the decoupling hypothesis. However, in contrast to decoupling, industrial countries and emerging Asian countries were affected by the 2008 financial crisis similarly.

Ismail H. Genc, Abdullah Jubain, and Abdullah Al-Mutairi (2010) investigated business cycle synchronization between the United States and two Gulf Cooperation Council countries, the Kingdom of Saudi Arabia and the United Arab Emirates (UAE). They used real *per capita* GDP variable period from 1950 to 2008 and stock market (KSA, DFM, and DJI) indexes daily data from 10 March 2008 to 10 March 2009 in the Granger causality test. They concluded that the U.S. business cycles have no significant effect on the Saudi Arabia and UAE business cycles. These economies decoupled from the U.S. business cycles. In contrast, the stock markets of Saudi Arabia and the UAE are highly synchronized with the U.S. stock market.

Adriana Z. Fernandez and Alex Nikolsko-Rzhevskyy (2010) considered the U.S. economic influence on the countries that are important partners of the United States using correlation analysis and the Granger causality test. They used real GDP data or industrial production indexes for these countries in the period of 1960-2007. They reached the result that, when globalization rose after the early 1980s, the U.S. economic influence on other countries took some time to affect them. This situation can be described by means of the Chinese economy. For example, China's export gradually increased in the European Union. China can be affected by the U.S. economic fluctuations indirectly because the U.S. economic fluctuations have effects on the European Union. This indirect effect could take a long time to be influential on the Chinese economy. Finally, business cycle fluctuations in the United States affect

other countries with a lag. The U.S. economic fluctuations have had a weak effect on the other countries in the short-run, but in the long-run the U.S. economic fluctuations have had strong effects on the other countries.

Pascha and Yoon (2011) examined the decoupling matter in terms of East Asia and developed countries. Correlation analysis and a panel regression model are used. Quarterly growth rates of GDP data in the period of 1995-2009 have been used. They found that in the periods of economic improvements decoupling has occurred. However, countries are recoupling during the economic recession periods.

Sebastien Walti (2012) examined the decoupling hypothesis between emerging economies and advanced economies. He defined business cycle as the output gap. Output gap constitutes the difference between actual GDP and trend GDP divided by trend GDP. The analysis period includes the period of 1980-2010. Walti (2012) measured the business cycle interdependence by the Euclidean distance method and the econometric test. According to the analysis results, there have not been any decoupling circumstances in recent years. Also, the interdependence degree of business cycle has become stronger.

Guillermo Felices and Tomasz Wieladek (2012) investigated which factors participate in the vulnerability of financial crises in emerging economies. In this respect, they used real exchange rate appreciation and international reserve growth variables for 41 countries during the period of 1999-2007 in the dynamic common factor model. They concluded that exchange rate regime reforms may bring decoupling. However, it is hard to say that there is a decoupling for most of these countries.

Nachane and Dubey (2013) investigated the decoupling circumstance between EMEs and the OECD countries and also between EMEs and advanced countries in the period of 1974-2010. They used growth rate data for these countries in the scope of nonstationary spectral causality testing and wavelet correlations methods. They revealed vigorous evidence that EMEs are decoupling from the OECD countries and advanced countries.

Pesce (2014) looked at the decoupling debate with respect to emerging economies and advanced economies using a time-varying panel VAR model. In the analysis, he used the annual growth rate of GDP data and domestic credit data in the period of 1978-2010. The main purpose of the study is to estimate the resilience of both emerging and advanced economies against the financial and real shocks. According to the analysis results, the resilience of emerging economies has been growing. The degree of resilience has not in a constant manner increased in the period of 2006-2010. This finding about resilience conditions is consistent with the decoupling hypothesis. Additionally, during the all sample period, emerging economies had more vulnerable credit shocks than real shocks.

Tiago Trancoso (2014) investigated the interdependence of business cycles synchronization with respect to the decoupling hypothesis between EMEs and advanced economies using network analysis and dynamic correlation. He used the annual growth rate of GDP variable in the period of 1952-2011. According to the analysis results, all country groups are economically interdependent in the entire sample period. This interdependence became more accelerated in the period of 1996-2011. The economic interdependence of country groups is explained by the global economic network conditions.

### 3. Data

The annual GDP for China, India, and the United States has been used. Also, the exports of goods and services and imports of goods and services data have been used for only the United States. The data that cover the period of 1960-2014 were measured in terms of billion USD (constant 2005), and their natural logarithms have been used in the analysis. The data were obtained from the World Bank Database (2015)<sup>1</sup>, and its descriptive statistics are given in Table 1. Export and import indicators have been used to distinguish the U.S. trade effects on China's and India's business cycle. Because it is theoretically suggested that trade could affect the countries' business cycles through aggregate demand shocks, it can be expected that the U.S. import has a positive effect on China's and India's GDP, whereas the U.S. export has a negative effect on China's and India's GDP.

**Table 1** Descriptive Statistics (Billion USD)

	UGDP	UIMP	UEXP	IGDP	CGDP
Min	2797.28	100.50	88.31	102.66	55.48
First quarter	4958.77	281.92	239.24	159.35	143.34
Median	7480.98	602.22	432.96	285.74	437.74
Mean	8106.03	891.66	698.80	459.79	1101.95
Third quarter	11,609.70	1605.51	1112.63	617.19	1483.00
Max	14,796.60	2372.15	1976.18	1598.32	5270.06

Source: Authors' calculations.

### 4. Methodology

The conditions decoupling China and India from the United States are analyzed in the context of the long-term relationship between the United States and China and also between the United States and India using the ARDL bounds testing approach to the cointegration developed by M. Hashem Pesaran, Yongcheol Shin, and Richard J. Smith (2001) in this study. Because the bounds testing approach does not require the variables to be integrated at the same level,  $I(0)$  or  $I(1)$  variables are adequate to search for a cointegration relation between them. This is the most significant superiority of the bounds testing approach on other cointegration methods. Moreover, this approach is also efficient in data sets with a limited number of observations and its statistical properties are likely to be better than other approaches (Chor Foon Tang and Hooi Hooi Lean 2011).

The bounds testing approach is based on the estimation of an adequate ARDL model. We have employed the following ARDL models:

<sup>1</sup> **World Bank.** 2015. World Development Indicators. <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators> (accessed January 22, 2015).

$$\begin{aligned} \ln CGDP_t = & \beta_0 + \beta_1 TREND + \sum_{i=1}^p \alpha_i \ln CGDP_{t-i} + \sum_{i=0}^{q_1} \gamma_i \ln UGDP_{t-i} \\ & + \sum_{i=0}^{q_2} \delta_i \ln UEXP_{t-i} + \sum_{i=0}^{q_3} \theta_i \ln UIMP_{t-i} + \varepsilon_t. \end{aligned} \quad (1)$$

$$\begin{aligned} \ln IGDP_t = & \beta_0 + \beta_1 TREND + \sum_{i=1}^p \alpha_i \ln IGDP_{t-i} + \sum_{i=0}^{q_1} \gamma_i \ln UGDP_{t-i} \\ & + \sum_{i=0}^{q_2} \delta_i \ln UEXP_{t-i} + \sum_{i=0}^{q_3} \theta_i \ln UIMP_{t-i} + \varepsilon_t. \end{aligned} \quad (2)$$

In the equations,  $\ln CGDP$ ,  $\ln IGDP$ ,  $\ln UGDP$ ,  $\ln UEXP$ , and  $\ln UIMP$  indicate the natural logarithm of China's GDP, India's GDP, U.S. GDP, export of the United States, and import of the United States, respectively. Both equations represent an ARDL( $p, q_1, q_2, q_3$ ) model.  $p$ ,  $q_1$ ,  $q_2$ , and  $q_3$  are the optimal lag lengths for the variables that may be determined using Akaike (AIC), Schwarz (BIC), or Hannan-Quinn (HQ) information criteria. Nevertheless, it should be noted that there shall not be a serial correlation problem in the model while specifying an ARDL model. This is a significant assumption required for the validity of the bounds test (Pesaran, Shin, and Smith 2001).

After the specification of the ARDL model, one can obtain the unrestricted error correction model (ECM) by transforming the estimated ARDL model. The bounds testing procedure uses the unrestricted ECM to test for a cointegration relationship among variables. For our case, these models are as follows:

$$\begin{aligned} \Delta \ln CGDP_t = & \beta_0 + \beta_1 TREND + \beta_2 \ln CGDP_{t-1} + \beta_3 \ln UGDP_{t-1} + \beta_4 \ln UEXP_{t-1} \\ & + \beta_5 \ln UIMP_{t-1} + \sum_{i=1}^{p-1} \alpha_i \Delta \ln CGDP_{t-i} + \sum_{i=0}^{q_1-1} \gamma_i \Delta \ln UGDP_{t-i} \\ & + \sum_{i=0}^{q_2-1} \delta_i \Delta \ln UEXP_{t-i} + \sum_{i=0}^{q_3-1} \theta_i \Delta \ln UIMP_{t-i} + \varepsilon_t. \end{aligned} \quad (3)$$

$$\begin{aligned} \Delta \ln IGDP_t = & \beta_0 + \beta_1 TREND + \beta_2 \ln IGDP_{t-1} + \beta_3 \ln UGDP_{t-1} + \beta_4 \ln UEXP_{t-1} \\ & + \beta_5 \ln UIMP_{t-1} + \sum_{i=1}^{p-1} \alpha_i \Delta \ln IGDP_{t-i} + \sum_{i=0}^{q_1-1} \gamma_i \Delta \ln UGDP_{t-i} \\ & + \sum_{i=0}^{q_2-1} \delta_i \Delta \ln UEXP_{t-i} + \sum_{i=0}^{q_3-1} \theta_i \Delta \ln UIMP_{t-i} + \varepsilon_t. \end{aligned} \quad (4)$$

In the equations,  $\Delta$  indicates the first-degree difference operator. In (3) and (4), the null hypothesis that indicates the nonexistence of cointegration can be written

as  $H_0: \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ . The test was conducted by calculating an  $F$ -statistics. The test statistics has a nonstandard distribution. Therefore, the mentioned  $F$ -statistics are compared to the lowest critical value considered all variables as  $I(0)$  and the highest critical value considered all variables as  $I(1)$ . Pesaran, Shin, and Smith (2001) tabulated the critical values for various model definitions. Furthermore, Paresh Kumar Narayan (2005) also tabulated the mentioned critical values for cases where there is a limited number of observations. Accordingly, if  $F$ -statistics is greater than the highest critical value, the null hypothesis is rejected, indicating a cointegration relation between variables. On the contrary, if  $F$ -statistics is smaller than the lowest critical value, the null hypothesis cannot be rejected; therefore, a cointegration relation does not exist between variables. A third possible case is that  $F$ -statistics might be between critical values that do not lead to any conclusion regarding cointegration relation.

If the existence of a long-term relationship is identified, then the coefficients indicating the long-term relationship and the ECM clarifying the short-term dynamics between relevant variables are obtained from the previously estimated ARDL model.

## 5. Empirical Results

Because all critical values are set with the assumption that all variables are either  $I(0)$  or  $I(1)$  in the bounds testing approach, one must be sure that none of the variables are  $I(2)$  before searching for the existence of a long-term relationship with the bounds testing approach. In this context, the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are applied on the variables before estimating the ARDL model. The results are given in Table 2. All variables, except  $\ln CGDP$ , are  $I(1)$  for both unit root test results.  $\ln CGDP$  is  $I(0)$  according to the PP test and  $I(1)$  according to the ADF test.

**Table 2** Unit Root Test Results

Variable	Level		First difference		Result
	ADF	PP	ADF	PP	
$\ln CGDP$	-2.162 (1)	-5.512* (0)	-7.989* (0)	-	$I(0)/I(1)$
$\ln I GDP$	-0.511 (0)	-0.075 (7)	-8.140* (0)	-11.167* (12)	$I(1)$
$\ln U GDP$	-2.223 (1)	-1.318 (4)	-5.722* (0)	-5.574* (7)	$I(1)$
$\ln U EXP$	-1.607 (0)	-1.607 (0)	-6.360* (0)	-6.333* (3)	$I(1)$
$\ln U IMP$	-1.490 (0)	-1.702 (1)	-6.359* (0)	-6.324* (6)	$I(1)$

**Notes:** The numbers in parentheses are the optimal lag lengths for the ADF test based on Schwarz information criterion and bandwidth for the PP test. All models included both constant and linear trend in the unit root tests. \* significance at the 1% level.

**Source:** Authors' calculations.

The optimal lag lengths of the ARDL models are determined by the AIC with maximum lag length as four. Based on the calculated AIC values, the best-fitted ARDL models are ARDL(3,2,4,4) for China and ARDL(3,3,4,1) for India. According to the serial correlation test results applied on the estimated models, there is no serial correlation problem in the models. Therefore, these models are adequate to estimate the unrestricted ECM and conduct bounds testing. The results are given in Table 3.

**Table 3** Bounds Test Results

	ARDL	AIC	$X_{SC}^2(1)$	$X_{SC}^2(4)$	F-statistics	Critical values (%10)
China	(3,2,4,4)	-213.280	0.909 (0.167)	1.908 (0.627)	1.116	I(0) 3.673
India	(3,3,4,1)	-213.681	0.096 (0.756)	0.096 (0.189)	1.010	I(1) 4.715

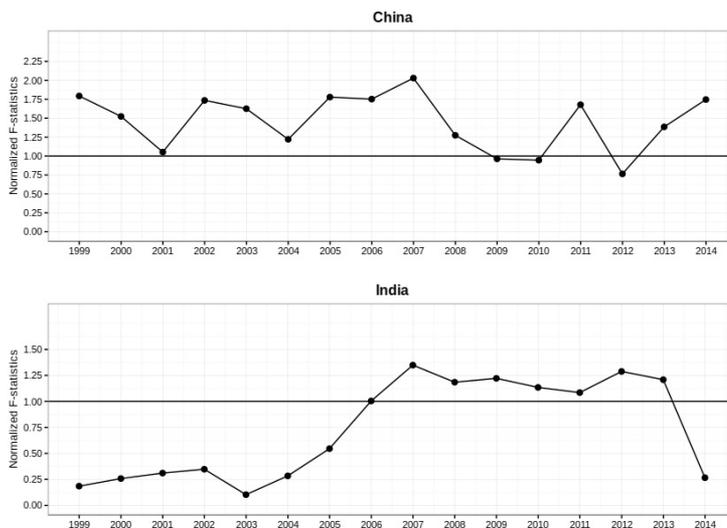
**Notes:**  $X_{SC}^2(1)$  and  $X_{SC}^2(4)$  are LM statistics for testing no residual serial correlation against orders 1 and 4. The *p*-values of serial correlation tests are given in parentheses.

**Source:** Authors' calculations.

The *F*-statistics calculated from the models are 1.116 and 1.010. These values are compared to the critical values (3.673 and 4.715) obtained from Narayan (2005) at the 10% significance level for three variable. *F*-statistics are smaller than the lowest critical value, so the null hypothesis cannot be rejected for both models, which means that a cointegration relation does not exist among the variables. According to the analysis results, GDP, export, and import indicators of the United States have no long-term relationship with China's and India's GDP. This evidence is consistent with the decoupling hypothesis.

We have extended our analysis using the rolling window approach to the bounds test proposed by Tang and Lean (2011) to detect when decoupling happened. The first step of the rolling window bounds test is to choose the rolling window size. As pointed by Tang and Lean (2011), there is no statistical procedure to determine the optimal windows size; thus, we set the rolling window size at 40 years and examined the decoupling conditions for the period of 1999-2014 because the significant increase on trade relations occurred among countries in this period. For each subperiod, we have calculated an *F*-statistic *via* the bounds testing procedure. Because the decoupling hypothesis is related to the absence of the cointegration relation, we have normalized each *F*-statistics by the 10% lower critical value of Narayan (2005). Therefore, if China or India is decoupling from the United States, then the normalized *F*-statistic of that country should be below 1. Figure 1 shows the normalized *F*-statistics.

As seen in Figure 1, China is decoupling from the United States in 2009, 2010, and 2012. This result can be described as an effect of the 2008 global financial crisis, which maintained its effects in the following years. There is a long-term relationship between China and the United States in periods of 1999-2000, 2002-2003, and 2005-2007 and after 2012. This relationship occurred with respect to trade ties between China and the United States. Because of that, China still keeps its head position about imports to the United States. Also, China is the third largest market for U.S. exports after Canada and Mexico (United States International Trade Commission 2010). On the contrary, India is decoupling from the United States from 1999 to 2005 and then in 2014. The decoupling period of 1999-2005 can be explained through economic reforms that were implemented by India after the balance of payments crisis in 1991. These reforms are commonly intended on liberalizing the trade policy (N. Kubendran 2013). The variables are cointegrated only in 2007 and 2012 for India and the United States.



Source: Authors' calculations.

**Figure 1** Normalized  $F$ -statistics for the Rolling Window Bounds Test

## 6. Conclusion

In this study, we indicated the conditions decoupling China and India from the United States over the period of 1960-2014. According to the empirical analysis for that sample period based on the ARDL bounds testing approach, GDP, export, and import indicators of the United States have no long-term relationship with China's and India's GDP. This evidence is consistent with other decoupling finds (Akın and Kose 2007; Park and Shin 2009; Fidrmuc and Korhonen 2010; Kose, Otrok, and Prasad 2012; Nachane and Dubey 2013). This finding can be described by the internal demand-driven economy and intraregional trade economy of Asian countries. The conclusion of Park and Shin (2009) is meaningful as it indicates that emerging economies widen their export markets to other countries. Thereby, the dependence on the United States in terms of export and import becomes weaker for China and India. Also, the results of Kose, Otrok, and Prasad (2012) clarified the decoupling of China and India from the United States. They pointed out that, in emerging economies, the more *per capita* income levels rise, the larger the subsequent domestic market size becomes. This process causes a tight linkage to advanced economies.

We also employed the rolling window approach to the bounds test to examine the persistence of the decoupling conditions. The results of the rolling window procedure show that the decoupling hypothesis is not always valid. For China's side, decoupling from the United States is a result of the 2008 crisis that affected the United States. Conversely, the 2008 crisis does not affect the decoupling conditions between India and the United States.

This study might be extended by considering other major trade partners of China (Japan, Taiwan, South Korea, and Germany) and India (Saudi Arabia, UAE, and Switzerland) with respect to decoupling conditions. The same variables can be used for these countries, and ARDL with the rolling window procedure can also be applied.

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