

Does Financial Cooperation Agreement Influence the Real Economy?: A GMM Panel Data Approach on ASEAN+3 Countries

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This study aims to investigate the influences and contributions of financial integration on real sectors in ASEAN+3 economies. It employs General Methods of Moment (GMM) technique and uses the proxies of financial integration and real economy from 1990 to 2012. The findings show that financial integration on real economy has positive effect, such as increasing government spending, reducing unemployment, and so forth. The finding has great implications for the regional economies. It is recommended that the policy makers improve the financial integration in order to develop the real economy.

JEL Classifications: E24, E31, E44, E51, G11, G15

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INTRODUCTION

The actions of financial market integration such as capital market openness, reduction of asymmetry information, minimization of moral hazard problem, reduction of transaction cost, and development of corporate governance play the key role in developing the real economy of integrated economies (King & Levine, 1993; Rajan & Zingales, 1998; Wurgler, 2000). The process of financial integration relaxes the market restrictions in allowing the in/out-flow of foreign capital, which is expected to respond positively on economic growth (Levine, 2005). It is further expected to contribute positively on other sectors of real economy (Chambet & Gibson, 2008).

The regional economies of ASEAN+3¹ launch the financial cooperation in April, 1999 in order to strengthen and stabilize the real economies by developing financial markets and liberalizing the capital markets. They adopted a number of initiatives such as Chiang Mai Initiatives (CMI)², Asian Bond Market Initiative (ABMI)³, and so forth in order to develop the market cooperation and further to develop the real economy. The progress of these initiatives has to be investigated to justify the development of financial cooperation. If the financial integration does not contribute in the development of real economy, further actions have to be implemented. Therefore, this study deals with the following issues:

1. What is the current progress of financial cooperation and how does it contribute in developing the real economy?
2. Which factors of financial markets have more effect on economic development?
3. Does the financial cooperation have positive impact on real economy? If yes, how can the policy makers strengthen the regional cooperation?

The study on financial market cooperation contributes in several perspectives: First, none of the previous studies investigated whether financial cooperation agreement improves the ASEAN+3 real economies. It is not justified whether ASEAN+3 regional bloc is successful in forming the financial cooperation framework. Second, very few of the studies consider the GMM panel approach showing the impact of financial integration on economic growth and output growth. Third, the multiple indicators of real economies and financial integration have been considered in this study. It provides a comprehensive finding in investigating the economic contribution of financial integration. Fourth, this study bridges all of the literature gaps and presents a comparative study between two periods: before and after the financial cooperation agreement. Finally, this study comes up with constructive policy recommendations for the regional economies.

The arrangement of this paper is as follows. The relevant literatures are discussed in section 2 followed by the research methodology in section 3. The details of data and variable are discussed in section 4 and the analysis of findings is presented in section 5. Concluding remarks along with the suggestions and implications of the study are described in section 6.

LITERATURE REVIEW

The previous studies are categorized into three groups of studies. First group of studies indicates the positive effect of financial integration on real economy, the second group of studies shows the neutral effect, while the third group of studies shows the negative influence of financial integration on real economy.

The first group of studies (King & Levine 1993; Obstfeld, 1994; Bekaert, Harvey, & Lundblad, 2001; Chinn & Prasad, 2003; Guiso, Jappelli, Padula, & Pagano, 2004; Klein &

Olivei, 2005; Masten, 2008) examined the effect of financial integration on economic growth in European economies, employing threshold approach using the data from 1996 to 2004. The studies indicate that financial integration affects economic growth positively, as it ensures the risk sharing among the integrated economies. This finding comply with that of Imbs (2006) who indicated that higher level of restriction on financial market openness causes low level of output correlation and vice-versa, which means positive correlation exists between financial integration and output.

Furthermore, Bonfiglioli (2008) investigated the role of financial integration on domestic productivity. He provided the evidence of strong linkage between financial integration and productivity where financial integration influences domestic productivity positively. The market integration improves the economic growth because the financial market integration leads to the reduction of information gap, asymmetric information, and cost of capital along with the improvement of corporate governance and facilitating risk management (King & Levine, 1993; Rajan & Zingales, 1998; Wurgler, 2000). Besides, Levchenko, Ranci re, and Thoenig (2009) investigated the effect of financial liberalization on firm's productivity, employment, and production. They found the short-term positive influences of financial liberalization on real economy. The findings of Herrmann and Winkler (2009) indicated the current account surplus in Asian economies and current account deficit in European economies due to the market integration.

The second group of studies (Grilli & Milesi-Ferretti, 1995; Rodrik, 1998; Kraay, 1998) investigated the influences of financial market integration on economic growth. They did not provide any evidence that financial market integration contributes in developing the economic growth. They argued that economic growth does not respond to the change of financial

market linkage. Rather, social infrastructure, government incentives, local productivity, and domestic rules of law play a significant role in improving the economic growth regardless of financial market integration. These findings conform with that of Edison, Levine, Ricci, and Slok (2002) and Gourinchas and Jeanne (2003) who stated that financial integration is neutral in influencing real sectors. The third group of studies (Eichengreen & Leblang, 2003) indicated the negative effect of financial integration on real economy. The market integration causes spillover effect which spreads the negative market shocks from one member economy to other integrated economies. Therefore, the spillover effect of market shocks causes the negative economic growth.

Generalized Method of Moments (GMM)

General Forms

The General Methods of Moment (GMM) was introduced by Arellano and Bond (1991) in the presence of unobserved country-specific effect with time-invariant for the dynamic short panel data series. The general model can be formed as follows:

$$y_{i,t} = \lambda y_{i,t-1} + \beta x_{i,t} + \varepsilon_{i,t} \quad | \lambda < 1 | \dots\dots(1)$$

Here, y represent dependent variables, $y_{i,t-1}$ is the lagged dependent variables while $x_{i,t}$ is the set of explanatory variables. The error term contains two orthogonal components; 1) η is the unobserved country specific effect and 2) $v_{i,t}$ indicates the idiosyncratic shocks. The $i=1,2,\dots\dots, N$ represent the country and $t=2,3,\dots\dots T$ represent the time. The error term $\varepsilon_{i,t} = \eta_i + v_{i,t}$ has the standard error structure, where $E(\eta_i) = E(v_{i,t}) = E(\eta_i v_{i,t}) = 0$ for both individuals over the periods.

Assuming the transient errors are serially uncorrelated, $E(v_{i,t} v_{i,s}) = 0$ for $i=1,2,\dots,N$ and $s \neq t$ where, the initial conditions y_{i1} are predetermined and $E(y_{i,t} v_{i,t}) = 0$ for $i=1,\dots,N$ and $t=1,\dots,T$. The assumptions indicate $m = 0.5(T-1)(T-2)$ moment restrictions, where, $E(y_{i,t-s} \Delta v_i) = 0$ for $t = 3,\dots,T$ and $s > 2$ which can be rearranged as $E(Z_i' \Delta v_i) = 0$, where, the instrument variables, Z_i is the $(T-2) \times m$ matrix given by

$$Z_i = \begin{bmatrix} y_{i1} & 0 & 0 & \dots & 0 & \dots & 0 \\ 0 & y_{i1} & y_{i2} & \dots & 0 & \dots & 0 \\ \cdot & \cdot & \cdot & \dots & \cdot & \cdot & \cdot \\ 0 & 0 & 0 & \dots & y_{i1} & \dots & y_{i,T-2} \end{bmatrix} \dots (2)$$

Here, Δv_i is the $(T-2)$ vector $(\Delta v_{i3}, \Delta v_{i4}, \dots, \Delta v_{iT})'$. The GMM estimator considers these moment restrictions that use lagged level dated $t-2$ and instruments of the equation in the first-differences (Arellano & Bond, 1991). These technique gives consistent estimator of λ where $N \rightarrow \infty$ and fixed T .

Model Specification

The popular econometric techniques GMM is employed in order to investigate the contribution of financial integration on real economy. The specified GMM model is formed as follows:

$$y_{i,t} = \lambda y_{i,t-1} + \beta x_{i,t} + \varepsilon_{i,t} \quad | \lambda < 1 | \dots (3)$$

Where, $\varepsilon_{i,t} = \eta_i + v_{i,t}$

Here, $y_{i,t}$ is the set of real economic variables which is considered as explained variables in year t ; $y_{i,t-1}$ is the lagged value of dependent economic variables; $x_{i,t}$ is the set of explanatory variables which represent the financial market integration; i and t indicate the indicators and time respectively.

This study has used static panel approaches in the estimation process at the beginning but the findings indicate that the findings suffer from heteroskedasticity and autocorrelation problems. This problem is solved through GMM estimation. It uses lagged and instrumental variables that remove those problems. Furthermore, the problems of causality inverse, biasness, and omitted variables are solved through this technique (Kpodar, 2007). The biasedness that resulted from omission of explanatory variables is eliminated through this technique, and finally it provides the better estimation for the parameters of endogenous variables such as portfolio investment.

VARIABLE SELECTION

Multiple variables have been used in investigating the relationship between financial integration and real economy. The financial cooperation are represented by two proxy variables which are foreign portfolio investment collected from Asian Development Bank (ADB) and stock market index (represents the net capital accumulation) collected from DATASTRAM. These variables have been selected as proxy of financial integration following Chambet and Gibson (2008) and Lane and Milesi-Feretti (2006). The real economy is represented by the market indicators: Consumer Price Index (CPI), Money supply (M2), Gross Domestic Products (GDP), Unemployment Rate (UR), Government Budget (GB), and Current Account (CA). These variables have been selected based on existing literature. All of the variables that represent the real economy are collected from ADB and World Bank. The data series covers from 1990 to 2012 and has been segmented into two subdivisions: pre-agreement period (1990-1996) and post-agreement period (2006-2012) in order to compare the effect in two periods, while the gap periods has not been considered

Table 1.
Descriptive Statistics and Cross-Correlation

	Descriptive statistics															
	Pre-agreement periods						Post-agreement periods									
	FPI	SMI	CPI	M2	GDP	UR	GB	CA	FPI	SMI	CPI	M2	GDP	UR	GB	CA
Mean	0.169	1.817	6.079	1.914	7.014	0.433	0.006	-0.702	1.061	1.996	3.346	3.214	4.845	0.576	-1.547	4.238
Maximum	5.210	3.420	24.240	2.32	14.200	0.860	4.240	5.120	5.210	3.670	13.110	11.490	14.780	1.010	4.530	5.620
Minimum	-5.44	-0.920	-0.120	1.570	-0.580	0.040	-4.320	-4.360	-5.440	-0.830	-1.350	1.580	-5.530	-0.150	-5.180	-4.380
Std. Dev.	4.234	1.139	4.542	0.215	3.485	0.147	3.101	3.829	3.875	1.188	2.659	3.144	3.724	0.258	3.442	1.364
Skewness	-0.151	-1.102	1.744	0.029	-0.219	0.171	0.022	0.536	-0.533	-1.019	0.894	2.243	-0.125	-0.996	0.874	-4.59
Kurtosis	1.137	3.588	6.989	2.367	2.603	4.347	1.341	1.348	1.459	3.288	5.111	6.083	3.419	4.102	2.161	29.752
Jarque-Bera	8.368	12.142	65.542	0.942	0.818	4.509	6.424	9.047	8.185	9.902	17.854	69.158	0.557	12.106	8.779	1867.371

	Cross-correlation															
	FPI	SMI	CPI	M2	GDP	UR	GB	CA	FPI	SMI	CPI	M2	GDP	UR	GB	CA
FPI	1								1							
SMI	0.122	1.000							0.092	1						
CPI	0.082	-0.429	1.000						0.090	-0.226	1					
M2	0.245	0.225	-0.081	1.000					0.242	0.531	-0.004	1				
GDP	-0.316	-0.264	0.148	-0.352	1.000				0.136	-0.467	0.249	0.028	1			
UR	-0.360	-0.290	0.085	-0.069	0.361	1.000			0.014	-0.522	-0.179	-0.094	0.177	1		
GB	0.062	0.472	-0.178	0.063	0.311	-0.199	1.000		0.139	0.426	0.028	0.636	0.121	-0.209	1	
CA	-0.321	-0.117	-0.292	-0.131	-0.102	0.036	-0.175	1	0.100	-0.021	-0.305	0.076	0.002	0.216	0.142	1

due to the effect of financial crisis. All of the variables are transformed into log form in the estimation process for simplification purpose. The descriptive statistics are given as follows:

The average foreign portfolio investment and stock market indices are 0.169% and 1.817% during pre-agreement period which increases to 1.061% and 1.996% during post-agreement period. The results show that the degree of financial cooperation has improved during post-agreement period. Money supply increases from 1.914% to 3.214% which indicates that financial markets are liberalized due to the motivation of financial cooperation. The average GDP growth in ASEAN+3 is 7.014% during pre-agreement periods but drops to 4.845% during post-agreement periods. It implies that the financial crisis in 1997/1998 and further in 2008/2009 decrease the GDP growth which is not reflected by financial cooperation. Furthermore, the cross-correlation of GDP growth with portfolio investment and SMI is negative in both periods, except FPI in post-period. It indicates

that financial cooperation does not maintain any significant relationship with GDP growth. The correlations of real sectors: GDP, UR, and CA with FPI in the pre-agreement periods are negative, which improves and positive during post-agreement periods. It indicates that financial cooperation has contribution in the development of real economy. In order to investigate the impact of financial integration on real economy empirically, this study considers the following hypotheses:

The specification tests in Table 3 are carried out through the Sargan test and second order autocorrelation to justify whether the employed model has been correctly specified. The Sargan test is used to justify the over-identifying restrictions in identifying the validity of instrumental lagged variables (for example, whether the instruments are exogenous). The null hypothesis of valid over-identifying restriction is not rejected in any of the variables in both of pre-and post-agreement periods.

Table 2.
Hypothesis

The hypothesis	Expected sign
Foreign Portfolio investment and Stock market index positively influence CPI	+
Foreign Portfolio investment and Stock market index positively influence M2	+
Foreign Portfolio investment and Stock market index positively influence GDP	+
Foreign Portfolio investment and Stock market index negatively influence UR	-
Foreign Portfolio investment and Stock market index positively influence GB	+
Foreign Portfolio investment and Stock market index positively influence CA	+

Note: the data are taken from Asian Development Bank and World Bank. The portfolio investment and GDP are in US \$, stock market index and CPI are based on base value 100, the M2, Government budget and current accounts are in % of GDP, and finally the unemployment rate is in % of total labor force.

Table 3.***Specification Test***

	CPI	M2	GDP	Unemployment	Budget	CA
Specification test (p-value)	During pre-agreement period					
Sargan test	0.979	0.983	0.954	0.992	0.996	0.995
2 nd order Autocorrelation	0.819	0.344	0.144	0.157	0.424	0.176
During pre-agreement period						
Sargan test	0.965	0.943	0.949	0.964	0.989	0.976
2 nd order Autocorrelation	0.155	0.467	0.332	0.890	0.378	0.187

The findings indicate that none of the null hypothesis of second order hypothesis of no autocorrelation is rejected. Therefore, the specification test indicates that the model used in the investigation process is correctly specified and results presented are free from the problem of invalid instrumental identification and autocorrelation.

ANALYSIS OF FINDINGS**Pre-Agreement Findings**

The empirical findings in Table 4 show that the parameters of FPI is significant at 5% and 1% level of significance and it is positively correlated with money supply and government budget respectively, which satisfy the hypothesis. It indicates that the higher portfolio investment increases the money supply and government budget in ASEAN+3 regional economies. It implies that the money supply and government budget is used in service sectors or development of human capital or other form of productive sectors that reduces the unemployment rate. It

is justified by the finding of unemployment rate where, the negative and significant coefficient of portfolio investment indicates the reduction of unemployment rate. A 1% increase in portfolio investment reduces unemployment rate, 0.09%. The result implies that the portfolio investment is used in such sectors that require more employment and hence, unemployment rate reduces during pre-agreement period as expected.

On the other hand, the estimated coefficient of FPI in forecasting the GDP is negative and insignificant, which indicate the unfavorable sign of portfolio investment in predicting GDP. This conforms with the findings of descriptive statistics and empirical findings investigated by Sarkar and Amor (2009). The finding implies that the foreign investment do not have contribution or influence in increasing regional GDP. It further implies that the FPI is used in non-productive sectors such as tourism, service sectors, and government allocated sectors that do not contribute on domestic production. This finding is supported by that of Imbs (2006) who found weak or no impact of financial integration on GDP. The estimated coefficient of FPI is negative and insignificant as well in

explaining the current account, which means portfolio investment does not have contribution on current account. This contradicted with the findings of Herrmann and Winkler (2009) who showed the existence of current account surplus as a result of financial integration. This finding clearly indicates that portfolio investment does not help in developing the current account, because GDP is irresponsive to the portfolio investment. Finally, the findings indicate that portfolio investment significantly contributes in increasing money supply, government budget, and unemployment reduction, but it does not contribute in the case of CPI, GDP, and CA.

Stock market index as a proxy of financial integration has linkage with the real sectors (Chambet & Gibson, 2008). The hypothesis of stock market index indicates the same relationship as portfolio investment. The finding indicates that the estimated coefficients of stock market index is positive and significant at 5% level of significance in influencing GB, which means the increase of stock market index

leads to increase the government budget. The estimated coefficient of SMI is negative and significant at 5% which indicates the decrease of unemployment rate in the regional economies. Both of portfolio investment and stock market index satisfy the hypothesis in influencing the government budget and unemployment rate. It means the financial integration brings the foreign cash flow to the regional economy that helps reduce the unemployment rate. This finding is supported by that of Levchenko et al. (2009) who showed the development of employment as a result of financial integration. The estimated coefficients of stock market index are insignificant for M2, CPI, GDP, and CA which means stock market index is unpredictable in influencing the real economic indicators. The findings further indicate that the stock markets of ASEAN+3 are comparatively less developed and standard in attracting foreign investment and hence, it does not contribute in some of real economic factors such as GDP and CA during pre-agreement period.

Table 4.

Findings of GMM Estimation During Pre-Agreement Period

	CPI	M2	GDP	Unemployment	Budget	CA
Constant	0.624 (0.39)	0.420 (0.183)	-0.131 (0.847)	1.080*** (0.000)	-4.832* (0.096)	3.988 (0.358)
Lagged (t-1)	-0.628* (0.092)	0.728** (0.003)	1.015*** (0.000)	-0.505** (0.004)	0.662*** (0.000)	-0.181*** (0.000)
Portfolio Investment	0.005 (0.41)	0.004** (0.001)	-0.0008 (0.373)	-0.009* (0.093)	0.140*** (0.000)	-0.034 (0.647)
Stock market index	0.274 (0.362)	0.060 (0.472)	-0.002 (0.953)	-0.208** (0.003)	2.772** (0.048)	-2.354 (0.225)
# countries	8	8	8	8	8	8
# observations	56	56	56	56	56	56

Note: *, ** and *** indicate the 1%, 5% and 10% level of significance

Post-Agreement Findings

The findings shown in Table 5 point out how real economic indicators of ASEAN+3 economies respond to the changes of financial integration during post-agreement period. The estimated coefficient of portfolio investment is negative and significant at 5% in forecasting CA, which means portfolio investment causes current account deficit contrasting the hypothesis. This finding complies with that of Herrmann and Winkler (2009) who found the current account deficit in European integrated emerging economies. The government budget increases by 0.4% when the portfolio investment increases by 1% as expected. The foreign inflow is used in non-productive sectors such as building roads and spending in public welfare. Therefore, the current account is deficit and government budget increases in the presence of financial integration during this period. It is supported by insignificant coefficient for

GDP and unemployment, which indicate that financial integration do not help in developing either GDP or employment rate during this period. Moreover, the positive and significant coefficient of portfolio investment indicates the higher level of inflation. The findings of this study imply that financial integration does not positively influence the real economies of ASEAN+3. It is probably because of financial crisis in 1997 and further in 2008 that causes negative impact on majority of real economic indicators. The crisis has two effects on foreign investments: 1) the level of foreign investment declines during the crisis periods and 2) the investment is mainly used in rebuilding the infrastructures in ASEAN+3 economies and hence, the government budget increases but the current account is deficit during this period.

Furthermore, the estimated coefficient of stock market index indicates that most of real economic variables are significantly influenced by that of stock market index

Table 5.

Findings of GMM Estimation During Post-Agreement Period

	CPI	M2	GDP	Unemployment	Budget	CA
Constant	3.071*** (0.000)	0.908*** (0.000)	1.497** (0.003)	0.527*** (0.000)	2.867 (0.310)	2.901** (0.001)
Lagged (t-1)	-0.339*** (0.000)	0.694*** (0.000)	0.859*** (0.000)	0.461*** (0.000)	-0.129* (0.097)	-0.189*** (0.000)
Portfolio Investment	0.138* (0.067)	-0.001 (0.295)	-0.001 (0.521)	0.001 (0.609)	0.047* (0.059)	-0.031** (0.011)
Stock	-8.980*** (0.000)	0.010 (0.382)	0.096** (0.005)	-0.103** (0.001)	-2.519 (0.147)	1.133*** (0.000)
# countries	8	8	8	8	8	8
# observations	56	56	56	56	56	56

Note: *, ** and *** indicate the 1%, 5% and 10% level of significance

during post-agreement period, supporting the findings of Chambet and Gibson (2008). The coefficient of SMI is negative and significant, which indicate the deflation in the ASEAN+3 economies. The GDP in ASEAN+3 increases as a response of stock market index increase. The unemployment rate declines and the current account shows surplus which are supported by the significant SMI coefficients at 5% and 1% significance level, respectively. The money supply and government budget are not supported by insignificant coefficients of stock market index. The findings indicate that the stock market index significantly contributes in real economy during post-agreement period, but the foreign portfolio investment does not support the economic development. The portfolio investment is volatile during this period due to the Asian and global financial crisis and that is why it does not show positive impact on real economy.

The summary of the findings indicates that the financial integration has positive impact on ASEAN+3 regional economies on average. Portfolio investment has higher impact on real economies compared to stock market index during pre-agreement period. The financial integration on GDP is found irresponsive to the change of market integration (Sarkar & Amor 2009). On the other hand, the stock market show the high and positive impact on real economies during post-agreement period complying with the findings of Herrmann and Winkler (2009) and Leila (2011) who found the positive impact of financial integration on real economy. The overall findings indicate that ASEAN+3 economies respond to the market integration depending on its integrating components⁴ during both of pre and post period. Therefore, each of the components requires to be taken with care through policy implication, since each of them has positive effect depending on time periods and economic consequences.

CONCLUDING REMARKS

The influence of financial integration on ASEAN+3 real economies is investigated using GMM panel data approach. The foreign portfolio investment and stock market index are considered as proxy variables of financial integration, while CPI, GDP, Government budget, unemployment, money supply, and current account represent the real economy. The estimation period is segmented into two parts: pre-agreement period and post-financial agreement period in order to justify whether the financial agreement of ASEAN+3 develops real economy during post-agreement periods.

The findings of this study present several indications: 1) portfolio investment during pre-agreement period has great impact on real economy in reduction of unemployment rate, developing the government spending and money supply; 2) the stock market index contributes in reducing unemployment rate and increasing the government spending; 3) both of the proxies of financial integration are unfavorable in the case of GDP, CPI, and current account during pre-agreement period; and 4) the financial integration, especially stock market index, positively influences the real economic factors such as GDP, money supply, current account, and inflation during post-agreement period. It reduces the inflation rate, develops the GDP and current account surplus, and finally reduces the unemployment rate, which is a significant improvement of real economy.

The overall impact of financial integration on real economy is found positive which means market integration contributes in developing the real economy. Therefore, we recommend that the policy makers implement the policy actions to achieve the complete market integration among ASEAN+3 regional markets. The complete market integration can be gained through mutual cooperation where high income economies of ASEAN+3 can play the key role in integrating

the low income economies. The achievement of market integration becomes easier when member economies cooperate for a common interest that helps each of the member economy. Both of high and low income economies in ASEAN+3 regional bloc have to increase the intra-regional financial transactions, which will improve the regional financial institutions and thereafter real economy.

NOTES

- ¹ ASEAN+3 economic bloc was established in April, 1999 consisting 10 ASEAN members of Southeast region; Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei Darussalam, Vietnam, Myanmar, Laos and Cambodia and three from Northeast region; China, South Korea and Japan
- ² The CMI was established in May, 2000 and further developed in March, 2010 in order to facilitate the liquidity shortage and enhance the capacity to protect the downturn of regional economy.
- ³ The ABMI was established in August, 2003 by member ministrel in order to raise the fund in local currency to be safe from exchange rate risk that would help the economic stability (Spiegel, 2009).
- ⁴ Integrating component refers to the proxy of financial integration such as FDI, foreign deposit in commercial banks, net foreign assets, and so forth that indicate the degree of market integration.

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