

Graduate School of Asia-Pacific Studies, Waseda University
Journal of the Graduate School of Asia-Pacific Studies
No. 27 (2014. 3) pp.67-89

East Asian Emerging-Market Economies: Are They Still Subject to “Original Sin”?

Meng, Jingjing*

東アジア新興国は まだ「原罪」に従属しているか？

孟 静 静*

Abstract

The “original sin” hypothesis has attracted much attention since the onset of the 1997-1998 financial crisis in East Asia (Eichengreen and Hausmann 1999; Eichengreen, Hausmann and Panizza 2003, 2007). One of the major arguments of the hypothesis is that East Asian emerging-market economies were subject to “original sin” that gave great incentives for accumulating a large pile of foreign currency debt in related economies on the eve of the regional crisis. The objective of this paper is to find whether East Asian emerging-market economies are still subject to “original sin” a decade and a half after the financial crisis. Moreover, it explores the determinants of “original sin” using a panel data set over 1994-2011. This paper shows that a number of East Asian emerging-market economies have successfully decreased their level of “original sin”. The estimates of a Tobit model illustrate that a series of institutional factors are strongly associated with “original sin”, hence agreeing with Burger and Warnock (2006) in that “original sin” might be a misnomer. Based on these findings, some East Asian emerging-market economies have the potential to further reduce their level of “original sin”.

Keywords: “original sin”, East Asian emerging-market economies, monetary and financial development in East Asia

*Graduate School of Asia-Pacific Studies, Waseda University, Doctoral Degree Program:
早稲田大学大学院アジア太平洋研究科博士課程後期課程。

1. Introduction

In a series of papers, Eichengreen, Hausmann and Panizza propose the “original sin” hypothesis on financial fragility in emerging economies (Eichengreen and Hausmann 1999; Eichengreen, Hausmann and Panizza 2003, 2007). They argue that “original sin” played a role in the fermentation of the 1997-1998 financial crisis in East Asia. “Original sin” is defined as the inability of a country to borrow abroad in its own currency.¹ The objective of this paper is to explore whether East Asian emerging-market economies² are still subject to “original sin” a decade and a half after the 1997-1998 financial crisis and try to find the determinants using an empirical test.

The “original sin” hypothesis traces the volatility of emerging-market economies and the difficulty that they experience in servicing and repaying external debts to the concentration of global portfolios and markets in a few major currencies and to the limited acceptance of emerging-market currencies in the portfolios of global investors. The dominant roles of several advanced economies’ currencies in the international financial market seem to support the hypothesis. According to statistics from the Bank for International Settlements (BIS), over 95% of the total outstanding international debt securities are denominated by the five major currencies including the euro, the US dollar, the Japanese yen, the pound sterling and the Swiss franc over 1994-2012. Compared to their GDP share in the world market, East Asian emerging-market economies seem to be “under-represented” in the currency composition of the international financial market.

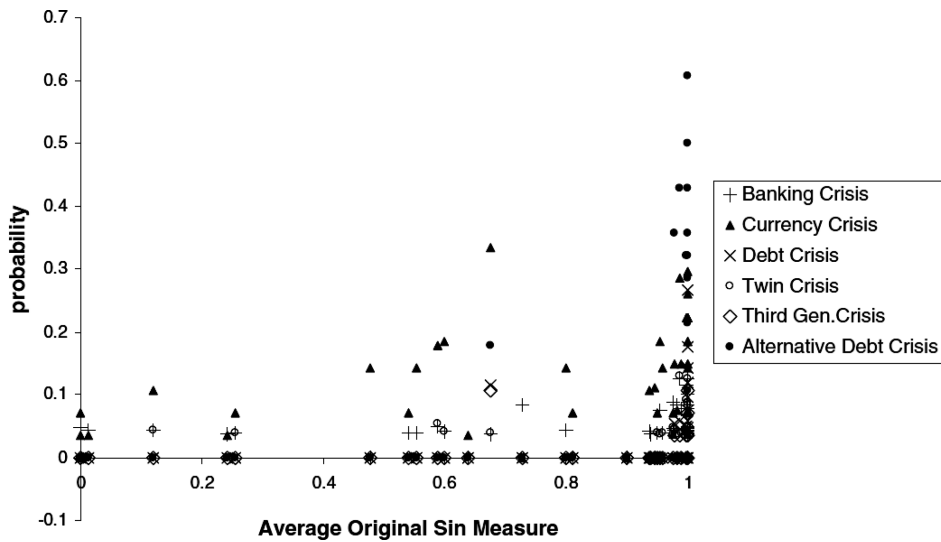
“Original sin” is one of the factors in affecting currency mismatch³ and systemic risk in an economy. The United States is largely free from currency mismatch because the US dollar is widely used around the world especially in international banking business. Bordo and Meissner (2006) have showed that the severity of financial crises was particularly high in the club of economies with “original sin” over 0.8 in history although there was a considerable variance in their experience (Figure 1). Furthermore, “original sin” is important for the understanding of a series of issues in emerging-market economies. A number of studies have made arguments based on

¹ In earlier work, Eichengreen and Hausmann (1999) used the term to refer to the inability of a country to borrow abroad in its own currency and the difficulty to borrow at home at long maturities. In subsequent work, Eichengreen and Hausmann narrowed the definition down to the first problem for reasons described fully in Eichengreen, Hausmann and Panizza (2007).

² East Asian emerging markets here refer to China mainland, Hong Kong SAR, Macao SAR, the Taiwan district, and the ASEAN countries.

³ Currency mismatch is commonly defined as the extent to which an economy’s liabilities are denominated in foreign currency while its assets are denominated in domestic currency. Differences in the values of foreign-currency-denominated assets and liabilities can be found in the balance sheets of households, firms, the government, the economy as a whole. Currency mismatch is an important mechanism in which emerging economies take on systemic risk (e.g., Bordo, Meissner and Stuckler 2010; Magud 2010; Baek 2013). High dependency on foreign currency-denominated debts is associated with risks of currency and debt crisis (Corsetti and Mackowiak 2003; Bordo, Meissner and Stuckler 2010).

Figure 1 Crisis frequencies and the average level of “original sin”



Source: Bordo and Meissner (2006), Figure 5, p.3308.

“original sin”. For instance, Park and Wyplosz (2010) have argued that “original sin” and the induced financial fragility are important factors for small economies to prefer regional monetary and financial cooperation.

The phrase “original sin” seems to suggest that it is hard, if not impossible, for the emerging-market economies to overcome this problem through reforms. However, the validity of the phrase “original sin” is questionable. Reinhart and Reinhart (2003) have sharply pointed out that the international discrimination perspective of the “original sin” hypothesis implies that there may be no easy answer to the problem of recurring financial crises in emerging markets. Burger and Warnock (2003) have suggested that stronger institutions and better inflation performance matter for “original sin” since they are important for local currency bond market and it takes a mature local currency bond market to be free from “original sin”. Reinhart, Rogoff, and Savastano (2003) have argued that without overcoming the institutional weaknesses⁴ in emerging markets it is impossible to free from “original sin”.

The critiques challenge that “original sin” might not be exogenous to the conditions of the afflicted economies. Time since the 1997-1998 financial crisis in East Asia provides a chance for the re-examination of the “original sin” issue. It has been more than a decade and a half since the break of the 1997-1998 financial crisis. Economic and fi-

⁴ Reinhart, Rogoff, and Savastano (2003) posit that emerging economies should take necessary reforms in changing weak institutions, a lack of political comity in part associated with an unequal distribution of income, and a capricious attitude toward the rule of law to strengthen financial stability.

nancial development during this period is tremendous. Regional economies continue to expand rapidly. Governments from East Asia have taken measures in promoting capital market development. The main task of East Asian governments after the 1997-1998 financial crisis is to develop local currency (LCY) bond markets.

LCY bond market is conducive to the solution of the “original sin” problem. Goldstein and Turner (2004) have pointed out that local currency-denominated bond markets create a natural demand for hedging currency risk and provide a source of local-currency finance that would otherwise be smaller if emerging-market borrowers had recourse only to external lenders. East Asian governments have worked together under the Asian Bond Markets Initiative (ABMI) to improve bond market infrastructure, invent new bond market products and enlarge international bond market for more than a decade time. A re-examination of the “original sin” issue in East Asian emerging-market economies contributes to the reflection of the “original sin” dispute.

This paper is related to a number of studies in the past. Bordo, Meissner and Redish (2005) have examined “original sin” from a historical perspective by studying five countries (the United States, Canada, Australia, New Zealand and South Africa) from 1800 through 2000. They emphasized the important role of shocks such as wars, massive economic disruption and the emergence of global markets in explaining the common movements of getting free from “original sin” in the five countries. Hausmann and Panizza (2003) have investigated the determinants of “original sin” using cross-sectional data and found only weak support for the idea that the level of development, institutional quality, or monetary credibility or fiscal solvency are correlated with “original sin”. Burger and Warnock (2006) suggest that “original sin” might be a misnomer after exploring determining factors of local currency bond market development. Their result shows that better historical inflation performance and strong rule of law are associated with deeper local bond markets. The result of this paper agrees with Burger and Warnock in that “original sin” is a misnomer. It finds that the inflation performance is a common determinant of local currency bond market development and low level of “original sin”.

This paper differed in three aspects from the existing literature. First, it contained updated information of different currencies from 2002 to 2011. The second distinction is that this research used both cross-sectional and time-series data to test the determinants. On account of the fact that the annual variation of the dependent variable is extremely low for most currencies, this paper calculated the index in four sub-periods (1994-1998, 1999-2003, 2004-2008, and 2009-2011). All the explanatory variables are averaged over each sub-period. Third, it finds that international public debt, political stability, financial market development and financial market openness variables are strongly associated with “original sin”.

The remainder of the paper is organized as follows. Section 2 introduces methodology and data. Section 3 presents the “original sin” in East Asian emerging-market economies in recent years. Section 4 empirically investigates the determinants of “original sin”. Section 5 analyzes “original sin” and the development of East Asia. Section 6 discusses “original sin” and the recent global financial crisis. Section 7 concludes.

2. Methodology and Data

The measure of “original sin” defined in Eichengreen, Hausmann and Panizza (2007) is used.⁵ This measure of “original sin” for country i in period j is based on securities issued by residents and nonresidents internationally:

$$\text{OSIN} = \max\left(1 - \frac{\text{securities in currency } i}{\text{securities issued by country } i}, 0\right) \quad \text{where } i = 1, \dots, 48; j=1,2,3,4$$

Data are taken from the Bank for International Settlements (BIS). Complete data for “original sin” in all East Asian economies is rare due to data accessibility in several economies. Data are collected on all currencies listed in the BIS database. The forty-eight economies (and their currencies) are categorized into four groups: (i) eurozone and four major world financial centers (the United States, the United Kingdom, Japan and Switzerland), (ii) other developed economies, (iii) other East Asian economies, and (iv) other emerging and developing economies.⁶ The 1994-2013 period is divided into four sub-periods: 1994-1998, 1999-2003, 2004-2008, and 2009-2013.⁷ This method has an advantage of striking a balance between the size of the sample and the variation of the dependent variable (OSIN) in the empirical test in Section 4.

Table 1-2 list the average stock of outstanding international debt securities for East Asian economies included in the BIS database by currency and by residence.⁸ The currency share of East Asian currencies in the international debt market has multiplied over the past two decades, although the share of any particular currency is still tiny compared to major international currencies. The currency share of the Hong Kong dollar, the *renminbi*, and the Malaysian *ringgit* has increased rapidly. On account of the

⁵ There are several indicators of “original sin” in their early works (e.g., Eichengreen, Hausmann and Panizza 2003); however, the indicator listed here is the most widely used one.

⁶ The currency of Liechtenstein is Swiss franc and its issuance is tiny compared to Switzerland. Country Liechtenstein is dropped therefore.

⁷ Due to the fact that data for the last three quarters of 2013 has not published until writing, the data set includes only the first quarter of 2013. The data on international debt securities are averaged over the four sub-periods respectively.

⁸ Bank for International Settlements sets out an internationally agreed framework for classifying debt securities issues. For definitions of debt securities, domestic and international market, and residence, please refer to the *Handbook on Securities Statistics*, Basel: Bank for International Settlements. Available at <http://www.imf.org/external/np/sta/wgsd/hbook.htm>. (December 16, 2013)

fact that the total volume of the international debt securities has increased by about four times from 1994-1998 to 2009-2013, the increased use of East Asian currencies in international lending is remarkable.

Table 1 International debt securities (billions of US dollars, outstanding), 1994-1998 and 1999-2003

Issuer	Currency	1994-1998				1999-2003			
		by currency		by residence		by currency		by residence	
		amount	(%)	amount	(%)	amount	(%)	amount	(%)
Hong Kong SAR	Hong Kong dollar	7.6	0.24	18.3	0.57	36.3	0.47	33.2	0.44
Singapore	Singapore dollar	0.1	0.00	2.6	0.08	5.1	0.07	13.2	0.18
Indonesia	Rupiah	0.5	0.02	4.8	0.15	0.1	0.00	2.9	0.04
Thailand	Baht	0.2	0.01	8.0	0.25	1.5	0.02	11.0	0.15
the Philippines	Philippine peso	0.2	0.01	9.1	0.29			18.7	0.25
Malaysia	Ringgit	0.1	0.00	8.3	0.26			16.8	0.22
China	Renminbi			12.5	0.39			12.4	0.17
South Korea	Won			34.8	1.09			47.5	0.63
Taiwan district	New Taiwan dollar			3.6	0.11			9.1	0.12
Vietnam	Dong			0.5	0.02			0.7	0.01
Macao SAR	Pataca			0.2	0.00			0.1	0.00
Total issues		3184.8	100	3184.8	100	7667.8	100	7522.1	100

Source: Compiled by author based on data from the BIS (2013).

Table 2 International debt securities (billions of US dollars, outstanding), 2004-2008 and 2009-2013

Issuer	Currency	2004-2008				2009-2013			
		by currency		by residence		by currency		by residence	
		amount	(%)	amount	(%)	amount	(%)	amount	(%)
Hong Kong SAR	Hong Kong dollar	73.8	0.41	49.2	0.27	67.1	0.32	73.4	0.35
Singapore	Singapore dollar	21.4	0.12	44.5	0.25	33.1	0.16	61.6	0.29
China	Renminbi			16.8	0.09	30.3	0.14	26.7	0.13
Malaysia	Ringgit			24.2	0.14	5.3	0.03	27.0	0.13
Indonesia	Rupiah	0.8	0.00	8.2	0.05	7.2	0.03	27.2	0.13
Thailand	Baht	2.3	0.01	10.0	0.06	3.5	0.02	7.4	0.04
Taiwan district	New Taiwan dollar	2.5	0.01	18.2	0.10	1.3	0.01	7.7	0.04
The Philippines	Philippine peso			30.3	0.17	2.3	0.01	39.4	0.19
South Korea	Won			85.0	0.47	1.0	0.00	137.4	0.65
Vietnam	Dong			1.5	0.01			2.8	0.01
Macao SAR	Pataca			0.5	0.00			0.7	0.00
Total issues		17897.8	100	17897.8	100	21004.1	100	21004.1	100

Source: Compiled by author based on data from the BIS (2013).

3. Results

Following the practice of Eichengreen, Hausmann and Panizza, Table 3 presents the economies with OSIN below 0.8 (over 2009-2013). Major international currencies as a group have the lowest level of OSIN. In East Asia, five East Asian emerging-market economies have OSIN below 0.8 in the period 2009-2013. In contrast, only the Hong Kong dollar fulfilled this condition over the 1994-1998 period.

To further illustrate the change of East Asian emerging-market economies in OSIN, I also calculated the annual OSIN (Table 4). Five East Asian emerging-market economies have OSIN below 0.8 in 2012. The index of China, Thailand and Indonesia decreased quickly.⁹ Particularly, the OSIN of China reached zero in 2012.¹⁰ Hong Kong SAR and Singapore have long enjoyed relative low level of OSIN since 1999, which confirms their role as financial off-shore centers in the region and in the world. Overall, the level of “original sin” in many East Asian emerging-market economies has reduced over the last two decades. However, the change in OSIN is uneven. One important empirical research question then arises out of the results: What are the determinants of “original sin”?

Table 3 OSIN below 0.8 in the period of 2009-2013

Currency	Issuer	1994-1998	1999-2003	2004-2008	2009-2013
i					
Euro	Eurozone	0.07	0.00	0.00	0.00
US dollar	United States	0.00	0.00	0.00	0.00
Pound sterling	United Kingdom	0.25	0.31	0.39	0.41
Yen	Japan	0.00	0.00	0.00	0.00
Swiss franc	Switzerland	0.00	0.00	0.00	0.00
ii					
Canadian dollar	Canada	0.58	0.75	0.50	0.52
Australian dollar	Australia	0.55	0.68	0.52	0.46
Swedish krona	Sweden	0.94	0.90	0.82	0.76
Norwegian krone	Norway	0.96	0.79	0.76	0.68
New Zealand dollar	New Zealand	0.46	0.00	0.00	0.00
iii					
Hong Kong dollar	HongKong SAR	0.59	0.00	0.00	0.09
Singapore dollar	Singapore	0.96	0.61	0.52	0.46
Renminbi	China				0.00
Rupiah	Indonesia	0.89	0.96	0.91	0.74
Baht	Thailand	0.98	0.86	0.77	0.53

⁹ OSIN in a number of other emerging and developing economies outside the East Asian region (such as Russia, Brazil, and Turkey) have lowered quickly, too.

¹⁰ Only seven economies around the world have an OSIN as low as zero. The other six economies with zero OSIN in 2012 include four economies from group i (the euro zone, the US, Japan, and Switzerland), New Zealand, and South Africa.

iv							
Rand	South Africa	0.00	0.09	0.00	0.00		
Russian rouble	Russia	0.96	0.99	0.90	0.73		
Brazilian real	Brazil			0.86	0.70		
New Turkish lira	Turkey	1.00	1.00	0.65	0.60		
Czech koruna	Czech Republic	0.00	0.00	0.00	0.30		
Zloty	Poland	0.94	0.48	0.70	0.79		
UAE dirham	United Arab Emirates			0.72	0.74		
Egyptian pound	Egypt			0.68	0.73		
Saudi riyal	Saudi Arabia				0.53		
Colombian peso	Colombia				0.77		
Lev	Bulgaria				0.73		
Uruguayan peso	Uruguay				0.72		

Source: Author's calculations.

Table 4 Annual OSIN

Currency	Issuer	2006	2007	2008	2009	2010	2011	2012
Hong Kong dollar	Hong Kong SAR	0.00	0.00	0.00	0.00	0.00	0.09	0.42
Singapore dollar	Singapore	0.61	0.55	0.46	0.44	0.42	0.44	0.50
Rupiah	Indonesia	0.93		0.84	0.84	0.77	0.66	0.72
Baht	Thailand	0.86	0.79	0.74	0.67	0.60	0.47	0.40
Renminbi	China				0.52	0.41	0.00	0.00
Malaysian ringgit	Malaysia				0.83		0.78	0.79
Philippine peso	Philippines				0.99		0.92	0.91
New Taiwan dollar	Taiwan district		0.88	0.84	0.76		0.86	0.88
Won	Korea				0.99		0.99	0.99

Source: Author's calculations.

4. Determinants: An Empirical Test

This section empirically tests the level of “original sin”. The data sample covers forty-eight currencies the data of which are available in the BIS securities database. Data for the explanatory variables are taken from the World Development Indicators (WDI) database, the Global Financial Development (GFD) database, and the Worldwide Governance Indicators (WGI) database. Table 5 summarizes main variables. Due to the fact that data of major variables are updated to the year 2011, regression used data over four sub-periods: 1994-1998, 1999-2003, 2004-2008, and 2009-2011.¹¹ All the explanatory variables were averaged in each sub-period correspondingly. The empirical

¹¹ Due to the fact that some data are not available for some periods, the total observation of the regression is less than 192 (=48×4).

test used the double-censored Tobit model on account of the fact that the dependent variable (OSIN) is bounded between zero and one.

Table 5 Description of main variables

Variable	Obs.	Mean	Std. Dev.	Min	Max	Notes
OSIN	121	.60	.37	0	1	Four sub-periods: 1994-1998; 1999-2003; 2004-2008; and 2009-2011
GDP	118	1.39	2.72	.01	13	Trillions, constant 2005 international \$; WDI
GDP per capita	118	16.62	13.35	.62	40.99	Thousands, constant 2005 international \$; WDI
GDP growth	118	3.22	2.42	-4.28	9.63	GDP growth rate, %; WDI
Central gov. debt /GDP	88	49.09	27.93	6.16	171.09	Percentage; WDI
Int. public debt/ GDP	109	5.26	6.26	.019	39.10	Percentage; GFD
Inflation, GDP deflator	118	5.11	6.29	-3.73	43.39	Percentage; WDI
Inflation, Consumer prices	112	4.73	6.03	-2.99	48.89	Percentage; WDI
M2 growth	112	12.08	9.75	-2.49	55.04	M2 growth rate, %; WDI
Foreign banks ratio	113	33.12	23.50	0.00	92.00	Percentage; GFD
Stock market capitalization /GDP	118	82.95	77.32	.39	450.86	Percentage; GFD
Trade/GDP	119	93.97	80.07	18.36	429.08	Percentage; WDI
Export/ GDP	114	48.76	42.79	9.85	228.29	Goods and services, %; WDI
Export growth	112	5.29	4.39	-5.10	23.77	Goods and services, %; WDI
Political stability	117	.35	.89	-1.93	1.51	WGI; higher number indicates more stability
Rule of law	117	.80	.93	-.98	1.97	WGI; higher number indicates better law environment

An overview of the previous section suggests that currencies with low OSIN are usually from countries/regions with sizable economy. Technical (supply) economies of scale in financial management is suggested to generate cost advantage in large economies (Lim 2006). One estimate of economic size is the Gross Domestic Product (GDP). Table 6 lists the regression results. The GDP variable has the expected sign and is statistically significant. The results tend to confirm the positive impact of large economic size upon low level of “original sin”. Regression also tested the impact of economic growth (measured by the GDP growth rate); however, its coefficient is not significant after controlling for the region dummies. Simply, “original sin” is closely associated with economic size but not directly with the speed of economic growth although high economic growth rate yields larger economic size at a quicker pace.

Second, currencies with low level of “original sin” are usually issued by the country (or region) with extensive and intensive trading relations with the rest of the world. The rise of East Asian emerging-market economies in global trade in recent decades is

palpable (Hanson 2012). Thus a question arises: Does the decreased OSIN of several East Asian economies relates to the growing international trade? Table 6 presents the regression results of two trade openness variables (the trade/GDP ratio and the export/GDP ratio). These two variables are statistically insignificant; moreover, the export/GDP variable does not have the expected sign. In short, no evidence is found for any association between OSIN and trade openness.

Research in currency crises suggests the impact of fiscal situation on the acceptance of currency as a financing and investment currency (e.g., Corsetti and Mackowiak 2003). The intuition is that weak public finances give governments the incentive to depreciate currencies. Table 6 shows the estimates of the two variables on fiscal solvency. They are the central government debt/GDP ratio and the international public debt/GDP ratio. Both have the expected sign and are statistically significant.

Furthermore, the stability of the currency value is one important consideration for international investors in holding financial assets, although the inflation-indexed securities have reduced the risks in recent years. Nevertheless, high inflation in the issuer's economy may erode the return of securities investment denominated in the currency. Unsurprisingly, data shows that economies with inflation rate over 15% all have high level of OSIN. Table 7 shows the estimates of two variables of the inflation risks (the GDP deflator and the consumer price). It also presents the monetary quantity variable: M2 (money and quasi money) growth rate. All the three variables above have the expected sign and are statistically significant. The quadratic forms of the three variables are also tested but failed to find any possible non-linear effect. In addition, the fiscal theory of the price level (FTPL) suggests that fiscal solvency might have an influence on price level (Sims 2013). To deal with the possible fiscal-monetary policy interaction, I run another regression after controlling for the fiscal factors. Both the inflation variables and the fiscal solvency variables have the expected signs and are statistically significant.

Eichengreen and Hausmann (1999) argued that the incomplete and underdeveloped financial market in most East Asian countries failed to provide a litany of diversified financial products for investors to cover risks in the 1990s before the break of the regional financial crisis. However, East Asia has made a long stride in developing financial system over the last decade. Table 7 lists the results of the regression on several financial development indicators. The estimate of financial openness is the ratio of foreign banks in total banks. Usually, the fiercer the competition in the banking sector is, the more open the domestic financial market becomes. On the other hand, the stock market capitalization/GDP ratio variable estimates the sophistication of domestic financial market development. The two explanatory variables are both statistically significant and have the expected sign. However, the impact of foreign banks ratio

variable is economically limited. In sum, evidence supports the association between the level of “original sin” and financial market development.

Another category of variables relates to the level of development. Developed economies usually have higher level of political stability and law enforcement. Thus, regression includes three estimates: GDP per capita, political stability (and absence of violence/terrorism), and rule of law.¹² Table 8 illustrates the result. First, the coefficient of GDP per capita is minimal in scale and statistically insignificant. Second, the political stability variable has the expected sign and is statistically significant; moreover, its coefficient is rather large. The third variable, rule of law, is statistically insignificant.¹³

To put things together, I run a regression including the variables discussed above. The results are consistent with the results in Table 6-8. Furthermore, to get rid of the possible impact of time passage, regression is done after controlling for the sub-period dummies. None of the four time dummies is statistically significant from zero using t test. Thus, the influence of time factor can be excluded.

The empirical investigation above suggests the role of a number of political and economic factors in determining “original sin”. The results agree with previous research on the impact of economic size upon the level of “original sin”. On average, OSIN decreases by about 0.06-0.07 when GDP (PPP, trillions of international \$) increases by one unit. Furthermore, the empirical test in this paper provides new evidence on the impact of a number of variables that were omitted or underestimated in previous research. Political instability, high international public debt, mismanaged inflation are strongly associated with the level of “original sin”. Economies with exceptional price volatility and international public debt are generally afflicted with “original sin”. However, the coefficients of international public debt and inflation are economically small for the complete elimination of “original sin”. In addition, the test results indicate the association between financial market development and openness with the level of “original sin”.

Last, the empirical test shows the importance of the fixed effect of the major international currencies. The network effect points out that transaction cost is low for widely used currencies (e.g., Krugman 1980, 1984). The intuition is that the more people are willing to accept the currency the more will use it. Bordo, Meissner and Redish (2003) have pointed out that network externalities and liquidity are pivotal in the existence of overseas markets in domestic currency debt in a study of “original sin” in

¹² The political stability indicator captures the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. And the rule of law measures the quality of contract enforcement and many other rule and law factors in a society.

¹³ In addition, some other governance indicators including control of corruption are also tested; however, their coefficients are not statistically significant.

five countries (the United States, Canada, Australia, New Zealand and South Africa) from 1800 through 2000.

The empirical test in this paper provides additional evidence on the role of network externalities in determining the “original sin”. The coefficients of the region dummies (eurozone, major financial centers, and offshore financial centers) are statistically significant. The magnitude and persistence of these coefficients illustrates that the fixed effect of the major international currencies is disadvantageous to the elimination of “original sin” in East Asia. Furthermore, the coefficients of the eurozone dummy and the major financial centers dummies are larger than previous findings.

Table 6

	1	2	3	4	5	6	7	8	9	10	11
GDP	-0.047 (-2.00)**	-1.010 (-4.64)***	-0.052 (-2.11)**	-1.017 (-4.74)***	-0.047 (-1.92)**	-0.043 (-1.76)*	-0.042 (-1.40)	-0.042 (-1.40)	-0.042 (-1.40)	-0.042 (-1.40)	-0.048 (-1.99)**
GDP growth		0.006 (0.42)	0.013 (0.94)								
Trade / GDP				0.000 (0.51)	0.000 (-0.06)						
Export / GDP					0.001 (0.64)						
Central gov. debt/GDP								0.003 (1.93)*	0.003 (2.08)**		
Int. public debt/ GDP										0.015 (2.88)***	0.013 (2.60)**
Eurozone	-0.642 (-2.25)**	-1.010 (-4.64)***	-0.570 (-1.90)*	-1.017 (-4.74)***	-0.639 (-2.21)**	-0.639 (-2.21)**	-0.639 (-2.21)**	-1.080 (-5.02)***	-0.740 (-2.30)**	-1.032 (-5.09)***	-0.633 (-2.24)**
Financial centers	-0.787 (-6.64)***	-0.896 (-7.99)***	-0.749 (-6.02)***	-0.896 (-8.00)***	-0.788 (-6.61)***	-0.891 (-7.91)***	-0.791 (-6.56)***	-0.900 (-7.29)***	-0.791 (-5.75)***	-0.813 (-7.53)***	-0.695 (-5.92)***
Offshore financial centers	-0.453 (-3.73)***	-0.436 (-3.52)***	-0.470 (-3.83)***	-0.557 (-2.03)**	-0.437 (-1.56)	-0.585 (-2.16)**	-0.483 (-1.75)*	-0.560 (-3.98)***	-0.586 (-4.14)***	-0.429 (-2.86)***	-0.454 (-3.06)***
Other advanced economies	-0.117 (-1.62)	-0.091 (-1.20)	-0.100 (-1.35)	-0.098 (-1.33)	-0.118 (-1.60)	-0.094 (-1.28)	-0.111 (-1.50)	-0.134 (-1.65)	-0.149 (-1.83)*	-0.128 (-1.74)*	-0.137 (-1.87)*
Constant	0.792 (18.43)***	0.735 (11.20)***	0.746 (11.52)***	0.723 (8.63)***	0.797 (8.49)***	0.711 (8.79)***	0.775 (8.57)***	0.657 (8.96)***	0.677 (9.19)***	0.666 (13.45)***	0.704 (13.40)***
Obs.	118	118	118	119	118	114	113	88	88	109	108
Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.509	0.482	0.514	0.486	0.508	0.447	0.467	0.502	0.521	0.538	0.563

Notes: t statistics in parentheses. ***significant at 1% **significant at 5% *significant at 10%

Table 7

	1	2	3	4	5	6	7	8	9	10	11	12	
GDP		-0.047 (-2.07)**		-0.044 (-1.91)*		-0.048 (-2.01)**		-0.057 (-2.34)**		-0.046 (-2.11)**		-0.055 (-2.35)**	-0.047 (-2.16)**
Inflation, GDP deflator	0.011 (2.13)**	0.011 (2.21)**									0.010 (1.97)*	0.009 (1.90)*	
Inflation, Consumer price			0.011 (1.95)*	0.011 (2.03)**									
M2 growth					0.007 (2.10)**	0.008 (2.25)**							
Foreign banks/total banks							-0.004 (-2.59)**	-0.004 (-3.01)**			-0.004 (-2.67)**		
Stock market capitalization /GDP									-0.002 (-3.78)**	-0.002 (-3.81)**			-0.002 (-3.64)**
Eurozone	-0.957 (-4.50)**	-0.572 (-2.04)**					-1.055 (-4.87)**	-0.606 (-2.11)**	-1.036 (-5.05)**	-0.660 (-2.45)**	-0.546 (-1.94)*		-0.602 (-2.26)**
Financial centers	-0.830 (-7.44)**	-0.706 (-5.83)**	-0.840 (-7.50)**	-0.724 (-5.93)**	-0.844 (-7.49)**	-0.715 (-5.79)**	-0.920 (-8.68)**	-0.782 (-6.89)**	-0.726 (-6.60)**	-0.595 (-4.91)**	-0.703 (-5.97)**		-0.537 (-4.39)**
Offshore financial centers	-0.353 (-2.81)**	-0.375 (-3.03)**	-0.369 (-2.95)**	-0.391 (-3.16)**	-0.386 (-3.11)**	-0.406 (-3.30)**	-0.332 (-2.63)**	-0.350 (-2.84)**	0.001 (0.01)	-0.026 (-0.16)	-0.285 (-2.28)**		0.014 (0.09)
Other advanced economies	-0.046 (-0.60)	-0.063 (-0.83)	-0.045 (-0.59)	-0.061 (-0.81)	-0.048 (-0.62)	-0.063 (-0.81)	-0.137 (-1.82)*	-0.167 (-2.25)**	-0.053 (-0.76)	-0.070 (-1.00)	-0.106 (-1.34)		-0.027 (-0.38)
Constant	0.671 (11.92)**	0.704 (12.23)**	0.676 (12.23)**	0.707 (12.45)**	0.648 (9.91)**	0.674 (10.28)**	0.879 (13.40)**	0.942 (13.65)**	0.874 (18.02)**	0.905 (17.75)**	0.840 (9.89)**		0.826 (12.78)**
Obs.	118	118	112	112	112	111	113	113	118	117	113		117
Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000
Pseudo R ²	0.507	0.536	0.462	0.489	0.466	0.492	0.500	0.540	0.564	0.589	0.563		0.610

Notes: t statistics in parentheses. ***significant at 1% **significant at 5% *significant at 10%

Table 8

	(1)	(2)	(4)	(5)	(6)	(7)
GDP per capita	.004 (0.91)	3.925 (0.86)				
Political stability			-.072 (-1.56)***	-.111 (-2.31)**		
Rule of law					-.050 (-0.82)	-.086 (-1.33)
GDP		-.046 (-1.99)**		-.058 (-2.33)**		-.052 (-2.09)**
Eurozone	-1.08 (-4.85)***	-.703 (-2.43)**				
Financial centers	-1.02 (-6.27)***	-.891 (-5.28)***	-.839 (-7.29)***	-.644 (-4.85)***	-.836 (-5.98)***	-.645 (-4.01)***
Offshore financial centers	-.520 (-3.29)***	-.538 (-3.46)***	-.351 (-2.67)***	-.327 (-2.50)**	-.370 (-2.57)**	-.343 (-2.36)**
Other advanced economies	-.188 (-1.55)	-.200 (-1.67)*	-.007 (-0.07)	.034 (0.35)	-.020 (-0.16)	.030 (0.23)
Constant	.732 (15.14)***	.767 (15.01)***	.749 (19.10)***	.776 (18.08)***	.768 (19.65)***	.804 (18.10)***
Obs.	118	118	117	114	117	114
Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R ²	0.486	0.513	0.471	0.504	0.460	0.482

Notes: t statistics in parentheses. ***significant at 1% **significant at 5% *significant at 10%

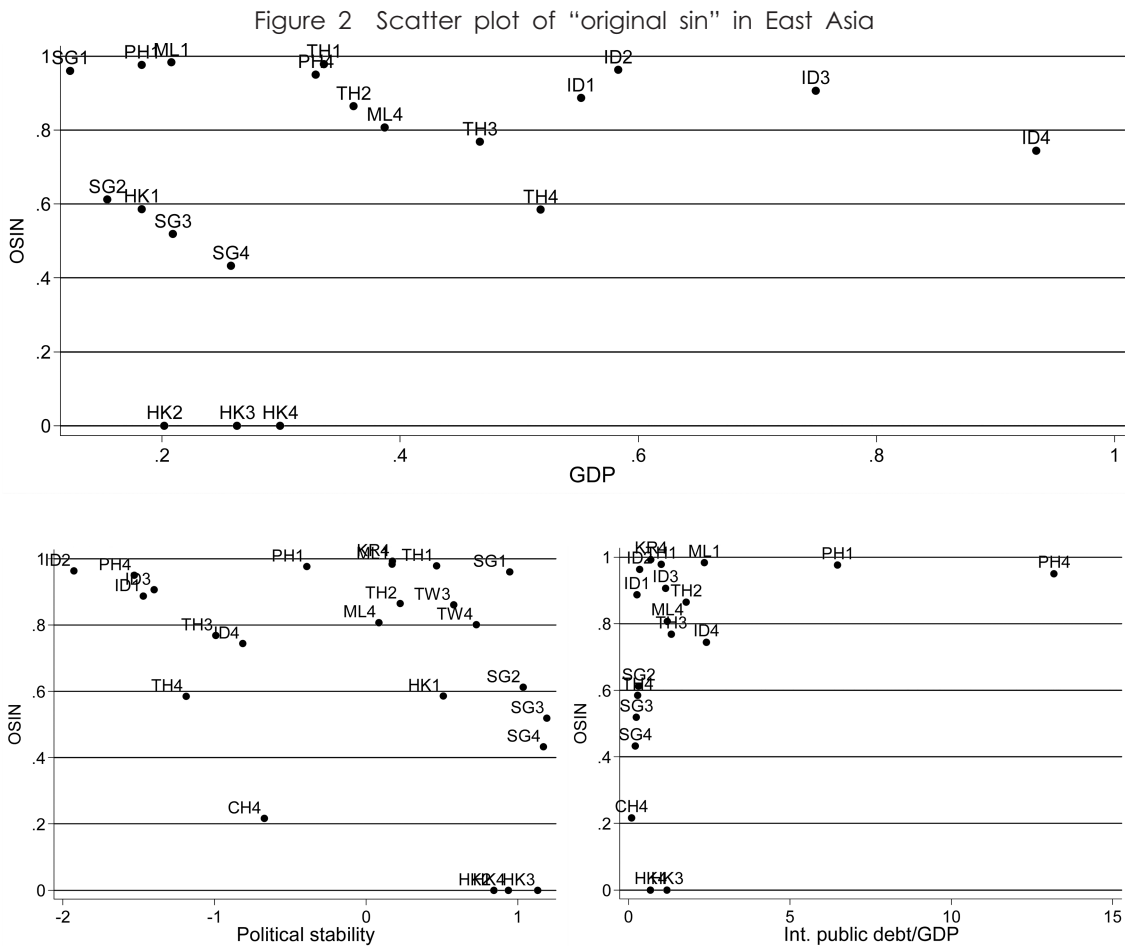
5. Discussion: “Original Sin” and East Asia

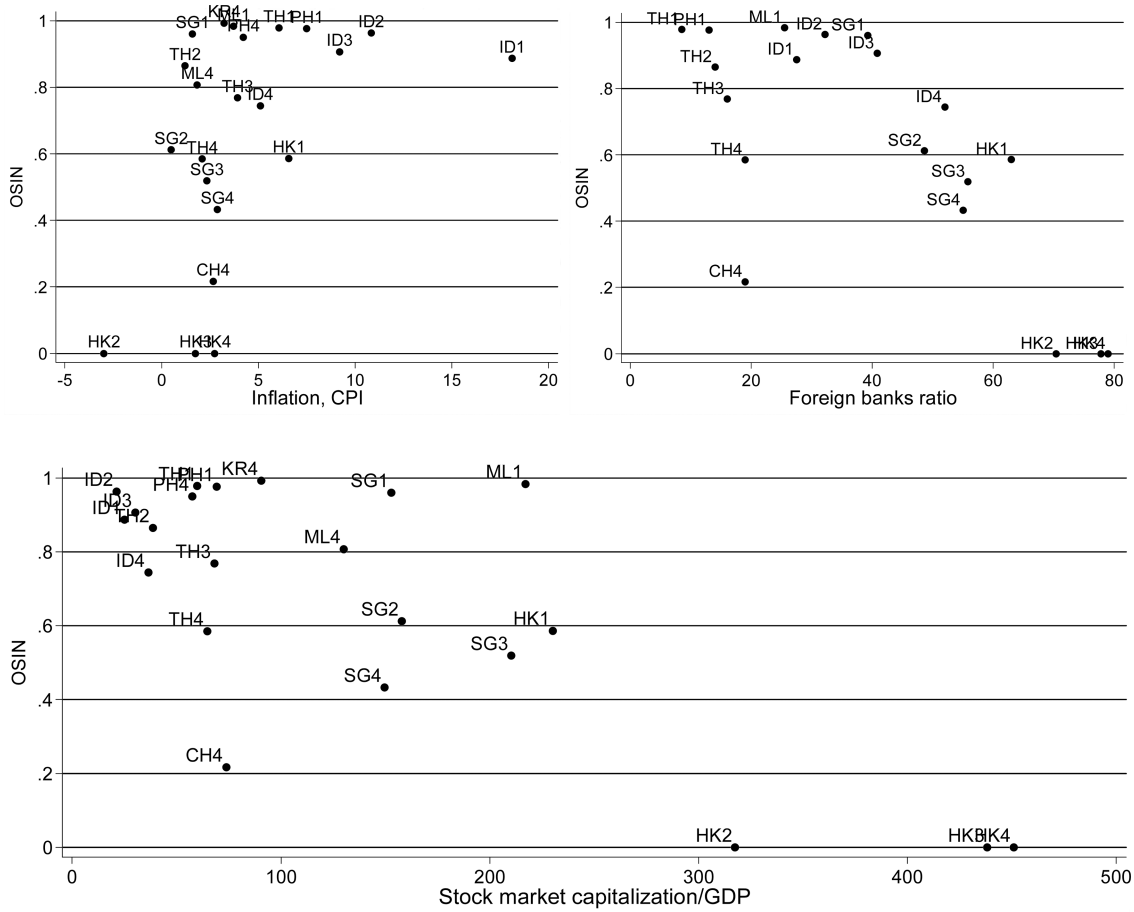
East Asian emerging-market economies have developed fast over the past decades and many political and economic factors in East Asian emerging-market economies have changed considerably. Figure 2 presents the level of “original sin” in East Asia with relation to a number of economic and political variables that have proved to be important in the empirical investigation in Section 4. Although there is a variance in the level of “original sin” with relation to individual variables, generally speaking, situation in East Asia is consistent with the regression results in Section 4.

The first panel of Figure 2 illustrates that economic volume has been increasing quickly in the region. Several East Asian emerging markets have large economic size at present. Their GDP (PPP) volume in 2011 is: China about 10 trillion, Korea about 1.4 trillion, and Indonesia about 1 trillion. The GDP of Thailand, Malaysia, the Philippines, Hong Kong SAR, and Singapore is between 0.28 trillion and 0.53 trillion. East Asian emerging-market economies maintain economic growth ranging between 3% and 8% in recent years. It implies that growing economic size is likely to continue contributing to the further decrease of the level of “original sin” in East Asia.

However, the development varies in different economies. First, political instability risk remains high in several countries. Data from the WGI database shows that political stability is weak in the Philippines, Thailand, and Indonesia. Future efforts to

reduce the threat of political instability in related countries are likely to further reduce the level of “original sin”. Second, several East Asian economies should be cautious about price stability. Indonesia has a bad inflation performance in the past but has corrected much over the years. Furthermore, most of East Asian emerging-market economies keep their present international public debt/GDP ratio below 2.5%; only the ratio for the Philippines is about 13%. The Philippines should control the level of debts; however, the contribution of decreased international public debt to other economies in the region in future is very limited. Fourth, further development and liberalization of financial market have the potential to further decrease the level of “original sin” in East Asian emerging-market economies. The past decade marked a great stride of several East Asian emerging-market economies in developing financial market. Governments took great efforts to encourage the infrastructure construction and the





Notes: Abbreviations (CH-China, HK-Hong Kong SAR, ID-Indonesia, KR-South Korea, ML-Malaysia, PH-the Philippines, SG-Singapore, TH-Thailand, TW-Taiwan district). Numbers that follow the abbreviations indicate four different periods: 1 (1994-1998), 2 (1999-2003), 3 (2004-2008) and 4 (2009-2011). The first panel does not include China and Korea for their economic size far exceeds other emerging-market economies in the region.

Source: Author's calculations.

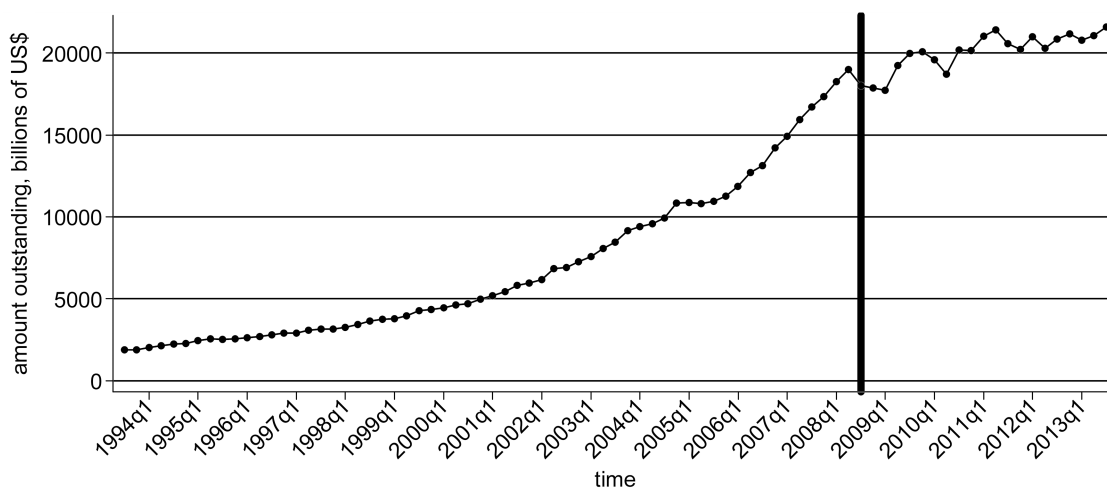
diversification of financial products. It should be noted, however, that the opening of the financial market should be managed carefully. The 1997-1998 financial crisis illustrates that ill-management of financial liberalization could induce debt and currency crises. Last, further efforts in enhancing political stability and financial market development in China may contribute to the acceptance of the renminbi in international market.

6. “Original Sin” and the Recent Global Financial Crisis

“Original sin” is measured using data from the international debt market, which can properly reveal the degree of international acceptance of a currency as a financing and investment currency according to Eichengreen and Hausmann. Although the total volume of the international debt market is dwarfed by domestic debt market around the globe, the international market is important for many East Asian emerging-market economies. The share of international debt securities in total debt securities is large in a number of East Asian economies. The international/domestic ratio for debt securities in Singapore is 72.65% in December 2012; the corresponding ratio in the Philippines and Indonesia is 52.77% and 32.53% respectively. International debt market has increased dramatically from 1987 through 2007 before the onset of the recent global financial crisis. Its total volume peaked in the first quarter of 2008 the number of which was over US\$ 20,000 billion (BIS securities statistics 2013). However, the recent global financial crisis cast a shadow on international capital flows.

To track the impact of recent global financial turmoil, I here take the international bond market for illustration.¹⁴ Figure 3 shows the trend of outstanding international bonds and notes in recent years. The total amount slumped shortly after the Lehman shock. In contrary to the steady increase in the past, market became very volatile

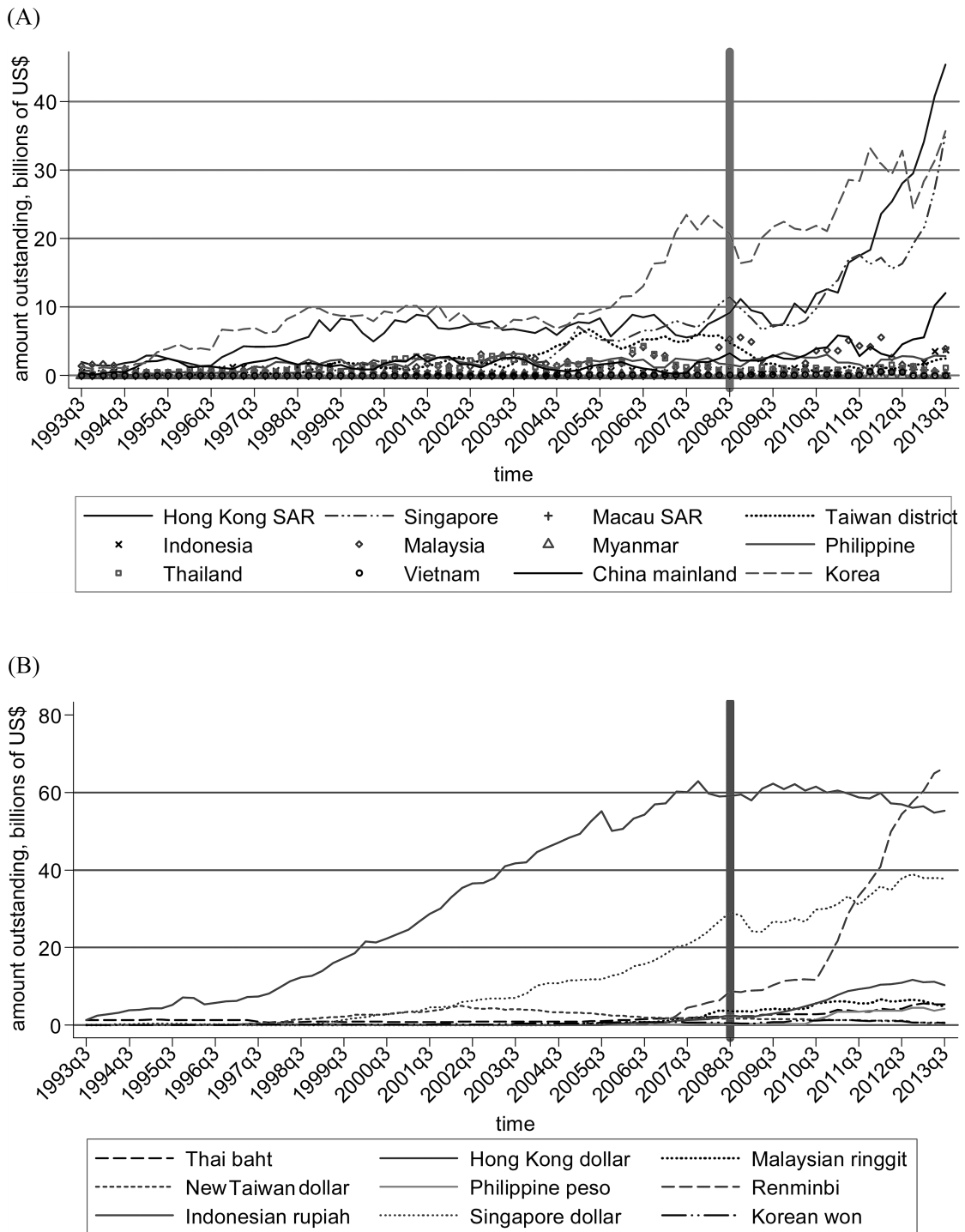
Figure 3 International bonds and notes, total amount



Source: Compiled by author based on data from the BIS (2013).

¹⁴ International debt securities (international debt market) are comprised by money market instruments (money market) and international bonds and notes (international bond market), the latter of which have a predominant market share. Particularly, the size of money market instruments is extremely small for emerging-market economies.

Figure 4 International bonds and notes, East Asia



Source: Compiled by author based on data from the BIS (2013).

from 2008 until 2013. There was significant risk of reversed cross-border transaction practices after the 2008 Lehman collapse until 2009 (Figure 4 A). However, East Asian emerging-market currencies stayed relatively safe in the turmoil of the Great Recession (Figure 4 B). During the jittery times of 2011, traders showed more confidence toward these previously susceptible currencies. It stands out that capital flow across borders was much more volatile than that measured by the denominating currency. Cross border capital flows are more susceptible to the boom and bust of the world economy. On contrary, the allocation of global portfolio and market in different currencies is rather stable over time.

Since “original sin” is only one of the many factors in determining currency mismatch, the change in “original sin” itself could not predict currency mismatch fully.¹⁵ Bordo and Meissner (2006) suggest that foreign currency debt as a result of “original sin” was dangerous when mismanaged. Other factors that influence currency mismatch and financial fragility include international reserves accumulated by the government and risk management in the banking sector. However, foreign reserves and risk control in the banking sector are no easy solution. For instance, a large pile of reserves can become a target of criticism on global imbalances and currency manipulation. On the other side, although governments around the world are working on banking supervision and regulation, the recent international financial crisis has illustrated again the tremendous difficulty of the task. Even the banks in the US with the one of the most advanced financial markets in the world were tempted to act irresponsibly for the economy as a whole. Eichengreen, Hausmann and Panizza (2007) argue that these two measures are only second best; economies without “original sin” are in the best position to deal with the risk of currency mismatch and the associated systemic risk.

7. Conclusion

Since the proposition of the “original sin” issue, studies generally relied on historical data before the 2000s and found the positions of different currencies were persistent. However, the results in this paper illustrate that the level of “original sin” of many East Asian emerging-market economies have changed over decades as regional economies have advanced rapidly, suggesting that “original sin” might be a misnomer. Many institutional factors including stable political environment, managed international public debt, sophisticated and open financial market are found to be strongly associated with reduced level of “original sin”. Global capital market integration after the 1990s

¹⁵ Bordo and Meissner (2006) find that although “original sin” by itself does contribute to crises, currency mismatches are a much more robust determinant of financial crises than “original sin” using a dataset over 1880-1913 and 1972-1997.

has played an important role. During this process, more and more countries that used to be shut from international capital market got access to it. The accession to global market in turn puts pressure on domestic reform in emerging-market economies so that borrowing becomes easier and cheaper.

Although the change of “original sin” in East Asian emerging-market economies is widely discernible, the degree of variation differs. The empirical investigation in this paper implies that many East Asian emerging-market economies might still be subject to relative high level of “original sin” for a long time in future; for example, Malaysia, the Philippines, Taiwan district, and South Korea. Moreover, the presence of large fixed effects of network externalities of major international currencies implies that complete elimination of “original sin” may only happen to a very limited number of currencies. Therefore, this paper suggests that it is necessary for emerging-market economies in East Asia to continue to closely monitor the risk of foreign-currency debt accumulation and that it is likely that emerging-market governments in the region will continue to hold foreign reserves as a safety bumper for financial turmoil in the near future.

References

- Bank for International Settlements. 2010. *Triennial Central Bank Survey: Report on Global Foreign Exchange Market Activity in 2010*. Monetary and Economic Department. Basel: Bank for International Settlements.
- Baek, Seung-Gwan. 2013. “On the Determinants of Aggregate Currency Mismatch.” *Journal of Policy Modeling*, 35(4): 623-637.
- Black, Stanley W. 1991. “Transactions Costs and Vehicle Currencies.” *Journal of International Money and Finance*, 10 (4): 512-526.
- Bordo, Michael D., and Christopher M. Meissner. 2006. “The Role of Foreign Currency Debt in Financial Crises: 1800-1913 Versus 1972-1997.” *Journal of Banking & Finance*, 30 (12): 3299-3329.
- Bordo, Michael D., Christopher M. Meissner, and Angela Redish. 2005. “How ‘Original Sin’ Was Overcome: The Evolution of External Debt Denominated in Domestic Currencies in the United States and the British Dominions 1800-2000.” In *Other People’s Money: Debt Denomination and Financial Instability in Emerging Market Economies*, edited by Barry Eichengreen and Ricardo Hausmann. Chicago and London: University of Chicago Press. pp. 122-153.
- Bordo, Michael D., Chrisopher M. Meissner, and David M. Stuckler. 2010. “Foreign Currency debt, Financial Crises and Economic Growth: A Long-Run View.” *Journal of International Money and Finance*, 29 (4): 642-665.
- Burger, John D., and Francis E. Warnock. 2003. “Diversification, Original Sin, and

- International Bond Portfolios. Board of Governors of the Federal Reserve System.” *International Finance Discussion Papers*, No. 755.
- — —. 2006. “Local currency bond markets.” *IMF Staff Papers*, 53 (Special Issue). International Monetary Fund, Washington, D.C.
- Corsetti, Giancarlo, and Bartosz Mackowiak. 2003. “A Fiscal Perspective on Currency Crises and ‘Original Sin.’” *Paper prepared for the conference “Currency and Maturity Mismatching: Redeeming Debt from Original Sin”*. Available at <http://www.iadb.org/res/publications/pubfiles/pubS-155.pdf>. (October 10, 2012)
- Eichengreen, Barry, and Ricardo Hausmann. 1999. “Exchange Rates and Financial Fragility.” *NBER Working Paper*, No.7418. National Bureau of Economic Research, Cambridge, Mass.
- Eichengreen, Barry, Ricardo Hausmann, and Ugo Panizza. 2003. “The Pain of Original Sin.” Available at <http://elsa.berkeley.edu/~eichengr/research/ospainaug21-03.pdf>. (October 3, 2012)
- — —. 2007. “Currency Mismatches, Debt Intolerance, and the Original Sin: Why They Are Not the Same and Why It Matters.” In *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences* edited by Sebastian Edwards. Chicago and London: University of Chicago Press. pp. 121-169. Available at <http://papers.nber.org/books/edwa06-1>. (December 10th, 2013)
- Goldstein, Morris, and Philip Turner. 2004. *Controlling Currency Mismatches in Emerging Markets*. Available at <http://bookstore.piie.com/book-store/373.html>. (May 1st, 2013)
- Hanson, Gordon H. 2012. “The Rise of Middle Kingdoms: Emerging Economies in Global trade.” *Journal of Economic Perspectives*, 26(2): 41-64.
- Hausmann, Ricardo, and Ugo Panizza. 2003. “On the Determinants of Original Sin: An Empirical Investigation.” *Journal of International Money and Finance*, 22 (7): 957-990.
- Krugman, Paul. 1980. “Vehicle Currencies and the Structure of International Exchange.” *Journal of Money, Credit, and Banking*, 12(3): 513-526.
- — —. 1984. “The International Role of the Dollar: Theory and Prospect.” In *Exchange Rate Theory and Practice*, edited by John F.O. Bilson, Richard C. Marston. Chicago and London: University of Chicago Press. pp. 261-278.
- Lim, Ewe-Ghee. 2006. “The Euro’s Challenge to the Dollar: Different Views from Economists and Evidence from COFER (Currency Composition of Foreign Exchange Reserves) and Other Data.” *IMF Working Paper*, WP/06/153. International Monetary Fund, Washington D.C.
- Magud, Nicolas E. 2010. “Currency Mismatch, Openness, Exchange Rate Regime Choice.” *Journal of Macroeconomics*, 32(1): 68-89.
- Park, Yung Chul, and Charles Wyplosz. 2010. *Monetary and Financial Integration in East Asia*. New York: Oxford University Press.

Reinhart, Carmen M., and Vincent R. Reinhart. 2003. "Twin Fallacies about Exchange Rate Policy in Emerging Markets." *NBER Working Paper*, No.9670. National Bureau of Economic Research, Cambridge, Mass.

Reinhart, Carmen M., Kenneth S. Rogoff, and Miguel A. Savastano. 2003. "Debt Intolerance." *Brookings Papers on Economic Activity*, 34: 1-74.

Sims, Christopher A. 2013. "Paper Money." *American Economic Review*, 103(2): 563-584.

Tobin, James. 1958. "Estimation of Relationships for Limited Dependent Variables." *Econometrica*, 26(1): 24-36.

(Received 29th October, 2013)

(Accepted 25th January, 2014)