

Chapter 5

Sovereign Credit Default Swaps and U.S. Economic Policy Uncertainty After the Global Financial Crisis



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Abstract This paper empirically investigates factors for sovereign credit default swap (CDS) spreads as a proxy for sovereign credit risk. We focus on U.S. economic policy uncertainty as a global factor and employ weekly data following the global financial crisis. In addition, we highlight the difference between advanced and emerging economies. The results show that U.S. economic policy uncertainty index changes influenced sovereign CDS spreads during quantitative easing (QE) 1 in emerging economies and during QE2 and QE3 in advanced economies. The U.S. stock index and the VIX affected the sovereign CDS spreads for all subsample periods in emerging economies, except QE2. This suggests that U.S. financial market factors are more important than economic policy uncertainty for the sovereign credit risk in emerging economies.

Keywords Sovereign CDS spreads · U.S. economic policy uncertainty · Global risk · Large-scale asset purchases · Emerging economies

5.1 Introduction

An assessment of sovereign credit risk may help reduce the likelihood of sovereign default. In particular, investigating the factors driving sovereign credit risk is essential for both governments and investors, especially if the risk is relatively high, as in emerging economies. Therefore, this study empirically explores factors of sovereign credit risk and primarily focuses on the influence of U.S. economic policy uncertainty as a global factor.

Various metrics are monitored to measure sovereign credit risk, including sovereign credit default swap (CDS) spreads and government bond yields. While

This research was supported in part by the Japanese MEXT KAKENHI (Grant No. 16K03759).

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we can gauge the sovereign credit risk by the difference between the government bond yield of a specified country and that of a benchmark country, the sovereign CDS spread of a country by itself reflects its sovereign credit risk. The sovereign CDS spread is useful in directly measuring sovereign credit risk; thus, we use it to explore factors that affect sovereign credit risk. We utilize weekly sovereign CDS spread data for 33 sample countries from February 25, 2008–March 25, 2016.

Sovereign credit risk is affected not only by fiscal conditions but also by other domestic economic conditions and global factors. As Table 5.1 shows, previous studies argue an influence of foreign shocks on sovereign credit risk, and some explore the global correlations of sovereign CDS markets to discuss the international transmission of sovereign debt shocks [4, 8, 10–13, 18]. Additionally, some studies use daily or weekly sovereign CDS data to focus on specific shocks and investigate their influence on sovereign CDS markets [1, 7, 9, 14, 16]. Many studies examine the effect of domestic factors driving sovereign credit risk on the monthly, quarterly, and yearly statistics of the sovereign CDS spreads [2, 3, 6, 17].

Fewer studies have analyzed both global and domestic factors driving sovereign CDS spreads. Among previous articles, Longstaff et al. [17] and Kim et al. [16] investigated the impacts of both domestic and global factors on sovereign CDS spreads. Longstaff et al. [17] tested monthly data of emerging economies from October 2000 to January 2010, demonstrating that sovereign CDS spreads relate to global factors more than local factors.¹ Kim et al. [16] used daily data of 19 emerging and advanced economies and studied the impact of macroeconomic news on sovereign CDS spreads and spread volatility from November 2007 to March 2012. They found that sovereign CDS spreads and volatility respond to both foreign and domestic news. Though the two studies use different sample data, their results suggest the critical role of foreign factors.²

This paper focuses on the influence of U.S. economic policy uncertainty as a global factor, which previous studies did not investigate. Following the global financial crisis (GFC), monetary policy in the U.S. went through a transition from a period of the U.S. large-scale asset purchases (LSAPs), including three phases of quantitative easing (QE) and tapering of QE, to a period of rising interest rates after the LSAPs. Uncertainty in the U.S. economic policy, including changes in the monetary policy, is likely to influence investor attitudes to credit risk because the LSAPs and tapering of QE are unprecedented for investors worldwide. We employ the U.S. economic policy uncertainty index provided by Baker et al. [5]. In addition, we explore the different factors for sovereign CDS spreads between advanced and emerging economies because financial markets and the governments in emerging economies are generally smaller, and the influence of global shocks on the sovereign credit risk of emerging markets may be more significant than that of advanced markets.

¹ Longstaff et al. [17] also decomposed the sovereign credit spreads into their risk premium and default risk components and explored global factors driving those components.

² With respect to domestic factors, Kim et al. [16] implied the influence of both domestic and foreign factors on the sovereign credit risk, which is different from that by Longstaff et al. [17].

Table 5.1 Related studies

Paper	Main target	Sample countries	Period	Data frequency
<i>International transmission of sovereign debt shocks</i>				
Ang and Longstaff [4]	Correlation between sovereign credit risk in US states and that in European countries	10 US states and 11 eurozone countries	May 14, 2008–January 5, 2011	Daily
Calice et al. [8]	Liquidity and credit interactions for sovereign bond and CDS spreads in Europe	10 eurozone countries	January 1, 2007–October 1, 2010	Daily
Delatte et al. [10]	Transmission of shock in sovereign debt market during the European sovereign crisis	11 European countries	January 1, 2008–July 27, 2010	Daily
Grammatikos and Vermeulen [11]	Transmission of shock in financial market from the US to Europe	15 EMU countries	January 2003–August 2010	Daily
Gunduz and Kaya [12]	Co-movements of sovereign CDS spreads with the financial crisis	10 eurozone countries	January 2006–November 2013	Daily
Hui and Chung [13]	Correlation between the dollar-euro currency option prices and the sovereign CDS spreads	11 eurozone countries	January 2, 2006–April 30, 2010	Daily
Kalbaska and Gatkowski [15]	Correlation of sovereign credit risk among European countries and the US	9 countries	August 2005–September 2010	Daily
Wang and Moore [18]	Influence of the sovereign CDS spreads in the US on other countries and the correlation's driver	38 advanced and emerging countries	January 2007–December 2009	Daily

(continued)

Table 5.1 (continued)

Paper	Main target	Sample countries	Period	Data frequency
<i>Influence of specific shocks on sovereign CDS markets</i>				
Afonso et al. [1]	Effect of sovereign credit rating change announcements on sovereign yield and CDS spreads in EU countries	24 EU countries	January 1995–October 2010	Daily
Blau and Roseman [7]	Effect of sovereign credit rating downgrade of the US on the CDS spreads in Europe	31 European countries	21-day period surrounding the August 5th, 2011	Daily
Calice et al. [9]	Dynamic behavior of the sovereign CDS term premium	10 European countries	September 2007–February 2012	Daily
Ismailescu and Kazemi [14]	Effect of sovereign credit rating change announcements on the CDS spreads	22 emerging countries	January 2, 2001–April 22, 2009	Daily
Kim et al. [16]	Impact of macroeconomic news on the sovereign CDS spreads	19 countries	14 November 2007–31 March 2012	Daily
<i>Domestic and global factors for sovereign credit risk</i>				
Ahmed et al. [2]	Role of economic fundamentals in the transmission of international shocks	64 emerging countries	1990–2016	Monthly
Aizenman et al. [3]	Effect of sovereign credit rating changes on CDS spreads in EU countries	26 EU countries	January 2005–August 2012	Monthly
Beirne and Fratzscher [6]	Drivers of sovereign credit risk during the European sovereign debt crisis	31 advanced and emerging countries	1999–2011	Monthly
Longstaff et al. [17]	Factors for sovereign credit risk	26 advanced and emerging countries	October 2000–January 2010	Monthly

The regression result shows that the U.S. economic policy uncertainty influenced sovereign CDS spreads in emerging economies for QE1 and advanced economies for the periods of QE2 and QE3. By contrast, the U.S. stock market price and the VIX affected sovereign CDS spreads of emerging economies in every subsample period except QE2. This suggests that, as a global factor, U.S. financial market factors are more important than the U.S. economic policy uncertainty for sovereign credit risk in emerging economies. Furthermore, this propensity is more evident in emerging economies than in advanced economies.

The remainder of the paper is structured as follows. Section 5.2 graphically illustrates the fluctuation of sovereign CDS spreads and the global variables. Section 5.3 discusses the methods used to estimate the influence on sovereign CDS spreads, and Sect. 5.4 provides some concluding remarks.

5.2 An Overview of Sovereign CDS Spreads and the U.S. Financial Markets

This section graphically illustrates the fluctuations in sovereign CDS spreads with the following global variables: the S&P 500 index, the 5-year U.S. Treasury yield, the VIX index, and the U.S. economic policy uncertainty index. All data are monthly averages of daily statistics from December 2008 to March 2016. Figures 5.1, 5.2, 5.3 and 5.4 depict the rates of change in sovereign CDS spreads in each sample country. Figures 5.1, 5.2 and 5.3 illustrate the rates of change in emerging economies' sovereign CDS spreads according to the region (Europe and Africa, Asia and the Middle East, and Latin America), and Fig. 5.4 shows the advanced economies' CDS spreads. Figures 5.5, 5.6, 5.7 and 5.8 present the average rates of change in sovereign CDS spreads of our sample countries and the fluctuations of the U.S. indices.

Figure 5.1 shows that the rates of change in sovereign CDS spreads for Europe and Africa are similar. Most emerging countries' sovereign CDS spreads rose primarily in February 2009, May and June 2010, September 2011, and June 2013. Thus, the sovereign credit risk for emerging economies in Europe and Africa significantly increased in those periods. The sovereign CDS spreads of Slovenia and Russia fluctuated most from December 2008 to September 2014 and March 2014 to March 2016, respectively. Figure 5.2 presents the rates of change in sovereign CDS spreads in Asian and Middle Eastern emerging economies. While their fluctuations are similar, the change in the sovereign spreads of Kazakhstan is more prominent than other emerging economies in this group. Figure 5.3 shows that the rates of change in sovereign CDS spreads are similar among Latin American emerging countries. Figure 5.4 depicts the rates of change in sovereign CDS spreads in advanced economies. The fluctuation was significant from the end of 2008 to the middle of 2011, which includes the GFC and the sovereign debt crisis in the Euro area. From Figs. 5.1, 5.2, 5.3 and 5.4, most countries' sovereign CDS spreads rise and fall in similar periods, and most sample countries' change rates are not significantly

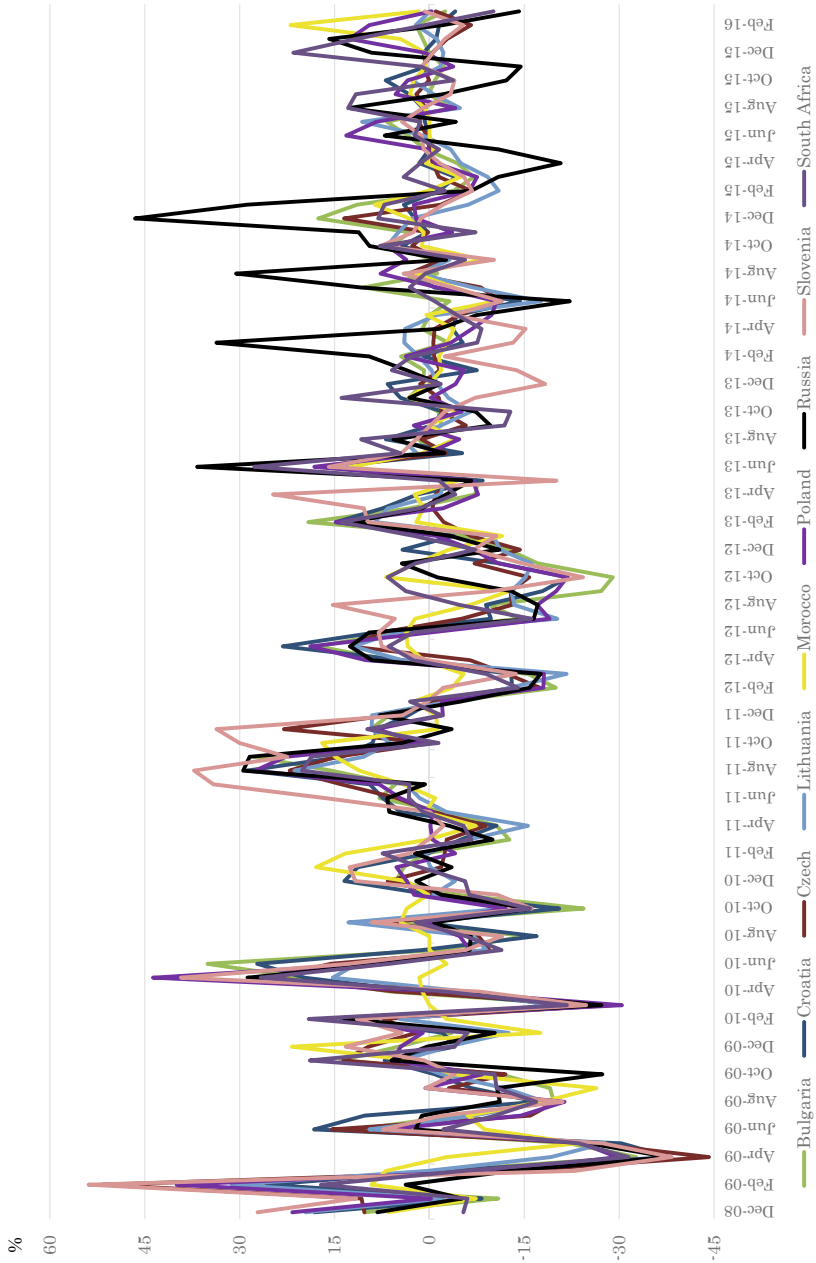


Fig. 5.1 Rate of change in CDS spreads in European and African emerging economies (monthly)

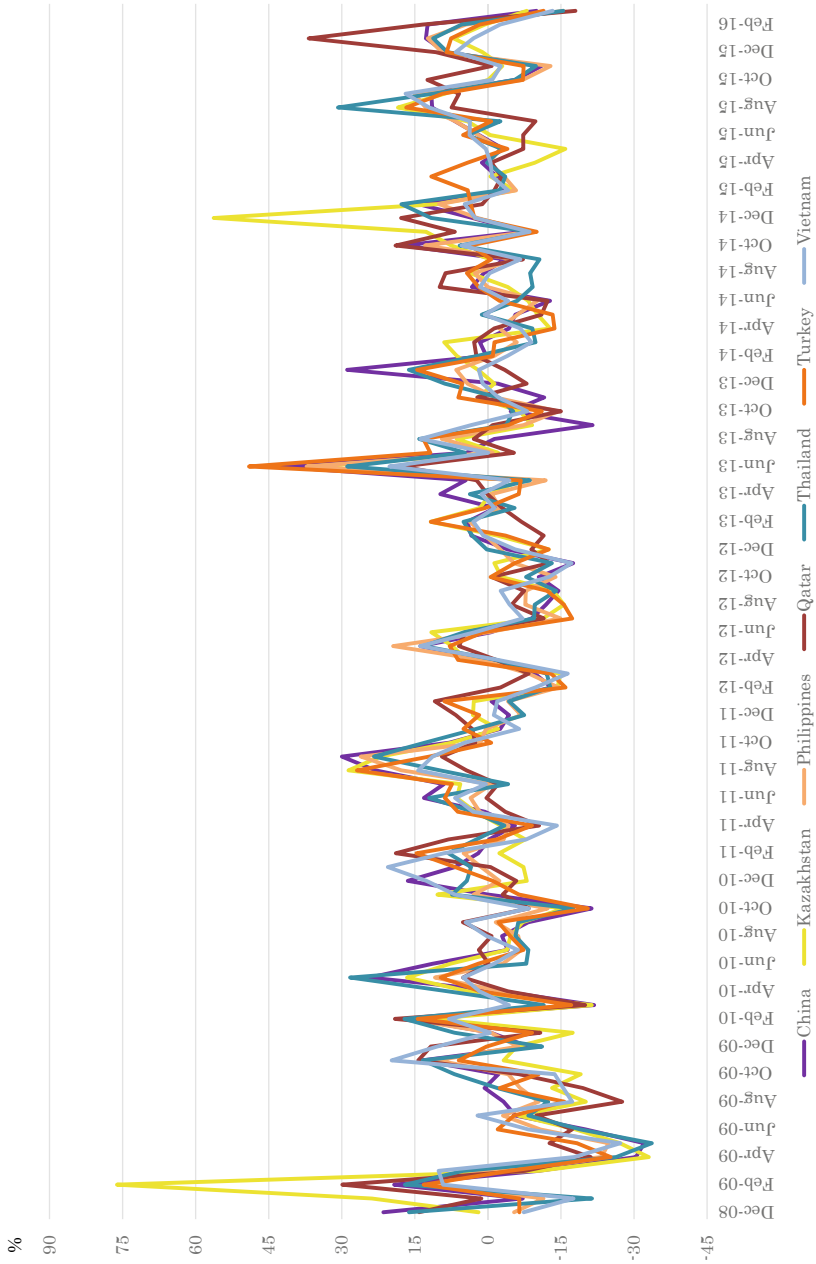


Fig. 5.2 Rate of change in CDS spreads in Asian and Middle-Eastern emerging economies (monthly)

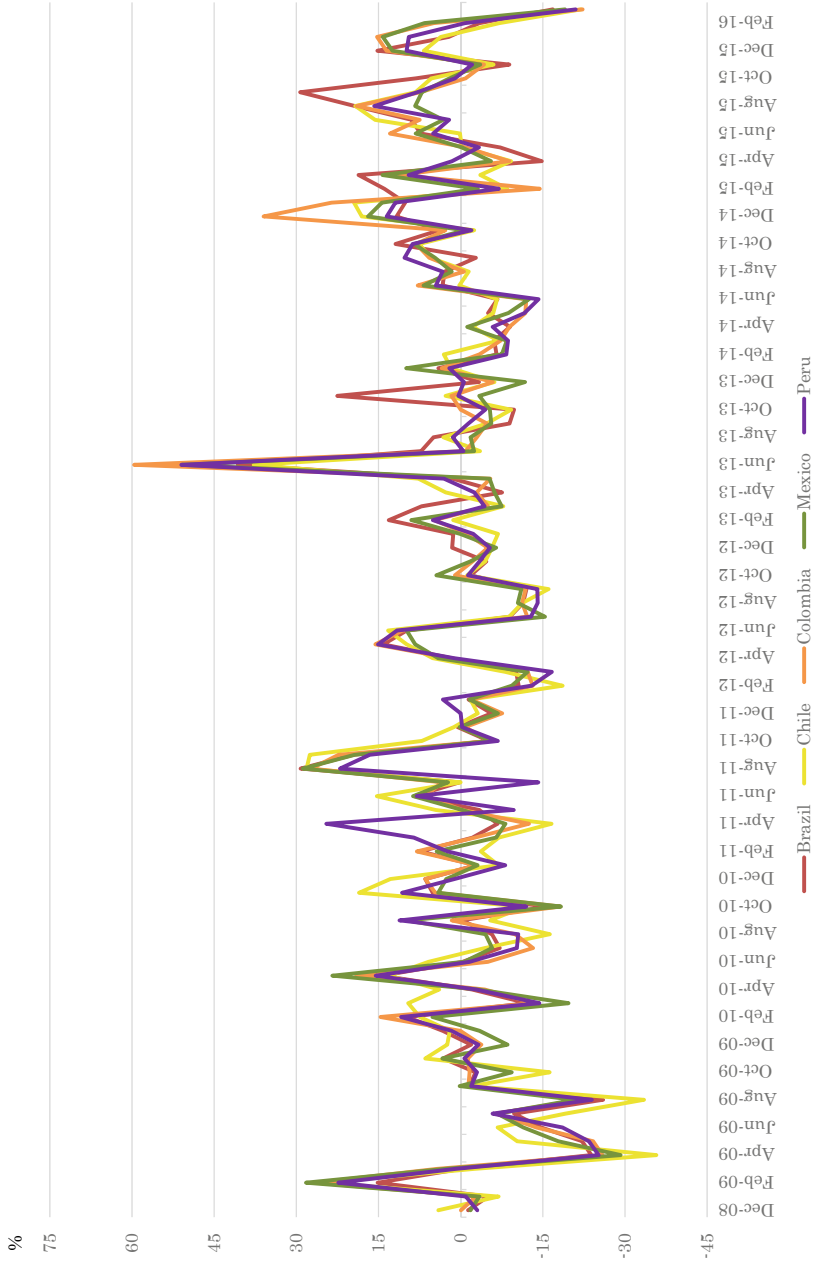


Fig. 5.3 Rate of change in CDS spreads in Latin-American emerging economies (monthly)

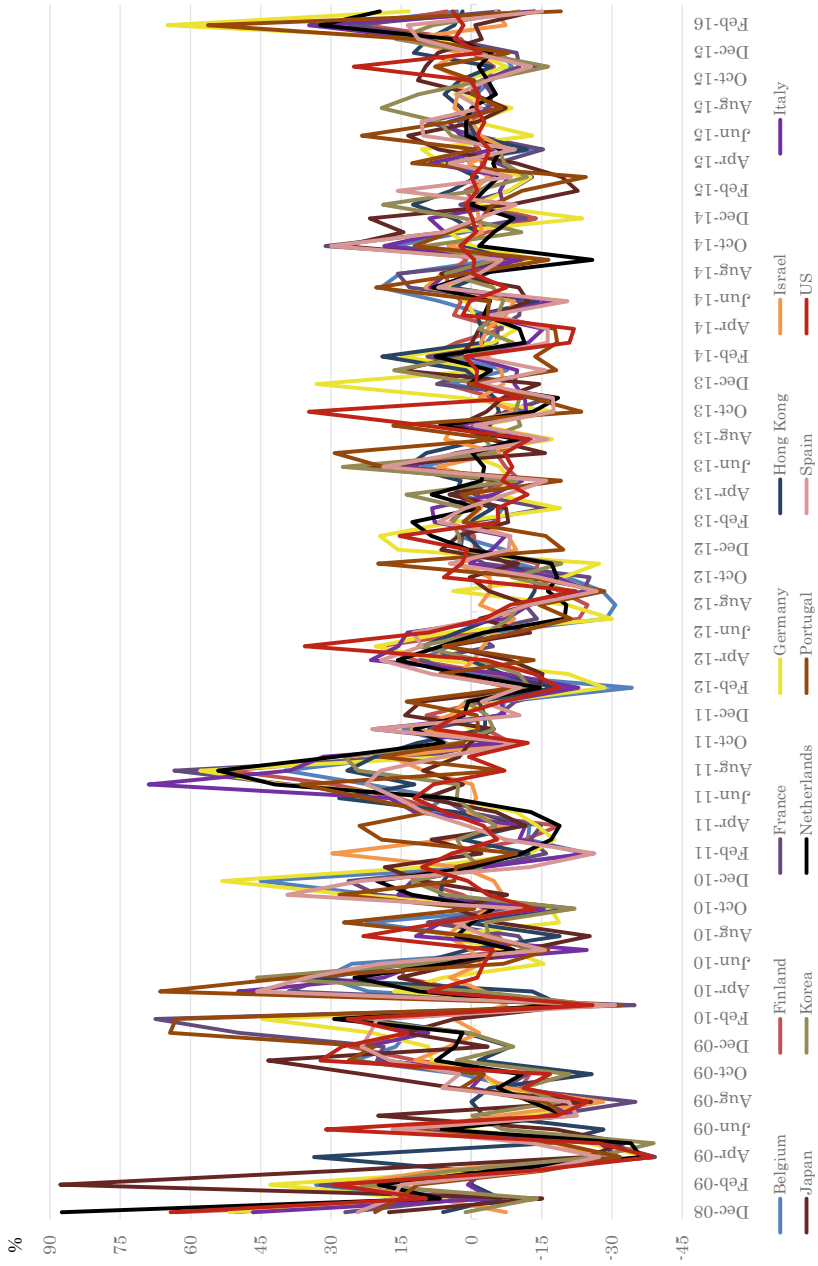


Fig. 5.4 Rate of change in CDS spreads in advanced economies (monthly)

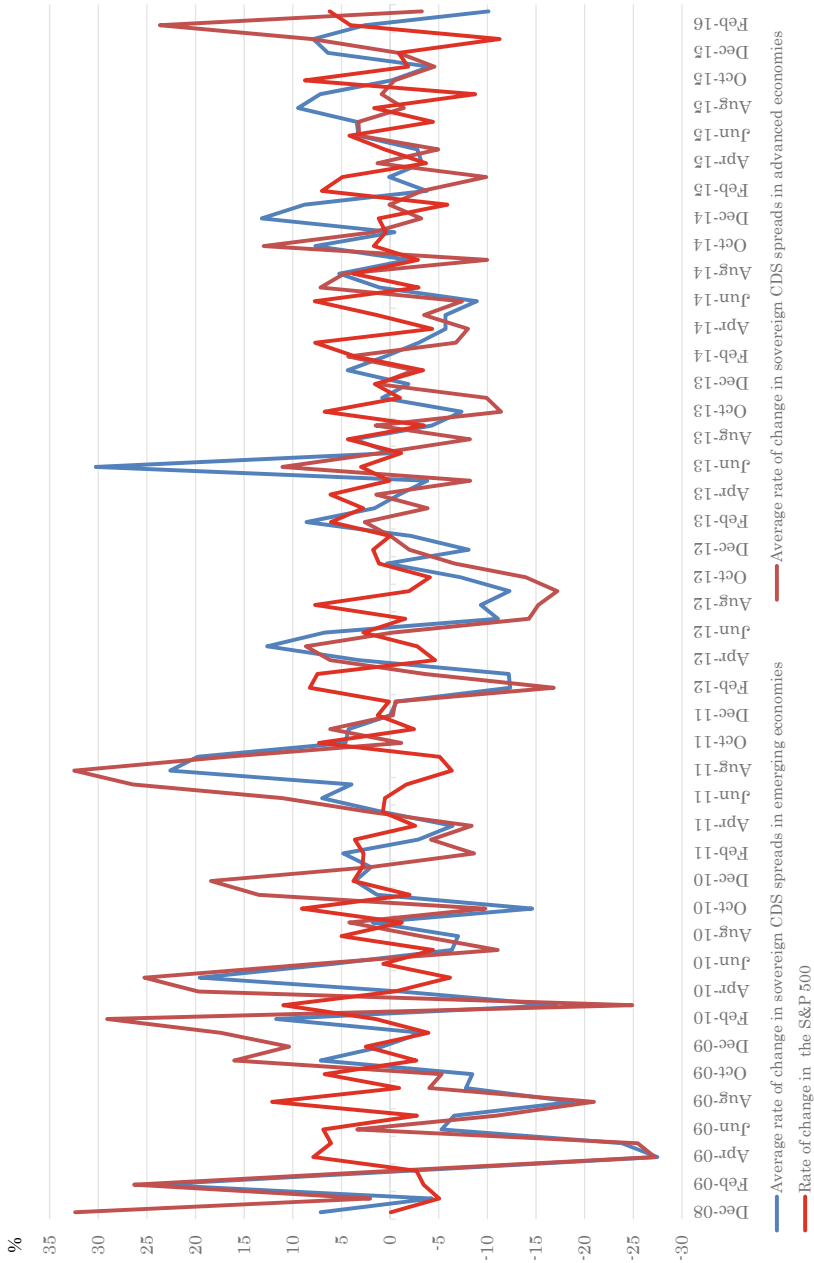


Fig. 5.5 Rates of change in sovereign CDS spreads and the U.S. stock index

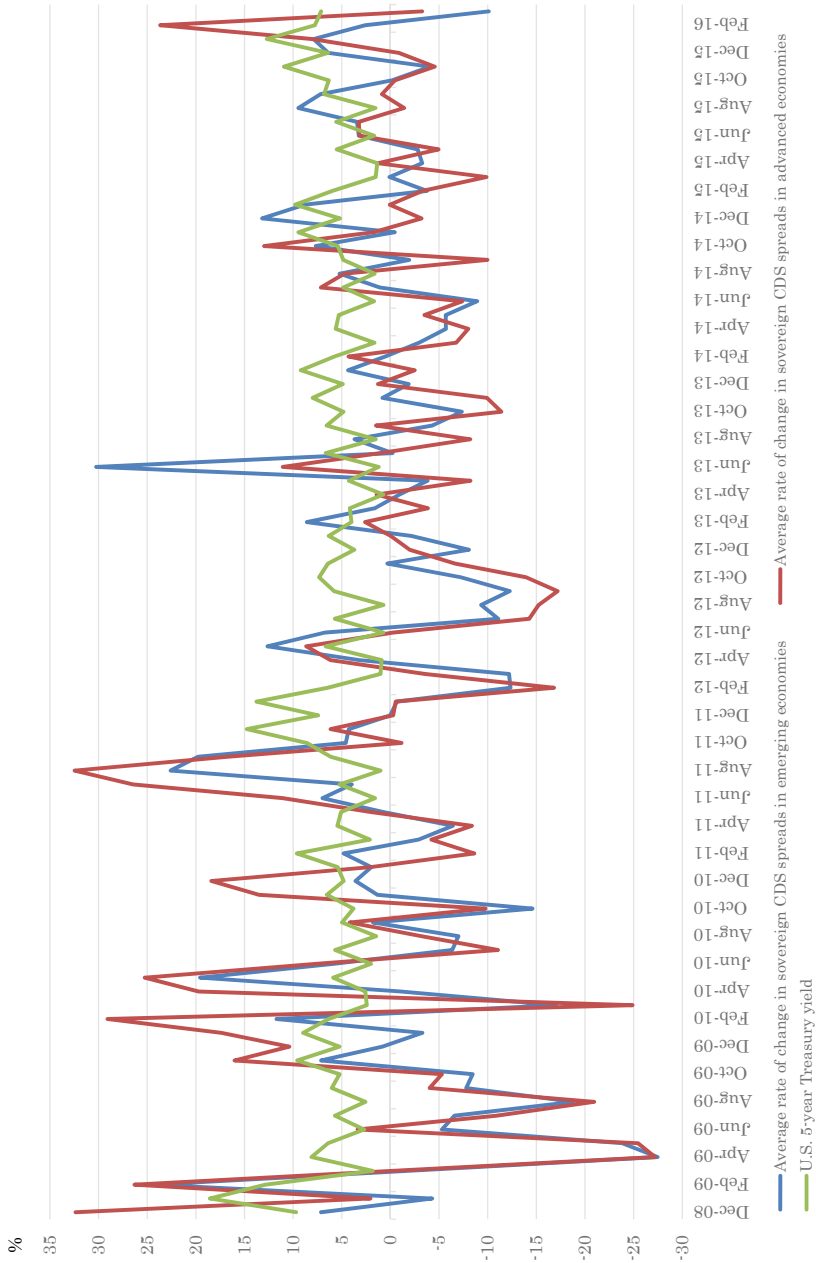


Fig. 5.6 Rates of change in sovereign CDS spreads and the U.S. interest rate

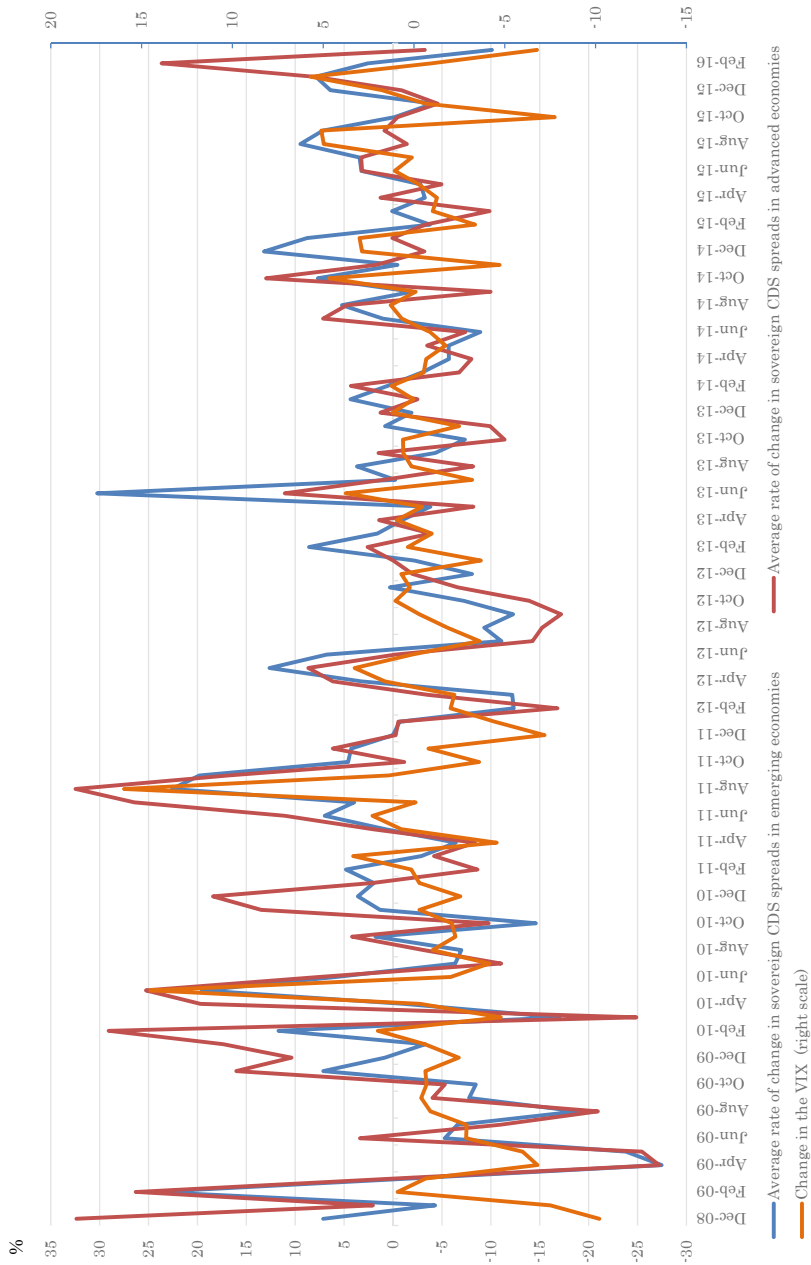


Fig. 5.7 Rates of change in sovereign CDS spreads and changes in the VIX

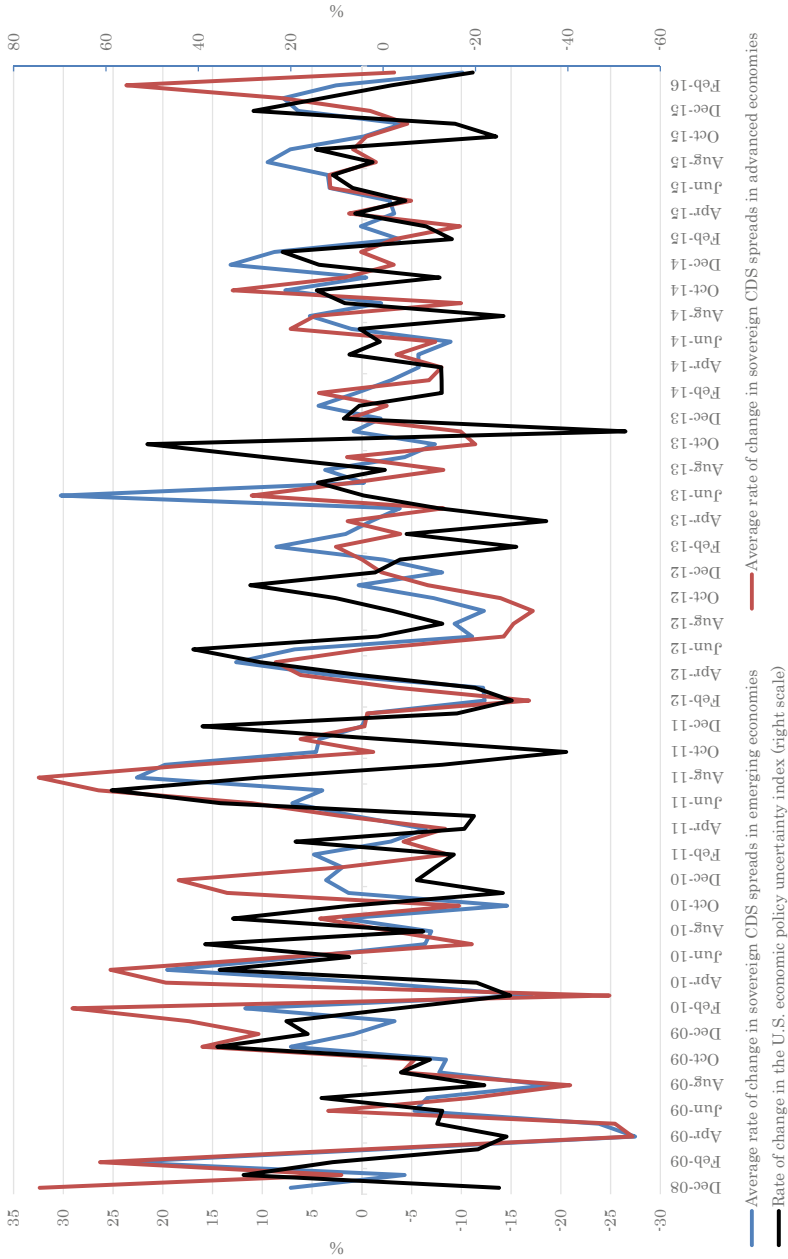


Fig. 5.8 Rates of change in sovereign CDS spreads and the U.S. economic policy uncertainty index

different. This implies that each country's sovereign CDS spread is affected by global shocks because it is part of an integrated market.

Figure 5.5 presents the average rates of change in sovereign CDS spreads for the sample countries in advanced and emerging economies and the rate of change in the U.S. S&P 500 index. The similar fluctuations between sovereign CDS spreads in advanced and emerging economies are consistent with the fluctuations among each country's sovereign CDS spreads, as illustrated in Figs. 5.1, 5.2, 5.3 and 5.4. Figure 5.5 also shows that sovereign CDS spreads tend to rise (fall) in the period of the fall (rise) in the S&P 500. Since a high CDS spread means a surge in credit risk, this shows that sovereign credit risk increases when the U.S. stock market is bearish. Figure 5.6 illustrates the average rates of change in sovereign CDS spreads and the U.S. 5-year Treasury yield fluctuation. Sovereign CDS spreads decline (increase) when the U.S. Treasury yield falls (rises), implying that sovereign CDS spreads rose during the period of monetary restraint in the United States. Figure 5.7 shows the co-movement between average rates of change in sovereign CDS spreads (left scale) and the change in the VIX (right scale). This implies that sovereign credit risk would be high when volatility in the U.S. stock market rises. Figure 5.8 also shows similar fluctuations between average sovereign CDS spreads (left scale) and the U.S. economic policy uncertainty index (right scale) in most periods. Figures 5.5, 5.6, 5.7 and 5.8 suggest that U.S. financial market conditions and economic policy uncertainty correlate with sovereign CDS markets.

5.3 Empirical Analysis

This paper analytically explores how domestic and foreign factors affect the sovereign CDS spreads in emerging and advanced economies in the period after the GFC. The regression data are of weekly frequency, and we employ panel data for financial markets. Our analysis utilizes the domestic stock index and foreign exchange rate (to the U.S. dollar) as domestic factors and the U.S. economic policy uncertainty index, the U.S. stock index, the U.S. interest rate, and the VIX as foreign factors. In addition, we regress subsample periods for QE1, QE2, QE3, and the period after the LSAPs, to analyze changes in the relationship between sovereign CDS spreads and factors.

5.3.1 Data

Following the previous studies regarding sovereign credit risk, we assume that the 5-year sovereign CDS spread represents sovereign credit risk. The regression employs the U.S. economic policy uncertainty index developed by Baker et al. [5] to measure U.S. economic policy uncertainty. This index is based on newspaper articles in the U.S. that include policy-related economic uncertainty. We also use the U.S. financial

indices for global factors driving the fluctuation in sovereign credit risk: the S&P 500 index, the 5-year U.S. Treasury yield, and the VIX index. In addition to global variables, our regression utilizes two domestic explanatory variables: domestic stock price index and foreign exchange rate. The U.S. economic policy uncertainty index is obtained from Baker et al.'s [5] website, and the sovereign CDS data come from the Datastream database. All other data are obtained from the Datastream and CEIC database.

According to data availability of sovereign CDS spreads, the regression period is from February 25, 2008 to March 25, 2016. To compare the effects on sovereign CDS spreads during the U.S. LSAPs, our analysis focuses on four subsample periods: QE1 (December 5, 2008–March 3, 2010), QE2 (November 12, 2010–June 30, 2011), QE3 and the tapering of QE (September 14, 2012–October 31, 2014), and the period following the end of QE (November 1, 2014–March 25, 2016). All weekly data used for the regression analysis are for the last trading day of the week.

The countries in our sample are as follows: Belgium, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czech Republic, Finland, France, Germany, Hong Kong, Israel, Italy, Japan, Kazakhstan, Korea, Lithuania, Mexico, Morocco, Netherlands, Peru, the Philippines, Poland, Portugal, Qatar, Russia, Slovenia, South Africa, Spain, Thailand, Turkey, and Vietnam. The sample countries do not include the U.S. because the U.S. financial market indices, used as global factors, are domestic factors for the U.S. regression. To analyze how the influence of domestic and foreign factors on sovereign CDS spreads differs between advanced and emerging economies, we divide our sample into emerging countries and advanced countries. We follow the IMF's definition when classifying countries as advanced or emerging. Our advanced sample economies are Belgium, Finland, France, Germany, Hong Kong, Israel, Italy, Japan, Korea, Netherlands, Portugal, and Spain. The emerging economies are Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czech Republic, Kazakhstan, Lithuania, Mexico, Morocco, Peru, the Philippines, Poland, Qatar, Russia, Slovenia, South Africa, Thailand, Turkey, and Vietnam.³

5.3.2 Regression Analysis

We use rates of change in the 5-year sovereign CDS spreads for the dependent variable representing credit risk. The explanatory variables consist of each country's rates of change in domestic stock price indexes and foreign exchange rates, the rate of change in the U.S. economic policy uncertainty index, the rate of change in the S&P 500 index, change in the 5-year U.S. Treasury yields, and change in the VIX index. The regression equation is as follows:

³ The Czech Republic is defined as an advanced economy for 2009–2013 and an emerging economy for 2014–2016 by the IMF's definition, and we added the Czech Republic to the subsamples of emerging economies.

$$\begin{aligned}
CDS_{i,t} = & \alpha + \beta_1 DST_{i,t} + \beta_2 FX_{i,t} + \beta_3 UNC_t + \beta_4 USST_t \\
& + \beta_5 USTR_t + \beta_6 VIX_t + \varepsilon_{i,t},
\end{aligned} \tag{5.1}$$

where

$CDS_{i,t}$: the rate of change in the sovereign CDS spread in country i and period t ,

$DST_{i,t}$: the rate of change in the domestic stock index in country i and period t ,

$FX_{i,t}$: the rate of change in the foreign exchange rates (to the U.S. dollar) in country i and period t ,

UNC_t : the rate of change in the U.S. economic policy uncertainty index in period t ,

$USST_t$: the rate of change in the S&P 500 in period t ,

$USTR_t$: change in the 5-year U.S. Treasury yield in period t ,

VIX_t : change in the VIX in period t ,

$\varepsilon_{i,t}$: residual errors.

The analysis employs a generalized method of moments (GMM) estimation method, using panel data from February 25, 2008 to March 25, 2016. A GMM estimator is used to alleviate endogeneity problems between sovereign CDS spreads and domestic explanatory variables. In the regression, we treat global factors as exogenous variables and domestic factors as endogenous.⁴

The expected sign of the coefficient for the domestic stock index (DST) is negative because a rise in the domestic stock price responds to a favorable economic condition, which reduces sovereign credit risk, thus reducing the sovereign CDS spreads by increasing tax revenues. The sovereign CDS spreads can rise when a large net capital outflow causes domestic currency depreciation. The coefficient of the variable for the foreign exchange rate (FX) would then be positive. When a rise in U.S. economic policy uncertainty increases the sovereign credit risk, the U.S. economic policy uncertainty index (UNC) coefficient is positive. The expected signs of the coefficients for the rates of change in the S&P 500 ($USST$) are negative, and the VIX (VIX) are positive. This is because a positive global financial market condition causes a rise in the global stock price and a fall in the VIX, reducing the sovereign CDS spreads. When monetary policy is tight and interest rates are high, the capital inflows to the U.S. are larger, and the sovereign credit risk in another country can rise because of capital outflows. Therefore, it is expected that the coefficient for the 5-year U.S. Treasury yields ($USTR$) will be positive.

5.3.3 Regression Results

Tables 5.2, 5.3, 5.4, 5.5 and 5.6 show the regression results for the determinants of the sovereign CDS spreads. Table 5.2 reports the results for the full sample

⁴ In the GMM regression, we use the second and the third lagged level variables as instruments for the explanatory variables of domestic factors.

Table 5.2 Determinants of sovereign CDS spread: full sample period

	All sample countries						Advanced economies					
<i>Domestic stock index</i>	Std. err	-6.10456 (4.21502)	-4.46447 (2.86118)	0.09220 (2.94778)	-4.35901** (1.88428)	-6.31017 (4.78106)	-4.41316 (5.40446)	3.70632 (2.88467)	-8.15781 (6.68665)			
<i>Foreign exchange rate</i>	Std. err	-0.43223 (7.85010)	1.83961 (5.37884)	10.17032 (7.07776)	2.08729 (4.37607)	12.13573* (7.11341)	12.00270** (4.98713)	15.77878*** (6.07504)	5.30130 (8.74704)			
<i>Economic policy uncertainty</i>	Std. err	-0.02648** (0.01123)	-0.02256** (0.01003)	-0.01048 (0.00975)	-0.01997*** (0.00665)	-0.02717* (0.01519)	-0.01881 (0.01416)	-0.01313 (0.01614)	-0.00590 (0.01446)			
<i>US stock index</i>	Std. err	2.06343* (1.17315)	1.35860 (1.19613)			5.94659** (2.99989)	4.02854 (4.58914)					
<i>US Treasury</i>	Std. err	0.04277 (0.09562)		-0.09835 (0.13431)		-0.20432 (0.14092)		-0.50059** (0.21965)				
<i>VIX</i>	Std. err	0.00027 (0.00369)			-0.00743 (0.00491)	-0.00166 (0.00778)			-0.04047 (0.03394)			
<i>Constant</i>	Std. err	0.00577 (0.00791)	0.00396 (0.00502)	-0.00382 (0.00780)	0.00544 (0.00480)	-0.00742 (0.00599)	-0.00488 (0.00483)	-0.00618 (0.00581)	0.00553 (0.00782)			
Hansen's J-statistics (p-value)		0.1221	0.1132	0.2110	0.3016	0.6720	0.6070	0.6468	0.8816			
Number of observations		13,814	13,814	13,814	13,814	5033	5033	5033	5033			

(continued)

Table 5.2 (continued)

	Emerging economies				
<i>Domestic stock index</i>	Std. err	-7.48393*** (2.57201)	-7.64204** (3.03317)	-7.05764*** (2.50404)	-7.86054*** (3.00657)
<i>Foreign exchange rate</i>	Std. err	-8.51312 (6.86031)	-9.79595 (8.30678)	-7.82478 (6.28499)	-10.19747 (8.61159)
<i>Economic policy uncertainty</i>	Std. err	-0.04495*** (0.01613)	-0.04698** (0.01927)	-0.04131*** (0.01539)	-0.04859** (0.01954)
<i>US stock index</i>	Std. err	0.53676 (0.84257)	0.04846 (1.09276)		
<i>US Treasury</i>	Std. err	0.14679* (0.07545)		0.12667* (0.07254)	
<i>VIX</i>	Std. err	0.00513* (0.00277)			0.00100 (0.00634)
<i>Constant</i>	Std. err	0.01762* (0.00930)	0.01924* (0.01088)	0.01727** (0.00831)	0.01988* (0.01085)
Hansen's J-statistics (p-value)		0.9512	0.9296	0.9766	0.9038
Number of observations		8812	8812	8812	8812

Notes *, **, and *** indicate that the statistics are significant at the 10, 5, and 1% level, respectively. Hansen's J test is the test for null hypothesis that the overidentifying restriction is satisfied. Full sample period covers weeks from February 25, 2008 to March 25, 2016. The dependent variable is the rate of change in sovereign 5-year CDS spread. The independent variables are as follows: *Domestic stock index* is the rate of change in domestic stock index, *Foreign exchange rate* is the rate of change in exchange rate to the U.S. dollar, *Economic policy uncertainty* is the rate of change in the U.S. economic policy uncertainty index, *US stock index* is the rate of change in S&P 500 index, *US Treasury* is change in 5-year US Treasury yield, and *VIX* is change in VIX index

Table 5.3 Determinants of sovereign CDS spread: subsample period of QE1

	All sample countries					Advanced economies				
<i>Domestic stock index</i>	Std. err	1.26095 (0.91597)	1.04525 (0.90593)	-1.75226 (3.32690)	-1.09689 (2.65946)	-3.41323** (1.35831)	-3.10610** (1.38975)	-2.58845** (1.11694)	-2.48289*** (0.91794)	
<i>Foreign exchange rate</i>	Std. err	0.98143 (2.93901)	-0.56257 (3.35809)	16.97532 (14.76456)	21.24876 (22.15029)	3.11965 (2.12876)	4.04064* (2.38420)	5.15865* (2.67881)	5.33315** (2.68209)	
<i>Economic policy uncertainty</i>	Std. err	0.02339 (0.02090)	0.03594* (0.01990)	-0.05282 (0.06031)	-0.07359 (0.10128)	-0.04194** (0.01776)	-0.03827** (0.01603)	-0.02767 (0.02254)	-0.03296* (0.01827)	
<i>US stock index</i>	Std. err	-1.80790** (0.78068)	-2.17106*** (0.83571)			1.84944** (0.88283)	1.72844* (1.02898)			
<i>US Treasury</i>	Std. err	-0.06214 (0.04959)		0.08311 (0.31680)		-0.05113 (0.06908)		0.06327 (0.11900)		
<i>VIX</i>	Std. err	0.00156 (0.00116)			-0.02290 (0.03426)	-0.00143 (0.00273)			-0.01013* (0.00590)	
<i>Constant</i>	Std. err	-0.00623 (0.00483)	-0.00480 (0.00515)	0.00776 (0.02030)	-0.00295 (0.01666)	0.01249** (0.00540)	0.01068* (0.00585)	0.01418** (0.00643)	0.01095* (0.00594)	
Hansen's J-statistics (p-value)		0.0019	0.0013	0.6351	0.7563	0.1389	0.2279	0.7510	0.7950	
Number of observations		2244	2244	2244	2244	792	792	792	792	

(continued)

Table 5.3 (continued)

		Emerging economies			
	Std. err				
<i>Domestic stock index</i>		-0.67844 (0.50826)	-0.47685 (0.51400)	-1.24394*** (0.44174)	-1.26438*** (0.44849)
<i>Foreign exchange rate</i>	Std. err	-1.50738 (2.05183)	-1.41420 (1.99665)	1.03207 (1.78331)	0.71644 (1.69326)
<i>Economic policy uncertainty</i>	Std. err	0.05660*** (0.01749)	0.06091*** (0.01612)	0.02831** (0.01184)	0.03575*** (0.01172)
<i>US stock index</i>	Std. err	-1.06775** (0.46274)	-1.32323*** (0.46124)		
<i>US Treasury</i>	Std. err	-0.02209 (0.02763)		-0.07175** (0.03142)	
<i>VIX</i>	Std. err	0.00181 (0.00122)			0.00417* (0.00226)
<i>Constant</i>	Std. err	-0.00082 (0.00400)	-0.00245 (0.00413)	0.00008 (0.00356)	0.00030 (0.00384)
Hansen's J-statistics (p-value)		0.0531	0.1189	0.0070	0.0102
Number of observations		1474	1474	1474	1474

Notes *, **, and *** indicate that the statistics are significant at the 10, 5, and 1% level, respectively. Hansen's J test is the test for null hypothesis that the overidentifying restriction is satisfied. The sample period covers the weeks of quantitative easing 1 (December 5, 2008–March 31, 2010). The dependent variable is the rate of change in sovereign 5-year CDS spread. The independent variables are as follows: *Domestic stock index* is the rate of change in domestic stock index, *Foreign exchange rate* is the rate of change in exchange rate to the U.S. dollar, *Economic policy uncertainty* is the rate of change in the U.S. economic policy uncertainty index, *US stock index* is the rate of change in S&P 500 index, *US Treasury* is change in 5-year US Treasury yield, and *VIX* is change in VIX index

Table 5.4 Determinants of sovereign CDS spread: subsample period of QE2

	All sample countries					Advanced economies				
<i>Domestic stock index</i>	Std. err	-4.60056** (2.15574)	-3.69424* (2.02238)	-3.51490*** (1.14098)	-4.62183* (2.56019)	2.31438 (2.30719)	3.30114 (2.40334)	3.07013 (2.69943)	-3.51101 (2.62564)	
<i>Foreign exchange rate</i>	Std. err	1.03523 (2.67041)	0.82954 (2.22864)	-0.74204 (2.02432)	1.23358 (2.67675)	-0.75508 (4.44581)	1.24372 (4.99125)	1.29576 (5.19859)	-3.60891 (4.55389)	
<i>Economic policy uncertainty</i>	Std. err	0.04109* (0.02324)	0.04118** (0.01848)	0.03467** (0.01624)	0.04531** (0.02097)	0.07633*** (0.02894)	0.10775*** (0.02830)	0.11502*** (0.02881)	0.09303*** (0.03229)	
<i>US stock index</i>	Std. err	1.85066 (1.38056)	1.25583 (1.42639)			-3.35441** (1.52104)	-4.07184** (1.67682)			
<i>US Treasury</i>	Std. err	-0.04236 (0.03503)		0.06166 (0.07685)		-0.16449 (0.11280)			0.11233 (0.25013)	
<i>VIX</i>	Std. err	-0.00128 (0.00250)			-0.01184 (0.01127)	-0.00165 (0.00292)		0.02274** (0.01124)		
<i>Constant</i>	Std. err	0.00023 (0.00677)	0.00328 (0.00670)	0.00642** (0.00299)	0.00535 (0.00447)	0.02420** (0.00957)	0.03053*** (0.01102)	0.02140** (0.00915)	0.00618 (0.00879)	
Hansen's J-statistics (p-value)		0.5263	0.4941	0.6604	0.8808	0.2035	0.5879	0.2600	0.0535	
Number of observations		1666	1666	1666	1666	576	576	576	576	576

(continued)

Table 5.4 (continued)

	Emerging economies			
	Std. err			
<i>Domestic stock index</i>	-3.47105** (1.54962)	-2.94622* (1.53066)	-3.22873*** (1.21583)	-3.05952** (1.34752)
<i>Foreign exchange rate</i>	-1.50480 (3.11593)	-1.32297 (2.71445)	-1.64990 (2.66123)	-1.38454 (2.90318)
<i>Economic policy uncertainty</i>	-0.00551 (0.02305)	-0.00342 (0.02075)	-0.00825 (0.01852)	-0.00343 (0.01873)
<i>US stock index</i>	0.45410 (0.67800)	-0.13152 (0.90771)		
<i>US Treasury</i>	-0.04526 (0.02826)		-0.03790 (0.06879)	
<i>VIX</i>	0.00156 (0.00305)			0.00089 (0.00518)
<i>Constant</i>	0.00438 (0.00395)	0.00679 (0.00431)	0.00586** (0.00276)	0.00631** (0.00276)
Hansen's J-statistics (p-value)	0.9658	0.9671	0.9644	0.9527
Number of observations	1078	1078	1078	1078

Notes *, **, and *** indicate that the statistics are significant at the 10%, 5%, and 1% level, respectively. Hansen's J test is the test for null hypothesis that the overidentifying restriction is satisfied. The sample period covers weeks of quantitative easing 2 (November 12, 2010–June 30, 2011). The dependent variable is rate of change in of sovereign 5-year CDS spread. The independent variables are as follows: *Domestic stock index* is the rate of change in of domestic stock index, *Foreign exchange rate* is the rate of change in exchange rate to the U.S. dollar, *Economic policy uncertainty* is the rate of change in of U.S. economic policy uncertainty index, *US stock index* is the rate of change in S&P 500 index, *US Treasury* is change in 5-year US Treasury yield, and *VIX* is change in VIX index

Table 5.5 Determinants of sovereign CDS spread: subsample period of QE3

	All sample countries						Advanced economies					
<i>Domestic stock index</i>	Std. err	-15.80148 (47.44357)	-2.72564 (3.32186)	-1.63231 (1.46152)	-2.63490 (1.89073)	2.21550 (2.76774)	0.71336 (1.67554)	0.31560 (0.90161)	-0.37047 (1.04506)			
<i>Foreign exchange rate</i>	Std. err	26.07787 (107.96022)	-4.40227 (7.47487)	-7.02288 (5.81182)	-4.75420 (4.53759)	-11.21998* (6.05504)	-6.37927** (3.09275)	-8.02757** (3.53884)	-5.04439** (2.28613)			
<i>Economic policy uncertainty</i>	Std. err	-0.03620 (0.19507)	0.02355 (0.02103)	0.03155 (0.02283)	0.02538* (0.01308)	0.04988* (0.02864)	0.02975* (0.01587)	0.04418* (0.02023)	0.02496* (0.01311)			
<i>US stock index</i>	Std. err	8.19842 (29.34438)	0.08408 (2.38825)			-3.92105 (2.86042)	-1.66962 (1.56382)					
<i>US Treasury</i>	Std. err	-0.51667 (2.46048)		0.20595* (0.11733)		0.17873 (0.11717)		0.12776* (0.07756)				
<i>VIX</i>	Std. err	-0.01669 (0.06608)			-0.00066 (0.00876)	-0.00580 (0.00564)			0.00316 (0.00641)			
<i>Constant</i>	Std. err	-0.02762 (0.12046)	0.00766 (0.01100)	0.00718* (0.00383)	0.00814** (0.00347)	0.01086 (0.00815)	0.00440 (0.00433)	-0.00066 (0.00341)	-0.00003 (0.00307)			
Hansen's J-statistics (p-value)		0.9783	0.6095	0.5034	0.6615	0.8531	0.2312	0.7796	0.1161			
Number of observations		3135	3135	3135	3135	1140	1140	1140	1140			

(continued)

Table 5.5 (continued)

	Emerging economies				
<i>Domestic stock index</i>	Std. err	0.62595 (1.40165)	0.89041 (1.91855)	1.42700 (1.78651)	0.80313 (1.88269)
<i>Foreign exchange rate</i>	Std. err	5.32387 (3.72410)	6.31842 (5.47098)	5.83941 (4.33386)	6.60468 (5.58528)
<i>Economic policy uncertainty std.err</i>	Std. err	-0.01018 (0.01103)	-0.01098 (0.01826)	-0.00344 (0.01247)	-0.01354 (0.01929)
<i>US stock index</i>	Std. err	-0.83669** (0.37695)	-1.29114** (0.50565)		
<i>US Treasury</i>	Std. err	0.04141 (0.08012)		-0.00282 (0.09210)	
<i>VIX</i>	Std. err	0.00367* (0.00202)			0.00820** (0.00330)
<i>Constant</i>	Std. err	-0.00140 (0.00498)	-0.00109 (0.00758)	-0.00652 (0.00615)	-0.00560 (0.00836)
Hansen's J-statistics (p-value)		0.2702	0.3375	0.6140	0.3728
Number of observations		2016	2016	2016	2016

Notes *, **, and *** indicate that the statistics are significant at the 10, 5, and 1% level, respectively. Hansen's J test is the test for null hypothesis that the overidentifying restriction is satisfied. The sample period covers weeks of quantitative easing 3 and the tapering of QE (September 14, 2012–October 31, 2014). The dependent variable is the rate of change in sovereign 5-year CDS spread. The independent variables are as follows: *Domestic stock index* is the rate of change in domestic stock index, *Foreign exchange rate* is the rate of change in exchange rate to the U.S. dollar, *Economic policy uncertainty* is the rate of change in the U.S. economic policy uncertainty index, *US stock index* is the rate of change in S&P 500 index, *US Treasury* is change in 5-year US Treasury yield, and *VIX* is change in VIX index

Table 5.6 Determinants of sovereign CDS spread: subsample period after the U.S. LSAPs

	All sample countries						Advanced economies						
<i>Domestic stock index</i>	Std. err	-3.46925*	-3.31519*	-2.73277	-3.07804*	-3.71655**	-3.18488*	-1.44165	-4.72109**				
		(1.81271)	(1.72831)	(2.43889)	(1.64906)	(1.60901)	(1.63860)	(0.90649)	(2.17015)				
<i>Foreign exchange rate</i>	Std. err	2.56894	2.62787	2.44205	1.82549	3.09203	4.12130*	2.57546	-0.19714				
		(1.69847)	(1.66353)	(2.26043)	(1.29516)	(2.41392)	(2.45543)	(1.81615)	(3.53604)				
<i>Economic policy uncertainty</i>	Std. err	0.00454	0.00360	-0.00426	-0.00608	-0.00900	-0.00819	-0.00952	-0.02852				
		(0.01803)	(0.01741)	(0.01475)	(0.01234)	(0.01245)	(0.01253)	(0.01031)	(0.01762)				
<i>US stock index</i>	Std. err	1.72187	1.38248			2.39269*	1.65896						
		(1.25976)	(1.33289)			(1.28566)	(1.42877)						
<i>US Treasury</i>	Std. err	-0.06849*		0.00659		-0.13404**		-0.10931					
		(0.03783)		(0.12390)		(0.06147)		(0.06691)					
<i>VIX</i>	Std. err	0.00040			-0.00553	-0.00136			-0.01904				
		(0.00194)			(0.00636)	(0.00330)			(0.01217)				
<i>Constant</i>	Std. err	-0.00180	-0.00153	-0.00045	0.00089	-0.00108	-0.00220	-0.00067	0.00565				
		(0.00477)	(0.00463)	(0.00541)	(0.00334)	(0.00473)	(0.00480)	(0.00372)	(0.00668)				
Hansen's J-statistics (p-value)		0.5982	0.6428	0.2323	0.4484	0.5778	0.2920	0.0807	0.9270				
Number of observations		2335	2335	2335	2335	852	852	852	852				

(continued)

Table 5.6 (continued)

		Emerging economies			
<i>Domestic stock index</i>	Std. err	-0.17796 (0.91868)	-0.33563 (0.91023)	-0.07370 (0.95823)	0.07854 (1.15166)
<i>Foreign exchange rate</i>	Std. err	-0.32880 (1.03881)	-0.47895 (1.03568)	-0.13884 (1.02278)	0.19958 (0.93862)
<i>Economic policy uncertainty</i>	Std. err	-0.03194** (0.01476)	-0.03449** (0.01438)	-0.01842 (0.01193)	-0.02123* (0.01163)
<i>US stock index</i>	Std. err	-0.98113 (0.61673)	-1.36944** (0.61155)		
<i>US Treasury</i>	Std. err	0.01080 (0.02462)		-0.10303** (0.04492)	
<i>VIX</i>	Std. err	0.00293** (0.00148)			0.00799** (0.00371)
<i>Constant</i>	Std. err	0.00834** (0.00341)	0.00873*** (0.00331)	0.00721** (0.00312)	0.00691** (0.00298)
Hansen's J-statistics (p-value)		0.1691	0.2173	0.5068	0.1423
Number of observations		1462	1462	1462	1462

Notes *, **, and *** indicate that the statistics are significant at the 10, 5, and 1 level, respectively. Hansen's J test is the test for null hypothesis that the overidentifying restriction is satisfied. The sample period covers weeks after the end of QE by the U.S. (November 1, 2014–March 25, 2016). The dependent variable is the rate of change in sovereign 5-year CDS spread. The independent variables are as follows: *Domestic stock index* is the rate of change in domestic stock index, *Foreign exchange rate* is the rate of change in exchange rate to the U.S. dollar, *Economic policy uncertainty* is the rate of change in the U.S. economic policy uncertainty index, *US stock index* is the rate of change in of S&P 500 index, *US Treasury* is change in 5-year US Treasury yield, and *VIX* is change in VIX index

period. The results for subsamples of advanced and emerging economies are not similar; the coefficient for foreign exchange rate is significantly positive in advanced economies, whereas the coefficient for the domestic stock index is significantly negative in emerging economies. The coefficients for global factor variables are mostly insignificant or have unexpected signs. The difference among subsample period results reflects this result for the full sample period.

Tables 5.3, 5.4, 5.5 and 5.6 suggest that important factors for sovereign CDS spreads vary between emerging and advanced economies for subsample periods. Table 5.3 indicates the results for the subsample period during QE1. In emerging economies, the coefficient for the U.S. economic policy uncertainty index is significantly positive. The coefficients for the U.S. stock index and the VIX index also have an expected sign.⁵ In advanced economies, the coefficients for domestic factors are significant and have an expected sign. Table 5.4 shows the results for QE2. The coefficients for the U.S. economic policy uncertainty, the U.S. stock index, and the VIX are significant in advanced economies; however, the coefficient for the domestic stock index is significantly negative in emerging economies.⁶ Table 5.5 reports the results for the period of QE3. In the advanced economies, the coefficients for the U.S. economic policy uncertainty and the U.S. Treasury yields are significant and have an expected sign. By contrast, the coefficients for the U.S. stock index and the VIX are significant in emerging economies. Table 5.6 indicates that the coefficients for the U.S. stock index and the VIX have the expected sign and are significant in emerging economies after the LSAPs period. In advanced economies, the coefficient for the domestic stock index is significantly negative.⁷

The regression results show that a rise in the U.S. economic policy uncertainty increases sovereign CDS spreads in emerging economies for QE1 and advanced economies for QE2 and QE3. However, other global factors (the U.S. stock market index and the VIX) affect sovereign CDS spreads of emerging economies in every subsample period, except QE2. In advanced economies, global financial factors are also significant during QE2 and QE3. This suggests that U.S. financial market conditions play a more important role as a global factor in emerging economies' sovereign CDS spreads than U.S. economic policy uncertainty. This propensity is more evident in emerging economies than in advanced economies.

⁵ The overidentifying restriction of the GMM estimation is not satisfied in the test for emerging economies during QE1, except for the model using the U.S. economic policy uncertainty index and the U.S. stock price as global factors.

⁶ The overidentifying condition of the GMM estimation is not satisfied in the test for the period of QE2 using the U.S. economic policy uncertainty index and the U.S. Treasury yields as global factors in advanced economies.

⁷ The overidentifying condition of the GMM estimation is not satisfied in the test after the LSAPs using the U.S. economic policy uncertainty index and the U.S. Treasury yields as global factors in advanced economies.

5.4 Conclusion

Given that a country's sovereign default delivers a sizable adverse shock to its economy, it is beneficial for policymakers to understand key factors that influence sovereign credit risk and the economic reforms that may mitigate such risk. This paper empirically explored how domestic and global factors affect sovereign CDS spreads, concentrating on the effect of U.S. economic policy uncertainty and the difference between advanced and emerging economies in the period after the GFC.

We find that the U.S. economic policy uncertainty only influenced the sovereign CDS spreads of emerging economies in QE1. In contrast, the impacts of the U.S. stock price and the VIX were significant in every subsample period, except QE2. This suggests that the fluctuation in the U.S. financial market is more important than that in the U.S. economic policy uncertainty as a global factor for the sovereign credit risk of emerging economies. In advanced economies, global factors, including the U.S. economic policy uncertainty, affected the sovereign CDS spreads in QE2 and QE3. Therefore, global factors, except U.S. economic policy uncertainty, played a more crucial role in the sovereign credit risk of emerging economies than that of advanced economies.

In addition, the result for the influence of U.S. financial market factors supports the argument that increasing capital flows from and to the U.S. can influence the sovereign credit risk in emerging economies. If changes in U.S. financial market conditions caused significant capital flows in emerging economies after the GFC, they may have enhanced the impact of U.S. financial market factors on the sovereign credit risk of emerging economies.

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