Interdependencies between CDS Spreads in the European Union: Is Greece the Black Sheep or Black Swan?

Dimitrios Koutmos

WORCESTER POLYTECHNIC INSTITUTE
100 Institute Road
Worcester, MA 01609
DKoutmos@WPI.edu (e-mail)
+1.508.831.5000 (tel.)

ABSTRACT

This paper dissects the dynamic interdependencies between credit default swap (CDS) spreads among several European Union (EU) countries (Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Portugal, Romania, Slovakia, and Spain) during the period between October 2004 and July 2016. Its purpose is to delineate interdependence patterns in credit risk in order to identify whether a particular country, such as Greece, or a group of countries, disproportionately transmit credit risk to the remaining sampled EU countries. The findings herein show that the interdependencies between countries' credit risks are heterogeneous across time. Specifically, when mapping credit risk transmission channels during the 2008-09 financial crisis and 2011-13 European debt crisis, respectively, it is evident that transmission patterns shift whereby some countries transmit more credit risk than others. Finally, despite recent news headlines, it cannot be shown empirically that Greece is the dominant transmission catalyst for shocks in the credit risks of the remaining sampled EU countries.

Keywords: Credit default swaps; European debt crisis; Greece; vector autoregression.
JEL classification: C58; G10; G15; G17.

"One striking characteristic of several of these crises was how an initial country-specific shock was rapidly transmitted to markets of very different sizes and structures around the globe. This has prompted a surge of interest in 'contagion.' But what is contagion? Despite the fact that the term is widespread, there is little agreement on what exactly it entails. Many people assume that contagion occurred...but few agree on exactly which countries were subject to contagion. Numerous theoretical papers have described the various channels by which contagion could occur, but empirical work sharply disagrees on whether or not contagion actually occurred during recent financial crises..."

– Kristin Forbes and Roberto Rigobon (Chapter 3, 2001)

1. INTRODUCTION

International financial market spillovers or contagion effects can broadly be defined as the spread of market volatility or disturbances from one regional market or economy to another. An alternative and less standard definition can entail the propagation of country-specific news to other markets - even if such news is not incorporated in the asset prices of the supposed country that is the catalyst for the contagion (Chapter 2, IMF, 2016).

There are several factors that can augment the propagation of spillovers. These factors have to do with the extent to which markets or economies are interlinked with one another. The stronger the 'channels' or interlinkages that bind them together, the higher the probability that a shock in one afflicted market will transmit into the remaining markets.

Recent research interest in spillovers and contagion effects has ballooned in the last few years. For example, beginning in 2011, the International Monetary Fund (IMF) has published spillover reports to identify and analyze global spillovers and their effects. In their 2015 report, for instance, the IMF warned of impending spillover effects from euro area countries and cited, among other reasons, the large size of their output gaps in relation to the output gaps of other advanced economies (IMF, 2015).

The European debt crisis has indeed fuelled research in this subject, particularly Greece, which is the focal point of discussion in socioeconomic and political news headlines. In relation to its European counterparts, Greece has, for better or worse, received numerous bailout packages and has implemented laborious austerity measures to avert exiting the Eurozone. Monetary authorities, such as the IMF and European Central Bank (ECB) contend that if Greece leaves the Eurozone, it may trigger an irreversible domino effect for the remaining European Union (EU) member states; specifically, it may raise borrowing costs - especially for other struggling countries such as Ireland, Italy, Portugal and Spain - as well as produce aggregate market volatility in European and international stock markets. From a political viewpoint, if Greece leaves, other struggling countries may also entertain the possibility of exiting - a move that will ensure the disintegration of the EU and the multiple layers of complex economic and legal agreements that presently bind all members.[1]

The recent news headlines paint an unflattering picture of Greece's economic state of affairs. Although Greece's (mis-)management of its domestic affairs have done little to quell these headlines, a nontrivial proportion of these news headlines have insinuated Greece as the catalyst for negative market shocks in other financial markets (CNBC, 2015a, 2015b, 2015c; Wall Street Journal, 2015a, 2015b, 2015c, 2015d; The Guardian, 2016). Such headlines are not to be taken lightly because it is, by now, well established in asset pricing and behavioral finance literature that news headlines, especially negative ones, have a significant impact on investor sentiment and the behavior of asset prices (Boudoukh et al., 2013; Da et al., 2015; Sicherman et al., 2016).

Clark et al. (2004) show, using present-day and historical evidence, the extent to which finance, trading and investing has become so intimately entwined with media companies, such as Bloomberg and CNBC. As they illustrate, these media companies, with all their embellishments, impart news on viewers as being urgently needed and momentous: "Breathless excitement characterizes such commentary, being associated with 'breaking news,' 'new information,' and 'unexpected events.' Talk is fast and furious. Talk is also often interrupted by some sudden happening. Talk moves at a breakneck pace covering topic after topic though interrupted, of course, by commercial breaks..." (p. 299). In a similar vein, Thrift (2001) eloquently discusses how a new market culture has formed as a result of media companies and that asset price movements and trading behavior are prone to irrationality and manipulation.[2]

One only has to perform a quick internet search of news headlines pertaining to Greece with references to "spillovers," "contagion," "domino effects," and the like, in order to appreciate the sheer size of headlines that insinuate Greece as the catalyst for negative market shocks in other countries at large. The question is, however, *are these news headlines empirically justifiable?* It is one thing to claim that Greece is in domestic turmoil and another to claim that it serves as the transmission channel for problems

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[1] Although the UK voted on a referendum, held on June 23, 2016, to leave the EU, it may take several years for the UK to actually negotiate its exit. According to the Lisbon Treaty, for a country to leave the EU, it must invoke Article 50, which gives the EU and the exiting country two years to agree to exit terms. The URL which outlines Article 50 of the Lisbon Treaty can be accessed online: http://www.lisbon-treaty.org/wcm/the-lisbon-treaty/treaty-on-European-union-and-comments/title-6-final-provisions/137-article-50.html. Theresa May, the current prime minister for the UK, has stated she will not initiate this process before the end of 2016. One of the primary concerns now for the UK is to determine what to do with EU citizens who work and reside in the UK but who are not permanent residents: http://www.bbc.com/news/uk-politics-32810887.

[2] Shiller (2000) explains that business news from the media directed to investors has become so pervasive in the US that "...traditional brokerage firms found it necessary to keep CNBC running in the lower corner of their brokers' computer screens. So many clients would call to ask about something they had just heard on the networks that brokers (who were supposed to be too busy working to watch television!) began to seem behind the chase..." (p. 29).

in other countries. Greece's dire domestic state of affairs are not a precondition for branding Greece the instigator for market shocks that transpire elsewhere. Or, are they?

This paper seeks to answer this question by delineating and dissecting, across various economic regimes, the dynamic interdependencies between credit default swap (CDS) spreads among twelve EU members (Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Portugal, Romania, Slovakia, and Spain) across various economic regimes that encompass the crash of 2008-09 and the European debt crisis of 2011-13. Using a multivariate vector autoregression (VAR) framework, and throughout each of the economic regimes, this paper identifies the transmission channels for credit risk and whether a single country, such as Greece, or a particular set of countries, is responsible for disproportionately spreading credit risk. If Greece is found to be the dominant transmission channel of credit risk to other countries, it is plausible evidence that it is the 'black swan' which causes negative shocks to other EU members. If not, then Greece has become a scapegoat, or 'black sheep,' that the media can facilely target for Europe's economic problems at large.

The sovereign CDS market provides over-the-counter (OTC) credit protection contracts whereby protection sellers compensate protection buyers in the event of a predefined sovereign credit event. For this insurance protection, the protection buyers pay a fixed fee, which is the CDS spread. As has been shown in the literature, the time-series behavior of CDS spreads provide a unique window for viewing the risk-neutral probabilities of major credit events as investors see them (Pan and Singleton, 2008). In terms of price discovery for credit risk, Blanco et al. (2005) find that CDS prices lead bond prices. As a result, it is not surprising that Acharya and Johnson (2007) suggest that insider trading first takes place in the CDS market - especially in the presence of negative market news. In a similar vein, Hull et al. (2005) show that CDS spreads can be used to predict rating changes.

The motivation for this paper stems from the sheer number of business news articles which brand Greece as the instigator for credit risk transmissions yet the lack of empirical evidence to support this claim. This is important to examine given that news headlines can shape aggregate beliefs and create, as Shiller (2000) describes, "self-fulfilling prophecies." So far, there is limited work into which countries serve as the transmission channels for sovereign credit risk throughout this European debt crisis ordeal. Recent research has instead seemed to focus more on the transmission channels between European nations and banks (Alter and Schuler, 2012; Cornett et al., 2016; Mink and De Haan, 2013) or the interdependencies between implied volatility in the Euro and CDS spreads (Hui and Chung, 2011). In particular, Cornett et al. (2016) show that changes in Greek CDS spreads have an insignificant impact on the abnormal returns of international US banks. When attempting to measure banks' exposures to Greece's credit risk, they report that Greek CDS spreads provide no explanatory power for rates of return on banks beyond what the US market index provides. Mink and De Haan (2013) document qualitatively analogous findings and also find that, although banks returns do not react to Greece, they do react positively to news about bank bailouts - even for banks that are not exposed to Greece of other indebted euro countries.

Thus, this paper contributes to at least three strands of literature. First, it is linked with literature that seeks to identify the determinants of CDS spreads, second, it is related to work on identifying transmission channels by which credit risk propagates during the European debt crisis and, third, it is related to work on financial contagion at large - work that has been the primary focus for international monetary authorities and regulators in the last few years.

The remainder of this paper is structured as follows. The second section describes the data that is used to conduct tests as well as explains the various economic regimes that serve as sub-samples. The third section describes the analytical framework and methodologies for implementing empirical tests. The fourth section discusses the results. The fifth section entertains various alternative approaches used as robustness and, finally, the sixth section concludes.

2. DESCRIPTION OF SAMPLE DATA AND ECONOMIC REGIMES

2.1. Data and Sub-sampled Economic Regimes

To examine interdependencies in credit risk, weekly CDS spreads are collected for Belgium (BE), Bulgaria (BG), Croatia (HR), France (FR), Germany (DE), Greece (EL), Hungary (HU), Italy (IT), Portugal (PT), Romania (RO), Slovakia (SK), and Spain (ES), respectively, from Bloomberg starting from October 1, 2004 until July 15, 2016 - a sample period that encompasses the 2008-09 financial crisis as well as the 2011-13 European debt crisis.[3] The abbreviations for each country just mentioned, which are used throughout the paper, are those used officially by the EU and are listed and referenced in figure 1.

As mentioned earlier, in the sovereign CDS market, protection buyers essentially buy insurance from protection sellers in the event of some prespecified credit event. For example, for the Greek CDS market, the Greek CDS seller compensates the Greek CDS buyer for prespecified losses on a given face value amount of Greek debt. Thus, the Greek CDS buyer is insuring themselves against Greece's credit risk by transferring such risk onto the Greek CDS seller. The CDS spread is the price (fee) that the CDS buyer pays the seller in order to have this insurance. During periods when the probability of a Greek debt default rises there is a commensurate rise in Greek CDS spreads, and vice versa.

After checking the various CDS tenors (maturities) for all the CDS markets in each of the twelve aforementioned EU markets, this paper will focus exclusively on 5-year CDS spreads. For all twelve EU markets, the 5-year CDS tenor is the most liquid and complete in terms of data continuity - a finding that is, by now, standard in the literature.

Time-series plots of each countries' weekly CDS spreads (in basis points) are shown in figure 2. The starting date for all the plots is October 1, 2004 and the end date is until July 15, 2016. The shaded regions are OECD recession periods for the Euro area and reflect the 2008-09 financial crisis and 2011-13

[3] Not all EU member states are included because some of them have scant or incomplete CDS data. Other countries, as Hui and Chung (2011) mention, have no active sovereign CDS market altogether (Cyprus, Luxembourg, Malta, to name a few).

European debt crisis, respectively.[4] Consistent with these OECD recession periods, this paper forms subsamples which reflect distinct economic regimes (these are labeled as 'regime 1,' 'regime 2,' 'regime 3,' 'regime 4' and 'regime 5,' respectively) on each of the plots.

Regime 1 embodies a period of normal global economic growth and tranquility. The start date for this regime is October 1, 2004 and ends February 29, 2008. Figure 3 plots the time-series of each countries' GDP per capita (in US$). As can be seen, all countries experienced growth in their GDP per capita during the regime 1 time period - even countries that are now considered "troubled," such as Greece, Spain and Italy, experienced growth in their GDP per capita at a rate consistent with the growth of France and Germany. Figure 4 plots the time-series of each countries' debt-to-GDP (in %) and shows that, during regime 1, the debt-to-GDP for each country did not experience any unusual level of growth to suggest something was amiss - albeit Greece, Italy and Belgium (in that order) had the highest levels of debt relative to their GDP compared with the other EU members.

Regime 2 embodies the 2008-09 financial crisis that gripped financial markets around the world. This regime is one of the two sampled OECD recession shaded periods and its starting date is March 7, 2008 and ends June 26, 2009. From figure 2, we can see that all countries experienced a substantive rise in their respective CDS spreads. For Greece, this rise in its CDS level (although noticeable) is exponentially dwarfed by its CDS level during the 2011-13 European debt crisis (regime 4). Bulgaria, Croatia and Romania are the only three EU members that experienced higher CDS levels during the 2008-09 crisis (regime 2) than during the 2011-13 crisis (regime 4). From figure 3, we can see that every sampled country experienced a decline in its GDP per capita. Likewise, on aggregate, all countries experience a rise in their debt-to-GDP - albeit this rise is not uniform across all EU members; for example, Bulgaria's debt-to-GDP remained flat in relation to the other EU countries while Greece's debt-to-GDP rose significantly and 'out-of-line' with its EU counterparts.

Regime 3, starting from July 3, 2009 until June 24, 2011, can be thought of as an artificial 'calm before the storm' period. The reason why it may have been artificial is because monetary authorities went to great and unprecedented lengths to quell the mayhem that rocked financial markets during regime 2. Between October and December of 2009, Greece's credit rating was downgraded by all three of the 'Big Three' credit rating agencies. Between February and December of 2010, Greece formally requests bailout packages from the ECB and IMF while instituting a series of austerity measures. In addition, laws are passed raising the retirement age, cutting pensions, raising taxes on certain goods and cutting certain government employee's salaries - all this while Greece is plagued with violent riots and protests.

Although regime 3 is not recognized as a recessionary period by the OECD or even the National Bureau of Economic Research (NBER), it is a time when systemic risks were building up in our financial system. While the respective CDS spreads of Bulgaria, Germany, Croatia, Hungary, Romania and

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[4] Information and data (the dummy variables) on the OECD recession indicators for the Euro area can be accessed online: https://fred.stlouisfed.org/series/EUROREC.

Slovakia oscillated at relatively lower levels during regime 3 than they did during regime 2, Belgium, Greece, Spain, France, Italy and Portugal experienced relatively higher CDS levels during regime 3.

Regime 4, the second sampled OECD recession period which starts from July 1, 2011 until February 22, 2013, will go down in history, as did the 2008-09 crisis, as a destructive period for our global financial system. Table 1, which provides summary statistics for the full sample in panel A (October 1, 2004 until July 15, 2016) as well as for each of the five regimes (panels B through F), illustrates the severity of Greece's credit risk during the 2011-13 European debt crisis. For regime 4 (in panel E), we can see that Greece's CDS spreads had deviated exponentially from the CDS spread levels of its EU peers. The average CDS level was 8,992 basis points for Greece during regime 4. Portugal had the second highest average (869 basis points) while Germany had the lowest (72 basis points). Throughout regime 4, Greece's CDS spread reached an inconceivable 26,089 basis points - an amount many times larger than its EU peers. The standard deviation of its CDS spread was also highest and reflects the violent changes in market perception each time Greece, the ECB and the IMF announce a supposed 'positive' or 'negative' piece of news.

Regime 5, which starts from March 1, 2013 until July 15, 2016, reflects our present-day state of affairs. From figure 2, we see that the CDS spreads of all sampled EU members are lower than they were relative to regime 4. Greece experienced a sharp spike in its CDS level between late June and early July. This was most likely associated with its missed payment to the IMF, which happened on June 30, 2015. From panel F of table 1, we can see that Greece had the highest average CDS level for regime 5, followed by Croatia, Portugal, Hungary, Romania, Italy, Belgium, Spain, Slovakia, Belgium, France and Germany, in that order.

2.2. Correlations and Stationarity Tests

Table 2 reports contemporaneous correlations of the logarithmic first differences in CDS spreads among the twelve sampled EU members; whereas panel A reports correlations for the full sample, panels B, C, D, E and F report correlations for regimes 1, 2, 3, 4 and 5, respectively.

Computing logarithmic first differences of CDS spreads provides us with a time-series of changes in the CDS spreads for each country. From panels B through F we can get obtain a preliminary sense of the degree to which interdependencies exist between the countries' CDS markets before and after recessionary economic periods (regimes 2 and 4, respectively). As discussed, regime 1 (panel B) reflects a period of normal economic growth. We can see that inter-market correlations are lower relative to what is reported in panel A. The average pairwise correlation (not tabulated) is 0.2161 in regime 1 whereas it is 0.4261 for the full sample (panel A).

In regime 2, we see a significant rise in pairwise correlations - an insinuation that inter-market interdependencies augmented as aggregate investor fear rose across all markets. The average pairwise correlation for regime 2 (not tabulated) is 0.6308 - an approximately 48% increase when compared to the average from regime 1.

Despite regime 3 (panel D) not being recognized as a recessionary period by monetary authorities and policymakers, we see that inter-market correlations remain elevated; the average pairwise correlation (not tabulated) is 0.6646 and analogous to the correlations in regime 2. This suggests that market participants feared that European markets, on aggregate, experienced a rise in credit risks following the 2008-09 financial crisis.

Regime 4 (panel E) corresponds with the 2011-13 European debt crisis. Average pairwise correlations (not tabulated) remain relatively high at 0.5742. Closer inspection of the inter-market correlations reveal that some countries experienced noticeable shifts in their pairwise correlations with other markets. For example, during the 2008-09 financial crisis (regime 2) and the 'calm before the storm' period (regime 3), Greece's average pairwise correlations with the other respective countries were 0.6663 and 0.6285, respectively (not tabulated). Now however, in regime 4, Greece's average pairwise correlation with the other respective countries is 0.1822 (not tabulated). This is a marked difference and may be attributable to the fact that international banks and governments reduced their holdings of Greek debt consecutively before the 2011-13 European debt crisis (Cornett et al., 2016; Wall Street Journal, 2015e). On July 26, 2012 (during the middle of regime 4), Mario Draghi, the current president of the ECB, stated publicly that the ECB will do "whatever it takes" to save the euro (Wall Street Journal, 2015e). His stance on 'saving' the euro and preventing Greece from exiting the Eurozone may be another reason for the low pairwise correlation between Greece's CDS changes with those of its peers.

Now in our present-day state of affairs (regime 5 in panel F), Greece's average pairwise correlation with the other sampled countries is 0.2412 (not tabulated) - an analogous finding compared with that of regime 4. This suggests other CDS markets have reduced their degree of comovement with that of Greece. Despite this, however, it is curious why the media, as referenced earlier and as is discussed more rigorously in the upcoming sections, insinuates that Greece's debt problems will spillover into other markets.

Although the correlation matrix in table 2 is not a formal statistical method for discriminating between transmission channels or even determining causal relations and their directionality, it does suggest some heterogeneity in the interdependence structure between the CDS markets across the regimes - something that is empirically tested in the next section and discussed in section 4.

Stationarity tests are performed and reported in table 3 for the full sample (panel A) and each of the regimes (panels B through F). Each of the panels estimates unit root statistics for the logarithmic levels (log-levels) in CDS spreads as well as logarithmic first differences (log-changes) in CDS spreads. Justification for expressing CDS time-series data in log-levels prior to performing regression-type modelling is provided by Alter and Schuler (2012) and Forte and Pena (2009). Additional justification for log-levels is self-evident when visually inspecting CDS spread levels in basis points (figure 2); specifically, we can see prolonged periods where CDS spread levels are relatively low and other periods when they are multiplicatively higher (Greece being an immoderate example).

For each of the panels (full sample and each economic regime) and for log-levels and log-changes, the augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981), the Phillips-Perron (PP) test (Phillips and Perron, 1988), and the Elliot, Rothenberg and Stock point optimal (ERS) test (Elliott et al., 1996) are performed to decipher whether or not the respective series contain a unit root in their univariate time-series representations. The purpose of estimating all three tests is to provide confirmatory, rather than competing, evidence that log-levels contain a unit root (i.e. are non-stationary) whereas log-changes do not contain a unit root (i.e. are stationary).

Assuming that the y_t time-series (in our case, log-levels or log-changes) follows an AR(k) process, the ADF test is specified as follows:

$$\Delta y_t = \mu + \gamma t + \alpha y_{t-1} + \sum_{j=1}^{k-1} \beta_j \Delta y_{t-j} + u_t \tag{1}$$

whereby Δ is the difference operator and u_t is a white-noise innovation series. This test checks the negativity of the parameter α using its regression t ratio. The asymptotic distribution of the statistic is derived in Dickey and Fuller (1979) while Hall (1994) shows that the asymptotic distribution is insensitive to parameter selection based on standard information criteria.

The PP test is based on the standard OLS regression estimate, $\hat{a}$, from an AR(1) specification:

$$y_t = a y_{t-1} + u_t \tag{2}$$

Using the OLS regression estimate $\hat{a}$, the PP unit root statistics are estimated as follows:[5]

$$Z_a = T(\hat{a} - 1) - \frac{1}{2}\left(\hat{\lambda}^2 - s^2\right)\left(\frac{1}{T^2}\sum_{t=1}^{T} y_{t-1}^2\right)^{-1} \tag{3}$$

$$Z_t = \frac{s}{\hat{\lambda}} t_{\hat{a}=1} - \frac{1}{2}\left(\hat{\lambda}^2 - s^2\right)\left(\frac{\hat{\lambda}^2}{T^2}\sum_{t=1}^{T} y_{t-1}^2\right)^{-1/2} \tag{4}$$

whereby $t_{\hat{a}=1} = s^{-1}(\hat{a} - 1)\left(\sum_{t=1}^{T} y_{t-1}^2\right)^{1/2}$ and $s^2 = T^{-1}\sum_{t=1}^{T} \hat{u}_t^2$ and $\hat{\lambda}^2$ are the estimators for the short- and long-run variances of $\{u_t\}$.

For the full sample (panel A) and for each of the regimes (panels B through F) the test statistics unanimously support the notion that log-levels contain a unit root (i.e. are non-stationary) while log-changes do not contain a unit root (i.e. are stationary). For the ADF test, the appropriate lag structure is atheoretical and more of an empirical question. Various lag structures are entertained (not tabulated) in order to check the robustness of the ADF test. In general, the test statistics at various lags consistently fail to reject the null hypothesis of a unit root for log-levels while rejecting this null for log-changes. For all ADF test statistics tabulated in table 3, the Akaike information criterion (AIC) is used to select the optimal lag structure. The PP test also yields qualitatively analogous findings for the full sample (panel A) as well as each of the regimes (panels B through F) for log-levels and log-changes.[6]

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[5] Castro et al. (2015) provide an in-depth review and analysis of the PP test along with its advantages and disadvantages, focusing in particular on time-series data which display a strong cyclical component.

[6] Various kernel-based sum-of-covariances estimators and autoregressive spectral density estimators are entertained to check the robustness of the PP test (not tabulated). The choice of using a kernel-based estimator versus a spectral density estimator does not systematically affect the aforementioned findings in any substantive way.

Whereas the critical values for the ADF and PP tests become larger (in absolute terms) when you move from a 10% to a 1% level of significance in rejecting the null, the ERS critical values become smaller. The ERS test seeks to modify the ADF test by de-trending the time-series so that explanatory variables are removed from the data prior to performing the test regression. De-trending the data is performed by quasi-differencing the time-series in question, y_t.

The quasi-difference of y_t that depends on the value of a, which represents the particular point alternative against which we test the null:

$$d(y_t|a) = \begin{cases} y_t & \text{if } t=1 \\ y_t - a y_{t-1} & \text{if } t>1 \end{cases} \quad (5)$$

The value for a is needed in order to obtain an ERS test statistic. This value can be obtained by an OLS regression with the quasi-differenced time-series $d(y_t|a)$ on the quasi-differenced $d(x_t|a)$:

$$d(y_t|a) = d(x_t|a)'\delta(a) + \eta_t \quad (6)$$

whereby x_t contains either a constant or both a constant and trend, and where $\delta(a)$ is an OLS from this regression. The residuals, $\eta_t(a)$, can be defined as $\hat{\eta}_t(a) = d(y_t|a) - d(x_t|a)'\delta(a)$ while the sum of squared (SSR) residuals function, $SSR(a)$, can be defined as $SSR(a) = \sum \hat{\eta}_t^2(a)$. The ERS point optimal tests statistic, P_T, tests the null (that y_t contains a unit root), $a = 1$, against the alternative $a = \bar{a}$. The test statistic is computed using SSR and the value for a from (6):

$$P_T = [SSR(\bar{a}) - \bar{a}SSR(1)]/f_0 \quad (7)$$

whereby f_0 is the estimator for the residual spectrum at frequency zero.

As in the ADF and PP tests, the optimal lag structure test statistics tabulated in table 3 for the ERS test are based on the AIC. Various lag structures entertained for the ERS test (not tabulated) generally support the notion that log-levels are non-stationary while log-changes are stationary. Taken altogether, the ADF, PP and ERS test statistics are consistent with one another for the full sample (panel A) as well as each of the sub-sampled economic regimes (panels B through F).

2.3. Cointegration Tests

The natural empirical question that follows, having established that CDS spreads are stationary in their logarithmic first differences (log-changes), is whether or not they share a common stochastic trend. In other words, are they cointegrated with one another? If they are, any empirical specification which seeks to delineate credit risk transmission channels ought to consider the long-run equilibrium relation that exists among all the sampled CDS spreads.

A priori, we have no way of knowing whether or not a long-run equilibrium relation exists. The appearance of comovement among all the CDS markets (inferred by their pairwise correlations or the fact that they exhibit similar behaviors in their graphical representations) is not a condition for cointegration. If it is the case that all the twelve sampled CDS markets are cointegrated, a linear combination of any set of CDS spreads ought to be stationary.

Given that there are twelve sampled CDS markets, the multivariate cointegration framework of Johansen (1991, 1995) is implemented to find out how many of the CDS series, if any, are cointegrated with one another. If *all* of the CDS series are cointegrated, it means we will have a total of eleven cointegrating equations at any given point in time (since there are twelve sampled series).

The Johansen (1991, 1995) multivariate cointegration methodology begins with a vector autoregression (VAR) of order p:

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + Bx_t + \varepsilon_t \quad (8)$$

whereby y_t is a k-vector of non-stationary variables, x_t denotes a d-vector of deterministic variables, and ε_t is an $n \times 1$ vector of innovations. In a more compact form, this VAR can be expressed as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \varepsilon_t \quad (9)$$

whereby:

$$\Pi = \sum_{i=1}^{p} A_i - I \quad \text{and} \quad \Gamma_i = -\sum_{j=i+1}^{p} A_j \quad (10)$$

For the coefficient matrix Π in (9) and (10) to have reduced rank $r < k$, there must exist $k \times r$ matrices α and β with respective rank r, such that $\Pi = \alpha\beta'$ and $\beta' y_t$ are stationary series (Engle and Granger, 1987). In this case, r denotes the number of cointegrating relationships (i.e. the cointegrating rank) while the elements of α are the adjustment parameters. Each respective column of β represents a cointegrating vector. Johansen (1995) shows that for a given cointegrating rank, r, the maximum likelihood estimator for a cointegrating vector, β, describes an arrangement of y_{t-1} that generates the r largest canonical correlations between Δy_t with y_{t-1}, following corrections for lagged differences and when deterministic variables, x_t, are present (Hjalmarsson and Osterholm, 2010). The Johansen methodology, (8) - (10), entails estimating the Π matrix using an unrestricted VAR and subsequently testing whether restrictions implied by the reduced rank of Π can be rejected.

There are two important statistics that are used to determine whether cointegration is present among non-stationary time-series and, if so, how many cointegrating equations there are at any given point in time: the trace test statistic and the maximum (max) eigenvalue test statistic, shown in equations (11) and (12), respectively:

$$LR_{trace}(r|k) = -T \sum_{i=r+1}^{k} \log(1 - \lambda_i) \quad (11)$$

$$LR_{\max}(r|r+1) = LR_{trace}(r|k) - LR_{trace}(r+1|k) = -T\log(1 - \lambda_{r+1}) \quad (12)$$

For (11) and (12), r is the number of cointegrating vectors, T denotes the sample size and λ_i is the i-th largest eigenvalue of the Π matrix in (9) and (10). The purpose of the trace statistic is to test the null hypothesis of r cointegrating relationships against an alternative of k cointegrating relationships whereby k represents the number of endogenous variables for $r = \{0, 1, \ldots, k-1\}$. The purpose of the max eigenvalue statistic is to test the null of r cointegrating relationships against the alternative of $r + 1$ cointegrating relationships. If the sampled series are not cointegrated, the rank of Π is zero.

Table 4 reports results for the Johansen cointegration methodology described in (8) - (12) for the full sample under all five of the deterministic trend cases considered by Johansen (1995). Given that the purpose of the cointegration framework in (8) through (10) is to determine whether a long-run equilibrium relationship is present between the CDS spreads, the full sample (October 1, 2004 through July 15, 2016) is used to initially determine whether a vector error correction (VEC) framework with an adjustment factor is necessary or whether a VAR is sufficient in order to subsequently determine causal relationships (implemented in section 3 and discussed in section 4).

The five deterministic trend cases are described in Johansen (1995, pp. 80-84) and are reported in each of the respective panels in table 4 for the full sample:

1. (Panel A): The log-level CDS spreads have no deterministic trends and the cointegrating equations have intercepts:

$$H_2(r): \Pi y_{t-1} + B x_t = \alpha\beta' y_{t-1}$$

2. (Panel B): The log-level CDS spreads have no deterministic trends and the cointegrating equations have intercepts:

$$H_1^*(r): \Pi y_{t-1} + B x_t = \alpha(\beta' y_{t-1} + \rho_0)$$

3. (Panel C): The log-level CDS spreads have linear trends but the cointegrating equations have only intercepts:

$$H_1(r): \Pi y_{t-1} + B x_t = \alpha(\beta' y_{t-1} + \rho_0) + \alpha_\perp \gamma_0$$

4. (Panel D): The log-level CDS spreads and the cointegrating equations have linear trends:

$$H^*(r): \Pi y_{t-1} + B x_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha_\perp \gamma_0$$

5. (Panel E): The log-level CDS spreads have quadratic trends and the cointegrating equations have linear trends:

$$H(r): \Pi y_{t-1} + B x_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha_\perp(\gamma_0 + \gamma_1 t)$$

Table 4 reports the trace and max eigenvalue statistics, respectively, along with their corresponding 5% and 1% critical values. If we look at, say, panel C (which is the standard assumption in empirical literature which seeks to determine cointegrating relationships), we see that 'None' is rejected because the trace value is greater than the critical value at the 5% level (i.e. 344.8079 > 334.9837). Thus, from the trace statistic, we can reject the null of hypothesis of no cointegration ($r = 0$). The max eigenvalue supports this finding; we see that the max eigenvalue statistic is greater than its critical value at the 1% level (i.e. 90.0808 > 83.7066).

However, given that there are twelve series and a maximum of eleven possible cointegrated equations, the results here provide very scant evidence in favor of cointegration. In all, panels A, B and C have trace statistics and eigenvalue statistics which provide supporting evidence of at least one cointegrating relationship. Trace statistics for panels D and E fail to reject the null of no cointegration albeit the respective max eigenvalue of each panel supports the notion of at least one cointegrating relationship.

This weak evidence in favor of cointegration among the CDS markets is reconcilable by the fact that some countries may experience large fluctuations in their credit risks at particular points in time which deviate in magnitude from those of its peers. Thus, the relationship between all CDS markets, if nonlinear in nature, has a lower probability of being detected when using standard linear cointegration methodologies. Chan-Lau and Kim (2004) find no evidence of cointegration in the CDS and corresponding bond markets of various sampled emerging markets. Among other reasons, they argue that this is possible because market frictions or other technical factors limit the ability to exploit arbitrage opportunities across markets - a reason which may also be relevant to the sampled EU markets considered here. Other empirical findings which examine CDS markets with their corresponding bond markets, and in contra to their theoretical predictions, also find weak evidence for a long-run equilibrium cointegrating relation (Palladini and Portes, 2011). In the context of cointegration between sovereign and bank CDS spreads, Alter and Schuler (2012) find that cointegration may exist in some cases while not in others.

In light of the results in table 4, sub-sample analysis is undertaken to determine whether there exists a pattern in the cointegrating relationships. After inspecting across the economic regimes and across random sub-sample periods (not tabulated), it is ascertained that evidence for cointegration is generally weak and, at best, unstable and time-dependent. In light of this, the following section implements a VAR for the purpose of delineating transmission channels between the sampled countries' CDS markets without a vector error correction representation.

3. ANALYTICAL FRAMEWORK

As mentioned, measuring contagion is problematic both from a statistical and theoretical point of view. A high correlation between markets, for example, does not necessarily provide a basis for causation. In other words, just because hypothetical countries *A* and *B* are highly correlated does not imply that shocks in one of them *causes* changes in another. Theoretically, establishing the transmission channels between markets is also problematic because we are oftentimes confined to discussing them in relatively abstract and unquantifiable ways. For example, if we argue that two markets are interlinked with one another due to geographic proximity and trade, we need to establish *which* country serves as the catalyst for shock transmissions to the other country. Is the supposed catalyst's economy of such relative importance to the other market that a spillover is justified? Furthermore, is the shock transmission unidirectional or bidirectional? These are not easy questions to answer and any empirical model that presumes some relation from the onset may be contaminated by noise.

Bayoumi and Vitek (2013) argue that, although "at first blush, the solution to measuring spillovers across countries would seem fairly easy...although progress is being made, the financial sectors in large macroeconomic models are poorly developed and...there are no strong theories as to why financial markets are as closely linked as they appear to be in the data..." (p. 3). From a practical standpoint, it is very difficult to establish *a priori* which country or group of countries constitute the dominant transmission channels for other countries.

For this reason, an unrestricted VAR is estimated, which, unlike structural models with simultaneous regression equations, presumes no specific structure in the pattern of the transmission channels between countries. Instead, all that is hypothesized *a priori* is that all the countries' credit risks affect each other in some way across time.

By using a VAR to describe transmission channels, we are at a vantage point where we can identify which country or group of countries serve as dominant transmission channels for credit risk. Without exogenous variables (the twelve CDS markets serve as endogenous variables), the VAR in (8) can be re-expressed compactly as follows:

$$Y_t = \mu + \sum_{p=1}^{k} AY_{t-p} + \varepsilon_t \qquad (13)$$

whereby the set of endogenous (Y) variables consists of the weekly log-level CDS spreads from the twelve sampled EU countries. Using log-levels is consistent with Alter et al. (2012, p. 3448) who argue that "...if the tests do not clearly indicate that there is a long-run relation, we obtain the impulse responses from a VAR with the variables modelled in log-levels. Thus we do not cancel out the dynamic interactions in the levels, as opposed to modelling the variables in first differences, and leave the dynamics of the series unrestricted..."

Within this VAR framework, a 'credit shock transmission' can be defined as the fraction of *H*-week-ahead forecast error variance of one country's log-level CDS spreads that can be accounted for by the innovations (i.e. shocks) in another country's log-level CDS spreads.

The vector of constants, μ, is an $n \times 1$ vector and A is an $n \times n$ matrix of parameters to be estimated. The residuals, ε, are an $n \times 1$ matrix of serially uncorrelated disturbances and k is the order for the variables, Y. The estimates for A are determined by the following orthogonality conditions:

$$E\{\varepsilon_t\} = 0 \quad \text{and} \quad E\{\varepsilon_t | Y'_{t-p}\} = 0_{n\times n}, \ \ p = 1, 2, \dots, k \qquad (14)$$

The most widely used method to achieve orthogonal decomposition of the ε vector in macroeconomic and financial time-series analysis is the Choleski decomposition method. This method, despite some of its potential weaknesses (discussed in more detail in section 5), traditionally serves as the standard workhorse for time-series analysis which implements VAR methodologies and is thus the method used to draw discussable inferences here (Hamilton, 1994; Wisniewski and Lambe, 2015).

As is explained by classics such as Hamilton (1994), the choice of the ordering procedure, k, for the endogenous variables Y is atheoretical in nature. In the case of the twelve sampled CDS markets considered here, neither academic theories nor policymakers' reports provide guidance as to which country may be a dominant transmission channel or which country's market exerts relatively undue influence on another market.

To get some sense as to which of the few sampled countries ought to be first in the ordering procedure, *k*, pairwise Granger causality tests are conducted and reported for the full sample (table 5A), regime 2 (table 5B), which represents the 2008-09 crisis, and regime 4 (table 5C), which represents the 2011-13 crisis.

Across each of the tables, there is no strict uniformity as to which country ought to be first or second in the ordering - a finding that is consistent with the notion of heterogeneity in credit risk transmission dynamics across economic regimes. The *k* ordering for the countries for the *H*-week-ahead forecast error variance decompositions reported in tables 6A-6F coincidentally are as follows (using their official abbreviations discussed in figure 1): BE, BG, DE, EL, ES, FR, HR, HU, IT, PT, RO, and SK. As is discussed in more detail in section 4, BE and BG are dominant transmission channels for credit risk in the full sample (table 6A) while BE, BG, DE and EL are more important during the 2011-13 crisis (regime 4 reported in table 5C). Although RO and SK are more important during the 2008-09 crisis (regime 2 reported in table 5B), their respective GDP per capita (figure 3), in relation to their peers, are lowest - suggesting they may carry less economic influence relative to countries such as BE, BG and DE.[7]

4. RESULTS & DISCUSSION

The purpose of the multivariate VAR in (13) is to quantify credit shock transmissions from one country to another. As mentioned, a transmission can be defined as the fraction of *H*-week-ahead forecast error variance of one country's log-level CDS spreads that can be accounted for by the innovations (i.e. shocks) in another country's log-level CDS spreads.

Before proceeding to discussing the variance decompositions in tables 6, it is worth reviewing the pairwise Granger causalities in table 5 that were briefly mentioned in the preceding section because they describe the direction of interdependency channels in credit risk transmissions among all the sampled countries. As mentioned, in panel A, pairwise Granger causalities are reported for the full sample while panels B and C report for regime 2 and regime 4, respectively. For each of the panels, Granger causality tests are conducted using one, two, three and four lags. Finally, for each of the panels, and given that they are pairwise causality tests (involving two countries at a time), there are a total of sixty six pairwise tests that are estimated: 1. (BE ⇆ BG), 2. (BE ⇆ DE), 3. (BE ⇆ EL), 4. (BE ⇆ ES), 5. (BE ⇆ FR), and so on, until all countries have been tested with one another (i.e. all sixty-six pairwise combinations have been examined).

Bearing in mind that the null hypothesis for the Granger causality test is that there is no causality (i.e. Country *A* does not Granger cause Country *B*), let us turn our attention to the full sample results

[7] Although GDP per capita is not a theoretically infallible method to determine 'economic influence,' for the sake of robustness, when GDP per capita is used as the criteria to establish *k* ordering of the countries (whereby high average GDP per capita countries are first and then followed by relatively lower average GDP per capita countries), the variance decompositions (not tabulated) are qualitatively analogous to those reported in tables 6A-6F. This suggests some insensitivity to the results with respect to variable ordering.

(panel A) whereby lag length = 1. If we look at the CDS market of, say, Belgium (BE), we can see that it Granger causes changes in the CDS markets of HR, FR, DE, EL, HU, IT and SK, respectively. Thus, BE causes changes in seven out of eleven possible markets (*approx*. 64% of cases). Likewise, there is no evidence BE causes changes in the CDS markets of BG, ES, PT and RO - the remaining four countries (the remaining 36% or so of cases where the null of no causality is not rejected). Of the seven markets that BE causes, none of those countries Granger cause BE (i.e. the direction of causality between BE and the seven aforementioned countries is unidirectional).

If we look at the case of Germany (DE) in panel A whereby lag length = 2, we see that DE respectively causes BE, FR, EL and SK (four out of eleven possible markets, or, about 36% of cases). Of these four markets, BE, FR and SK Granger cause DE. Thus, there is a bidirectional causality pattern between DE and, respectively, BE, FR and SK.

From the full sample in panel A, we see that Greece (EL) does not cause any other CDS market when there is one lag. When there are two lags, EL causes BE and ES while, for three and four lags, respectively, EL causes BE. Overall, for the full sample, EL does not appear to be a dominant transmission channel for credit risk. However, BE, BG and ES consistently serve as channels for credit risk across all four lag lengths. Relative to the causality results with one and two lags, RO and SK become more active credit risk transmission channels when there are three and four lags.

In panel B of table 5, which represents the 2008-09 crisis, we see that BG and RO serve as dominant transmission channels across all lag lengths. HR and SK are dominant transmission channels when there is one lag. Across all lag lengths, DE does not Granger cause a single CDS market while EL Granger causes two markets across all lag lengths.

Finally, let us turn our attention to panel C of table 5, which is the fourth regime that represents the 2011-13 European debt crisis. Compared to panel B (the 2008-09 crisis), we see that EL now serves as a relatively stronger transmission channel for the other countries. This is not surprising given that it has been implicated as the catalyst for the Eurozone crisis. However, we can see that when lag length = 1, EL transmits to about 63% of countries - a percentage that is still lower than BE, BG, PT and equivalent to that of FR. Keeping in mind that, for one lag, DE transmits to about 55% of markets, we can conclude conservatively that, at a minimum, EL does not disproportionately channel credit risk to its EU peers any more than DE, FR, or any other major market does. When we inspect causality results for two, three and four lags, we see that the percentage of its (outbound) transmission channels, compared with its peers, are relatively fewer and, at best, nothing out of the ordinary.

Tables 6 report forecast error variance decompositions for the full sample (table 6A) and each of the regimes (tables 6B through 6F). For each of the countries, 2-, 4-, 6-, 8- and 10-week forecast horizons are considered. Instead of tabulating all the A coefficients from the VAR in (13), a more compact and intuitive way of determining how shocks in one CDS market affect other CDS markets is to estimate variance decompositions. As mentioned, shock transmissions are the fraction of H-week-ahead forecast error variance of one country's log-level CDS spreads that can be explained by shocks in another country's log-level CDS spreads. The variance decomposition table (tables 6A through 6F) tell us, in relative terms, the importance of each random shock within the VAR system. To estimate the variance decompositions, the Choleski method is used (the merits of this procedure are revisited in section 5).

Table 6A provides variance decompositions for the full sample. In the first column are each of the twelve CDS markets while in the second column are the *H*-week ahead periods corresponding to each respective market. The standard error (S.E.) corresponding to each horizon is in the third column. The columns that follow are each of the predictor variables in the VAR system. For the sake of explaining the decomposition table, let us look at, say, Germany (DE) when it serves as the response variable. We can see that in the 2-week horizon, a significant fraction of its forecast variance is explained by its own lagged shocks (76%). Lagged shocks in Belgium (BE) and Bulgaria (BG) explain 18% and 4% of its forecast variance, respectively. Greece (EL) explains a mere 0.04% while Croatia (HR) explains almost 0%. If we were to sum all these percentage variance decompositions across any of the respective horizons, they sum to 100% by construction. Thus, we can see for any given country at any given horizon, the proportion of forecast variance explained by shocks in each of the CDS markets in the VAR system.

Looking down the columns in table 6B (regime 1), we can see that specific countries (such as DE, EL, HR, PT, RO, SK) uniformly contributed a small proportion of forecast variance to other countries (in all cases, and as is expected, each country responds to lagged innovations in its own CDS market). Other countries, particularly BE and BG, appear to have a disproportionate impact on some countries while a negligible effect on others. For example, shocks in BE explains 34% to 40% of the forecast variance in ES across the various week horizons. Shocks in BG explain 73% to 81% of the forecast variance in HR, 43% to 50% of the forecast variance in HU and 55% to 74% of the forecast variance in RO, to name only a few examples.

Results for regime 2, which corresponds with the 2008-09 financial crisis, are reported in table 6C. Again we see that BE and BG appear to have a disproportionate impact on some markets. One notable difference in regime 2 compared to regime 1 is the contributions of EL to the forecast variances of the other countries increased. For example, EL explains 20% to 23% of the forecast variance in ES and 15% to 19% of the forecast variance in IT. When EL is the response variable, we see that BE, BG and DE (in that order) are the largest contributors to its forecast variance (excluding shocks in its own lags).

Regime 3 (table 6D) is comparable to regime 1 in the sense that BE and BG tend to dominate, relative to their peers, in terms of explaining forecast variances of other countries. EL tends to appear uniform and relatively modest in explaining forecast variances of other countries, with the exception of Portugal (PT) where it explains 13% to 34% of its forecast variance. For the sake of comparison, DE and FR both explain between 1% and 3% of the forecast variance in PT.

Regime 4 represents the 2011-13 European debt crisis (table 6E) where Greece made headline news and was insinuated as a catalyst for the Eurozone crisis. As we discussed in panel C from table 5, Greece had a relatively higher tendency to Granger cause shifts in other CDS markets during this period (when compared with the percentage of cases it Granger causes during regime 2 and the full sample). We see however that it explains very little of the forecast variance of other countries.

Finally, regime 5 (table 6F) represents our present-day state of affairs where EL is uneventful in explaining other countries' forecast variances. One notable difference with table 6E is the case of ES. In regime 5, ES accounts for 33% to 38% of the forecast variance for IT and 21% to 26% of the forecast variance for PT.

Impulse response graphs to Cholesky one standard deviation (S.D.) innovations (and a 95% confidence band) are illustrated in figures 5 for regime 4 only. Impulse responses reveal how one country's CDS market responds to a unit shock in another CDS market. The purpose of focusing on regime 4, the 2011-13 European debt crisis, is to focus more on the dynamic interactions between CDS markets and the extent to which shocks in Greece's credit risks can affect other markets. While figures in 5A show the response of each countries to a shock in Greece, figures in 5B show the response of Greece to shocks in other countries.

Visual inspection of the figures suggests heterogeneity in the decay patterns of the impulse responses; specifically, some innovations (impulses) decay (or 'die out') for response countries at different times. For example, the response of Hungary to Greece is most pronounced during the 5th week even though the innovation finally begins to decay at around the 12th week. Now, if we look at the response of Portugal to Greece we observe very different behavior; at first the impulse response appears to decay by the 4th week then begins to show some small signs of transmission shocks after the 12th week (although they are very small in magnitude).[8]

Focusing on how Germany and Greece react to one another's innovations further reinforces this notion of heterogeneity in impulse decay behavior; in figure 5A we see the response of Germany to Greece while in figure 5B we see the response of Greece to Germany. In the former case, innovations in Greece appear to decay by the 9th week but then shift behavior after the 12th week. In the latter case, innovations in Germany decay by the 5th week. In terms of magnitudes, however, the size of the shock from Germany to Greece is larger than the shock from Greece to Germany (based on the scales of each graph).

[8] Compared with literature that focuses on the dynamic interlinkages in bond markets and interest rates, the impulse response functions in figures 5A and 5B are distinctive in at least two ways; first, they do not necessarily show a significant shock at the first few periods which dies out immediately afterwards (as is the case for the bond markets and interest rates). Second, it is possible that many weeks later, the impulse response function shows signs of life and reveals shifts in its pattern (look at the response of DE to EL in figure 5A after week 8, for example). These types of behaviors are not customary in impulse response functions involving bond markets and interest rates. An early study by Mills and Mills (1991, p. 278) concluded that "...these quick reactions to innovations suggest that the behavior of bond markets seem to be broadly consistent with the notion of informationally efficient international financial markets, implying that it would be difficult to earn unusual profits by operating in a particular market based on observed developments in other markets." The question of whether CDS markets are 'efficient' in this sense (compared to fixed income markets) is an interesting question that is left to future research to explore.

5. ROBUSTNESS TESTS AND OTHER AD HOC FINDINGS

As mentioned in footnote (7), the ranking order of the countries was changed in accordance with their GDP per capita in order to check that there were no sensitivities in the variance decompositions reported in tables 6. In addition to this, a generalized variance decomposition á la Koop et al. (1996) and Pesaran and Shin (1998) is implemented for the sake of comparison and in order to extract generalized impulse response functions.

The advantage of generalized variance decompositions is that they do not rely on an ordering pattern for variables in the VAR system (i.e. they are order invariant). If there are no criteria for establishing an ordering procedure for the variables, a generalized variance decomposition method may prove useful because no such ordering is required. The disadvantage of this approach, however, is that structural shocks are not orthogonalized. In an analysis involving country spillover effects, IMF (2016) shows that Cholesky methods of decomposition yield qualitatively similar findings with the generalized approach. Given their advantages and disadvantages, one cannot prove theoretically that a generalized method is superior to a Cholesky method, or vice versa, given that such a comparison is data-dependent.

For the sake of some comparison, generalized impulse response functions are illustrated in figure 6 for Greece, Germany, France and Spain. Even with generalized impulse responses, we can see that shock transmissions from Greece to Germany, France and Spain, respectively, are somewhat smaller in magnitude relative to the shock transmissions Greece receives. It seems that shock transmissions from Greece to the other countries begins to decay by the 8th week while shocks transmissions from the other countries to Greece may experience a shift in behavior after the 10th week. This latter point is illustrated when looking at the "response of EL to ES" and the "response of EL to FR" graphs.

Finally, and separate from the generalized variance decomposition approach, a Bayesian VAR methodology á la Litterman (1986) and Sims and Zha (1998) is also considered. Relative to traditional VAR approaches, Bayesian VAR models address the problem of over-parameterization which can occur in the presence of many variable series in the VAR system. The problem of potential over-parameterization is addressed via the use of information priors that reduce the VAR to a more parsimonious model which, theoretically, can help to improve variance forecasts.

Variance decompositions and impulse response functions (not tabulated) using the Litterman/Minnesota and Sims-Zha priors do not lead to any qualitative changes in the results which merit specific discussion. In fact, many of the patterns and behaviors we observed (such as BE and BG dominating in terms of explaining forecast variance for other countries) manifests in the same manner even when using a Bayesian VAR.

6. SUMMARY & CONCLUDING REMARKS

This purpose of this paper is to examine the dynamic interdependencies between CDS markets among several of the major EU countries which have an active and liquid CDS market. Specifically, the countries examined are, Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Portugal, Romania, Slovakia, and Spain. The motivation for this paper lies in the fact that Greece has featured, disproportionately relative to its peers, in the media as the instigator (or catalyst) for the Eurozone crisis. Thus, the idea in this paper is to test, using a VAR methodology, whether Greece disproportionately channels credit risk transmissions to other markets (i.e. Greece is the 'black swan') or whether Greece is being ostracized for Europe's general economic problems given its idiosyncratic hapless economic conditions (i.e. Greece is the 'black sheep').

Despite Greece's sovereign problems, it is yet to be proven empirically that it serves as a catalyst for the problems that grip Europe at large. This is important to identify because, as discussed earlier, news headlines and media outlets have a significant impact on the behavior of market participants. Despite the heterogeneity in credit risk transmission channels across time, the results here show that, at a minimum, it cannot be shown empirically that Greece serves as a dominant transmission channel for credit risk any more than France, Germany or any of the other major EU players.

Instead of the media trying to find a black sheep to explain our dire international state of economic affairs, more attention and research needs to be devoted into examining why there has been a systemic buildup in risks across our international financial and banking community.

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Figure 1
Glossary of country codes in the European Union

Country	Code
Belgium	BE
Bulgaria	BG
Germany	DE
Greece	EL
Spain	ES
France	FR
Croatia	HR
Hungary	HU
Italy	IT
Portugal	PT
Romania	RO
Slovakia	SK

Notes: These country codes and their descriptions are accessible online: http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Country_codes

Figure 2
Time series plots of CDS spreads (in basis points)

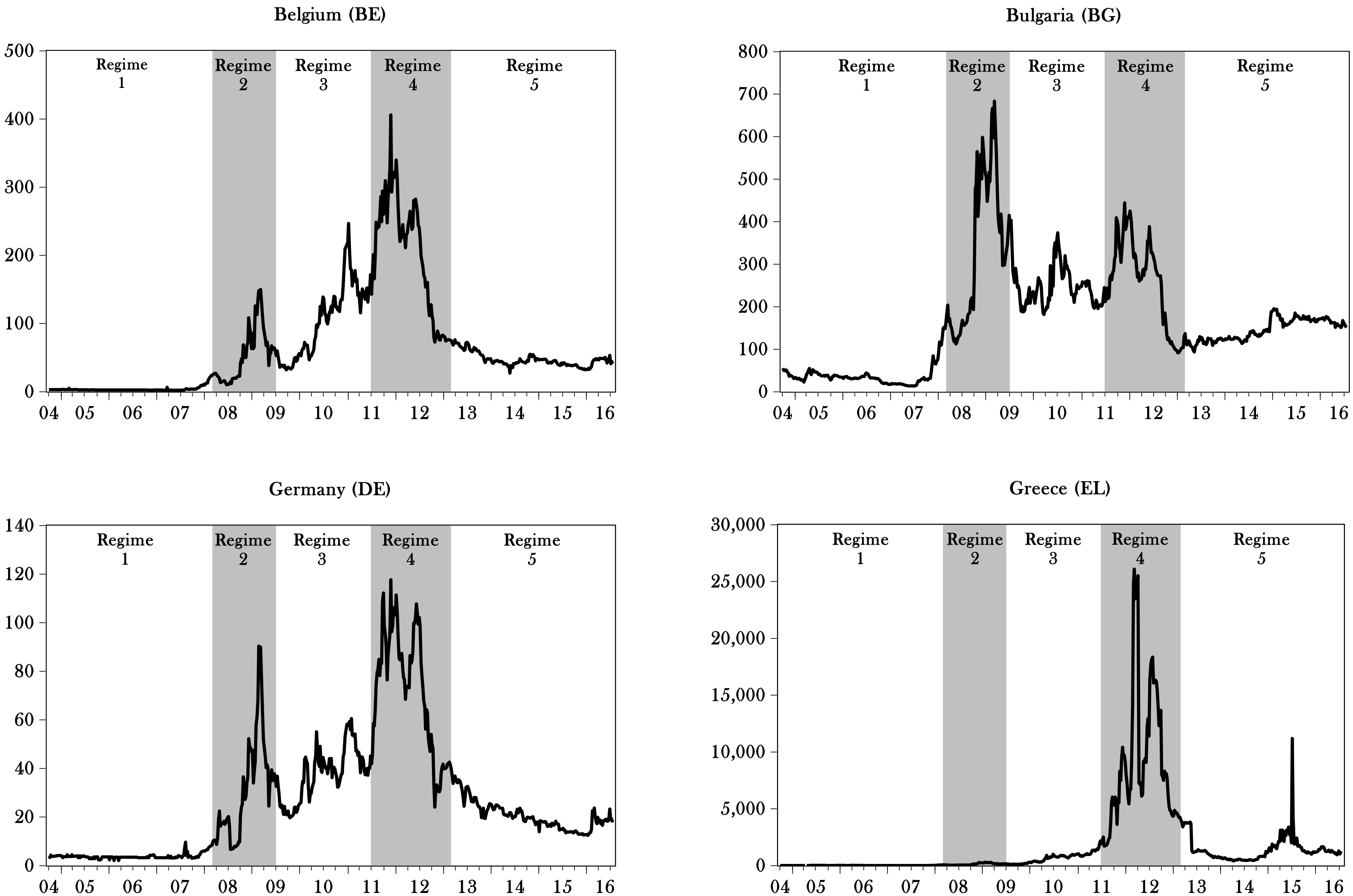


Figure 2 (Cont.)
Time series plots of CDS spreads (in basis points)

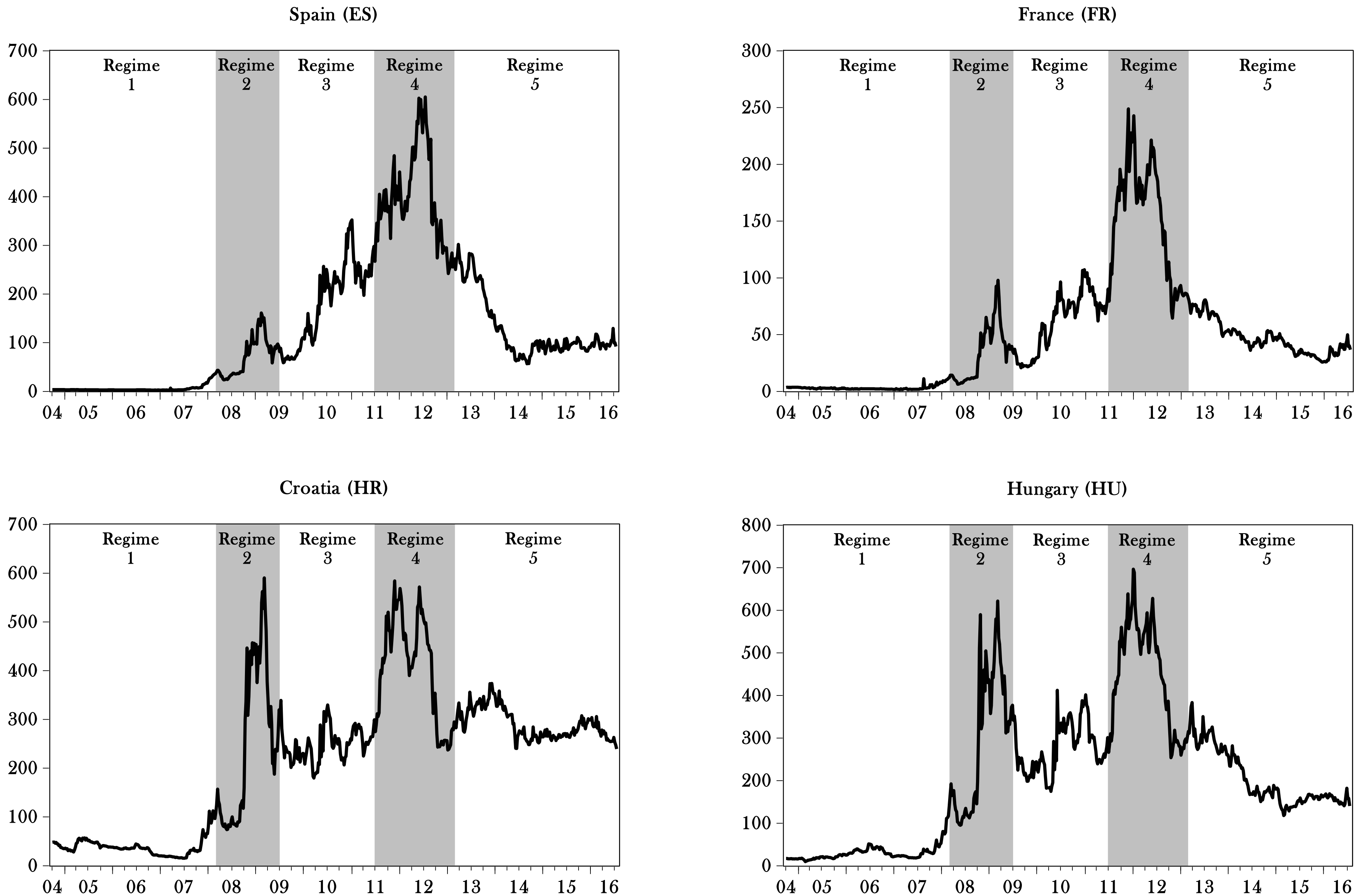


Figure 2 (Cont.)
Time series plots of CDS spreads (in basis points)

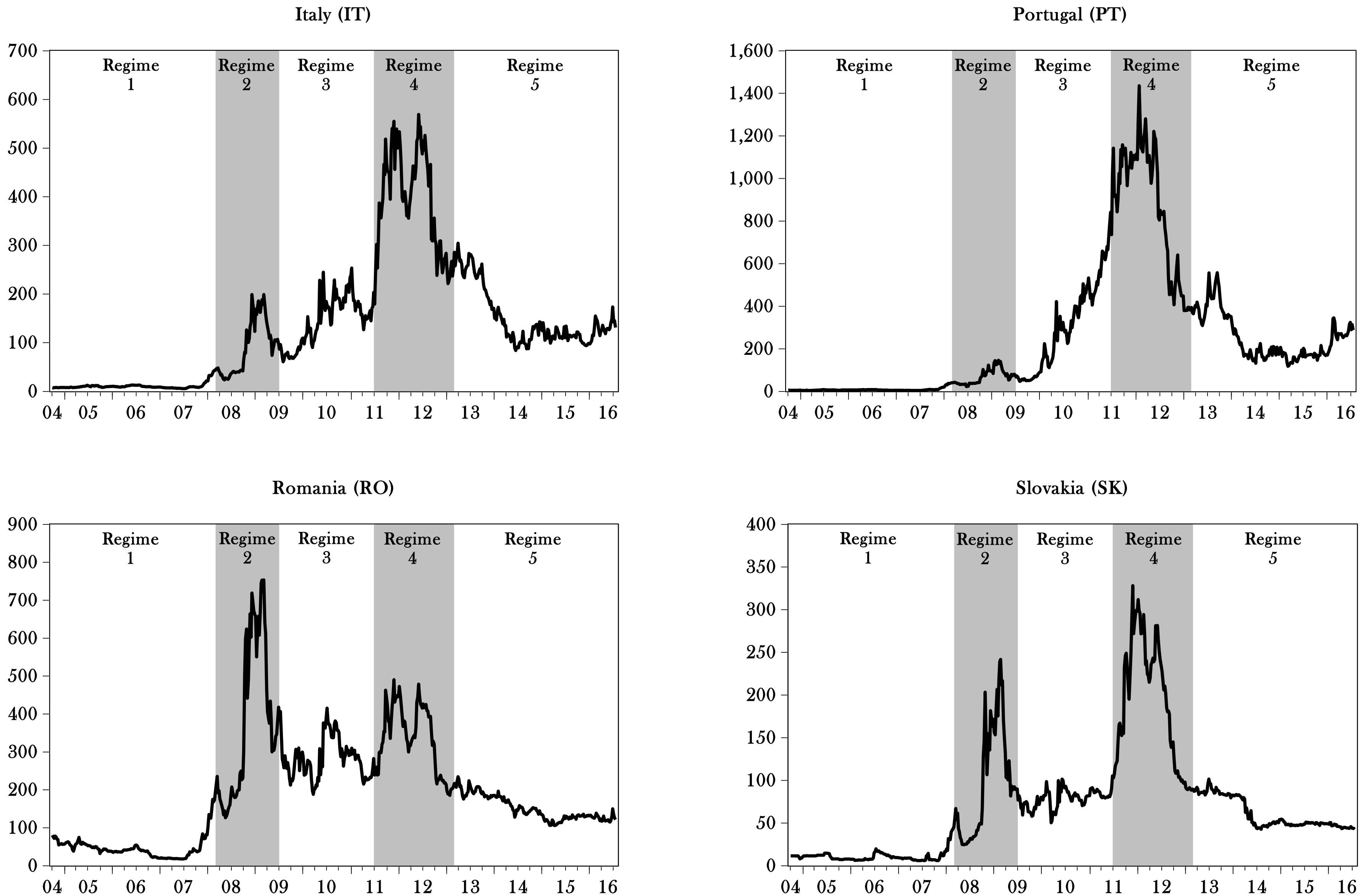


Figure 3
GDP per capita (in US$)

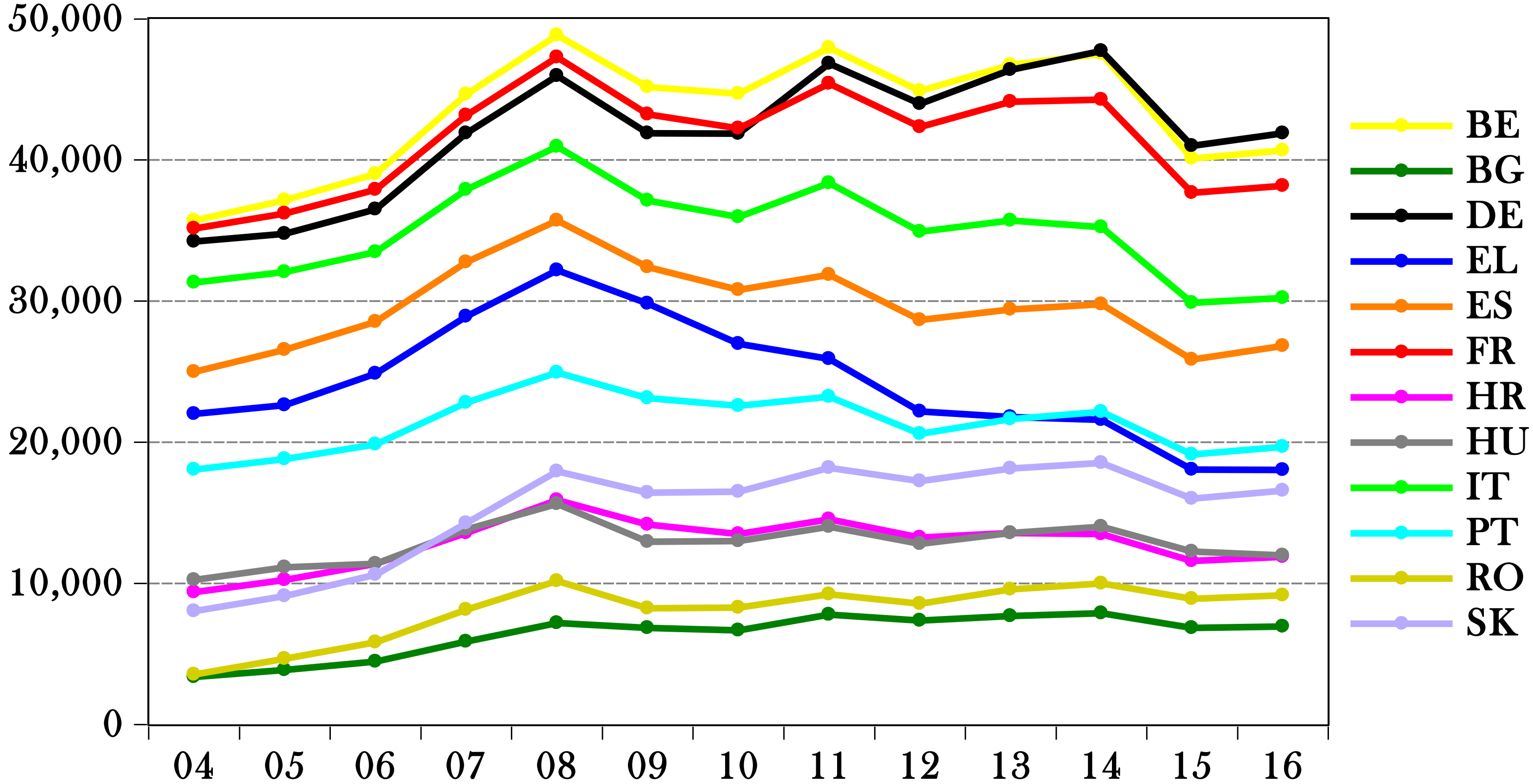


Figure 4
Debt-to-GDP (%)

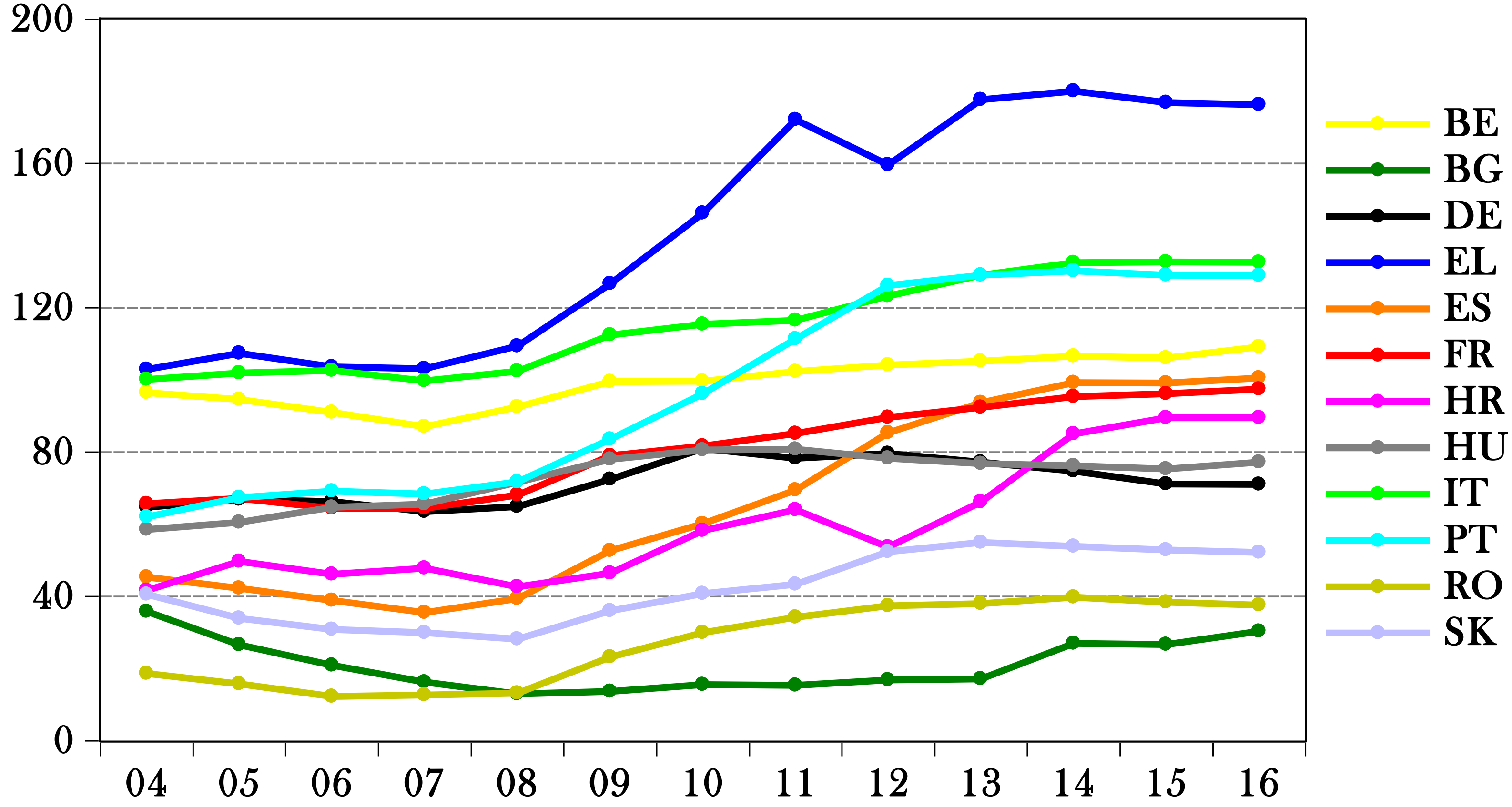


Figure 5A

Impulse response to Cholesky one S.D. innovations ± 2 S.E.

Response of Country$_j$ to impulse EL

Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

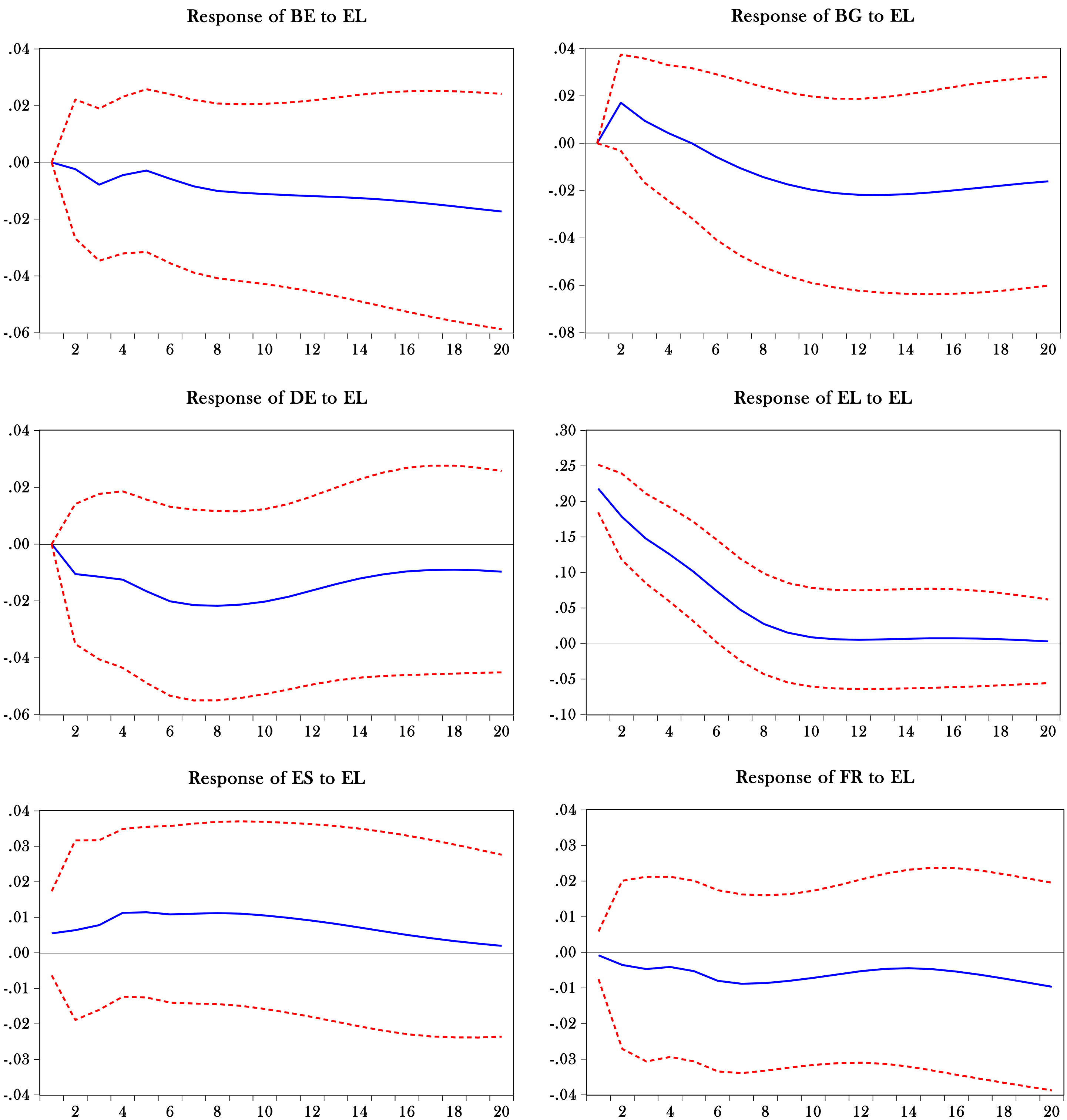
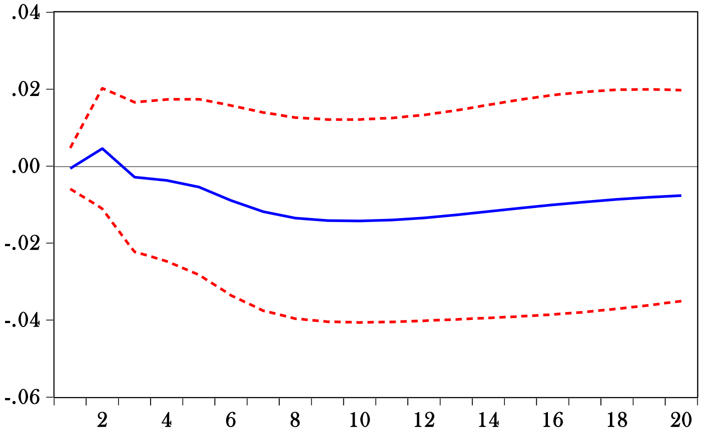
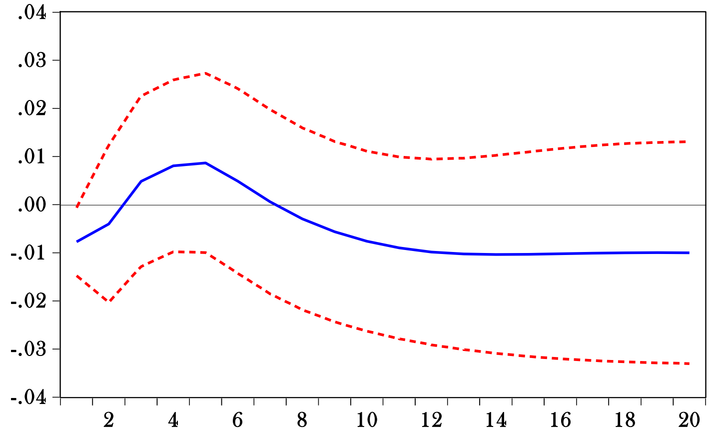


Figure 5A (Cont.)
Impulse response to Cholesky one S.D. innovations ± 2 S.E.
Response of Country$_j$ to impulse EL
Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

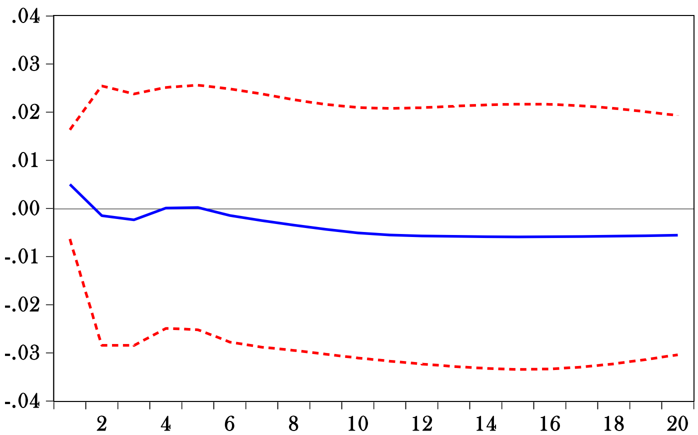
Response of HR to EL



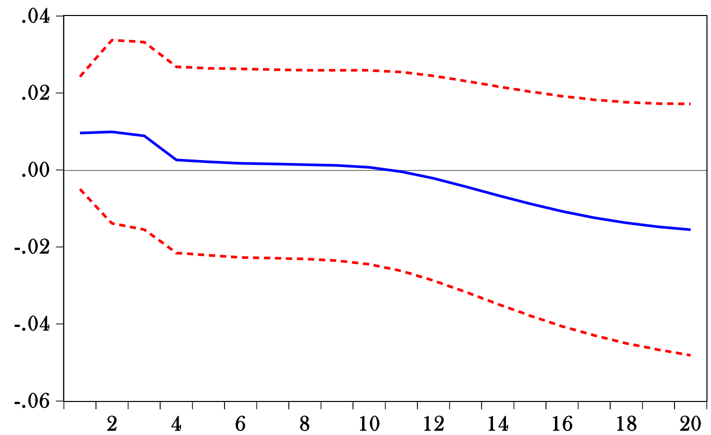
Response of HU to EL



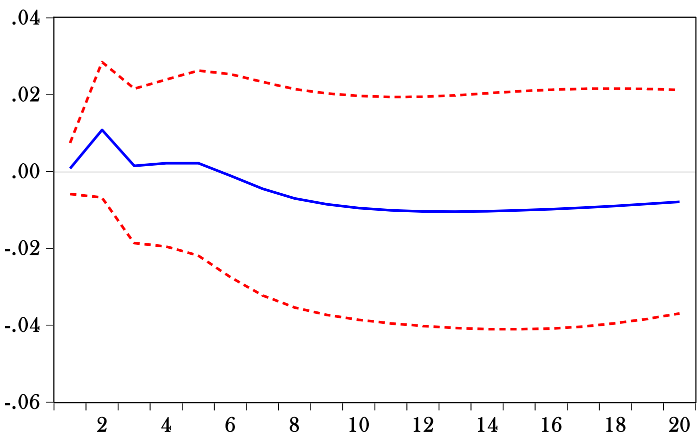
Response of IT to EL



Response of PT to EL



Response of RO to EL



Response of SK to EL

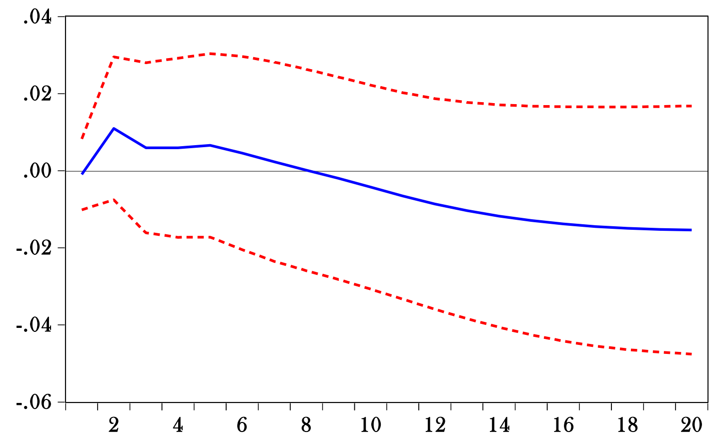


Figure 5B.

Impulse response to Cholesky one S.D. innovations ± 2 S.E.

Response of EL to impulse Country_j

Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

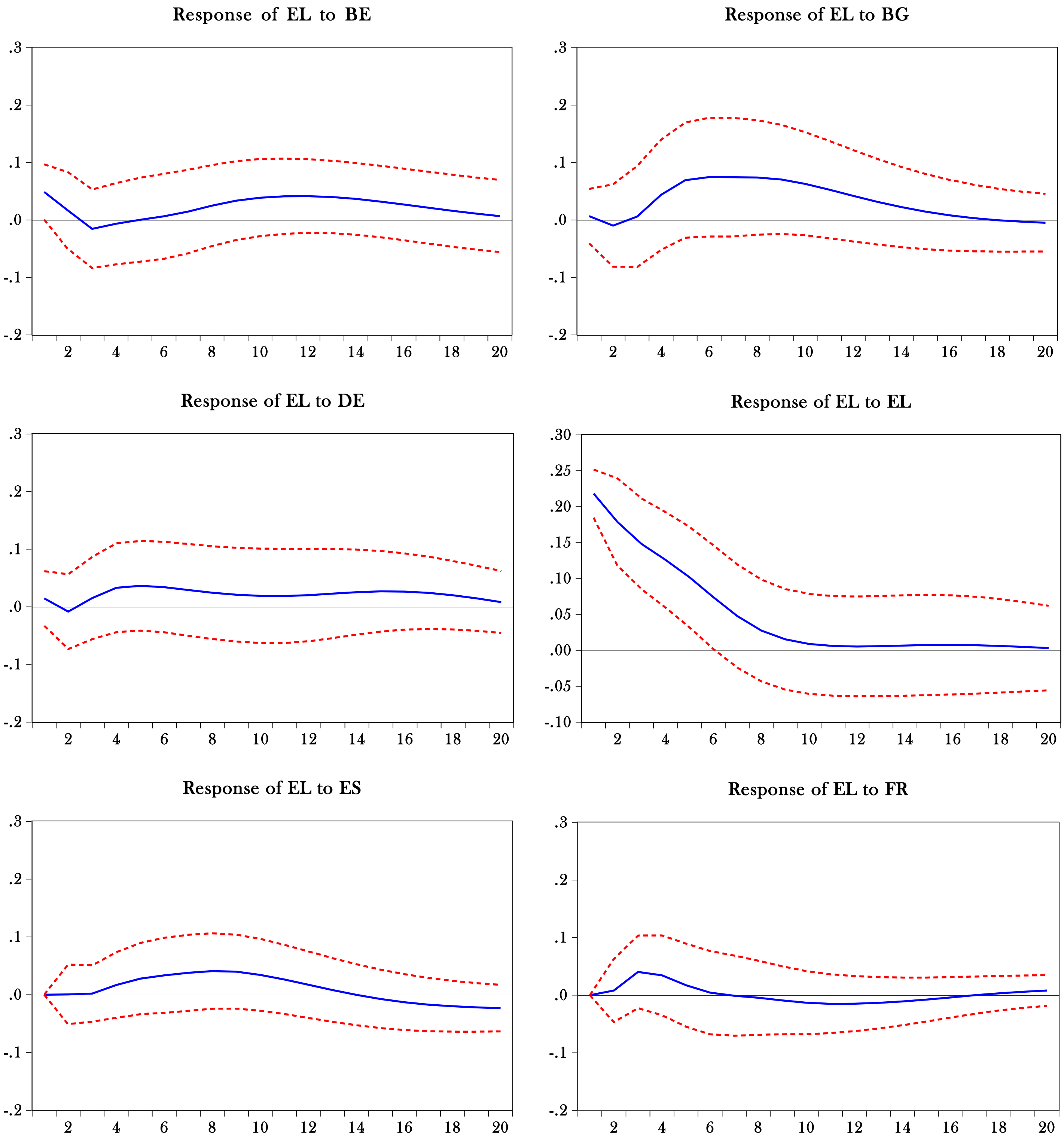


Figure 5B (Cont.)

Impulse response to Cholesky one S.D. innovations ± 2 S.E.

Response of EL to impulse Country_j

Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

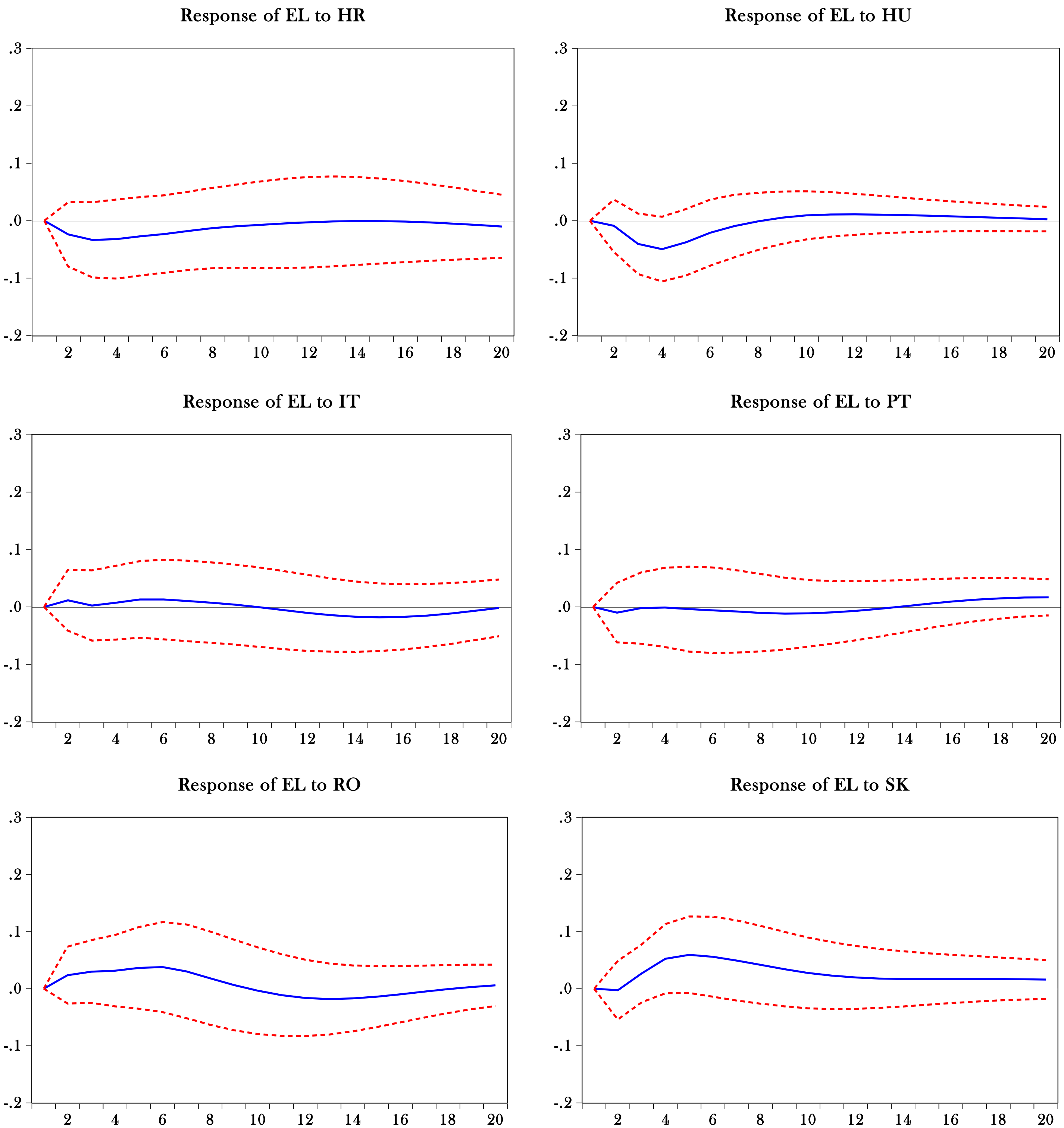


Figure 6

Generalized impulse responses to one S.D. innovations ± 2 S.E.

Impulses and Responses between DE, EL, ES and FR

Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

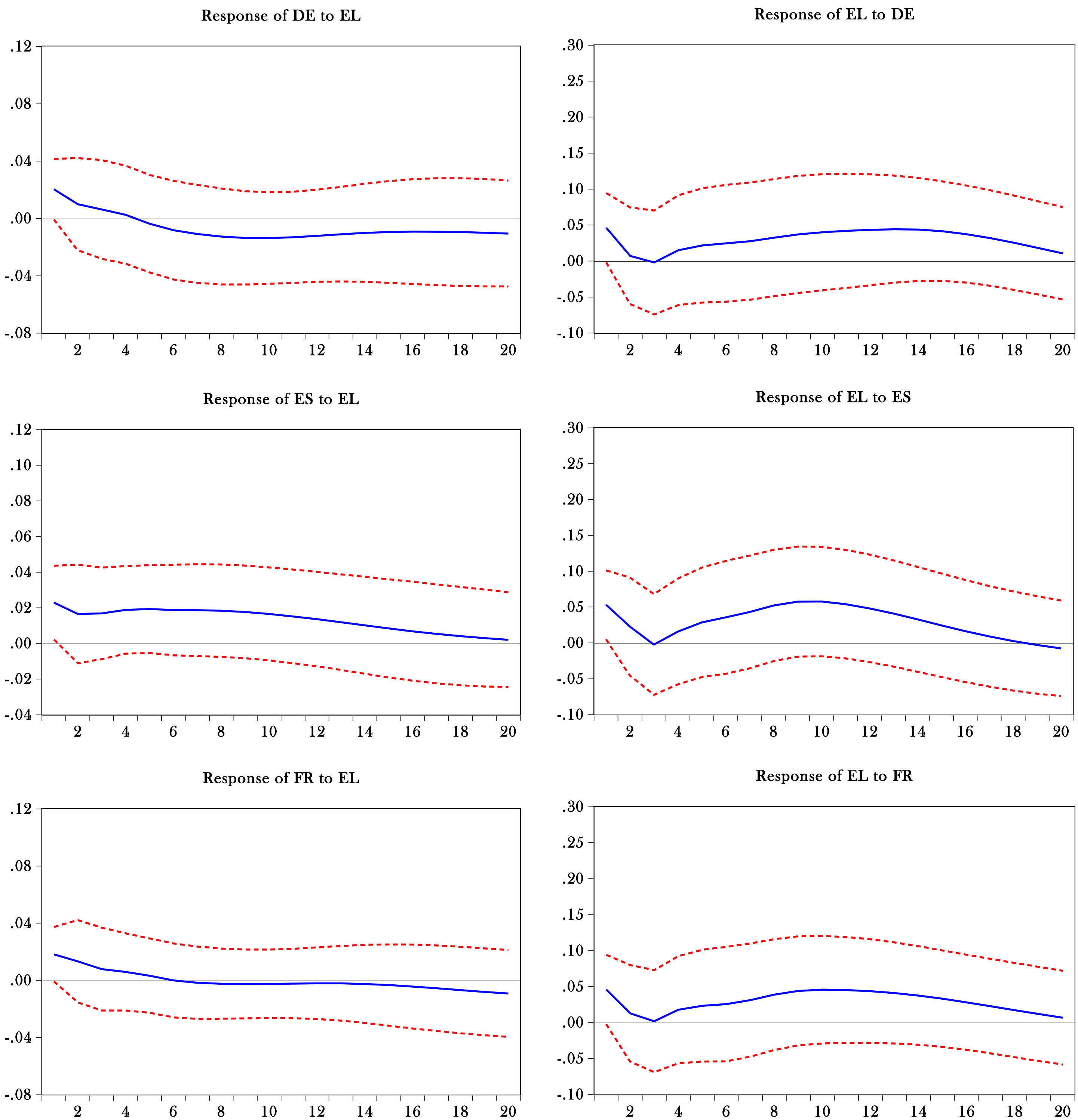


Table 1.
Summary statistics of CDS spreads (in basis points)

Country	Mean	Med.	Max.	Min.	Std. dev.	Country	Mean	Med.	Max.	Min.	Std. dev.
Panel A: Full sample; October 1, 2004 - July 15, 2016 (N=616)						*Panel B: Sample regime 1; October 1, 2004 - February 29, 2008 (N=179)*					
BE	66.93	44.34	406.12	2.15	76.31	BE	3.75	2.63	23.84	2.15	3.54
BG	169.44	154.68	683.44	13.50	127.35	BG	37.67	32.39	163.28	13.50	25.16
DE	27.14	20.17	117.67	2.13	25.37	DE	3.85	3.63	9.68	2.13	1.12
EL	1819.57	500.00	26089.20	3.00	3792.06	EL	13.13	11.35	61.00	3.00	9.08
ES	133.79	92.35	604.99	2.55	139.32	ES	5.31	3.19	36.25	2.55	6.29
FR	50.06	39.18	248.77	1.50	52.55	FR	3.15	2.50	12.25	1.50	2.06
HR	223.00	255.50	590.23	15.38	145.78	HR	38.71	35.98	112.50	15.38	18.52
HU	211.13	176.67	696.56	9.75	161.90	HU	30.16	23.88	139.17	9.75	18.94
IT	136.79	111.98	569.19	5.58	132.62	IT	10.72	9.38	43.42	5.58	6.32
PT	256.14	161.16	1435.50	4.07	313.66	PT	7.90	6.43	40.75	4.07	6.54
RO	195.77	172.49	753.60	17.34	147.84	RO	47.37	41.59	192.84	17.34	29.33
SK	72.10	51.01	328.25	6.00	67.49	SK	10.98	9.00	45.50	6.00	6.35
Panel C: Sample regime 2; March 7, 2008 - June 26, 2009 (N=69)						*Panel D: Sample regime 3; July 3, 2009 - June 24, 2011 (N=104)*					
BE	53.80	49.94	149.99	10.00	39.15	BE	103.92	112.78	246.77	32.18	53.58
BG	335.94	316.89	683.44	112.26	176.67	BG	247.88	242.98	403.56	181.76	47.19
DE	31.15	27.24	90.40	6.75	21.10	DE	37.65	38.64	60.54	19.67	10.77
EL	131.15	132.70	297.50	35.50	85.15	EL	669.72	745.60	2174.10	107.80	437.53
ES	72.67	72.79	161.01	23.50	39.69	ES	182.61	205.15	352.41	58.87	83.04
FR	33.67	35.03	97.90	6.25	24.52	FR	61.37	68.96	107.15	20.74	25.88
HR	253.62	235.25	590.23	73.83	161.11	HR	249.08	247.87	339.05	179.67	33.96
HU	299.13	322.50	621.60	95.17	163.29	HU	276.29	267.91	412.14	174.50	58.69
IT	91.36	87.38	198.91	23.75	56.43	IT	144.84	151.14	253.59	60.91	50.52
PT	69.13	68.59	146.12	22.67	35.23	PT	300.86	288.08	841.76	46.52	207.19
RO	380.05	319.24	753.60	126.67	208.55	RO	284.36	282.21	415.51	188.00	53.16
SK	98.14	90.00	241.67	24.50	64.65	SK	78.80	80.50	105.21	50.42	10.67
Panel E: Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)						*Panel F: Sample regime 5; March 1, 2013 - July 15, 2016 (N=177)*					
BE	202.21	230.00	406.12	72.83	85.62	BE	47.36	45.31	76.31	27.28	10.28
BG	261.20	274.52	444.48	91.67	102.80	BG	145.85	143.34	195.70	93.66	24.98
DE	72.05	76.59	117.67	24.11	25.19	DE	20.75	19.55	39.66	12.43	6.02
EL	8992.56	7307.50	26089.20	1705.20	6049.68	EL	1444.32	1199.20	11188.50	422.40	1180.22
ES	399.40	382.24	604.99	242.21	95.66	ES	127.58	99.09	302.26	56.86	63.85
FR	152.26	166.59	248.77	64.50	49.90	FR	46.74	43.73	80.61	25.73	14.45
HR	407.81	430.18	584.00	237.35	106.75	HR	290.21	280.38	373.75	239.40	31.24
HU	450.64	490.00	696.56	254.04	124.34	HU	202.79	169.16	383.30	118.14	64.12
IT	394.67	397.14	569.19	179.40	104.16	IT	149.78	127.06	304.50	83.86	57.68
PT	869.74	975.75	1435.50	379.51	297.25	PT	250.82	206.73	557.48	118.07	105.05
RO	337.18	338.64	490.23	185.41	88.40	RO	151.62	138.63	234.71	105.98	32.20
SK	191.86	205.98	328.25	88.49	72.41	SK	60.60	50.00	101.55	42.60	17.77

Notes: This table provides summary statistics for the full sample (panel A) as well as each of the sub-sampled regimes (panels B through F) for the CDS spreads (in basis points) of each of the twelve sampled EU markets. In each panel and for each market, it reports the mean, median (med.), maximum (max.), minimum (min.) and standard deviation (std. dev.).

Table 2
Correlation matrix between log changes in CDS spreads

	BE	BG	DE	EL	ES	FR	HR	HU	IT	PT	RO	SK
Panel A: Full sample; October 1, 2004 - July 15, 2016 (N=616)												
BE	–	0.3693	0.3253	0.2293	0.6582	0.3903	0.3592	0.3914	0.5271	0.4389	0.3605	0.3229
BG	0.3693	–	0.2889	0.1905	0.4304	0.3231	0.8391	0.7066	0.4764	0.3930	0.8605	0.5341
DE	0.3253	0.2889	–	0.1981	0.3098	0.2642	0.2849	0.2807	0.4087	0.3170	0.2857	0.2495
EL	0.2293	0.1905	0.1981	–	0.3367	0.2554	0.2007	0.2015	0.3883	0.3824	0.2255	0.1690
ES	0.6582	0.4304	0.3098	0.3367	–	0.4210	0.4496	0.4706	0.7221	0.6685	0.4432	0.3589
FR	0.3903	0.3231	0.2642	0.2554	0.4210	–	0.3705	0.3957	0.4239	0.3957	0.3683	0.4159
HR	0.3592	0.8391	0.2849	0.2007	0.4496	0.3705	–	0.7467	0.4914	0.3984	0.8357	0.5244
HU	0.3914	0.7066	0.2807	0.2015	0.4706	0.3957	0.7467	–	0.5091	0.4215	0.7506	0.5236
IT	0.5271	0.4764	0.4087	0.3883	0.7221	0.4239	0.4914	0.5091	–	0.6815	0.4933	0.3906
PT	0.4389	0.3930	0.3170	0.3824	0.6685	0.3957	0.3984	0.4215	0.6815	–	0.3882	0.3480
RO	0.3605	0.8605	0.2857	0.2255	0.4432	0.3683	0.8357	0.7506	0.4933	0.3882	–	0.5453
SK	0.3229	0.5341	0.2495	0.1690	0.3589	0.4159	0.5244	0.5236	0.3906	0.3480	0.5453	–
Panel B: Sample regime 1; October 1, 2004 - February 29, 2008 (N=179)												
BE	–	0.1004	-0.0414	0.0665	0.6722	0.0918	0.1110	0.1299	0.1842	0.1967	0.0884	0.0625
BG	0.1004	–	0.0484	0.0403	0.2103	0.0952	0.8397	0.6197	0.2239	0.1603	0.8548	0.2644
DE	-0.0414	0.0484	–	0.0912	-0.0945	-0.1167	0.0029	-0.0312	0.0715	0.0592	0.0247	0.0075
EL	0.0665	0.0403	0.0912	–	0.0921	0.1752	0.0809	0.0292	0.2210	0.1995	0.0968	0.0849
ES	0.6722	0.2103	-0.0945	0.0921	–	0.1531	0.2595	0.2174	0.2703	0.4527	0.1815	0.0979
FR	0.0918	0.0952	-0.1167	0.1752	0.1531	–	0.2108	0.2589	0.1377	0.2439	0.2160	0.3485
HR	0.1110	0.8397	0.0029	0.0809	0.2595	0.2108	–	0.6436	0.3245	0.2564	0.8050	0.2462
HU	0.1299	0.6197	-0.0312	0.0292	0.2174	0.2589	0.6436	–	0.2512	0.2269	0.6188	0.3023
IT	0.1842	0.2239	0.0715	0.2210	0.2703	0.1377	0.3245	0.2512	–	0.5465	0.2685	0.1337
PT	0.1967	0.1603	0.0592	0.1995	0.4527	0.2439	0.2564	0.2269	0.5465	–	0.1465	0.1555
RO	0.0884	0.8548	0.0247	0.0968	0.1815	0.2160	0.8050	0.6188	0.2685	0.1465	–	0.2737
SK	0.0625	0.2644	0.0075	0.0849	0.0979	0.3485	0.2462	0.3023	0.1337	0.1555	0.2737	–
Panel C: Sample regime 2; March 7, 2008 - June 26, 2009 (N=69)												
BE	–	0.5400	0.5048	0.6896	0.6995	0.7379	0.4972	0.4957	0.7554	0.6586	0.4778	0.5155
BG	0.5400	–	0.4486	0.5664	0.6392	0.6386	0.9167	0.8190	0.5865	0.4910	0.9435	0.7973
DE	0.5048	0.4486	–	0.5630	0.5542	0.7129	0.4102	0.4169	0.5436	0.4204	0.4320	0.4259
EL	0.6896	0.5664	0.5630	–	0.9126	0.8065	0.5579	0.5165	0.8479	0.7240	0.5339	0.6105
ES	0.6995	0.6392	0.5542	0.9126	–	0.8011	0.6002	0.5880	0.8309	0.8145	0.5900	0.6853
FR	0.7379	0.6386	0.7129	0.8065	0.8011	–	0.5838	0.5831	0.7875	0.6177	0.5690	0.6099
HR	0.4972	0.9167	0.4102	0.5579	0.6002	0.5838	–	0.8281	0.5452	0.4742	0.8968	0.7306
HU	0.4957	0.8190	0.4169	0.5165	0.5880	0.5831	0.8281	–	0.5105	0.4645	0.8539	0.7147
IT	0.7554	0.5865	0.5436	0.8479	0.8309	0.7875	0.5452	0.5105	–	0.6411	0.5131	0.5899
PT	0.6586	0.4910	0.4204	0.7240	0.8145	0.6177	0.4742	0.4645	0.6411	–	0.4656	0.5543
RO	0.4778	0.9435	0.4320	0.5339	0.5900	0.5690	0.8968	0.8539	0.5131	0.4656	–	0.7824
SK	0.5155	0.7973	0.4259	0.6105	0.6853	0.6099	0.7306	0.7147	0.5899	0.5543	0.7824	–

Table 2 (Cont.)
Correlation matrix between log changes in CDS spreads

	BE	BG	DE	EL	ES	FR	HR	HU	IT	PT	RO	SK
Panel D: Sample regime 3; July 3, 2009 - June 24, 2011 (N=104)												
BE	–	0.5707	0.7918	0.6577	0.7867	0.7400	0.4629	0.6135	0.7248	0.6636	0.5301	0.4798
BG	0.5707	–	0.5998	0.6199	0.6431	0.5955	0.9017	0.7989	0.6837	0.6652	0.9342	0.7693
DE	0.7918	0.5998	–	0.6112	0.7568	0.8049	0.5390	0.6235	0.7189	0.7145	0.5236	0.5078
EL	0.6577	0.6199	0.6112	–	0.7286	0.6242	0.5356	0.5828	0.7083	0.7634	0.5808	0.5011
ES	0.7867	0.6431	0.7568	0.7286	–	0.7430	0.5782	0.6720	0.8861	0.8635	0.5855	0.5349
FR	0.7400	0.5955	0.8049	0.6242	0.7430	–	0.5241	0.5515	0.6459	0.7149	0.5154	0.4245
HR	0.4629	0.9017	0.5390	0.5356	0.5782	0.5241	–	0.8031	0.6243	0.5981	0.8931	0.7578
HU	0.6135	0.7989	0.6235	0.5828	0.6720	0.5515	0.8031	–	0.6994	0.6370	0.8318	0.7301
IT	0.7248	0.6837	0.7189	0.7083	0.8861	0.6459	0.6243	0.6994	–	0.8371	0.6305	0.5949
PT	0.6636	0.6652	0.7145	0.7634	0.8635	0.7149	0.5981	0.6370	0.8371	–	0.5730	0.6079
RO	0.5301	0.9342	0.5236	0.5808	0.5855	0.5154	0.8931	0.8318	0.6305	0.5730	–	0.7464
SK	0.4798	0.7693	0.5078	0.5011	0.5349	0.4245	0.7578	0.7301	0.5949	0.6079	0.7464	–
Panel E: Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)												
BE	–	0.6516	0.7486	0.2035	0.7602	0.8858	0.6900	0.7355	0.8030	0.5042	0.6813	0.6141
BG	0.6516	–	0.4915	0.1600	0.5611	0.6446	0.9004	0.7449	0.6271	0.4319	0.8599	0.7539
DE	0.7486	0.4915	–	0.1237	0.5392	0.8285	0.5963	0.6024	0.6149	0.2887	0.5337	0.5815
EL	0.2035	0.1600	0.1237	–	0.2161	0.1676	0.1742	0.1426	0.2494	0.2629	0.2250	0.0793
ES	0.7602	0.5611	0.5392	0.2161	–	0.7603	0.6002	0.6410	0.9151	0.5984	0.6229	0.5098
FR	0.8858	0.6446	0.8285	0.1676	0.7603	–	0.7211	0.7381	0.7821	0.4464	0.6740	0.5993
HR	0.6900	0.9004	0.5963	0.1742	0.6002	0.7211	–	0.8170	0.6544	0.4002	0.8907	0.7635
HU	0.7355	0.7449	0.6024	0.1426	0.6410	0.7381	0.8170	–	0.6984	0.4713	0.8190	0.6764
IT	0.8030	0.6271	0.6149	0.2494	0.9151	0.7821	0.6544	0.6984	–	0.6224	0.6818	0.5533
PT	0.5042	0.4319	0.2887	0.2629	0.5984	0.4464	0.4002	0.4713	0.6224	–	0.4484	0.3292
RO	0.6813	0.8599	0.5337	0.2250	0.6229	0.6740	0.8907	0.8190	0.6818	0.4484	–	0.7814
SK	0.6141	0.7539	0.5815	0.0793	0.5098	0.5993	0.7635	0.6764	0.5533	0.3292	0.7814	–
Panel F: Sample regime 5; March 1, 2013 - July 15, 2016 (N=177)												
BE	–	0.2408	0.4392	0.1989	0.4197	0.5919	0.2357	0.3350	0.4025	0.3281	0.4025	0.3354
BG	0.2408	–	0.1544	0.1336	0.2584	0.2480	0.3591	0.4584	0.3068	0.3075	0.4307	0.0921
DE	0.4392	0.1544	–	0.1836	0.4806	0.5855	0.2917	0.2799	0.4623	0.3777	0.2796	0.1553
EL	0.1989	0.1336	0.1836	–	0.3996	0.3132	0.1335	0.2287	0.4188	0.4088	0.1854	0.0494
ES	0.4197	0.2584	0.4806	0.3996	–	0.5712	0.4162	0.4908	0.8901	0.6544	0.5114	0.2386
FR	0.5919	0.2480	0.5855	0.3132	0.5712	–	0.3139	0.3628	0.5520	0.5000	0.3903	0.1853
HR	0.2357	0.3591	0.2917	0.1335	0.4162	0.3139	–	0.5777	0.4414	0.3076	0.5260	0.0507
HU	0.3350	0.4584	0.2799	0.2287	0.4908	0.3628	0.5777	–	0.5431	0.3739	0.6012	0.1777
IT	0.4025	0.3068	0.4623	0.4188	0.8901	0.5520	0.4414	0.5431	–	0.6836	0.4937	0.2036
PT	0.3281	0.3075	0.3777	0.4088	0.6544	0.5000	0.3076	0.3739	0.6836	–	0.4000	0.1322
RO	0.4025	0.4307	0.2796	0.1854	0.5114	0.3903	0.5260	0.6012	0.4937	0.4000	–	0.1952
SK	0.3354	0.0921	0.1553	0.0494	0.2386	0.1853	0.0507	0.1777	0.2036	0.1322	0.1952	–

Notes: This table reports contemporaneous correlations between log-changes in CDS spreads between each pair of countries. Panel A reports for the full sample while panels B through F report for each of the sub-sampled regimes.

Table 3
Unit root tests

Country	ADF	PP	ERS	Country	ADF	PP	ERS
Panel A: Full sample; October 1, 2004 – July 15, 2016 (N=616)							
(Log levels)				*(Log changes)*			
BE	-0.8018	-0.8145	38.5428	BE	-14.0664*	-30.4558*	0.4356*
BG	-1.4211	-1.4848	19.8693	BG	-21.3188*	-21.3912*	0.4145*
DE	-1.2954	-1.5452	22.2796	DE	-13.9880*	-27.9892*	0.1867*
EL	-1.1984	-1.1226	17.7772	EL	-7.0868*	-29.4486*	2.0778*
ES	-0.3764	-0.4484	60.6998	ES	-27.7683*	-29.6704*	0.3194*
FR	-0.9796	-1.0423	27.9644	FR	-32.2863*	-32.6645*	0.3267*
HR	-1.6377	-1.6042	13.6561	HR	-11.0132*	-22.6878*	0.4498*
HU	-1.2162	-1.0987	30.1038	HU	-11.6434*	-23.4032*	0.4353*
IT	-1.0982	-1.1393	28.1336	IT	-26.1346*	-26.1070*	0.3409*
PT	-0.8723	-0.9117	37.7725	PT	-11.3880*	-25.9904*	0.2491*
RO	-1.2046	-1.1926	24.1527	RO	-21.7112*	-21.7952*	0.3615*
SK	-1.4033	-1.2929	17.9784	SK	-15.7307*	-23.9707*	0.3543*
Panel B: Sample regime 1; October 1, 2004 – February 29, 2008 (N=179)							
(Log levels)				*(Log changes)*			
BE	3.4879	1.2017	85.3268	BE	-13.1838*	-21.9555*	0.8513*
BG	0.2211	0.6173	37.3027	BG	-10.2450*	-10.2704*	1.2082*
DE	-1.3126	0.5305	15.2195	DE	-10.1233*	-37.2237*	0.2005*
EL	0.5077	-0.4598	26.2059	EL	-9.8848*	-19.8029*	1.2559*
ES	2.5289	1.8096	156.6126	ES	-19.4477*	-19.5618*	1.2694*
FR	1.7666	-1.8003	150.6033	FR	-8.8527*	-31.2464*	0.5736*
HR	-0.9790	0.0411	7.7583	HR	-2.6800*	-10.8702*	1.1644*
HU	-0.2398	-0.5050	25.0783	HU	-11.3005*	-11.8093*	1.1809*
IT	-0.5957	0.5445	9.8159	IT	-2.7359*	-12.0483*	2.1700*
PT	0.2726	0.8028	32.2179	PT	-4.9948*	-13.6574*	2.8577*
RO	0.9494	1.5304	56.0308	RO	-9.6241*	-10.9361*	1.1098*
SK	-0.4611	-0.6395	20.2142	SK	-8.4807*	-12.3819*	0.5335*
Panel C: Sample regime 2; March 7, 2008 – June 26, 2009 (N=69)							
(Log levels)				*(Log changes)*			
BE	-1.6806	-1.7151	19.9820	BE	-9.2898*	-9.2467*	2.6925*
BG	-1.3233	-1.4395	25.9039	BG	-6.9445*	-6.9197*	2.9905*
DE	-1.5820	-1.7994	15.9799	DE	-7.1460*	-7.0332*	2.7829*
EL	-2.4629	-1.3315	13.3155	EL	-7.2351*	-7.3621*	2.7057*
ES	-1.5865	-1.6791	20.5114	ES	-8.0097*	-8.0108*	2.6865*
FR	-1.2169	-1.5315	29.3048	FR	-7.7406*	-7.8450*	2.8642*
HR	-1.2978	-1.4513	29.5987	HR	-6.9885*	-6.9976*	3.1618*
HU	-1.6105	-1.7806	17.9137	HU	-6.5712*	-6.6947*	1.9093*
IT	-1.2007	-1.3257	28.8830	IT	-8.0186*	-8.0244*	2.6871*
PT	-1.6650	-1.6443	16.4366	PT	-8.3131*	-8.3439*	2.6294*
RO	-1.5864	-1.1462	18.0050	RO	-6.4831*	-6.4182*	2.9882*
SK	-1.1852	-1.4241	30.9629	SK	-7.5821*	-7.6362*	3.0147*

Table 3 (Cont).
Unit root tests

Country	ADF	PP	ERS	Country	ADF	PP	ERS
Panel D: Sample regime 3; July 3, 2009 - June 24, 2011 (N=104)							
(Log levels)				*(Log changes)*			
BE	-2.2343	-2.5354	16.0599	BE	-9.4840*	-9.5020*	2.3145*
BG	-3.2785	-3.2776	12.4187	BG	-6.3795*	-11.0319*	2.4274*
DE	-2.5599	-2.8326	11.4037	DE	-10.0162*	-10.0321*	2.0516*
EL	-1.9217	-2.0268	12.6257	EL	-10.5449*	-10.5374*	2.0246*
ES	-2.2068	-2.4009	7.7872	ES	-12.9480*	-12.7805*	2.3422*
FR	-1.8097	-2.0592	6.5613	FR	-3.5681*	-11.0084*	1.3179*
HR	-0.2374	-0.0780	3.8661	HR	-12.0415*	-11.9747*	1.9154*
HU	-2.7535	-3.1780	6.4595	HU	-4.4309*	-13.2227*	2.0289*
IT	-2.3739	-2.5968	8.4040	IT	-12.0105*	-12.3090*	2.1883*
PT	-2.7717	-2.8520	6.5837	PT	-6.4319*	-12.0469*	3.0394*
RO	-2.8959	-3.0294	9.7978	RO	-11.3063*	-11.2686*	1.8741*
SK	-0.2403	-0.2380	4.5201	SK	-12.7195*	-12.6944*	2.7609*
Panel E: Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)							
(Log levels)				*(Log changes)*			
BE	-2.2492	-3.1875	47.3889	BE	-10.5451*	-10.6587*	3.6693*
BG	-2.3132	-2.3184	40.1171	BG	-7.4036*	-7.3461*	4.1638*
DE	-3.1892	-3.1853	48.1714	DE	-8.5908*	-8.5799*	2.4401*
EL	-1.5340	-1.8509	61.2783	EL	-5.7348*	-8.9056*	2.3184*
ES	-1.3811	-2.0651	24.8868	ES	-8.5923*	-11.8090*	1.9092*
FR	-1.2989	-2.1147	22.7051	FR	-7.6688*	-8.9979*	2.1209*
HR	-2.7450	-2.7366	45.4005	HR	-7.4602*	-7.4106*	3.2633*
HU	-3.0736	-1.4218	19.7468	HU	-5.6347*	-8.3341*	2.2940*
IT	-2.5111	-2.6003	51.3253	IT	-6.5456*	-10.4289*	1.8817*
PT	-2.7497	-2.7748	36.8734	PT	-9.4253*	-9.5960*	3.0507*
RO	-2.2199	-2.2060	39.4666	RO	-8.5837*	-8.5881*	4.5735*
SK	-2.8924	-2.7865	21.0212	SK	-6.5930*	-8.1190*	0.5581*
Panel F: Sample regime 5; March 1, 2013 - July 15, 2016 (N=177)							
(Log levels)				*(Log changes)*			
BE	-2.3192	-2.9017	16.4937	BE	-16.7285*	-16.9015*	1.2083*
BG	-1.5294	-3.2024	16.9075	BG	-6.0189*	-14.1178*	0.9138*
DE	-3.1092	-2.9911	10.9793	DE	-14.9677*	-16.8164*	1.1894*
EL	-2.2230	-2.6446	52.6314	EL	-10.1700*	-18.5833*	0.3419*
ES	-1.8507	-1.6192	20.3366	ES	-14.4464*	-15.0835*	1.1748*
FR	-2.4555	-2.5466	9.7535	FR	-12.8545*	-13.0900*	1.2398*
HR	-2.7574	-2.8917	9.3067	HR	-15.4068*	-16.4466*	1.1044*
HU	-2.1729	-2.1225	10.1637	HU	-12.7757*	-13.1385*	1.4582*
IT	-2.0794	-1.8590	15.8816	IT	-14.7259*	-15.5998*	1.8207*
PT	-1.5593	-1.4954	16.5821	PT	-13.6205*	-13.6351*	1.1092*
RO	-2.7426	-2.6207	7.4943	RO	-10.4491*	-14.1352*	0.9915*
SK	-2.1803	-1.6770	5.1549	SK	-5.1256*	-16.4897*	1.8645*

Notes: This table reports unit root test statistics for the log-levels and log-changes of each country's CDS spreads. Panel A reports for the full sample while panels B through F report for each of the sub-sampled regimes. Critical values for the ADF and PP tests are found in MacKinnon (1996). Lag length for the ADF and ERS tests are based on the AIC. Critical values for the ERS test are found in Elliott et al. (1996). An asterisk (*) denotes rejection of the null hypothesis of a unit root at the 5% significance level at least.

Table 4
Multivariate Cointegration Tests

Hypothesized No. of CE(s)	Trace statistic	Critical values 0.05	Critical values 0.01	Max-Eigen statistic	Critical values 0.05	Critical values 0.01
Panel A: Log-level CDS spreads have no deterministic trends and cointegrating equations do not have intercepts						
None	317.1058	311.1288	326.9649	89.2332	73.0909	80.1049
At most 1	227.8726	263.2603	278.0073	46.9538	67.0756	73.8926
At most 2	180.9188	219.4016	232.8405	40.8027	61.0341	67.6430
At most 3	140.1162	179.5098	191.8186	31.0235	54.9658	61.3501
At most 4	109.0927	143.6691	154.8038	27.7332	48.8772	55.0355
At most 5	81.3595	111.7805	121.7433	22.5371	42.7722	48.6582
At most 6	58.8224	83.9371	92.7137	19.9202	36.6302	42.2333
At most 7	38.9022	60.0614	67.6367	15.9976	30.4396	35.7261
At most 8	22.9046	40.1749	46.5716	11.0585	24.1592	29.0603
At most 9	11.8460	24.2760	29.5135	7.6540	17.7973	22.2517
At most 10	4.1920	12.3209	16.3619	4.1537	11.2248	15.0913
At most 11	0.0383	4.1299	6.9406	0.0383	4.1299	6.9406
Panel B: Log-level CDS spreads have no deterministic trends and the cointegrating equations have intercepts						
None	350.9242	348.9784	365.6481	90.1952	77.3818	84.5081
At most 1	260.7290	298.1594	313.7524	51.8233	71.3354	78.2886
At most 2	208.9057	251.2650	265.5449	43.0395	65.3002	72.0939
At most 3	165.8662	208.4374	221.4442	36.2492	59.2400	65.7836
At most 4	129.6170	169.5991	181.5219	30.6233	53.1878	59.5090
At most 5	98.9937	134.6780	145.3981	27.7077	47.0790	53.1229
At most 6	71.2859	103.8473	113.4194	20.4200	40.9568	46.7458
At most 7	50.8660	76.9728	85.3365	18.3321	34.8059	40.2953
At most 8	32.5339	54.0790	61.2669	15.5133	28.5881	33.7329
At most 9	17.0206	35.1928	41.1950	8.2460	22.2996	27.0678
At most 10	8.7746	20.2618	25.0781	4.8740	15.8921	20.1612
At most 11	3.9006	9.1645	12.7608	3.9006	9.1645	12.7608
Panel C: Log-level CDS spreads have linear trends but the cointegrating equations have only intercepts						
None	344.8079	334.9837	351.2421	90.0808	76.5784	83.7066
At most 1	254.7272	285.1425	300.2879	51.8194	70.5351	77.4953
At most 2	202.9078	239.2354	253.2348	42.9487	64.5047	71.2606
At most 3	159.9591	197.3709	210.0548	36.2377	58.4335	64.9960
At most 4	123.7214	159.5297	171.0905	30.5624	52.3626	58.6690
At most 5	93.1590	125.6154	135.9732	27.7020	46.2314	52.3082
At most 6	65.4571	95.7537	104.9615	19.7802	40.0776	45.8690
At most 7	45.6769	69.8189	77.8188	15.8055	33.8769	39.3701
At most 8	29.8714	47.8561	54.6815	15.3233	27.5843	32.7153
At most 9	14.5481	29.7971	35.4582	7.8062	21.1316	25.8612
At most 10	6.7419	15.4947	19.9371	4.7838	14.2646	18.5200
At most 11	1.9581	3.8415	6.6349	1.9581	3.8415	6.6349

Table 4 (Cont.)
Multivariate Cointegration Tests

Hypothesized No. of CE(s)	Trace statistic	Critical values 0.05	Critical values 0.01	Max-Eigen statistic	Critical values 0.05	Critical values 0.01
Panel D: Log-level CDS spreads and the cointegrating equations have linear trends						
None	362.2620	374.9076	392.0162	90.5055	80.8703	88.1262
At most 1	271.7564	322.0692	337.9757	51.8588	74.8375	81.9394
At most 2	219.8976	273.1889	287.8761	43.4375	68.8121	75.6860
At most 3	176.4601	228.2979	241.7341	37.3530	62.7522	69.4403
At most 4	139.1071	187.4701	199.8084	30.6971	56.7052	63.1697
At most 5	108.4100	150.5585	161.7185	29.4386	50.5999	56.8447
At most 6	78.9714	117.7082	127.7086	21.5866	44.4972	50.4731
At most 7	57.3848	88.8038	97.5972	18.6047	38.3310	44.0164
At most 8	38.7801	63.8761	71.4792	15.4453	32.1183	37.4870
At most 9	23.3348	42.9153	49.3628	11.8026	25.8232	30.8340
At most 10	11.5322	25.8721	31.1539	7.5783	19.3870	23.9753
At most 11	3.9539	12.5180	16.5539	3.9539	12.5180	16.5539
Panel E: Log-level CDS spreads have quadratic trends and the cointegrating equations have linear trends						
None	355.4161	358.7184	375.3175	90.2165	79.9787	87.2326
At most 1	265.1995	306.8944	322.4372	51.5502	73.9404	81.0678
At most 2	213.6494	259.0294	273.3838	43.4196	67.9103	74.7434
At most 3	170.2298	215.1232	228.2226	37.0225	61.8055	68.5027
At most 4	133.2072	175.1715	187.1960	30.6935	55.7282	62.1741
At most 5	102.5137	139.2753	150.0778	29.2174	49.5863	55.8141
At most 6	73.2963	107.3466	116.9870	21.4078	43.4198	49.4117
At most 7	51.8886	79.3415	87.7748	18.5916	37.1636	42.8638
At most 8	33.2970	55.2458	62.5211	14.3816	30.8151	36.1930
At most 9	18.9154	35.0109	41.0815	11.4332	24.2520	29.2616
At most 10	7.4822	18.3977	23.1524	4.2317	17.1477	21.7442
At most 11	3.2505	3.8415	6.6349	3.2505	3.8415	6.6349

Notes: This table reports Trace statistics and Max-Eigen statistics derived from (11) and (12), respectively, using the Johansen (1991, 1995) cointegration method described in (8) through (10). CE(s) denote the hypothesized number of cointegrating equations. Each panel reports based on each of the deterministic trend cases described in Johansen (1995, pp. 80-84).
Critical values are found in MacKinnon et al. (1999).

Table 5A.

Pairwise Granger causality tests

Full sample; October 1, 2004 - July 15, 2016 (N=616)

Direction of causality	(Lags = 1) % cases causality not rejected	(Lags = 1) List of *j* countries	(Lags = 2) % cases causality not rejected	(Lags = 2) List of *j* countries	(Lags = 3) % cases causality not rejected	(Lags = 3) List of *j* countries	(Lags = 4) % cases causality not rejected	(Lags = 4) List of *j* countries
$BE \rightarrow Country_j$	63.64%	HR, FR, DE, EL, HU, IT, SK	81.82%	HR, FR, DE, EL, HU, IT, PT, SK, ES	81.82%	HR, FR, DE, EL, HU, IT, PT, SK, ES	90.91%	BG, HR, FR, DE, EL, HU, IT, PT, SK, ES
$BG \rightarrow Country_j$	72.73%	HR, FR, DE, EL, IT, SK, BE, HU	72.73%	BE, HR, FR, DE, EL, HU, IT, SK	90.91%	BE, HR, FR. DE, EL, HU, IT, PT, SK, ES	81.82%	HR, FR, DE, EL, HU, IT, PT, SK, ES
$DE \rightarrow Country_j$	18.18%	EL, FR	36.36%	BE, FR, EL, SK	27.27%	BE, FR, SK	36.36%	BE, HR, FR, SK
$EL \rightarrow Country_j$	0.00%	——	18.18%	BE, ES	9.09%	BE	9.09%	BE
$ES \rightarrow Country_j$	81.82%	BE, HR, FR, DE, EL, HU, IT, PT, SK	81.82%	BE, HR, FR, DE, EL, HU, IT, PT, SK	81.82%	BE, HR, FR, DE, EL, HU, IT, PT, SK	81.82%	BE, HR, FR, DE, EL, HU, IT, PT, SK
$FR \rightarrow Country_j$	36.36%	DE, EL, IT, HR	45.45%	BE, HR, DE, EL, IT	45.45%	BE, HR, DE, EL, IT	45.45%	BE, HR, DE, EL, IT
$HR \rightarrow Country_j$	27.27%	FR, DE, EL	45.45%	BE, DE, EL, SK, ES	72.73%	BE, FR, DE, EL, IT, PT, SK, ES	63.64%	BE, FR, DE, EL, IT, PT, ES
$HU \rightarrow Country_j$	36.36%	SK, FR, DE, EL	36.36%	FR, EL, IT, SK	54.55%	BE, FR, DE, IT, SK, ES	45.45%	BE, FR, DE, SK, ES
$IT \rightarrow Country_j$	45.45%	SK, ES, FR, DE, EL	54.55%	BE, FR, DE, EL, SK, ES	54.55%	BE, FR, DE, HU, SK, ES	63.64%	BE, FR, DE, EL, HU, SK, ES
$PT \rightarrow Country_j$	54.55%	HR, FR, DE, EL, IT, SK	63.64%	BE, FR, DE, EL, IT, SK, ES	63.64%	BE, FR, DE, EL, IT, SK, ES	63.64%	BE, FR, DE, EL, IT, SK, ES
$RO \rightarrow Country_j$	63.64%	SK, BE, FR, DE, EL, HU, IT	72.73%	BE, HR, FR, DE, HU, IT, SK, ES	90.91%	BE, HR, FR, DE, EL, HU, IT, PT, SK, ES	90.91%	BE, HR, FR, DE, EL, HU, IT, PT, SK, ES
$SK \rightarrow Country_j$	27.27%	FR, DE, EL	27.27%	BE, FR, DE	90.91%	BE, BG, HR, FR, DE, HU, IT, PT, RO, ES	72.73%	BE, HR, FR, DE, HU, IT, RO, ES

Notes: This table reports pairwise Granger causality tests between each pair of countries for the full sample period (October 1, 2004 until July 15, 2016), for one, two, three and four lags, respectively. It reports for which countries the null hypothesis of 'no causality' is rejected (i.e. the % of cases causality not rejected).

Table 5B.
Pairwise Granger causality tests
Sample regime 2; March 7, 2008 - June 26, 2009 (N=69)

Direction of causality	(Lags = 1) % cases causality not rejected	(Lags = 1) List of *j* countries	(Lags = 2) % cases causality not rejected	(Lags = 2) List of *j* countries	(Lags = 3) % cases causality not rejected	(Lags = 3) List of *j* countries	(Lags = 4) % cases causality not rejected	(Lags = 4) List of *j* countries
$BE \rightarrow Country_j$	9.09%	DE	18.18%	DE, HU	27.27%	DE, HU, RO	36.36%	BG, DE, HU, RO
$BG \rightarrow Country_j$	72.73%	BE, HR, FR, EL, HU, IT, PT, SK	72.73%	BE, HR, FR, EL, HR, IT. PT, SK	54.55%	BE, HR, HU, IT, PT, SK	36.36%	BE, HR, HU, SK
$DE \rightarrow Country_j$	0.00%	——	0.00%	——	0.00%	——	0.00%	——
$EL \rightarrow Country_j$	18.18%	BE, PT	18.18%	BE, IT	18.18%	BE, HU	18.18%	BE, HU
$ES \rightarrow Country_j$	36.36%	BE, FR, HU, PT	18.18%	BE, HU	18.18%	BE, HU	36.36%	BE, BG, HU, RO
$FR \rightarrow Country_j$	27.27%	BE, HU, PT	18.18%	BE, HU	27.27%	HR, HU, RO	36.36%	BG, HR, HU, RO
$HR \rightarrow Country_j$	63.64%	BE, BG, DE, HU, IT, PT, RO	18.18%	BE, PT	9.09%	HU	18.18%	DE, HU
$HU \rightarrow Country_j$	36.36%	BE, BG, DE, RO	18.18%	RO, SK	18.18%	RO, SK	9.09%	RO
$IT \rightarrow Country_j$	18.18%	BE, PT	27.27%	BE, HU, PT	18.18%	HU, PT	18.18%	HU, RO
$PT \rightarrow Country_j$	18.18%	BE, DE	27.27%	BE, DE, HU	18.18%	BE, DE	18.18%	BE, DE
$RO \rightarrow Country_j$	90.91%	BE, HR, FR, DE, EL, HU, IT, PT, SK, ES	63.64%	BE, HR, FR, HU, IT, PT, SK	63.64%	BE, HR, EL, HU, IT, PT, SK	54.55%	BE, HR, HU, IT, PT, SK
$SK \rightarrow Country_j$	63.64%	BE, HR, FR, DE, HU, IT, PT	36.36%	BE, DE, HU, PT	27.27%	BE, HU, PT	18.18%	BE, PT

Notes: This table reports pairwise Granger causality tests between each pair of countries for regime 2 (March 7, 2008 until June 26, 2009), for one, two, three and four lags, respectively. It reports for which countries the null hypothesis of 'no causality' is rejected (i.e. the % of cases causality not rejected).

Table 5C.

Pairwise Granger causality tests

Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

Direction of causality	(Lags = 1) % cases causality not rejected	(Lags = 1) List of *j* countries	(Lags = 2) % cases causality not rejected	(Lags = 2) List of *j* countries	(Lags = 3) % cases causality not rejected	(Lags = 3) List of *j* countries	(Lags = 4) % cases causality not rejected	(Lags = 4) List of *j* countries
$BE \rightarrow Country_j$	72.73%	BG, HR, FR, DE, HU, IT, RO, SK	81.82%	BG, HR, FR, DE, HU, IT, PT, RO, SK	90.91%	BG, HR, FR, DE, HU, IT, PT, RO, SK, ES	90.91%	BG, HR, FR, DE, EL, HU, IT, RO, SK, ES
$BG \rightarrow Country_j$	72.73%	HR, FR, DE, HU, IT, RO, SK, ES	63.64%	HR, DE, EL, HU, IT, RO, SK	45.45%	BE, DE, IT, RO, SK	54.55%	HR, DE, HU, IT, RO, SK
$DE \rightarrow Country_j$	54.55%	BE, HR, EL, IT, RO, SK	45.45%	HR, EL, IT, PT, RO	36.36%	BE, HR, IT, RO	45.45%	BE, HR, EL, IT, RO
$EL \rightarrow Country_j$	63.64%	BE, BG, HR, FR, DE, HU, SK	27.27%	BG, HR, SK	9.09%	BG	36.36%	BE, BG, HU, SK
$ES \rightarrow Country_j$	18.18%	BE, PT	9.09%	FR	9.09%	BE	9.09%	BE
$FR \rightarrow Country_j$	63.64%	BE, HR, EL, HU, IT, RO, SK	63.64%	BE, HR, EL, HU, IT, RO, SK	54.55%	BE, HR, HU, IT, RO, SK	63.64%	BE, HR, EL, HU, IT, RO, SK
$HR \rightarrow Country_j$	36.36%	BE, EL, IT, RO	45.45%	BE, DE, EL, IT, RO	36.36%	BE, DE, EL, RO	36.36%	BE, DE, EL, RO
$HU \rightarrow Country_j$	27.27%	BE, EL, IT	18.18%	BE, DE	18.18%	BE, DE	27.27%	BE, DE, EL
$IT \rightarrow Country_j$	27.27%	BE, PT, RO	36.36%	BE, FR. DE, RO	18.18%	BE, RO	36.36%	BE, FR, EL, RO
$PT \rightarrow Country_j$	81.82%	BE, HR, FR, DE, HU, IT, RO, SK, ES	63.64%	HR, FR, DE, HU, IT, RO, SK	63.64%	HR, FR, DE, HU, IT, RO, SK	45.45%	FR, HU, IT, RO, SK
$RO \rightarrow Country_j$	36.36%	BE, BG, HR, IT	27.27%	BE, BG, DE	36.36%	BE, BG, HR, DE	36.36%	BE, BG, HR, DE
$SK \rightarrow Country_j$	27.27%	BG, EL, IT	9.09%	EL	18.18%	BE, EL	18.18%	BE, EL

Notes: This table reports pairwise Granger causality tests between each pair of countries for regime 4 (July 1, 2011 until February 22, 2013), for one, two, three and four lags, respectively. It reports for which countries the null hypothesis of 'no causality' is rejected (i.e. the % of cases causality not rejected).

Table 6A
Forecast error variance decompositions of CDS spreads
Full sample; October 1, 2004 - July 15, 2016 (N=616)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.1454	94.4439	1.6730	0.2154	0.1180	0.0963	1.4875	0.0842	0.0601	0.3722	0.8701	0.4051	0.1742
	4	0.1944	90.6347	2.8715	0.1422	0.1750	0.2016	2.4324	0.2329	0.0465	0.7114	1.6995	0.4492	0.4031
BE	6	0.2317	86.1202	4.0224	0.2650	0.1856	0.4256	3.3449	0.4908	0.0476	1.0814	2.9361	0.4643	0.6162
	8	0.2631	81.5888	5.0244	0.5100	0.1874	0.7842	4.0011	0.8122	0.0522	1.4491	4.3735	0.4643	0.7527
	10	0.2910	77.2573	5.8560	0.8190	0.1871	1.2839	4.4219	1.1760	0.0582	1.7824	5.8897	0.4571	0.8113
	2	0.1229	12.8333	85.7658	0.0068	0.0465	0.0322	0.1351	0.1872	0.0142	0.0065	0.4343	0.2932	0.2449
	4	0.1753	13.7711	83.7141	0.2186	0.0269	0.2752	0.1233	0.4824	0.0634	0.0578	0.6068	0.3537	0.3067
BG	6	0.2127	14.4998	81.8067	0.5840	0.0569	0.6841	0.1330	0.8097	0.1838	0.0639	0.5516	0.3203	0.3063
	8	0.2429	15.0482	79.7666	1.0337	0.1263	1.2293	0.1532	1.1825	0.3512	0.0544	0.4758	0.2755	0.3033
	10	0.2687	15.4493	77.6161	1.5196	0.2245	1.8791	0.1801	1.5914	0.5459	0.0455	0.4082	0.2338	0.3065
	2	0.1605	18.1126	4.2580	76.3769	0.0427	0.4378	0.0593	0.0020	0.1712	0.0871	0.0135	0.0808	0.3581
	4	0.2037	25.9508	5.2107	66.8679	0.0291	0.3751	0.0437	0.0136	0.2912	0.0979	0.0132	0.2814	0.8254
DE	6	0.2309	32.6374	5.5968	58.7773	0.0280	0.4355	0.0420	0.0156	0.3345	0.0870	0.0929	0.5077	1.4455
	8	0.2514	37.9305	5.8839	51.8766	0.0332	0.6018	0.0370	0.0662	0.3560	0.0743	0.3043	0.7427	2.0935
	10	0.2685	41.7775	6.1607	46.1325	0.0372	0.9034	0.0330	0.2111	0.3667	0.0768	0.6579	0.9748	2.6685
	2	0.2268	5.7897	1.8503	1.0762	90.7398	0.0264	0.0006	0.1101	0.0074	0.0002	0.3104	0.0307	0.0581
	4	0.3013	6.1307	2.2113	1.0795	89.4220	0.1049	0.1007	0.0675	0.0604	0.0021	0.5623	0.1123	0.1464
EL	6	0.3568	6.6621	2.4666	1.1078	87.5680	0.2789	0.2336	0.0580	0.2277	0.0054	0.8771	0.2393	0.2756
	8	0.4021	7.2904	2.6654	1.1078	85.4114	0.5207	0.3709	0.0803	0.5016	0.0075	1.2362	0.3945	0.4133
	10	0.4410	7.9801	2.8202	1.0758	83.0649	0.8179	0.5015	0.1263	0.8631	0.0073	1.6298	0.5682	0.5450
	2	0.1323	37.7157	8.0020	0.2328	4.1337	48.3497	0.3249	0.0008	0.2006	0.0295	0.7319	0.2173	0.0612
	4	0.1790	36.3758	8.9342	0.1500	4.7622	47.7597	0.4214	0.0342	0.2273	0.1429	0.8548	0.2273	0.1103
ES	6	0.2158	35.2080	9.2167	0.2129	5.1036	47.5234	0.5343	0.1329	0.2061	0.4323	1.0287	0.2153	0.1859
	8	0.2475	34.2081	9.2030	0.3476	5.2986	47.3795	0.6130	0.3006	0.1761	0.8378	1.1896	0.1920	0.2542
	10	0.2760	33.3169	9.0255	0.5173	5.4124	47.2813	0.6567	0.5342	0.1481	1.3061	1.3288	0.1657	0.3071
	2	0.1630	32.2848	5.4504	2.4619	1.6768	1.6074	54.5667	0.0053	0.0394	0.6335	0.0314	0.1594	1.0829
	4	0.2092	37.2861	7.1655	2.8440	1.8234	2.9083	45.6388	0.0127	0.0257	0.5373	0.2485	0.2626	1.2469
FR	6	0.2403	40.5790	8.0414	2.6069	1.8386	4.3573	39.5419	0.0119	0.0557	0.4764	0.6803	0.3701	1.4404
	8	0.2650	42.5872	8.6186	2.2521	1.8258	5.9928	34.8509	0.0109	0.1204	0.4126	1.2723	0.4635	1.5930
	10	0.2864	43.6630	9.0076	1.9361	1.8047	7.7483	31.0742	0.0225	0.2062	0.3554	1.9497	0.5387	1.6935

Table 6A (Cont.)
Forecast error variance decompositions of CDS spreads
Full sample; October 1, 2004 - July 15, 2016 (N=616)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.1161	11.5915	64.1043	0.0382	0.0425	0.5976	1.2168	21.7720	0.0175	0.0013	0.2261	0.3478	0.0442
	4	0.1637	12.4700	66.3980	0.1148	0.0237	1.1972	1.2825	17.5918	0.0209	0.0559	0.3646	0.4414	0.0394
HR	6	0.1971	13.0112	66.7268	0.3380	0.0178	2.1382	1.3536	15.4587	0.0979	0.1085	0.3041	0.4155	0.0298
	8	0.2236	13.3725	66.3634	0.6412	0.0187	3.2912	1.4217	13.8577	0.2456	0.1375	0.2420	0.3721	0.0364
	10	0.2459	13.6107	65.6125	0.9821	0.0226	4.5892	1.4839	12.5327	0.4453	0.1410	0.2013	0.3286	0.0500
	2	0.1271	16.1046	42.1295	0.0665	0.0497	0.8035	0.6806	3.4448	36.1580	0.0042	0.1980	0.3252	0.0354
	4	0.1774	17.2529	44.8282	0.1123	0.0301	1.2575	0.3854	2.2532	32.9138	0.1374	0.3042	0.4772	0.0476
HU	6	0.2124	17.9370	45.5318	0.3100	0.0231	2.1390	0.2735	1.6549	30.9926	0.3577	0.2358	0.5103	0.0343
	8	0.2401	18.3350	45.6665	0.5937	0.0211	3.2295	0.2370	1.2982	29.3146	0.5741	0.1863	0.5161	0.0279
	10	0.2634	18.5333	45.5122	0.9197	0.0231	4.4353	0.2315	1.1153	27.7780	0.7408	0.1741	0.5113	0.0257
	2	0.1311	25.1036	13.6698	3.5622	5.6080	15.8619	0.4866	0.2234	1.2886	33.8424	0.1695	0.0988	0.0854
	4	0.1742	25.1499	16.8862	2.8537	6.5932	16.3067	0.6788	0.2619	1.5679	28.9438	0.3980	0.1933	0.1666
IT	6	0.2044	25.3711	19.0474	2.3115	7.2817	16.9614	0.8093	0.2559	1.5186	25.1393	0.7487	0.2815	0.2736
	8	0.2283	25.5658	20.5862	1.8977	7.7908	17.7200	0.8820	0.2306	1.3867	22.0372	1.1761	0.3537	0.3731
	10	0.2486	25.6936	21.6445	1.6025	8.1634	18.5722	0.9144	0.1989	1.2360	19.4719	1.6428	0.4072	0.4528
	2	0.1444	17.5395	6.5603	1.1053	8.0396	14.3229	0.3067	0.0051	0.0472	4.1891	47.7547	0.1270	0.0026
	4	0.1979	17.9307	6.1497	0.6093	8.3246	14.7542	0.1918	0.0060	0.0278	3.4690	48.3847	0.1398	0.0125
PT	6	0.2387	18.4866	5.7026	0.4862	8.3048	15.5846	0.1497	0.0236	0.0386	2.9218	48.1398	0.1335	0.0283
	8	0.2729	18.9706	5.3140	0.5641	8.2017	16.5342	0.1372	0.0673	0.0713	2.4603	47.5105	0.1178	0.0510
	10	0.3029	19.3493	4.9796	0.7473	8.0711	17.5357	0.1429	0.1401	0.1198	2.0745	46.6599	0.0999	0.0800
	2	0.1171	11.9850	61.8749	0.2030	0.3244	0.3407	0.2886	2.5813	1.6686	0.0628	0.7516	19.6559	0.2631
	4	0.1655	11.9907	62.5276	0.1077	0.2420	0.9818	0.2932	1.5889	1.4065	0.1482	0.9515	19.4823	0.2796
RO	6	0.1993	12.0727	62.7284	0.0943	0.1891	1.8745	0.2851	1.1237	1.1495	0.1666	0.8520	19.2239	0.2402
	8	0.2259	12.1420	62.5169	0.1392	0.1517	2.9556	0.2736	0.8869	0.9453	0.1523	0.7338	18.8952	0.2076
	10	0.2481	12.1929	61.9641	0.2266	0.1260	4.1683	0.2606	0.8116	0.7926	0.1284	0.6329	18.5110	0.1851
	2	0.1404	15.1835	27.4216	1.6206	0.5519	0.3312	1.1835	1.6184	1.0032	0.1851	0.0391	0.4233	50.4387
	4	0.1950	17.0073	32.8534	1.1135	0.6089	0.7002	0.6525	1.2826	0.9772	0.6587	0.0278	0.8831	43.2348
SK	6	0.2325	17.8773	34.4767	0.7939	0.6788	1.3620	0.4790	0.9758	0.8985	1.3305	0.0579	1.2264	39.8432
	8	0.2619	18.2387	35.2665	0.6629	0.7665	2.1983	0.4202	0.7727	0.8186	1.9707	0.1638	1.5417	37.1796
	10	0.2861	18.3054	35.7364	0.6595	0.8703	3.1519	0.3975	0.6876	0.7458	2.4831	0.3316	1.8381	34.7928

Table 6B
Forecast error variance decompositions of CDS spreads
Sample regime 1; October 1, 2004 - February 29, 2008 (N=179)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
BE	2	0.1341	88.7888	3.9694	0.7375	0.0073	1.4786	0.7167	0.7053	2.3858	0.9111	0.0106	0.0152	0.2737
	4	0.1653	72.4538	13.2606	1.1201	0.0512	7.5450	0.6374	0.9942	1.7114	1.4978	0.1961	0.0130	0.5193
	6	0.1961	61.4778	20.0433	0.8976	0.0383	12.1708	0.5597	1.4806	1.2407	1.5121	0.1599	0.0388	0.3804
	8	0.2267	55.3127	22.9946	0.7120	0.0334	15.8655	0.4475	1.8104	0.9308	1.3448	0.1347	0.0397	0.3738
	10	0.2581	51.3896	24.2643	0.5695	0.0262	18.9415	0.3468	1.9952	0.7188	1.1301	0.1106	0.0320	0.4753
BG	2	0.1322	0.2961	99.3075	0.0226	0.0443	0.0108	0.0000	0.0531	0.0026	0.0061	0.0696	0.1802	0.0072
	4	0.1807	2.2622	94.1568	0.0150	1.5699	0.1327	0.3043	0.0298	0.2720	0.0569	0.6103	0.4249	0.1651
	6	0.2102	3.9354	87.1777	0.0473	3.4647	1.1181	0.3958	0.0256	0.7593	0.0563	1.7225	0.4655	0.8319
	8	0.2363	5.8444	80.7153	0.1169	4.2037	2.9498	0.3231	0.0551	1.0339	0.0501	2.2239	0.4107	2.0730
	10	0.2633	8.0481	74.8575	0.1772	4.1335	5.1977	0.3065	0.1057	1.1227	0.0465	2.2262	0.3348	3.4437
DE	2	0.1498	0.3290	1.0892	90.0920	0.5066	2.2173	0.0138	0.0882	0.9362	0.1797	0.0152	0.0116	4.5210
	4	0.1664	0.5429	7.1176	78.5420	0.6299	4.5332	1.5915	0.4963	0.8926	0.8325	0.3951	0.0436	4.3828
	6	0.1745	2.1327	8.6841	71.7542	0.6213	6.4304	2.2064	1.2652	0.8325	1.3249	0.5245	0.0841	4.1397
	8	0.1814	5.0298	8.7252	66.4732	0.5770	8.0569	2.2859	1.8791	0.7801	1.6683	0.5182	0.1064	3.9001
	10	0.1886	8.0919	8.7724	61.5582	0.5593	9.6491	2.1845	2.3339	0.7250	1.8678	0.4934	0.1218	3.6428
EL	2	0.1598	0.2380	1.8268	2.3369	80.5285	0.3378	1.6870	3.8831	0.0049	1.3956	3.6658	3.5137	0.5818
	4	0.1962	0.7450	12.0459	4.3203	60.0844	1.2462	1.9392	7.6241	0.0791	1.9600	4.6392	2.8944	2.4222
	6	0.2290	1.5900	22.4603	4.5408	46.8215	1.8883	1.4652	8.0578	0.0598	2.2732	3.9598	3.0634	3.8199
	8	0.2602	2.9548	29.9130	4.1246	37.7954	2.6694	1.1369	7.6173	0.0999	2.0987	3.4925	3.3728	4.7246
	10	0.2905	4.5957	34.7427	3.5576	31.2404	3.7287	0.9233	6.9167	0.2034	1.8131	3.1121	3.7462	5.4201
ES	2	0.1253	39.5821	9.6623	0.8377	0.2543	47.2267	0.4561	0.0099	0.2081	0.0110	1.6270	0.0003	0.1245
	4	0.1760	35.8382	16.8685	0.4362	0.3373	44.0463	0.3441	0.0194	0.5887	0.0118	0.8672	0.0098	0.6325
	6	0.2212	34.3175	20.9805	0.2927	0.2924	41.4460	0.3154	0.0871	0.7938	0.0352	0.6192	0.0261	0.7943
	8	0.2639	33.8900	22.6197	0.2092	0.2627	40.1364	0.2870	0.2474	0.8224	0.0894	0.4841	0.0568	0.8950
	10	0.3053	33.9392	22.9836	0.1571	0.2615	39.4905	0.2820	0.4407	0.7996	0.1434	0.4067	0.1036	0.9920
FR	2	0.1712	6.9433	1.9494	1.4715	0.9130	1.4224	86.4016	0.0010	0.2033	0.1900	0.3133	0.0164	0.1748
	4	0.1985	8.4123	11.0281	2.3621	2.4494	7.7076	64.6455	0.4214	0.6158	0.2113	0.9273	1.0830	0.1361
	6	0.2194	9.9934	17.5919	1.9333	2.1216	11.2578	52.9837	0.5167	0.5094	0.2539	0.7801	1.5437	0.5145
	8	0.2390	12.5372	19.9755	1.6309	1.7880	14.5495	44.7267	0.6556	0.4312	0.3867	0.6584	1.7640	0.8962
	10	0.2592	15.0803	20.8132	1.3881	1.5221	17.7538	38.1538	0.7680	0.3682	0.5029	0.5602	1.7832	1.3061

Table 6B (Cont.)
Forecast error variance decompositions of CDS spreads
Sample regime 1; October 1, 2004 - February 29, 2008 (N=179)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
HR	2	0.1159	0.4403	81.3337	0.2136	0.2263	0.1671	0.7876	16.4256	0.0329	0.1910	0.0212	0.1240	0.0367
	4	0.1606	0.5913	83.1309	0.2564	1.7500	0.2910	0.4583	11.9759	0.1546	0.3888	0.4573	0.3628	0.1828
	6	0.1888	0.8642	79.9398	0.3500	3.6852	1.1262	0.4040	10.2688	0.4816	0.4601	1.2569	0.3863	0.7770
	8	0.2120	1.5147	76.2206	0.4429	4.5982	2.5724	0.3255	9.2458	0.7823	0.4089	1.6368	0.3483	1.9036
	10	0.2339	2.6357	72.5437	0.4938	4.6978	4.3159	0.3234	8.4183	1.0095	0.3572	1.6858	0.2922	3.2267
HU	2	0.1210	2.0362	46.9500	0.0347	0.2116	1.0798	1.1787	0.4016	47.3338	0.5727	0.0021	0.0082	0.1906
	4	0.1626	2.5649	49.6898	0.3946	2.9382	0.6692	1.4861	1.1319	39.1569	0.7608	0.8777	0.0900	0.2399
	6	0.1923	3.3434	47.2187	0.5093	6.0700	1.0213	2.0513	1.7166	33.7679	0.6254	2.1990	0.7039	0.7731
	8	0.2190	5.0847	44.9312	0.6060	7.5115	1.9827	2.0453	1.8590	29.0609	0.5168	2.8344	1.8057	1.7618
	10	0.2467	7.6559	43.2516	0.6519	7.6033	3.2432	1.7633	1.7408	24.5676	0.5321	2.9382	3.2417	2.8104
IT	2	0.0857	1.5440	10.7534	6.6406	4.0861	4.3814	0.5519	9.5210	0.3711	61.3076	0.4640	0.3373	0.0417
	4	0.1216	5.7022	25.7972	7.6255	3.2984	3.4112	1.7320	8.6165	0.5677	41.6263	1.2237	0.3657	0.0335
	6	0.1514	8.1427	35.5504	7.2087	3.8540	3.6311	2.0844	6.0428	0.4269	31.2694	1.2724	0.4797	0.0376
	8	0.1787	10.7149	40.7147	6.2540	4.2131	4.5229	2.1307	4.3876	0.3080	24.5026	1.4277	0.6606	0.1632
	10	0.2056	13.4244	43.2474	5.2600	4.1969	5.9129	1.8919	3.3159	0.2439	19.6711	1.4933	0.8759	0.4664
PT	2	0.0901	0.8860	8.6054	1.7830	8.5515	20.8616	1.5224	5.5031	0.5455	10.4941	40.2731	0.1633	0.8110
	4	0.1312	4.6650	28.6005	2.4738	5.0866	18.4090	0.8007	5.0224	1.8997	8.2956	21.2391	0.4216	3.0859
	6	0.1695	9.0112	39.0715	2.3936	4.1284	16.1071	0.4894	3.4262	1.8981	5.8898	13.0789	0.7794	3.7265
	8	0.2055	12.6844	42.9755	2.0349	3.7040	15.6987	0.3403	2.3918	1.4994	4.2371	9.2002	1.2194	4.0142
	10	0.2410	15.7345	43.9061	1.6378	3.2480	16.2980	0.2490	1.7440	1.1454	3.1593	6.9031	1.6844	4.2905
RO	2	0.1152	0.5721	74.1682	0.2695	0.4165	0.1450	0.2787	0.9310	0.8816	0.1076	0.3234	21.7797	0.1267
	4	0.1595	1.3104	69.5536	0.9055	3.0273	0.2440	0.4492	0.4996	0.5079	0.1504	0.9922	22.0452	0.3149
	6	0.1894	1.9974	63.4547	1.2354	5.5140	1.3752	0.5394	0.4124	0.4005	0.1659	2.1635	21.5430	1.1986
	8	0.2155	3.2540	58.7735	1.4106	6.4572	3.3399	0.4352	0.3531	0.3610	0.1363	2.6642	20.0216	2.7934
	10	0.2416	5.1607	55.1041	1.4408	6.3492	5.7304	0.3855	0.2978	0.3336	0.1163	2.6696	17.8382	4.5739
SK	2	0.1531	0.1694	15.1987	3.5528	0.2422	0.1242	4.5940	1.7125	1.1029	0.5742	0.1264	0.0402	72.5626
	4	0.2201	0.0845	28.2002	2.5065	0.3484	0.8994	8.7623	1.1605	1.1633	0.6933	0.0629	0.7475	55.3712
	6	0.2562	0.4070	29.5117	2.3575	0.7322	1.5998	11.7013	0.9212	1.1874	1.6049	0.0656	1.4865	48.4249
	8	0.2811	1.4620	28.6654	2.5912	1.2541	2.3907	12.9767	0.9675	1.1301	2.8821	0.1352	2.1046	43.4405
	10	0.3031	3.2144	28.0018	2.9263	1.5954	3.3352	13.0802	1.1579	1.0768	4.1684	0.2164	2.5238	38.7035

Table 6C
Forecast error variance decompositions of CDS spreads
Sample regime 2; March 7, 2008 - June 26, 2009 (N=69)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.2603	84.2426	1.2046	2.1882	3.9553	1.6334	0.0502	0.3485	0.0166	2.8415	2.4020	1.0094	0.1078
	4	0.3499	71.8956	7.7115	1.4418	9.0050	1.2389	0.2286	0.3807	3.3205	1.6616	1.4552	0.6300	1.0306
BE	6	0.4272	59.5138	15.7226	0.9873	12.0017	0.9573	0.9448	0.8854	4.0989	1.1471	1.2100	0.7110	1.8202
	8	0.5078	47.7681	23.4323	0.7802	13.6851	0.6832	1.5763	2.3747	5.1002	0.8281	1.1165	0.9249	1.7306
	10	0.5840	39.1939	29.0993	0.7894	14.5908	0.5289	1.8903	4.1551	5.5755	0.6713	0.9141	1.1899	1.4014
	2	0.1903	28.5260	55.5520	2.2061	6.0011	0.6013	1.1549	1.8541	1.0835	0.0095	0.0050	2.7258	0.2806
	4	0.2953	30.3870	42.8996	2.0575	9.3518	0.4263	1.9449	3.4568	6.3100	0.0748	0.2278	2.4275	0.4361
BG	6	0.3733	28.3854	42.8157	1.4280	10.9229	0.5908	1.4311	4.1826	6.7261	0.4346	0.1709	2.4643	0.4477
	8	0.4404	25.6431	42.2695	1.3035	12.4532	0.4972	1.1653	5.4683	7.7173	0.3855	0.2761	2.4303	0.3908
	10	0.4902	22.9504	42.4447	1.2660	13.8202	0.4341	1.1118	6.5944	7.8625	0.4661	0.2568	2.4732	0.3198
	2	0.2923	38.1052	8.0774	44.8863	1.4436	0.4758	0.7340	0.1843	0.1666	0.2658	1.2473	3.7396	0.6742
	4	0.4114	41.5002	14.6508	29.5825	3.8903	0.2897	4.3978	0.2684	0.4233	0.6944	0.7951	3.0968	0.4106
DE	6	0.4893	48.6371	13.2421	21.2479	4.6695	0.2754	5.4255	0.4017	0.4931	0.7922	1.5147	2.4848	0.8159
	8	0.5296	51.8572	12.4142	18.1506	5.0125	0.2486	5.0412	0.5952	0.4552	0.6989	1.8139	2.2725	1.4398
	10	0.5536	51.7206	13.0058	16.7561	5.5084	0.3793	4.6865	0.8088	0.5413	0.6563	1.8413	2.2041	1.8914
	2	0.1865	39.4096	19.8286	7.1966	28.1215	0.0000	0.6446	0.2043	0.0892	0.0011	0.0045	4.3913	0.1086
	4	0.2818	29.0136	33.3801	4.9624	22.8723	1.1830	1.8134	1.6528	1.1501	0.0871	0.3831	2.7639	0.7383
EL	6	0.3720	24.7966	39.4014	4.3051	18.9246	1.2921	1.8842	4.0083	1.9926	0.0636	0.2305	2.4861	0.6149
	8	0.4512	23.0606	42.1459	3.6735	16.4625	1.0991	1.6931	5.9734	2.6160	0.0767	0.2181	2.5324	0.4488
	10	0.5190	21.9485	43.3037	3.3083	15.1075	0.8903	1.5601	7.3208	3.2502	0.0871	0.2064	2.6763	0.3408
	2	0.1994	42.6569	18.2480	3.4590	23.4026	7.4468	0.6577	0.2015	0.0041	0.0670	0.0967	3.3289	0.4310
	4	0.2885	33.7251	26.9185	2.3520	22.0822	3.7161	1.4729	0.8884	3.4322	0.0386	2.1931	1.8782	1.3028
ES	6	0.3628	28.6743	31.7861	2.1697	21.7004	2.3769	1.3822	2.4324	4.7095	0.2365	1.8573	1.5537	1.1210
	8	0.4214	25.7486	34.7965	1.9910	20.9221	1.7645	1.2806	4.4413	4.9550	0.3338	1.4024	1.4801	0.8842
	10	0.4672	23.5643	36.5086	2.0483	20.2017	1.4475	1.3695	6.1595	4.9898	0.3302	1.1424	1.5156	0.7225
	2	0.2433	48.7444	13.6171	9.1104	8.8314	0.1552	12.6537	1.9494	0.0328	0.7396	0.1145	4.0388	0.0125
	4	0.3738	40.3039	26.9028	4.5824	11.8576	0.3202	6.7387	1.3681	4.1454	0.3732	0.8536	2.0094	0.5445
FR	6	0.4926	34.9766	31.8032	3.0886	13.8821	0.4941	4.2272	2.3017	5.6865	0.4039	0.8172	1.6738	0.6453
	8	0.5893	31.3970	34.1924	2.4651	14.8888	0.4525	3.1489	3.7753	6.2821	0.4839	0.6970	1.6297	0.5875
	10	0.6642	28.4141	35.6551	2.1922	15.7420	0.3860	2.6693	5.1752	6.5456	0.5095	0.5876	1.6392	0.4842

Table 6C (Cont.)
Forecast error variance decompositions of CDS spreads
Sample regime 2; March 7, 2008 - June 26, 2009 (N=69)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.2099	26.7579	55.6062	1.2110	5.9424	1.5948	0.6153	5.9197	0.3526	0.0039	0.0428	1.9527	0.0009
	4	0.3351	33.4726	42.4786	2.1820	7.6338	0.8737	0.9864	4.3679	3.7916	0.2258	0.2534	2.3528	1.3814
HR	6	0.4289	32.6707	42.2097	1.5157	8.9753	0.5512	0.6716	4.3953	4.2945	0.3830	0.1858	2.7644	1.3827
	8	0.5082	30.2721	41.7823	1.1883	10.2819	0.3936	0.5315	5.5169	5.4859	0.2998	0.1359	2.8358	1.2761
	10	0.5683	27.1753	42.2552	1.0481	11.5399	0.3212	0.5929	6.6448	5.8903	0.2948	0.1090	3.0291	1.0993
	2	0.1885	27.4486	49.9396	1.4361	2.6927	0.1575	0.9518	1.9302	13.6396	0.0101	0.0563	1.6344	0.1031
	4	0.3017	35.2487	35.5237	1.3574	8.0153	0.5248	2.8932	1.9967	10.8283	0.4481	1.2507	0.6933	1.2200
HU	6	0.3769	36.0254	34.2509	0.8948	9.9389	1.4168	2.4307	2.0845	8.9616	1.1253	0.8187	0.6194	1.4330
	8	0.4468	34.0651	34.3281	0.7270	11.3976	1.2734	1.9417	3.1348	9.3725	0.8685	0.8975	0.6409	1.3529
	10	0.5006	31.0695	34.9235	0.6770	13.3667	1.2017	1.8317	4.0144	9.2454	0.8869	0.8366	0.7917	1.1548
	2	0.1880	43.4061	16.4926	6.4916	18.6302	0.6782	1.5975	0.7674	0.2610	7.3984	0.0000	4.2124	0.0647
	4	0.2896	30.0167	33.5042	3.9479	16.9922	0.7217	3.1624	1.2018	3.5470	3.1270	0.7572	2.7843	0.2376
IT	6	0.3862	26.1171	38.3112	3.4310	15.9779	0.4168	2.4814	3.3722	4.6712	1.8336	0.5867	2.4843	0.3165
	8	0.4689	23.8444	41.0052	2.9538	15.3085	0.2859	1.9027	5.1306	5.0516	1.3714	0.4073	2.4930	0.2457
	10	0.5351	22.2612	41.7642	2.7459	15.1707	0.2202	1.6242	6.6126	5.4378	1.1316	0.3138	2.5270	0.1907
	2	0.2000	57.5952	5.5813	0.0228	9.6233	6.1911	1.4578	0.6096	0.0874	3.1806	13.4629	2.0091	0.1788
	4	0.2570	52.6467	13.2159	0.7963	10.3308	3.8844	0.9359	1.0835	2.5441	2.3385	8.5775	2.3468	1.2998
PT	6	0.3106	42.6060	23.0460	0.9828	12.6420	2.7969	0.8188	1.7474	3.4434	1.6773	5.9611	3.0780	1.2000
	8	0.3615	35.4819	29.2712	0.8731	13.2791	2.2445	0.8318	3.8538	4.2256	1.2613	4.4064	3.1606	1.1107
	10	0.4054	30.2098	33.2192	1.0118	13.4580	1.9723	0.9938	5.8736	4.4425	1.0069	3.5110	3.3867	0.9144
	2	0.1941	20.5233	58.4078	3.3333	5.6470	2.3987	0.5204	1.1840	1.6937	0.0104	0.0657	6.1717	0.0439
	4	0.3055	22.3520	46.7315	3.2303	9.5344	1.3302	0.8635	3.5922	6.2062	0.1881	0.4051	5.1519	0.4146
RO	6	0.3832	21.1497	47.3669	2.2926	10.7005	0.8547	0.6175	4.9375	5.9796	0.4018	0.2874	4.9724	0.4394
	8	0.4484	19.3650	46.7555	2.0493	11.5325	0.6709	0.5239	6.8305	6.6426	0.3022	0.2167	4.7330	0.3778
	10	0.4963	17.3108	46.9062	1.9415	12.3073	0.5844	0.5725	8.1752	6.6634	0.3104	0.1862	4.7307	0.3114
	2	0.2374	34.0733	37.7015	0.8417	8.5180	0.9945	1.8474	0.2775	2.3629	0.3156	0.1701	2.4023	10.4954
	4	0.3625	31.9760	37.3969	0.5517	9.5717	0.5035	2.0948	2.2972	4.4592	0.3594	0.5973	2.2880	7.9044
SK	6	0.4558	28.5249	39.4065	0.3706	11.4798	0.3192	1.7990	3.6316	5.3941	0.3322	0.4624	2.4846	5.7953
	8	0.5362	24.8358	41.4187	0.3409	12.1949	0.2723	1.5988	5.5441	6.1305	0.2755	0.3462	2.6108	4.4315
	10	0.6027	21.4790	42.7002	0.4899	12.9042	0.2644	1.6342	7.2085	6.4083	0.2407	0.2766	2.8601	3.5338

Table 6D
Forecast error variance decompositions of CDS spreads
Sample regime 3; July 3, 2009 - June 24, 2011 (N=104)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
BE	2	0.1191	93.4948	0.4118	0.6144	1.5017	1.0429	0.3136	1.5930	0.5096	0.4823	0.0169	0.0041	0.0148
	4	0.1561	79.4156	1.1845	0.4454	2.8109	8.5918	0.2155	1.3858	0.4236	4.6921	0.2694	0.4434	0.1220
	6	0.1758	68.2382	3.1851	0.9782	4.4913	12.9947	0.7489	1.3099	0.3405	6.0890	0.4945	0.9897	0.1401
	8	0.1893	59.9776	5.4780	2.2116	6.7365	13.9446	1.6174	1.4720	0.4271	5.8475	0.5679	1.5490	0.1708
	10	0.2006	53.5137	6.9245	3.4605	9.5804	13.1601	2.5890	1.6052	0.7050	5.2378	0.5143	2.4774	0.2323
BG	2	0.1016	37.3900	56.8250	0.2393	0.0237	0.8170	0.9138	1.8098	0.2925	0.3418	0.7520	0.0677	0.5275
	4	0.1291	38.0392	48.4140	0.6589	0.0621	2.2443	1.4267	3.1912	0.5029	1.8601	2.8917	0.3648	0.3442
	6	0.1437	35.8041	43.8751	0.8209	0.0942	3.3632	2.0023	3.9129	0.5893	2.9489	5.5091	0.5691	0.5108
	8	0.1525	33.8515	41.0576	1.1961	0.2119	3.6528	2.5497	4.7917	0.6784	3.1392	7.3442	0.6472	0.8796
	10	0.1579	32.4253	39.5428	1.5691	0.4968	3.5232	2.9328	5.5156	0.7834	3.0239	8.3470	0.6319	1.2081
DE	2	0.1148	56.6714	1.9761	37.8381	1.0282	0.0750	0.2916	0.4836	1.0188	0.0239	0.4770	0.0000	0.1163
	4	0.1532	46.3611	4.2536	34.0690	1.5245	3.8330	0.3061	0.9986	2.2220	5.4975	0.4567	0.1109	0.3671
	6	0.1724	41.8040	7.6878	29.8063	2.1489	5.9901	0.4937	1.7300	2.2201	5.9793	1.0692	0.4485	0.6220
	8	0.1855	38.2713	11.0514	26.4784	2.5964	6.7708	0.6786	3.0439	2.0285	5.8832	1.7368	0.4932	0.9673
	10	0.1934	36.0097	13.2414	24.7162	3.3243	6.7560	0.8666	3.9878	1.8784	5.6022	1.9408	0.5028	1.1738
EL	2	0.1315	34.5860	2.9243	0.2898	54.1284	0.5950	0.5881	2.3666	1.1205	2.4194	0.1396	0.3273	0.5152
	4	0.1763	27.6166	2.8393	0.7994	53.0618	0.7751	1.0830	3.0875	3.3082	6.6032	0.2664	0.2508	0.3087
	6	0.2053	22.0730	3.9257	2.5491	55.0876	0.6617	2.1964	2.9298	4.2358	5.6736	0.2208	0.2129	0.2336
	8	0.2303	17.8015	5.2330	4.1923	56.1604	1.1386	2.9249	2.5857	4.7265	4.5308	0.2799	0.2377	0.1886
	10	0.2542	14.6187	6.4879	4.9216	56.1892	2.2286	3.1339	2.1575	5.0474	3.9155	0.7773	0.3489	0.1737
ES	2	0.1131	66.9755	4.0502	1.5278	6.6923	17.3856	0.0012	1.5774	0.6706	0.0053	1.0332	0.0047	0.0762
	4	0.1503	50.3724	6.1879	0.9843	8.0854	18.5858	0.4472	4.6160	0.7928	7.1636	2.3483	0.2903	0.1260
	6	0.1681	42.7955	8.2503	1.3037	11.8833	17.4076	1.4571	5.3039	0.6437	7.2650	2.6935	0.8648	0.1315
	8	0.1799	37.6113	9.3173	2.0676	15.7403	15.6025	2.8659	5.3610	0.5998	6.4439	2.4936	1.7792	0.1176
	10	0.1910	33.4310	9.3948	2.7933	19.5539	13.8793	4.2602	4.9945	0.6262	5.8731	2.2226	2.8352	0.1360
FR	2	0.1161	60.3548	1.9251	11.3092	1.5397	1.3879	21.3809	1.3308	0.0829	0.0208	0.0826	0.5611	0.0243
	4	0.1556	55.8744	2.1077	9.1375	4.1926	6.8191	16.0613	3.5918	0.2513	0.7936	0.2616	0.5688	0.3403
	6	0.1805	49.3928	4.1827	7.4245	6.8396	8.6887	13.8107	6.0315	0.3308	1.3253	0.7421	0.4474	0.7838
	8	0.1977	43.7183	6.3915	6.2516	10.1474	8.3637	12.8896	7.9587	0.3357	1.3741	1.0565	0.4819	1.0311
	10	0.2100	39.2564	7.7053	5.5426	13.9709	7.5116	12.7370	8.7099	0.3104	1.2314	1.0785	0.8875	1.0585

Table 6D (Cont.)
Forecast error variance decompositions of CDS spreads
Sample regime 3; July 3, 2009 - June 24, 2011 (N=104)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
HR	2	0.0876	20.0665	60.0999	0.8000	0.1529	0.5324	0.4021	15.2264	1.3681	0.4487	0.4490	0.0428	0.4110
	4	0.1079	24.3571	49.1779	2.9680	0.3423	3.2983	0.3224	10.3128	3.1177	2.3718	2.0726	1.3559	0.3032
	6	0.1188	24.7394	41.6727	4.1663	0.3385	5.0517	0.2824	8.6794	4.0178	4.2962	3.8396	2.4415	0.4745
	8	0.1243	24.6548	38.1224	5.0145	0.3127	5.5510	0.2923	8.3177	4.7033	5.1518	4.4536	2.7224	0.7036
	10	0.1264	24.5788	36.8955	5.5977	0.3611	5.5383	0.3140	8.2393	5.1795	5.3270	4.4849	2.7063	0.7777
HU	2	0.0942	40.1024	28.1184	0.5217	0.0043	0.9481	2.2167	4.0898	20.7113	1.5942	1.3252	0.0780	0.2898
	4	0.1249	35.7971	22.2683	1.0004	0.0316	13.0490	1.9925	3.3295	12.9425	6.4429	2.7083	0.1837	0.2542
	6	0.1421	32.3046	18.6969	2.2319	0.0880	16.8869	1.6830	3.8793	10.2294	9.4787	4.0665	0.2465	0.2082
	8	0.1517	29.5026	17.3427	4.6396	0.2570	17.4300	1.7495	4.4805	9.3286	9.6819	4.9685	0.4335	0.1857
	10	0.1583	27.2929	16.9935	6.9416	0.6671	16.7275	2.2457	4.7595	9.0239	9.0762	5.2642	0.8242	0.1838
IT	2	0.1226	54.4420	10.4932	1.3578	4.0507	4.8207	0.3396	2.2227	0.6575	20.6713	0.3528	0.4009	0.1909
	4	0.1517	45.8383	8.4096	1.1622	4.6309	9.5375	1.1100	6.8657	0.5479	17.6905	2.3142	1.4505	0.4427
	6	0.1652	40.2884	8.2368	1.0503	7.7635	9.9057	2.6615	7.3584	0.5154	15.7837	3.5061	2.4555	0.4749
	8	0.1743	36.2387	7.9838	1.0781	10.5352	9.2492	4.8787	7.3887	0.6721	14.2137	4.0268	3.2683	0.4666
	10	0.1827	33.0508	7.4459	1.2750	13.2931	8.4380	6.8476	7.1690	0.8705	13.1409	4.0593	3.9658	0.4441
PT	2	0.1451	39.5354	7.2216	2.5098	12.9182	4.7004	1.5841	2.7805	2.5015	2.1330	24.0118	0.0210	0.0828
	4	0.1960	31.6478	9.9002	1.5078	19.8534	3.7517	1.2426	4.7326	3.5529	2.7252	20.7457	0.0432	0.2969
	6	0.2283	25.3745	13.7077	1.3440	26.7088	2.8219	1.3698	4.8049	3.3699	2.0588	17.9070	0.0405	0.4923
	8	0.2548	20.7291	16.8606	1.4039	31.0302	2.4583	1.5540	4.4342	3.1066	1.6642	16.0265	0.1512	0.5812
	10	0.2788	17.3421	18.5768	1.4360	34.0437	2.5883	1.7297	3.8109	2.8463	1.5009	15.0258	0.4136	0.6859
RO	2	0.1060	25.2595	57.0410	2.9736	0.0696	0.6528	0.5137	1.6015	0.8035	1.1554	2.2810	6.9594	0.6890
	4	0.1360	21.3754	53.4132	6.2481	0.0459	2.6742	1.7492	1.0896	0.5772	1.1555	5.9326	5.1833	0.5557
	6	0.1527	17.9709	49.2866	7.9508	0.0513	4.4003	2.8894	0.8849	0.6101	1.6013	9.6664	4.2240	0.4641
	8	0.1630	16.0305	46.5545	9.4122	0.0656	4.8671	3.7526	0.9921	0.6369	1.6420	11.7535	3.7429	0.5501
	10	0.1695	14.8889	45.2608	10.5146	0.2215	4.7035	4.2758	1.2581	0.6270	1.5339	12.5212	3.5316	0.6632
SK	2	0.0987	35.6090	28.2517	1.3966	0.5556	1.1038	2.4109	1.7491	1.2492	5.0021	0.2335	0.4248	22.0137
	4	0.1217	40.6113	25.8023	1.1297	0.8239	2.7808	4.0130	1.4909	3.1892	3.3278	0.5678	0.2832	15.9800
	6	0.1295	38.8017	23.3518	1.9724	1.1882	3.6240	4.0632	1.7001	5.0069	4.4951	1.2098	0.2597	14.3270
	8	0.1329	37.1371	22.2440	3.0724	1.6650	3.5790	3.9114	1.7761	5.8063	5.0772	1.8236	0.2565	13.6513
	10	0.1343	36.3321	21.8609	3.8646	2.0676	3.5738	3.8331	1.7476	6.1228	5.0558	1.9317	0.2533	13.3567

Table 6E
Forecast error variance decompositions of CDS spreads
Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.1321	88.8792	2.2120	0.5013	0.0316	3.3085	2.1537	0.6732	0.1180	0.3036	0.8800	0.8900	0.0489
	4	0.1655	86.9264	4.5013	0.3917	0.3192	2.5746	2.1740	1.0257	0.1267	0.2485	0.7323	0.8204	0.1593
BE	6	0.1857	84.7233	5.3867	0.9579	0.3734	2.1642	2.1147	1.4455	0.2230	0.2216	0.9730	1.2886	0.1281
	8	0.2013	82.2942	5.1779	1.3083	0.7416	2.6644	2.0512	1.9891	0.2148	0.2285	1.4975	1.7160	0.1164
	10	0.2147	78.9328	4.6527	1.6543	1.1695	4.2836	2.0590	2.5345	0.1959	0.2201	2.2011	1.9703	0.1263
	2	0.1240	44.3718	50.3203	0.0327	1.9030	1.6168	0.0108	0.3896	0.0461	0.2546	0.4361	0.1449	0.4734
	4	0.1707	44.6531	46.6790	0.3795	1.3777	1.2026	0.2163	1.4425	0.1231	0.2127	0.3847	1.3854	1.9436
BG	6	0.2073	47.7394	40.6679	0.5282	1.0100	0.9512	0.4599	1.0052	0.2769	0.3041	0.2729	4.6735	2.1108
	8	0.2327	50.7204	35.3950	0.4878	1.3818	0.8058	0.4681	0.9256	0.2608	0.7641	0.2993	6.5071	1.9840
	10	0.2506	52.1018	31.2693	0.6435	2.2816	1.1259	0.5380	0.9334	0.2270	1.3290	0.6711	7.0551	1.8243
	2	0.1400	57.8961	6.8909	29.0080	0.5670	2.1172	0.5319	1.9537	0.0477	0.0264	0.3963	0.5557	0.0091
	4	0.1821	58.7123	12.4954	19.2342	1.2046	2.2636	1.4276	2.6921	0.1682	0.4640	0.3793	0.5618	0.3969
DE	6	0.2044	59.3446	12.5174	15.2805	2.5896	2.2544	2.2367	2.7727	0.1433	0.6818	0.4586	1.2938	0.4267
	8	0.2174	59.6228	11.9168	13.5188	4.2636	2.0416	2.1987	2.5211	0.1297	0.7164	0.8389	1.8511	0.3803
	10	0.2257	59.0566	11.0973	12.5842	5.6509	2.3872	2.1060	2.3593	0.1469	0.7487	1.3738	2.1361	0.3530
	2	0.2899	3.1320	0.1641	0.3359	94.5719	0.0004	0.0780	0.6718	0.0938	0.1605	0.1141	0.6694	0.0081
	4	0.3743	2.0792	1.4872	1.1482	83.6803	0.2024	2.0574	1.9322	2.9594	0.1394	0.0714	1.7476	2.4952
EL	6	0.4289	1.6057	6.7544	2.2294	72.3534	1.1825	1.7407	2.1620	3.2500	0.2915	0.0803	2.8305	5.5196
	8	0.4580	1.8055	11.1648	2.6448	64.9051	2.5186	1.5367	2.1249	2.8929	0.3332	0.1491	3.0826	6.8419
	10	0.4774	2.8157	14.1900	2.7851	59.8543	3.5303	1.5237	2.0166	2.7121	0.3138	0.2505	2.8603	7.1476
	2	0.1187	57.9856	5.0348	0.0466	0.5001	36.0240	0.0006	0.0066	0.0303	0.1307	0.1817	0.0489	0.0100
	4	0.1408	54.2749	7.9921	0.1046	1.3036	33.2299	0.5768	0.7472	0.1142	1.2101	0.1445	0.2152	0.0869
ES	6	0.1573	52.2729	9.3202	0.5498	2.0472	28.9935	0.9064	0.8903	0.1194	3.4330	0.1210	1.0452	0.3013
	8	0.1706	50.1446	9.2831	2.1774	2.5894	25.0461	1.2803	0.9735	0.2162	5.9693	0.2868	1.4747	0.5586
	10	0.1809	48.0848	8.8446	3.8835	3.0130	22.2876	1.3189	1.0064	0.3264	8.0678	0.7649	1.5762	0.8258
	2	0.1259	71.7224	4.3219	3.6835	0.0831	9.8356	8.0031	1.1796	0.0105	0.4293	0.6076	0.1230	0.0004
	4	0.1497	71.5809	7.2231	2.7228	0.2318	9.4084	6.7085	0.8888	0.0559	0.4391	0.5139	0.1195	0.1075
FR	6	0.1616	71.7144	7.7962	2.5280	0.5517	8.3384	6.1082	0.8605	0.1257	0.3807	0.5776	0.4364	0.5821
	8	0.1693	71.3947	7.5263	2.3460	1.0352	7.8904	5.5763	1.3191	0.1249	0.3493	0.9058	0.6146	0.9175
	10	0.1759	69.7391	6.9858	2.3173	1.3326	8.8389	5.1910	1.9889	0.1490	0.3277	1.4274	0.7236	0.9787

Table 6E (Cont.)

Forecast error variance decompositions of CDS spreads

Sample regime 4; July 1, 2011 - February 22, 2013 (N=87)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.0919	44.9691	36.7928	1.5695	0.2501	5.8727	0.1039	8.4606	0.1451	0.6822	0.8076	0.2332	0.1131
	4	0.1246	43.0232	41.6750	1.3692	0.2760	5.6790	0.4010	4.6286	0.2211	0.5417	0.8767	0.6435	0.6649
HR	6	0.1472	44.4914	39.5773	0.9825	0.7028	5.0469	0.5266	3.6955	0.1982	0.4493	0.7068	2.8989	0.7237
	8	0.1620	46.5671	35.5155	0.9535	1.8084	4.2974	0.4713	3.5098	0.1655	0.7142	0.5993	4.7091	0.6891
	10	0.1716	47.5859	32.1633	1.2212	2.9831	3.9866	0.4389	3.4098	0.1788	1.1853	0.7516	5.4660	0.6294
	2	0.0867	53.8115	16.9279	1.5751	1.0032	4.1567	0.3334	5.7428	15.0111	0.0628	0.3199	0.0464	1.0094
	4	0.1067	50.9009	24.7304	1.2798	1.4393	3.2538	1.2152	4.3106	10.7625	0.3735	0.2283	0.5837	0.9220
HU	6	0.1195	49.4887	26.5775	1.4183	1.8418	2.6496	1.6418	3.6320	8.9586	0.5252	0.1837	2.2742	0.8085
	8	0.1267	50.4275	25.5804	1.2974	1.6934	3.0337	1.6759	3.2636	8.1290	0.5018	0.2341	3.1347	1.0285
	10	0.1323	50.7197	23.8836	1.2833	2.0637	4.4337	1.7279	3.0251	7.4622	0.4666	0.5237	3.2161	1.1943
	2	0.1293	56.5618	7.8432	0.3551	0.1626	20.8592	0.3047	0.0932	0.0899	12.4770	0.8486	0.0021	0.4027
	4	0.1512	53.9736	11.9596	1.0406	0.1431	19.1188	0.3278	0.2283	0.2124	10.3845	1.5624	0.3573	0.6918
IT	6	0.1682	54.4011	13.8133	1.1577	0.1235	16.7916	0.3131	0.1915	0.2992	8.4254	1.8258	2.0623	0.5956
	8	0.1787	55.9046	13.7600	1.2192	0.1669	15.0150	0.3253	0.1835	0.2691	7.8802	1.6530	3.0940	0.5292
	10	0.1863	56.6399	13.1335	1.6238	0.2820	13.8768	0.3076	0.1859	0.2685	8.0237	1.6591	3.5115	0.4878
	2	0.1093	18.3919	7.0738	2.9347	1.5975	5.0614	0.9590	1.7960	0.7385	0.3695	60.7886	0.2830	0.0062
	4	0.1357	13.4936	11.8138	4.1446	1.4985	3.4908	0.7148	10.9007	0.5753	0.4326	52.0103	0.2474	0.6776
PT	6	0.1504	15.1474	13.2775	4.4686	1.2529	4.3943	0.5976	14.4919	0.4835	0.4121	43.6884	0.9818	0.8040
	8	0.1617	17.9822	11.8638	4.4395	1.1002	7.3627	0.5285	14.5775	0.4344	0.4536	38.4040	2.1426	0.7111
	10	0.1721	19.4250	10.5030	4.0972	0.9779	11.5910	0.6544	13.9596	0.3926	0.4271	34.7678	2.5705	0.6342
	2	0.0928	43.5408	27.8384	0.4476	1.3663	8.8860	0.1896	2.8958	2.0948	2.6464	1.4518	8.2790	0.3635
	4	0.1288	36.7307	35.2652	1.3518	0.7504	9.9812	1.0615	2.2334	1.3429	3.2200	1.9258	4.7056	1.4314
RO	6	0.1572	36.7712	35.9480	2.4927	0.5277	9.4406	0.8786	1.5357	1.1794	2.4542	1.9676	5.3433	1.4611
	8	0.1753	39.9252	33.4971	2.1128	0.6494	8.2523	0.7290	1.3486	1.0144	2.1161	1.8134	7.1819	1.3599
	10	0.1883	42.4478	30.4867	2.3632	1.0226	7.1780	0.6628	1.4161	0.8881	2.6112	1.5883	8.0995	1.2358
	2	0.1010	29.9889	32.3461	5.4325	1.1951	1.3913	0.6426	0.2614	0.9650	1.1796	1.8665	6.2401	18.4908
	4	0.1338	30.8163	35.9688	3.7439	1.0754	1.1746	0.4924	4.4336	2.3990	1.8414	1.8755	4.8962	11.2829
SK	6	0.1542	34.6746	35.8151	4.0073	1.0807	0.9078	0.5236	4.4601	1.8226	1.8969	1.5072	4.7648	8.5393
	8	0.1681	38.5892	33.2905	3.7147	0.9285	1.1856	0.5046	4.1632	1.5917	1.7001	1.2804	5.8338	7.2178
	10	0.1781	41.1686	30.4773	3.3134	0.8965	2.7136	0.5444	3.8800	1.4501	1.5162	1.2942	6.2597	6.4860

Table 6F
Forecast error variance decompositions of CDS spreads
Sample regime 5; March 1, 2013 - July 15, 2016 (N=177)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
	2	0.0743	92.6092	0.4113	0.5938	0.1070	1.4304	2.5226	0.3280	0.1063	0.0280	0.0346	0.0063	1.8224
	4	0.0934	89.5237	0.5766	0.9773	0.2113	2.1070	2.4152	0.7712	0.7017	0.5409	0.5235	0.3604	1.2913
BE	6	0.1054	85.8657	0.6587	1.5706	0.4278	2.2525	2.1971	1.9975	1.2397	1.2090	0.8798	0.5977	1.1038
	8	0.1149	81.3936	0.6406	2.6495	0.8365	2.6530	2.0382	3.2116	1.6633	1.8606	1.4267	0.5739	1.0525
	10	0.1230	77.0974	0.5668	3.9871	1.3214	3.1461	1.9190	4.0544	1.9400	2.2276	2.0659	0.5138	1.1606
	2	0.0486	4.5792	91.7991	0.3167	0.2248	1.2464	0.3340	0.0023	0.2189	0.0315	0.1339	0.1081	1.0050
	4	0.0612	3.2285	84.0614	5.0288	0.3895	1.0182	0.2987	1.8348	0.2802	0.5067	0.4246	0.2667	2.6619
BG	6	0.0704	4.3603	73.5408	9.1408	0.3275	0.7721	0.3260	4.9849	1.1420	1.1079	0.7166	0.2247	3.3563
	8	0.0772	5.9553	65.9877	11.1565	0.3599	0.6456	0.2774	7.4907	2.3590	1.4273	0.7244	0.2223	3.3939
	10	0.0821	7.2057	61.0842	12.0891	0.5540	0.5715	0.3104	9.0424	3.5402	1.5574	0.6774	0.2318	3.1359
	2	0.0925	33.2366	0.3427	59.2708	0.3854	0.0791	1.5315	0.0683	1.4952	0.7449	2.4229	0.0074	0.4152
	4	0.1192	34.1604	0.2844	53.7850	0.4888	0.1229	2.2323	1.0200	3.0960	1.6028	2.4717	0.4608	0.2749
DE	6	0.1332	34.5790	0.5276	51.1787	0.4291	0.2244	2.0945	1.3022	3.8673	2.3956	2.4512	0.6580	0.2924
	8	0.1422	34.8031	1.0856	49.6309	0.3868	0.3624	1.9368	1.3690	4.2405	2.6325	2.5377	0.6940	0.3208
	10	0.1489	34.9255	1.7614	48.3968	0.3611	0.5143	1.8038	1.4169	4.4916	2.5944	2.6839	0.6846	0.3657
	2	0.2462	5.9637	0.6306	2.0658	89.6203	0.4316	0.2157	0.0063	0.6067	0.1093	0.0403	0.1819	0.1278
	4	0.2993	9.2171	0.9635	2.1639	85.0826	0.3977	0.2281	0.0771	0.4744	0.0903	1.0431	0.1266	0.1356
EL	6	0.3305	11.8294	1.3726	2.0711	80.5756	0.7102	0.2677	0.0696	0.3918	0.1085	2.3529	0.1116	0.1390
	8	0.3527	13.6064	1.6526	1.8502	76.8160	0.9035	0.2672	0.1509	0.4041	0.2607	3.8189	0.1053	0.1642
	10	0.3708	14.7915	1.9144	1.6752	73.6248	0.9842	0.2449	0.3381	0.4795	0.4273	5.2053	0.1289	0.1861
	2	0.1079	24.9210	1.8271	4.3663	5.7039	57.1776	0.3232	0.1241	1.2744	0.4389	3.2506	0.0386	0.5544
	4	0.1373	30.7387	1.2045	2.8870	5.4765	51.5241	0.2781	0.0831	1.8250	1.5535	3.0675	0.0267	1.3352
ES	6	0.1578	34.6513	0.9283	2.9096	5.4016	47.2167	0.5764	0.1221	1.8358	2.2535	2.5206	0.0263	1.5577
	8	0.1749	37.6175	0.7650	3.0469	5.5946	43.4337	0.8709	0.2288	1.8918	2.6645	2.1366	0.0468	1.7029
	10	0.1897	39.8967	0.6517	3.0326	5.9682	40.4271	1.0876	0.3745	1.9795	2.8441	1.8649	0.0882	1.7849
	2	0.0822	40.7324	0.3817	5.9670	1.1210	4.5652	45.4628	0.2264	0.1110	0.2319	0.7805	0.0211	0.3991
	4	0.1056	46.0556	0.2771	4.1303	0.7260	4.3168	41.0967	0.1985	0.7620	1.0627	0.5933	0.0199	0.7609
FR	6	0.1192	49.7336	0.2687	3.3070	0.7327	4.0002	37.2032	0.2473	1.0348	1.8789	0.4806	0.0759	1.0371
	8	0.1290	51.8877	0.4120	2.9697	0.7035	3.8171	34.2081	0.4880	1.2249	2.3897	0.4992	0.2205	1.1796
	10	0.1370	53.1608	0.6769	3.0224	0.6336	3.7408	31.7683	0.6993	1.4249	2.6693	0.6848	0.3729	1.1460

Table 6F (Cont.)
Forecast error variance decompositions of CDS spreads
Sample regime 5; March 1, 2013 - July 15, 2016 (N=177)

Response variable	Horizon (weeks)	S.E.	Predictor variables											
			BE (%)	BG (%)	DE (%)	EL (%)	ES (%)	FR (%)	HR (%)	HU (%)	IT (%)	PT (%)	RO (%)	SK (%)
HR	2	0.0399	8.3847	5.1011	2.8268	0.6843	7.1523	0.5538	72.8591	0.4841	0.7309	0.0001	0.4171	0.8057
	4	0.0473	6.8504	3.8470	5.8704	3.4248	5.5472	4.0207	62.6733	1.0832	0.6784	0.1518	0.2966	5.5562
	6	0.0527	5.5473	3.1039	10.0606	4.2970	4.7309	6.4858	53.1524	0.8770	1.0250	0.3213	0.3624	10.0364
	8	0.0569	4.8045	2.6727	13.0917	4.1082	4.4403	7.4535	46.9586	0.7529	1.3858	0.3285	0.6491	13.3541
	10	0.0604	4.4137	2.3791	15.3306	3.7318	4.4866	7.7919	42.5827	0.6687	1.6864	0.3063	1.0512	15.5712
HU	2	0.0617	19.7003	10.4344	0.7237	0.4522	6.5771	0.2048	9.1888	49.5534	0.0933	0.5604	0.3283	2.1832
	4	0.0767	17.1693	7.1820	1.0602	1.1971	8.3173	2.4509	6.0946	43.8421	0.1502	0.3939	4.4314	7.7111
	6	0.0872	15.4539	6.2805	1.4113	1.1703	10.0331	3.7114	4.7209	36.9069	0.4701	0.4140	8.7923	10.6352
	8	0.0957	15.2767	7.0400	1.4668	0.9782	11.2195	4.0530	3.9712	31.9084	1.4030	0.5653	10.9898	11.1282
	10	0.1032	16.3464	8.0418	1.4030	0.8701	11.9004	4.1245	3.7119	28.3869	2.5157	0.6960	11.3969	10.6064
IT	2	0.0993	25.2652	3.7704	5.9434	6.1283	37.6594	1.0982	0.2143	1.7547	14.2974	3.4085	0.0433	0.4170
	4	0.1228	30.8738	2.6881	4.0001	5.4638	37.6264	0.8237	0.6967	1.5653	10.3318	4.4621	0.1399	1.3284
	6	0.1384	35.0093	2.1857	3.1780	5.4744	36.5783	0.6520	1.1629	1.3373	8.1469	4.7968	0.1747	1.3035
	8	0.1516	38.5307	1.9003	2.6615	5.7100	34.8656	0.5708	1.3783	1.3167	6.8481	4.9426	0.1577	1.1177
	10	0.1633	41.2900	1.6743	2.2974	5.9668	33.1848	0.5618	1.5104	1.4755	5.9837	4.9538	0.1369	0.9650
PT	2	0.1303	13.1536	5.5212	4.5113	7.0504	20.7784	0.8115	0.2039	0.4339	4.5995	42.8264	0.0923	0.0176
	4	0.1680	15.7722	4.8049	2.9476	5.2137	22.7184	0.7670	0.2174	1.3789	4.1040	41.9732	0.0654	0.0373
	6	0.1920	16.6605	3.9479	2.2728	4.2105	24.2330	2.0195	0.5721	1.8348	3.5433	40.5389	0.0594	0.1073
	8	0.2114	16.8257	3.3075	1.8960	3.6730	25.0575	3.5738	1.0926	2.1819	2.9649	39.1620	0.0518	0.2130
	10	0.2281	16.7581	2.8468	1.6297	3.4319	25.5238	4.9702	1.5197	2.5202	2.5551	37.8285	0.0456	0.3704
RO	2	0.0540	19.7667	5.9882	0.4512	0.1602	7.9607	0.2138	10.4124	11.0031	1.1313	0.9464	41.7199	0.2463
	4	0.0659	18.6529	4.1421	1.2449	1.9180	6.5934	1.1199	7.8943	15.5138	2.0239	0.9463	37.6782	2.2721
	6	0.0727	17.0662	4.4036	1.8401	2.8973	6.1022	2.5871	6.5091	15.7805	2.8445	0.8089	35.7293	3.4311
	8	0.0777	16.2344	5.4500	1.8172	2.9770	6.0663	3.3855	5.7591	15.6557	3.5779	0.8323	34.2609	3.9838
	10	0.0818	16.0497	6.6470	1.6588	2.8066	6.2396	3.7953	5.4101	15.4831	4.2004	0.9352	32.6548	4.1195
SK	2	0.0487	14.0542	1.1660	0.6460	0.2115	0.8951	0.1792	4.3687	2.1126	0.3704	0.2761	0.2226	75.4977
	4	0.0647	16.8699	0.6651	2.0045	0.1918	2.3595	0.1239	7.6940	1.6595	0.2848	0.5949	1.7822	65.7699
	6	0.0774	19.2883	0.6768	3.9000	0.1729	3.7434	0.0902	8.3610	1.2901	0.2141	0.6631	3.2661	58.3340
	8	0.0880	21.7159	0.9477	5.6332	0.1809	4.6784	0.0934	8.0551	1.0422	0.3304	0.6557	4.1106	52.5566
	10	0.0973	24.3418	1.1782	6.8218	0.2275	5.3629	0.1168	7.5307	0.9137	0.5763	0.6147	4.4618	47.8538