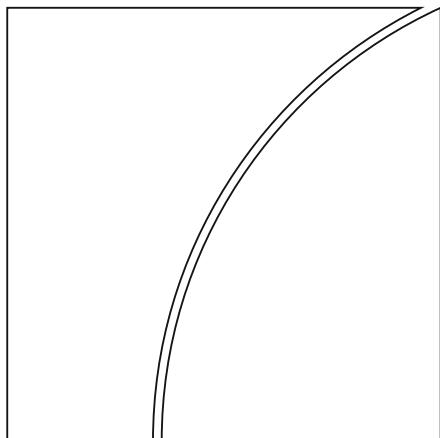




BANK FOR INTERNATIONAL SETTLEMENTS

# BIS Working Papers

## No 541



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by Marlene Amstad, Eli Remolona and Jimmy Shek  
Monetary and Economic Department

January 2016

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ISSN 1020-0959 (print)  
ISSN 1682-7678 (online)

# How do global investors differentiate between sovereign risks? The new normal versus the old<sup>1</sup>

Marlene Amstad, Eli Remolona and Jimmy Shek

## Abstract

When global investors go into emerging markets or get out of them, how do they differentiate between economies? Has this behaviour changed since the crisis of 2008 to reflect a "new normal"? We consider these questions by focusing on sovereign risk as reflected in monthly returns on credit default swaps (CDS) for 18 emerging markets and 10 developed countries. Tests for breaks in the time series of such returns suggest a new normal that ensued around October 2008 or soon afterwards. Dividing the sample into two periods and extracting risk factors from CDS returns, we find an "old normal" in which a single global risk factor drives half of the variation in returns and a new normal in which that risk factor becomes even more dominant. Surprisingly, in both the old and new normal, the way countries load on this factor depends not so much on economic fundamentals as on whether they are designated an emerging market.

Keywords: C38, F34, G11, G12, G15

JEL classification: Emerging market, CDS, sovereign risk, risk factor, new normal, taper tantrum

<sup>1</sup> We are grateful for comments from Steve Cecchetti, Piti Disyatat, Torsten Ehlers, Marco Lombardi, Philip Lowe, Garry Olivar, Frank Packer, Daranee Saeju, Ilhyock Shim, Yu Zheng and other participants in seminars at the City University of Hong Kong, the Hong Kong Institute for Monetary Research, the Bank of Thailand and the School of Economics at the University of the Philippines. The views expressed here are our own and do not necessarily reflect those of the Bank for International Settlements.

## 1. Introduction

During the “taper tantrum” of 2013, many emerging market countries saw their currencies depreciate sharply and the spreads on their sovereign bonds widen dramatically. This prompted market analysts to identify five of the worst hit economies as the “Fragile Five,” attributing their vulnerability to economic fundamentals, particularly to current account deficits.<sup>2</sup> Indeed when global investors decide to buy or sell emerging market bonds, how do they differentiate between the different economies? What economic fundamentals do they consider to be important?

Much of the literature on investing in emerging markets has been about a tug-of-war between “push” and “pull” factors, with the relative strength of these factors deciding whether we see capital inflows or outflows. The push factors often relate to economic or financial developments in the global economy as a whole or in the advanced economies, notably the United States. The pull factors often relate to country-specific economic fundamentals in emerging markets. Both push and pull factors seem to be important. Fratzscher (2012) finds that global push factors drove capital flows in 2008 but country-specific pull factors drove such flows in 2009-2010. Forbes and Warnock (2012) identify unusually large capital inflows and outflows in a large sample of emerging markets. In explaining these flows, they find a global risk factor to be the most important variable and domestic country factors to be less important. Puy (2015) looks at mutual fund flows and finds that push effects from advanced economies expose developing countries to sudden stops and surges. In the case of the taper tantrum, Eichengreen and Gupta (2014) look at equity prices, exchange rates and foreign reserves and find that the differential impact on emerging markets is largely explained by the size of the domestic financial market.

We consider the role of economic fundamentals in investment decisions by focusing on sovereign risk in emerging markets. But instead of looking at capital flows, we look at risk premia. The role of risk premia is important because they determine the cost at which a country can raise funds abroad. Kennedy and Palerm (2014) examine such premia by analysing emerging market bond (EMBI) spreads. They find that much of the decline in these spreads from 2002 to 2007 reflected improved country-specific fundamentals, but the sharp increase in these spreads in the 2008 crisis was due to risk aversion. Remolona, Scatigna and Wu (2008) choose to analyze sovereign CDS spreads rather than EMBI spreads, the CDS market being more liquid than the underlying bond markets. They find that country-specific fundamentals drive default probabilities, while global investors' risk aversion drives time variation in the risk premia. Longstaff, Pan, Pedersen and Singleton (2011, hereafter LPPS) also rely on sovereign CDS spreads and find that “the majority of sovereign credit risk can be linked to global factors.” The risk premia found in CDS spreads seem to be largely a compensation for bearing the risk of these global factors. Aizenman, Jinjarak and Park (2013) focus on economic fundamentals in also analyzing CDS spreads on emerging markets and find that external factors were more important before the global crisis, while domestic factors associated with the capacity to adjust became more important during the crisis and afterwards.

<sup>2</sup> The term “Fragile Five” refers to Brazil, India, Indonesia, Turkey and South Africa. It seems to have been first used by Lord (2013). Not to be outdone, another analyst proposed a grouping called the “Sorry Six,” which would include Russia as the sixth country

In analyzing returns on sovereign CDS contracts, we follow closely the approach of LPPS, an approach that emphasizes the role of risk premia. We analyze CDS returns for 18 emerging markets and 10 advanced countries over 11 years of monthly data from January 2004 to December 2014. Statistical tests for breaks in the movements of CDS returns suggest a break at the time of the eruption of the global subprime crisis in October 2008. This leads us to consider two subperiods separately, an "old normal" before the outbreak of the crisis and a "new normal" afterwards.

For each subperiod, we extract principal components, which provide us with a conveniently small number of otherwise unobservable global risk factors. We consider such factors to be the driving forces of risk premia. We then analyze the role of economic fundamentals in the way the different countries load on those risk factors. In both the old normal and new normal, we seek to explain the variation of these loadings in terms of such fundamentals as debt-to-GDP ratios, fiscal balances, current account balances, sovereign credit ratings, trade openness, GDP growth and depth of the domestic bond market.

In the old normal, the first risk factor alone explains about half of the variation in CDS returns, consistent with LPPS. This factor becomes more dominant in the new normal, in which it explains over three-fifths of the variation in returns. When it comes to how the different countries load on this factor, we find that that the commonly cited economic fundamentals have little influence on the country-specific loadings on the factor. Instead the single most important explanatory variable for the differences in loadings is a dummy variable that identifies whether or not a country is an emerging market.

In Section 2, we explain how we go about identifying the emerging markets in our sample as opposed to advanced economies. We also implement procedures for identifying breaks in the time series of our CDS data. In Section 3, we conduct factor analysis on CDS returns and analyse the resulting global risk factors. In Section 4, we analyse the country-specific loadings on the two most important global risk factors. In the last section, we draw conclusions about the new normal in global bond markets

## 2. Data on sovereign CDS returns

### 2.1 Eighteen emerging markets, ten advanced economies

It turns out that there is no consensus on which countries are "emerging markets." In general, the term refers to fast-growing developing countries. The original definition in the 1980s seems to have referred to developing countries in which portfolio equity investment presented opportunities for high returns. The term was later applied also to fixed-income investments. In this paper, we focus on bond markets but adopt a relatively broad country definition. We include in our sample of emerging markets any country that meets one of the following criteria as of 2014: (a) it is in the IMF's list of emerging or developing economies; (b) it is in the World Bank's list of low and middle-income countries; or (c) it is a constituent of the emerging market bond index of Barclays, JP Morgan, Merrill Lynch or Markit.

However, we exclude so-called "frontier markets", countries in which the outstanding amount of public debt as of 2014 is less than USD10 billion and countries for which the sovereign credit rating falls below Ba3/BB- as of 2014. To include such

frontier markets would raise idiosyncratic issues related to market illiquidity or other restrictions. We also exclude countries for which data on sovereign CDS contracts are not available for most of the sample period.

We end up with a sample of 18 emerging markets. The sample includes five countries in Latin America: Brazil, Chile, Colombia, Mexico and Peru; seven in Asia: China, Hong Kong SAR, Indonesia, South Korea, Malaysia, the Philippines and Thailand; three in Eastern Europe: Czech Republic, Hungary and Poland; and three elsewhere: Russia, South Africa and Turkey. The classification is broadly in line with the MSCI market classification. India and Singapore do not make it to the sample because they lack actively traded sovereign CDS contracts for the more recent part of the sample.<sup>3</sup> A high per capita income is apparently not a barrier to inclusion in the list of emerging markets. Hong Kong has the same per capita income as the United States, and South Korea has the same per capita income as the European Union.

For our sample of advanced economies, we choose countries based on the following criteria for data as of 2014: (a) its currency is part of the SDR and its government bond market is at least USD1 trillion in size; (b) its currency has a share of at least 1% of global reserves based on COFER statistics; or (c) it is a constituent of the developed market bond index of Barclays, JP Morgan, Merrill Lynch or Markit. Note that the first criterion leads to the inclusion of any country in the euro area that has a government bond market that is at least USD1 trillion in size as of 2014. We end up with a sample of 10 advanced economies: Australia, Canada, France, Germany, Italy, Japan, New Zealand, Sweden, the United Kingdom and the United States..

## 2.2 The CDS market and returns across countries

An advantage of using CDS data rather than data on underlying bonds is that, at least since 2004, the CDS market has become more liquid than the underlying bond markets. The disadvantage of CDS data is that they provide a shorter time series than the data on emerging market bonds.

We obtain from Markit monthly data on five-year sovereign CDS spreads. We choose the five-year maturity, because this is the most liquid maturity segment of the CDS market. Our sample covers the period from January 2004 to December 2014, giving us 132 observations for each country.<sup>4</sup> To avoid possible weekend and holiday effects, we choose CDS spreads available on the last Wednesday of each month. If that Wednesday happens to be a holiday, we go back to the previous trading day that is not a Monday or Friday.

Returns on CDS contracts are given by, where  $r_{i,t+1}$  is the return realized at month  $t+1$  for country  $i$ ,  $s_{it}$  is the CDS spread at month  $t$  and  $d_t$  is the duration, with the variables consistently expressed in monthly terms. For purposes of analysis, however, it will suffice to focus only on the monthly changes in spreads, which will account for most of the variation in returns.

The average spread for a given sovereign ranges from 19 basis points for the United States to 232 basis points for Turkey. As we would expect for a reasonably long sample, the average monthly change tends to be close to zero. The annualized

<sup>3</sup> CDS data for India are available only up to August 2009 and for Singapore up to March 2012.

<sup>4</sup> While CDS spread data are available going back to 2000 for some of the countries in our sample, the contracts apparently started trading actively only in 2004.

volatility based on these spread changes ranges from 22 basis points for the United States and 243 basis points for Russia. Spreads and volatility tend to be of the same order of magnitude. In our sample, the ratio of average spread to average volatility is 1.06. The average pair-wise correlation of spread changes is 0.61, suggesting a fairly high level of commonality in general.

### 3. Global risk factors in a new normal

#### 3.1 Testing for a “new normal”

The bankruptcy of Lehman Brothers in September 2008 marked the start of the global subprime crisis. The question in this paper is whether the event led to a lasting change in the behaviour of investors in emerging markets.<sup>5</sup> To test for the existence of a “new normal”, we see whether we can find one or more break points in the data generation process across time. If we do, where do the breaks occur? We apply specific tests to different moments of the CDS series, namely the spreads, first differences and volatility of those first differences.

First, we apply Bai and Perron (1998, 2003) to test for the existence of breaks in the series for each sovereign.<sup>6</sup> We find no significant break in any of the times series of first differences. We do find at least one and up to three break points for 19 of the 28 spreads and 12 of the volatilities. These are reported in Table 1. While some of the markets exhibit more than one break in spreads or volatilities, October 2008 stands out as the most common break point across different sovereigns. Since break points for first differences are not found, we do not analyse them any further. We then turn to the Quandt-Andrews test, which imposes on each individual market the condition of a single break at an unknown date. In nine of the markets, the tests for spreads and volatilities place a break in October 2008 and in two of the markets in September 2008. Finally, we apply a Chow test, which imposes on all markets the same break of October 2008.<sup>7</sup> The Chow test confirms the break in October 2008, which would mark the dividing line between an old and new normal. Nonetheless, the data show that there were already spikes in CDS spreads in September 2008, albeit small ones relative to the spikes in October. The extraordinary spikes during the eight months of September 2008 to April 2009 suggest that the period should be analysed separately.

<sup>5</sup> In the April 2008 issue of its *Global Financial Stability Report*, for example, the IMF assumes that only emerging markets are vulnerable to financial crises. To the extent that market participants shared this attitude, the onset of the global subprime crisis in advanced countries might have led them to change this attitude.

<sup>6</sup> Wang and Moore (2012) test for a structural shift in September 2008 in sovereign CDS spreads of 38 developed and emerging countries by applying the likelihood test to a dummy variable, and they reject the null of no shift between the two periods. Tamakoshi and Hamori (2014) test for breaks in volatility by applying the Bai-Perron approach to the absolute values of the demeaned series. In the case of financial sector CDS indexes, they find no breaks.

<sup>7</sup> A trimming percentage of 15% is employed. Since there are 124 observations in the sample, the trimming value implies that regimes are restricted to have at least 18 observations.

## Tests for structural breaks in CDS spreads and volatility

Table 1

|                | Bai-Perron test |         |            |         | Quandt-Andrews test for break at unknown date <sup>1</sup> |                       |            | Chow test break in 2008-10 <sup>2</sup> |            |
|----------------|-----------------|---------|------------|---------|--|-----------------------|------------|---|------------|
|                | Spread          |         | Volatility |         | Break  | Spread                | Volatility | Spread                                  | Volatility |
| Brazil         |                 |         |            |         |  |                       |            | 12.85***                                |            |
| Chile          | 2008-09         | 2010-03 | 2011-09    | 2009-08 | 2008-09  | 57.08***              |            | 115.40***                               |            |
| Colombia       |                 |         |            | 2009-06 | 2009-06  |                       |            | 11.07***                                |            |
| Mexico         | 2008-09         | 2010-02 |            |         |  |                       | 2.26**     |   |            |
| Peru           |                 |         |            |         |  |                       |            | 43.61***                                | 2.73*      |
| China          |                 |         |            |         |  |                       |            | 2.93*                                   |            |
| Hong Kong SAR  |                 |         |            |         |  |                       |            | 137.42***                               | 4.20**     |
| Indonesia      | 2009-07         |         |            |         |  |                       |            | 164.17***                               | 4.08**     |
| Korea          | 2009-11         |         |            |         |  |                       |            | 57.04***                                |            |
| Malaysia       | 2009-07         | 2011-08 |            |         |  |                       |            | 81.89***                                | 3.33*      |
| Philippines    | 2009-07         |         |            |         |  |                       |            | 24.34***                                |            |
| Thailand       |                 |         |            |         |  |                       |            | 111.90***                               | 3.32*      |
| Czech Republic | 2008-10         | 2010-03 | 2011-08    |         | 2008-10  | 112.79***             |            | 234.28***                               | 6.32**     |
| Hungary        | 2008-10         |         |            | 2009-08 | 2008-10  | 197.74***             | 3.39***    | 404.25***                               | 11.34***   |
| Poland         | 2008-10         |         |            | 2009-09 | 2008-10  | 123.79***             | 2.83**     | 256.34***                               | 10.07***   |
| Russia         | 2008-09         | 2010-02 |            |         | 2008-09  | 12.54***              |            | 30.35***                                |            |
| South Africa   | 2009-07         |         |            |         |  |                       |            | 71.06***                                |            |
| Turkey         |                 |         |            |         |  |                       |            |   |            |
| Australia      | 2008-10         | 2010-03 | 2011-08    | 2009-08 | 2008-10  | 133.44***             |            | 275.64***                               | 9.37***    |
| Canada         | 2009-01         | 2010-06 |            |         | 2009-01  | 178.28***             |            | 274.24***                               |            |
| France         | 2008-10         | 2010-03 | 2011-08    | 2008-10 | 2011-07  | 120.0*** <sup>3</sup> | 9.56***    | 160.87***                               | 23.19***   |
| Germany        | 2008-10         |         |            | 2008-10 | 2008-10  | 14.72***              | 6.22***    | 238.01***                               | 18.21***   |
| Italy          | 2008-10         | 2011-07 |            | 2008-10 | 2011-07  | 147.04***             | 16.25***   | 160.61***                               | 24.95***   |
| Japan          | 2008-10         |         |            | 2008-10 | 2008-10  | 235.22***             | 4.56***    | 479.20***                               | 14.44***   |
| New Zealand    | 2008-10         | 2010-02 | 2011-06    | 2008-10 | 2010-01  | 109.59***             |            | 227.72***                               | 5.01**     |
| Sweden         | 2008-10         |         |            | 2008-10 | 2010-02  | 66.33***              | 2.67**     | 141.29***                               | 9.92***    |
| United Kingdom | 2008-10         |         |            | 2008-10 | 2009-10  | 103.34***             | 1.60*      | 214.87***                               | 6.60**     |
| United States  | 2008-09         |         |            | 2008-09 | 2010-02  | 165.01***             | 4.30***    | 330.15***                               | 12.69***   |

\*/\*\*/\*\*\* indicate the statistical significance.

<sup>1</sup> Exp F-statistics. <sup>2</sup> F-statistics. <sup>3</sup> 04-2010.

Sources: Markit; authors' calculations.

Sovereign CDS spreads in the old normal, new normal, during the global crisis and during the taper tantrum

(In basis points)

Table 2

|                       | All (28) | Latin America (5) | Emerging Asia (7) | Eastern Europe (3) | Other (3) | Advanced Econ (10) |
|-----------------------|----------|-------------------|-------------------|--------------------|-----------|--------------------|
| <b>Old normal</b>     |          |                   |                   |                    |           |                    |
| (Jan 2004 – Aug 2008) |          |                   |                   |                    |           |                    |
| Average               | 72.7     | 171.3             | 98.1              | 24.9               | 145.0     | 5.6                |
| Average change        | -0.3     | -2.5              | 0.2               | 0.9                | -0.3      | 0.2                |
| Volatility            | 76.4     | 132.3             | 66.1              | 32.0               | 109.5     | 9.6                |
| Average correlation   | 0.59     | 0.69              | 0.60              | 0.92               | 0.66      | 0.87               |
| <b>New normal</b>     |          |                   |                   |                    |           |                    |
| (May 2009 – Dec 2014) |          |                   |                   |                    |           |                    |
| Average               | 113.7    | 118.7             | 112.0             | 179.0              | 187.0     | 69.8               |
| Average change        | -1.4     | -2.0              | -2.2              | -2.4               | -0.5      | -0.6               |
| Volatility            | 75.5     | 65.3              | 77.8              | 106.4              | 100.5     | 56.4               |
| Average correlation   | 0.54     | 0.66              | 0.69              | 0.90               | 0.57      | 0.64               |
| <b>Global crisis</b>  |          |                   |                   |                    |           |                    |
| (Sep 2008 – Apr 2009) |          |                   |                   |                    |           |                    |
| Average               | 240.2    | 288.3             | 308.0             | 277.7              | 470.8     | 80.4               |
| Average change        | 12.6     | 17.5              | 11.9              | 22.8               | 14.8      | 7.7                |
| Volatility            | 362.5    | 331.9             | 477.8             | 318.5              | 624.8     | 103.1              |
| Average correlation   | 0.70     | 0.97              | 0.77              | 0.94               | 0.93      | 0.83               |
| <b>Taper tantrum</b>  |          |                   |                   |                    |           |                    |
| (May 2013 – Dec 2013) |          |                   |                   |                    |           |                    |
| Average               | 108.0    | 130.8             | 113.3             | 146.5              | 193.7     | 57.3               |
| Average change        | 1.1      | 3.8               | 2.6               | -1.7               | 6.4       | -2.1               |
| Volatility            | 67.5     | 67.3              | 85.3              | 64.7               | 100.8     | 32.8               |
| Average correlation   | 0.50     | 0.77              | 0.71              | 0.81               | 0.77      | 0.43               |

In the analysis to follow, we divide our sample into two subperiods, the subperiod up to August 2008 to represent the old normal and the one since May 2009 to represent the new normal. To ensure that our results do not unduly depend on just the height of the global financial crisis, we avoid the period of extraordinarily wide spreads between September 2008 and April 2009. This leaves us with 56 months of data in the old normal and 68 months in the new normal. We analyse separately the behaviour of CDS returns during the unusual period of the crisis. We also analyse separately the period of the taper tantrum, although we do not exclude it from the new normal.

The summary statistics in Table 2 show the following interesting changes between the two subperiods of the old normal and the new normal:

- a) The levels of CDS spreads rose from an average of 73 basis points in the old normal to 114 basis points in the new normal; the rise was most pronounced for emerging markets in Eastern Europe;
- b) Across regions, only for Latin America did the average spread decline between the two subperiods; this is because there was a crisis in Brazil in 2002, and that

- was such a big event for the region that spreads for Brazil, Colombia and Peru remained elevated through the first two years of our sample;
- c) The average volatility or the annualized standard deviation of the changes in spreads hardly changed, but it rose significantly for specific regions, namely emerging Asia, Eastern Europe and the advanced economies; and
  - d) The average unconditional pairwise correlation declined somewhat, from 0.59 to 0.54, but it rose significantly for emerging Asia.

The summary statistics for the brief periods of the global crisis and the taper tantrum are also interesting:

- e) The average spread during the global crisis was more than three times that in the old normal and more than double that in the new normal; the average volatility during the crisis was close to five times what it was in the two other subperiods and correlations were generally higher than even those in the old normal; and
- f) The period of the taper tantrum was considerably tamer than that of the global crisis. The average spread of the taper tantrum was less than half that of the global crisis and the volatility less than a fifth.

### 3.2 Importance and behaviour of the global risk factors

Can a small number of global risk factors explain the variation in the returns to sovereign CDS contracts? To answer this question, we extract principal components, which are orthogonal linear transformations of the returns. Not only are these transformations a parsimonious way of modelling the variance structure of returns, they also provide a way to identify what would otherwise be unobservable risk factors that drive risk premia. Because risk premia are so important in asset pricing, the risk factors can often explain asset returns to a greater degree than can observable market variables. Amato and Remolona (2005), Pan and Singleton (2008) and Remolona, Scatigna and Wu (2007) show that risk premia are especially important in the case of CDS spreads.

How much can the principal components explain? In Figure 1, the first pie chart at the top shows how much each principal component can explain of the CDS returns during January 2004 to August 2008, the period of the old normal. Similarly, the second pie chart shows the division of explanatory power between principal components for returns during May 2009 to December 2014, the period of the new normal. The two pie charts at the bottom show the principal components during two relatively brief stress periods.

The dominance of the first risk factor is striking. In the old normal, this factor alone accounts for 51% of the common variation in returns. In the new normal, this factor becomes even more dominant, capturing 64% of the variation, quite a substantial increase.<sup>8</sup> For its part, the second global factor explains 15% in the old

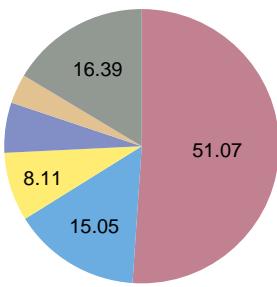
<sup>8</sup> In LPPS, the first factor explains only 47% of the variation. They extract the factor from monthly CDS returns for a sample of 26 emerging markets and no advanced economies, covering the period from October 2000 to May 2007. While our sample of emerging markets is roughly a subset of theirs, we also include 10 advanced economies. Their sample period does not include our new normal, and in fact it ends 13 months before the end of our old normal.

normal and 9% in the new normal. The two factors together account for 66% of the variation in the old normal and 73% in the new normal.

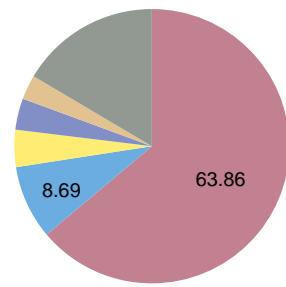
Principal components of changes in sovereign CDS spreads

Figure 1

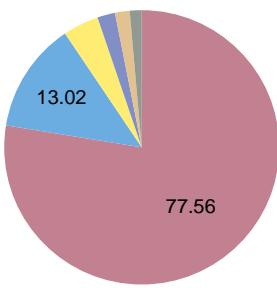
Old normal: Jan 2004 – Aug 2008



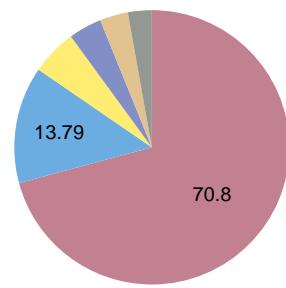
New normal: May 2009 – Dec 2014



Global crisis: Sep 2008 – Apr 2009



Taper tantrum: May 2013 – Dec 2013



It is also interesting to see what happens to this variance structure in times of market stress. Figure 1 also shows how much each of the factors explains during the crisis episode of September 2008 to April 2009 and during the taper tantrum of May 2013 to December 2013. In both stress episodes, the first factor becomes even more important. In the crisis episode, the first factor alone accounts for 78% of the variation in CDS returns. In the taper tantrum, this factor alone accounts for 71% of the variation.

### 3.3 Factor correlations with global asset prices

One possible interpretation of the global risk factors is that they represent the time-varying risk appetites of various classes of investors.<sup>9</sup> Pan and Singleton (2008) offer a similar interpretation of the factors. To get a sense of who these investors might be, we take the time series for each of the risk factors and examine their unconditional correlations with various global financial asset returns. The cumulative movement of

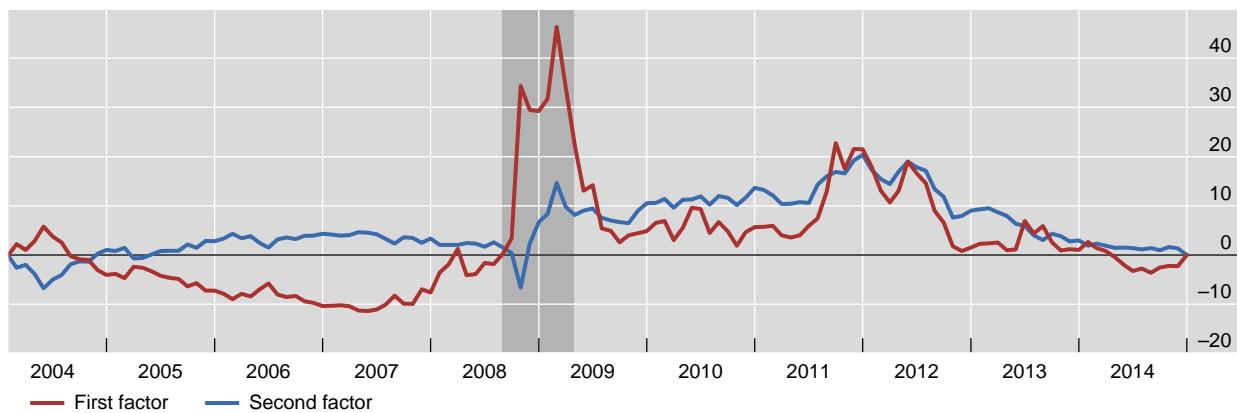
<sup>9</sup> The large literature on the equity premium puzzle, starting with Mehra and Prescott (1985), serves to reject the consumption-based utility function with constant risk aversion. To model decisions related to risk, Kahneman and Tversky (1979) propose prospect theory, in which risk aversion can quickly change over time because it depends on recent gains and losses.

the two risk factors are shown in Figure 2, with the period of the global crisis indicated in a darker shade of grey. The first risk factor is evidently more volatile, and we know that it would track average sovereign returns more closely. High correlations with other global asset returns, negative or positive, could suggest markets that reflect correlated fundamentals. Such correlations in fundamentals, however, are not evident in the data at the monthly frequency. But the high correlations could also mean markets that share the same investors, whose risk appetites vary over time.

### First and second risk factors over time

(Cumulative over time)

Figure 2



We consider global asset return variables that represent the US equity market, the global corporate credit markets, and the US Treasury market. These variables are specifically the following: (a) the change in VIX, which is a calculation of the implied volatility of the S&P 500 Index over the next 30 days; (b) the return on the S&P 500 index; (c) the change in the CDX.NA.IG index, which is an actively traded contract based on CDS contracts for 125 large investment-grade corporate borrowers in North America and emerging markets; (d) the change in the CDX.NA.HY index, which is an actively traded contract similar to that for the CDX.NA.IG Index except that is based on 100 non-investment grade borrowers; (e) the change in the iTraxx Europe index, which is an actively traded contract based on the 125 most actively traded CDS contracts for corporate borrowers in Europe; and (f) the change in the US Treasury 10-year yield. These correlations are reported in Table 3 for both the old normal and the new normal.

In terms of absolute values, the first factor is highly correlated with most of the global asset return variables, and the correlations in the new normal are higher than those in the old normal. The correlations are highest with the corporate credit spread variables, namely the iTraxx Europe index, the CDX.NA.IG index and the CDX.NA.HY index, but they are also high with the S&P 500 (in absolute value) and the VIX. Only with the US Treasury 10-year yield is the correlation low. These correlations suggest that the investors who drive the sovereign risk market are also investors who drive the US equity market and the global credit markets but not the US Treasury market. In the new normal, these global investors have evidently become even more important in the various markets in which they have had a strong presence.

Unconditional correlations of global risk factors with observable global financial market variables in the old normal and new normal

Table 3

|  | First risk factor <sup>1</sup> |            | Second risk factor <sup>1</sup> |            |
|--|--------------------------------|------------|---------------------------------|------------|
|  | Old normal                     | New normal | Old normal                      | New normal |
| Change in VIX <sup>1</sup>                       | 0.5293                         | 0.6548     | 0.4146                          | 0.2171     |
| Return on S&P500 <sup>2</sup>                    | -0.5983                        | -0.6716    | -0.4767                         | -0.1023    |
| Change in CDX NA IG <sup>1, 3</sup>              | 0.6683                         | 0.8047     | 0.4288                          | 0.2054     |
| Change in CDX NA HY <sup>1, 3</sup>              | 0.6049                         | 0.7266     | 0.5243                          | 0.2385     |
| Change in iTraxx Europe <sup>1</sup>             | 0.6982                         | 0.8616     | 0.4176                          | 0.0189     |
| Change in 10-year US Treasury yield <sup>1</sup> | -0.1303                        | -0.3566    | 0.0473                          | 0.0561     |

<sup>1</sup> Monthly change. <sup>2</sup> Change in logs. <sup>3</sup> Five-year on-the-run spreads.

Sources: Bloomberg; JPMorgan Chase; authors' calculations.

The second factor is much less highly correlated with the global asset return variables than is the first. Unlike the correlations of the first factor, those of the second factor are lower (in absolute value) in the new normal than in the old normal.<sup>10</sup> These correlations suggest that the investors represented by the second factor have tended to focus on the sovereign risk market and have not dealt very much with the US equity market, global corporate credit markets or the US Treasury market. If these investors had been somewhat active in other global assets markets before, the decline in correlations in the new normal suggests that they now merely dabble in those markets.

### 3.4 Risk factors versus observable market variables

Can our extracted risk factors do better than observable market variables in explaining the variation in sovereign CDS returns? To answer this question, we regress CDS returns for individual countries on various combinations of risk factors, global market variables and local market variables. We run these regressions separately for the old normal and new normal. The global market variables are the same as the asset return variables we used in calculating unconditional correlations in Section 3.3 above. The local market variables are the ones LPPS find significant in similar regressions, namely the local stock market return and the exchange rate return.

The regressions suggest that the global risk factors capture important influences that are not found in observable market variables. The upper part of Table 4 reports the median across countries of R<sub>2</sub>s, both unadjusted and adjusted, for each of seven regressions in each of the two subperiods. The lower part of the table reports the median for various ratios of unadjusted R<sub>2</sub>s. The median ratios for regression (1) versus (4) suggest that the risk factors serve to improve explanatory power over the global market variables by 37% in the old normal and 38% in the new normal. These are conservative estimates, because we use unadjusted R<sub>2</sub>s and do not control for the high correlations between the factors and the global market variables.

<sup>10</sup> Note, however, that by construction, the higher the correlations of the first factor, the lower correlations of the second are likely to be. This is because the two factors are derived to be orthogonal to each other.

Interestingly, when we include only the first risk factor and not the second one, the median ratio of 0.91 for (3) versus (4) suggests that in the old normal the first factor alone was less important than the six global market variables combined. Nonetheless, consistent with our results in Section 3.2, the first factor becomes more important in the new normal, in which it then dominates by itself the six global market variables combined.

The median ratios reported in the two bottom rows of the table suggest that the global market variables, whether in the form of extracted risk factors or observable variables, dominate the local market variables as determinants of CDS returns for individual countries. The results for the old normal are consistent with those of LPPS. These results still hold qualitatively in the new normal but become weaker.

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### Median R<sup>2</sup>s of regressions of CDS returns on different combinations of global risk factors and observable global and local market variables

(Seven regressions are run for each of 28 individual countries for each of two subperiods, a total of 392 regressions)

Table 4

| Independent variables  | Old normal            |                           | New normal            |                           |
|--|-----------------------|---------------------------|-----------------------|---------------------------|
|  | Median R <sup>2</sup> | Median Adj R <sup>2</sup> | Median R <sup>2</sup> | Median Adj R <sup>2</sup> |
| (1) Two risk factors and global market variables <sup>1</sup>          | 0.81                  | 0.77                      | 0.81                  | 0.78                      |
| (2) Two risk factors only  | 0.73                  | 0.72                      | 0.77                  | 0.77                      |
| (3) First risk factor only   | 0.50                  | 0.49                      | 0.65                  | 0.65                      |
| (4) Global market variables only <sup>1</sup>                          | 0.56                  | 0.51                      | 0.57                  | 0.53                      |
| (5) Two risk factors and local market variables <sup>2</sup>           | 0.76                  | 0.74                      | 0.80                  | 0.79                      |
| (6) Global market variables and local market variables <sup>1, 2</sup> | 0.60                  | 0.54                      | 0.69                  | 0.65                      |
| (7) Local market variables only <sup>2</sup>                           | 0.25                  | 0.22                      | 0.49                  | 0.47                      |
| Median ratio of unadjusted R <sup>2</sup>                              |                       |                           |                       |                           |
| Ratio of:  | Old normal            |                           | New Normal            |                           |
| (1) to (4)   | 1.37                  |                           | 1.38                  |                           |
| (2) to (4)   | 1.15                  |                           | 1.38                  |                           |
| (3) to (4)   | 0.91                  |                           | 1.18                  |                           |
| (5) to (7)   | 2.69                  |                           | 1.59                  |                           |
| (6) to (7)   | 2.42                  |                           | 1.36                  |                           |

<sup>1</sup> Global market variables are change in VIX, return on S&P500, change in CDX NA IG, change in CDX NA HY, change in iTraxx Europe, change in 10-year US Treasury yield. <sup>2</sup> Local market variables are local stock market return, exchange rate return in US dollars

## 4. Analysing the factor loadings: The role of fundamentals

The country-specific loadings help us interpret the factors. In this paper, these loadings measure the sensitivity of individual sovereign risk premia to given global risk factors. The countries perceived by investors as riskier should be those that load more on the factors. The question is, what does "riskier" mean? What economic fundamentals enter into the risk assessments that investors use for judging the different countries? In this analysis, we try to answer these questions by analysing the

factor loadings of the 28 countries in our sample. We limit ourselves to the loadings on just the first two global factors, which between them explain the bulk of the variation of sovereign CDS returns.

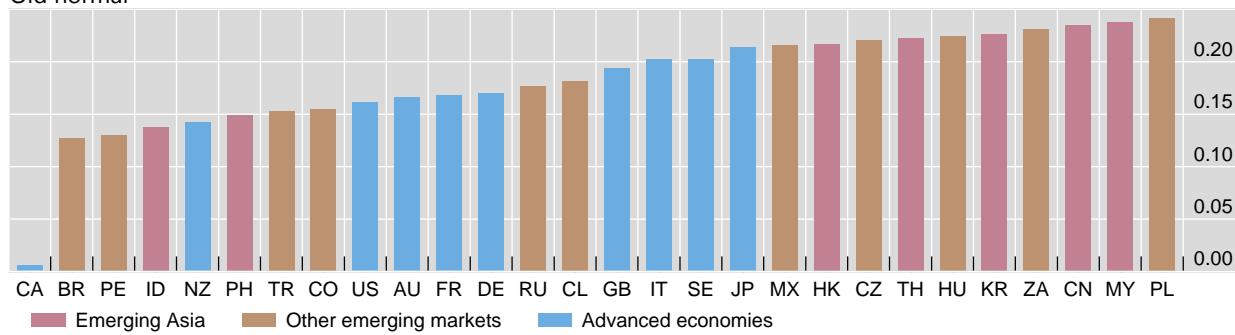
#### 4.1 The country-specific loadings

All the countries in our sample load positively on the first risk factor. This means it is this factor that tends to make sovereign spreads widen together and narrow together. Nonetheless the loadings vary considerably across countries, so that when spreads move together, they do so in different magnitudes. The loadings also change between the old normal and the new. We show these loadings in Figure 3, arranged from lowest to highest. In the old normal, the loadings were relatively low for Canada and New Zealand and relatively high for Poland and Malaysia. In the transition to the new normal, the largest changes are a decline in the loading for the United States and increases in the loadings for Canada and Indonesia.

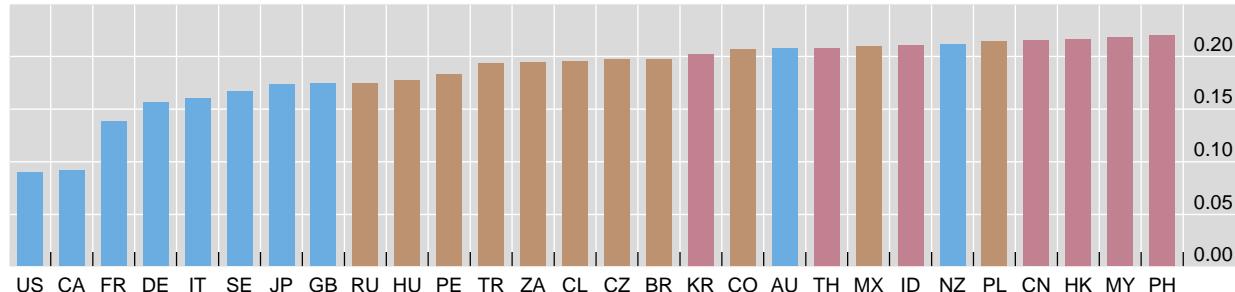
Loadings on the first global risk factor

Figure 3

Old normal



New normal

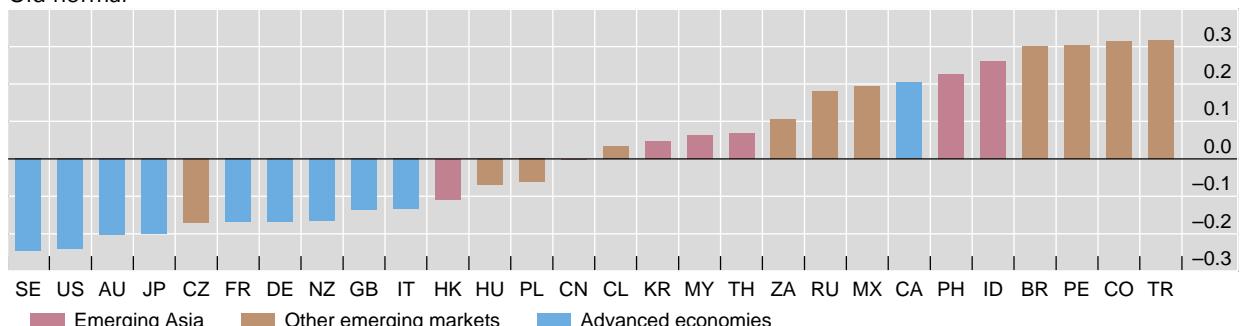


Countries load on the second risk factor quite differently from the way they load on the first. As shown in Figure 4, this time some countries load positively, others negatively. It is this factor that tends to make movements in sovereign spreads less than perfectly correlated. A rise in the factor leads to wider sovereign spreads for some countries and narrower spreads for others. The opposite effects on spreads suggest a rotation effect. For lack of a better term, we shall call this factor the “safe-haven” factor. In the old normal, the “safe havens” are largely the developed countries in that they load negatively on the second factor, with the exception of Canada, which loads positively. The Czech Republic, Hong Kong, Hungary and Poland also load negatively. In the transition to the new normal, the most pronounced changes are declines in the loadings for Canada and Turkey and increases in the loadings for Australia and Japan.

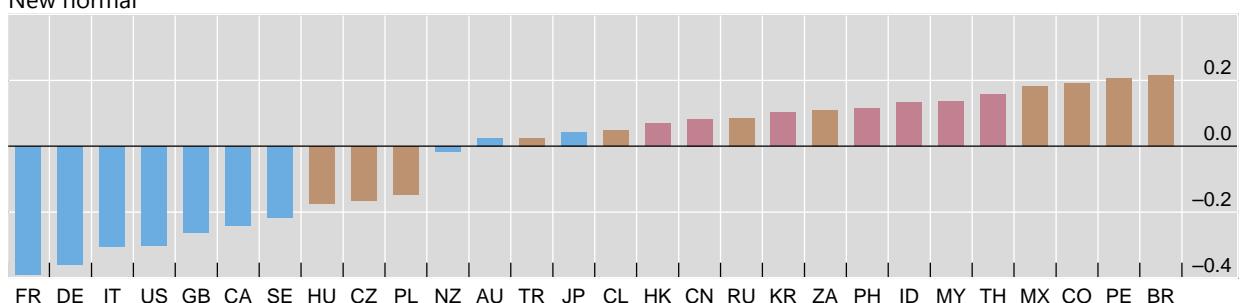
Loadings on the second global risk factor

Figure 4

Old normal



New normal



## 4.2 Economic fundamentals and two dummy variables

Can the variation in these loadings be explained by differences in economic fundamentals? We examine the relationship of the loadings to nine commonly cited fundamentals, each one measured as the average for the country in each subperiod. To this list, we add dummy variables for emerging markets and for Asian emerging markets, so that we have a total of 11 variables (the sources of the data are the IMF World Economic Outlook unless otherwise given in the parentheses): (a) ratio of general government debt to GDP (Moody's); (b) current account balance as a ratio to GDP; (c) fiscal balance as a ratio to GDP; (d) sovereign credit rating (average of Fitch, Moody's and Standard and Poor's); (e) Institutional Investor's Country Credit Rating (Institutional Investor); (f) real GDP growth; (g) size of the domestic bond market as a ratio to GDP (BIS statistics); (h) trade openness as the sum of exports and imports as a ratio to GDP; (i) CPI inflation; (j) dummy variable for whether the country is an emerging market; and (k) dummy variable for whether the country is an emerging market in Asia.

The current account balance is emphasized by Lord (2013) in identifying the "Fragile Five". The trade openness variable is also used by Aizenman, Jinjarak and Park (2013). The size of the bond market is similar to the domestic financial market variable highlighted by Eichengreen and Gupta (2014). The dummy variable for Asia is meant to capture the Asia factor found by LPPS.

The sovereign credit ratings are long-term foreign currency ratings from the three major international rating agencies, Fitch, Moody's and Standard and Poor's. In computing the average rating, numerical values are assigned to the ratings, with an AAA/Aaa rating receiving a value of 20, an AA+/Aa1 a value of 19 and so on notch by notch.

There are questions about the robustness of those sovereign ratings as an explanatory variable. Indeed, de Vries and de Haan (2014) examine the relationship between the sovereign ratings and bond yield spreads of Greece, Ireland, Italy, Portugal and Spain. The results suggest that the rating agencies have changed their approach to assessing sovereign risk.<sup>11</sup> As a robustness check, we also consider the Institutional Investor's Country Credit Ratings. These alternative ratings come from a survey of senior economists and sovereign risk analysts at leading global banks, securities firms and asset management companies. The rating index for a country is constructed by weighting participants' responses by their firms' global exposures..

### 4.3 Regression analysis

To determine what economic fundamentals enter into the risk assessments by global investors, we regress the country-specific loadings on our set of 11 fundamentals. We run this regression for the loadings on each of the two risk factors in the both the old normal and new normal. We also similarly analyse the loadings from just the height of the global crisis in September 2008 to April 2009 and those from the taper tantrum of May 2013 to December 2013.

In each case, we run the regressions in two ways. First, we run the full regression, in which we include all nine fundamental variables, plus the dummy variables for emerging markets and Asian emerging markets. Second, because of the strong possibility of multicollinearity, we run a stepwise regression. We use the forward method as described by Derksen and Kesleman (1992), with a p-value of 0.10 as the stopping criterion. The results are not sensitive to the forward method, because we get the same results with the backward method.<sup>12</sup> If the stepwise procedure results in a significant variable with the wrong sign, we exclude that variable and run the procedure again. Once we have the final stepwise result, we rerun the regression to obtain robust White standard errors.

### 4.4 What explains the loadings on the first risk factor?

The regressions of the loadings on the first risk factor show that the usual fundamentals have little influence on how investors differentiate between sovereign risks. The robust White t-statistics for these regressions are reported in Table 5. In the old normal, the full regression shows a statistically significant coefficient for the sovereign credit rating but the coefficient has the wrong sign, because it suggests that the more highly rated countries load more highly on the risk factor. The regression also shows a significant coefficient for the emerging markets dummy variable. The stepwise regression, however, changes the picture. Both the Akaike Information Criterion and the Schwarz criterion suggest that this regression is better specified than the full regression. In the stepwise regression, it is the market depth variable and the dummy variable for emerging markets that are significant. Countries with larger bond markets and those designated as emerging markets tend to load more on the first factor.

<sup>11</sup> This is confirmed by Amstad and Packer (2015) who look at a broader sample of sovereigns.

<sup>12</sup> Nonetheless, statistical inference in this case requires extra care, because the resulting p-values or standard errors do not account for the selection process.

The first factor: Robust White t-statistics from regressions of factor loadings on fundamentals and dummy variables

Table 5

|   | Old normal |          | New normal |          | Crisis    |           | Taper tantrums |          |
|---|------------|----------|------------|----------|-----------|-----------|----------------|----------|
|   | Full       | Stepwise | Full       | Stepwise | Full      | Stepwise  | Full           | Stepwise |
| Ratio of government debt to GDP         | -0.097     |          | -0.447     |          | -0.128    |           | -0.393         |          |
| Current account balance as ratio to GDP | 1.173      |          | 0.449      |          | 1.051     |           | 0.808          |          |
| Sovereign credit rating                 | 4.355***   |          |            |          | 2.086*    |           |                |          |
| Institutional Investor rating           |            |          | -1.185     |          | -1.956*   |           | -0.947         |          |
| GDP growth                              | 0.395      |          | -0.416     |          | -1.202    |           | -0.513         |          |
| Bond market size                        | 0.727      | 2.123**  | -0.325     |          | 0.299     |           | 0.043          |          |
| Fiscal balance                          | -0.699     |          | -0.487     |          | 0.465     |           | -0.015         |          |
| Openness                                | -1.418     |          | 0.073      |          | -2.930*** | -3.707*** | 0.425          |          |
| Inflation                               | -0.622     |          | -1.634     |          | -1.564    |           | -1.275         |          |
| EM dummy                                | 4.269***   | 2.074**  | 0.218      | 3.383*** | 2.656**   | 4.011***  | 0.320          | 2.144**  |
| Asia dummy                              | -0.463     |          | 0.820      |          | -0.924    |           | -0.709         |          |
| R <sup>2</sup>                          | 0.5432     | 0.1862   | 0.5442     | 0.4105   | 0.6879    | 0.4924    | 0.3174         | 0.2365   |
| Adj R <sup>2</sup>                      | 0.2291     | 0.1211   | 0.2761     | 0.3878   | 0.4734    | 0.4518    | -0.0841        | 0.2071   |
| AIC                                     | -3.1205    | -3.1860  | -3.9576    | -4.3431  | -4.7922   | -4.9485   | -2.4311        | -2.9620  |
| Schwarz                                 | -2.5496    | -3.0432  | -3.4342    | -4.2480  | -4.2212   | -4.8057   | -1.9078        | -2.8668  |
| White test (p-value)                    | 0.88       | 0.64     | 0.16       | 0.01     | 0.19      | 0.28      | 0.40           | 0.01     |

Note: Only t-statistics are shown, \*/\*\*/\*\*\* indicate significance at 10%, 5% and 1% level.

The regressions for the new normal show an even more striking result. As shown in Table 5, the full regression shows significance for none of the variables. The stepwise regression, however, shows significance only for the emerging markets dummy variable. The market depth variable is no longer significant. Again, the Akaike and Schwarz criteria favour the specification of the stepwise regression. The R<sup>2</sup>s suggest a tighter fit for the stepwise regression in the new normal.

When we analyse the loadings on the first factor for just the global crisis in September 2008 to April 2009 or the loadings for just the taper tantrum of May 2013 to December 2013, we get largely the same results: the emerging markets dummy variable remains significant, although for the global crisis period the trade openness variable is also significant.<sup>13</sup> It is notable that neither the fiscal balance nor the current account balance enters significantly, even for the taper tantrum period.

The above results suggest that the investors driving movements in sovereign spreads are those that tend to follow index tracking. Virtually all that matters to them

<sup>13</sup> To check the robustness of our emerging markets definition, we redefine the dummy variable to exclude Hong Kong and South Korea. In the resulting regression for the new normal, the Institutional Investor's rating becomes significant at the expense of the dummy variable. This is not too surprising because the correlation between the two variables goes from -0.76 in the old normal to -0.84 in the new normal.

is whether the country is part of their emerging markets benchmark. They seem to care little about fundamentals beyond that.

#### 4.5. What explains the loadings on the second risk factor?

Our regression results suggest that the way countries load on the second risk factor also distinguishes the new normal from the old. The robust White t-statistics for these regressions are reported in Table 6. In the old normal, the full regression shows only the sovereign credit rating to be a significant variable, and this time the coefficient has the expected negative sign. The stepwise regression confirms this. Countries with higher sovereign credit ratings load less highly on the second risk factor. In the new normal, the full regression shows the Institutional Investor's rating to be significant, albeit only at the 10% confidence level. The stepwise regression confirms the significance of this variable, and it does so at the 1% level. In the move to the new normal, sovereign credit ratings lost out in significance to Institutional Investor's ratings.

The second factor: Robust White t-statistics from regressions of factor loadings on fundamentals and dummy variables

Table 6

|   | Old normal |           | New normal |           | Crisis  |          | Taper tantrums |           |
|---|------------|-----------|------------|-----------|---------|----------|----------------|-----------|
|   | Full       | Stepwise  | Full       | Stepwise  | Full    | Stepwise | Full           | Stepwise  |
| Ratio of government debt to GDP         | -0.283     |           | -0.493     |           | 0.376   |          | 0.435          |           |
| Current account balance as ratio to GDP | 0.713      |           | 0.624      |           | -0.127  |          | 0.174          |           |
| Sovereign credit rating                 | -5.384***  | -7.940*** | 1.039      |           |         |          |                |           |
| Institutional Investor rating           | 0.666      |           | -1.777*    | -6.307*** | -0.950  |          | -1.136         | -7.486*** |
| GDP growth                              | -1.352     |           | 0.110      |           | -0.497  |          | 0.685          |           |
| Bond market size                        | -0.315     |           | 0.660      |           | 0.275   |          | 0.018          |           |
| Fiscal balance                          | 0.402      |           | -0.153     |           | 2.055** |          | -0.553         |           |
| Openness                                | -1.852*    |           | -0.517     |           | 0.034   |          | 0.894          |           |
| Inflation                               | 0.571      |           | -0.839     |           | 0.848   |          | 1.204          |           |
| EM dummy                                | -0.518     |           | 0.572      |           | 1.161   | 6.261*** | 0.861          |           |
| Asia dummy                              | 0.157      |           | 0.048      |           | 1.858*  |          | -0.076         |           |
| R <sup>2</sup>                          | 0.7979     | 0.7309    | 0.6867     | 0.5621    | 0.8227  | 0.6015   | 0.7213         | 0.6379    |
| Adj R <sup>2</sup>                      | 0.6590     | 0.7205    | 0.4713     | 0.5452    | 0.7184  | 0.5862   | 0.5574         | 0.6239    |
| AIC                                     | -1.2469    | -1.6748   | -0.8134    | -1.1929   | -1.4438 | -1.2769  | -1.0222        | -1.4038   |
| Schwarz                                 | -0.6760    | -1.5796   | -0.2425    | -1.0978   | -0.9204 | -1.1817  | -0.4998        | -1.3086   |
| White test (p-value)                    | 0.79       | 0.40      | 0.11       | 0.29      | 0.22    | 0.99     | 0.57           | 0.56      |

Note: Only t-statistics are shown, \*/\*\*/\*\*\* indicate significance at 10%, 5% and 1% level.

## 5. Conclusion: the new normal versus the old

While much of the literature on investing in emerging markets paints the picture of a tug-of-war between push and pull factors, the picture we paint in our analysis is one of a division of labour between global risk factors and country-specific factors. The global factors drive what happens over time, while the country-specific variables drive what happens across countries. While the movements in global risk factors determine whether CDS spreads rise or fall over time, the extent to which these spreads rise or fall depends on the country. This is broadly similar to the picture painted by Eichengreen and Gupta (2014), although they look only at the taper tantrum episode. They find that equity prices, exchange rates and foreign reserves tended to move together across countries but the magnitudes of the movements depended on the size of the domestic financial market.

The most important difference between the old normal and the new normal is in the role of the first risk factor. While this factor already accounts for half of the variation in sovereign CDS returns in the old normal, it plays an even more dominant role in the new normal, where it accounts for over three-fifths of the variation. The factor becomes even more important during periods of stress. Our analysis of the loadings across countries suggests that this factor represents the time-varying risk appetites of global investors who do not seem to differentiate meaningfully between emerging markets, although they differentiate sharply between emerging markets and advanced economies.

The fact that the factor's importance rises during periods of stress is broadly consistent with the results of Cohen and Remolona (2008), who analyze the Asian crisis of 1997. They compare price movements in Asian equity markets with price movements of US-based closed-end funds that invest in those markets, while exploiting the fact that trading hours in the two regions do not overlap. They find that US market sentiment assumed a more important role in driving market movements in Asia during the crisis than in less stressful times.

The second risk factor plays only a supporting role, and it is a role that is reduced further in the new normal. Some countries load positively on this factor, others negatively, suggesting safe-haven behaviour. The factor seems to represent the risk appetites of relatively conservative investors. While they paid attention to sovereign ratings in the old normal, they now seem to have shifted their attention to something that is reflected in Institutional Investor's ratings.

In the end, we find that CDS returns in the new normal move over time largely to reflect the movements of a single global risk factor, with the variation across sovereigns for the most part reflecting the designation of "emerging market". There seems to be no "Fragile Five"; there are only emerging markets. While the emerging markets designation may serve to summarize many relevant features of sovereign borrowers, it is a designation that lacks the kind of granularity that we would have expected for a fundamental on which investors' risk assessments are based.

The importance of the emerging markets designation in the new normal suggests that index tracking behaviour by investors has become a powerful force in global bond markets. Haldane (2014) has argued that in the world of international finance, the global subprime crisis and the regulations that followed made asset managers more important than banks. Miyajima and Shim (2014) show that even actively managed emerging market bond funds follow their benchmark portfolios

quite closely. For the most part, when global investors invest in emerging markets, instead of picking and choosing based on country-specific fundamentals, they appear to simply replicate their benchmark portfolios, the constituents of which hardly change over time

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