

Kornél Kisgergely¹: What moved sovereign CDS spreads in the period of financial turbulence?²

For sovereign issuers a CDS³ transaction can be considered as insurance against a possible bankruptcy of a state. The price of this insurance is the amount paid during the contract period by the party purchasing the protection to the party selling the protection, expressed as the ratio of the insured nominal value (CDS spread). As a result of the development of the CDS market, these quotations provide the truest picture of the current value of an issuer's risk premium. Since the credit risk premium of the state influences the credit risk premia of other agents of the country and thus their financing costs, identifying the underlying driving forces is crucial in terms of financial stability. One of the most important conclusions of our principal component analysis is that since the outset of the international financial market turbulence, global factors explain more than 90 per cent of the development in the CDS spreads of the countries in the sample (and nearly 95 per cent in the case of Hungary). Another conclusion of the analysis is that a unit of change in the global component results in a greater CDS spread increase in more vulnerable countries. These sensitivities changed only slightly over the last two years, suggesting that indicators describing the outstanding debt of a country play a decisive role in investors' assessment of that country. Finally, the third conclusion of the analysis is that the common global factor gained from the sample captures the global risk premium shocks that affect the exchange rate dynamics of the forint, the Czech koruna and the Polish zloty, however, but cannot explain the episode of exchange rate depreciation observed between December 2008 and February 2009.

METHODOLOGY OF THE ANALYSIS

CDS quotations for 46 developed and emerging countries were collected for the analysis.⁴ Although they are available on a daily basis, a weekly frequency was chosen in order to avoid the problems stemming from the time-lag. The sample period runs from February 2006 to September 2009, but for most part of the analysis only the period after August 2007 is used, when the international financial market turbulence erupted.

The essence of principal component analysis is that it decomposes each individual CDS to components consisting of linear combinations of all CDSs. These components are uncorrelated with one another. On average, the first principal component has the highest explanatory power, the second one has the second highest, etc. A principal component has intuitive interpretation if a separable group of countries has greater weight in it than the others (e.g. it is mainly composed of countries with high balance of payment deficits or commodity exporting countries), or broadly all countries have the same weight in it (in which case it may be global component).

GLOBAL COMPONENT ESTIMATION

In both periods, the first principal component largely explains the dynamics of the CDSs, but its role has grown markedly during the financial turbulence (Table 1). In this period, this component already explains 91 per cent of the dynamics of individual CDSs on average, compared to the earlier 57 per cent. This principal component may clearly be called a global factor, because normalised individual CDSs have almost the same weight in it.

The evolution of the CDS spread clearly reflects the development of credit spreads of the agents of a country (state, corporations, households), which affects the performance of the real economy to a great degree. The fact that this spread – at least over the short run – is almost exclusively determined by international developments shows the important role played by the global financial system in the transmission of fluctuations in the economic cycle.

Chart 1 shows the developments in the Hungarian CDS and the global component. This main component explains 95 per cent of the Hungarian development, i.e. more than the

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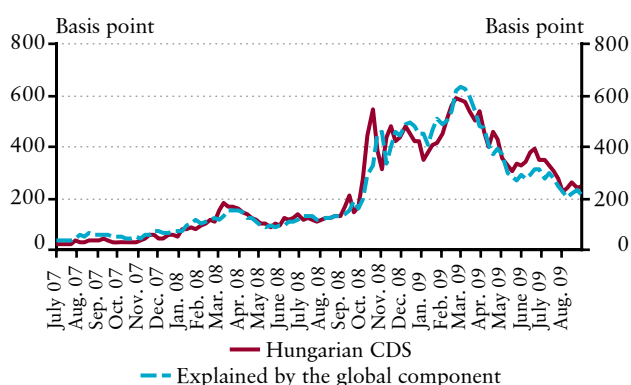
² The views expressed in the paper are those of the author and do not necessarily reflect the official views of Magyar Nemzeti Bank, the central bank of Hungary.

³ Complete name: credit default swap.

⁴ We examined the following CDSs: Hungarian, Polish, Czech, Romanian, Croatian, Bulgarian, Russian, Ukrainian, Latvian, Estonian, Lithuanian, Kazakh, Brazilian, Argentine, Peruvian, Venezuelan, Chilean, Colombian, Chinese, Thai, Malaysian, Indonesian, Vietnamese, Korean, Indian, Pakistani, Turkish, Israeli, South-African, Australian, German, Belgian, Danish, Spanish, French, Greek, Italian, Japanese, Dutch, Norwegian, Austrian, Portuguese, Swedish, Slovenian, Irish. Source: Thomson Reuters.

Table 1**Proportion of the variance explained by the first five principal components**

| Principal component | Period before the financial turbulence (Feb. 2006–Aug. 2007) | | Principal component | Period of financial turbulence (Aug. 2007–Sept. 2009) | |
|---------------------|---|------------|---------------------|--|------------|
| | Explained variance | | | Explained variance | |
| | Individual | Cumulative | | Individual | Cumulative |
| 1st | 0.57 | 0.57 | 1st | 0.91 | 0.91 |
| 2nd | 0.09 | 0.66 | 2nd | 0.04 | 0.95 |
| 3rd | 0.07 | 0.73 | 3rd | 0.01 | 0.96 |
| 4th | 0.05 | 0.78 | 4th | 0.01 | 0.97 |
| 5th | 0.04 | 0.82 | 5th | 0.01 | 0.98 |

Chart 1**Global component and the Hungarian CDS**

Source: Reuters, MNB.

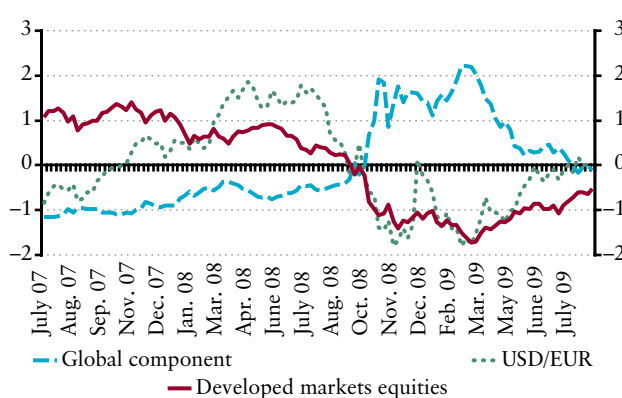
average. As the chart shows, the increase early in the year is explained by global reasons, rather than by country- or region-specific reasons. The surge in the CDS spread in October 2008 can be considered as a country-specific shock, which was followed by the extraordinary interest rate increase and the IMF-EU agreement. Subsequently, the Hungarian CDS improved more than the average in January 2009, then less in recent months.

INTERPRETATION OF THE GLOBAL COMPONENT

In all probability, the global main component simultaneously comprises (i) expectations related to the global economic cycle, (ii) investors' willingness to take risks and (iii) the financial intermediary system's ability to take risks. The role of all three factors may increase in times of economic and financial crises.

Chart 2**Global component and the price of some risky assets**

(normalised values)



Source: Reuters, MNB.

Concerning the expectations related to the global economic cycle (i) and investors' willingness to take risks (ii) Reinhart and Rogoff (2008)⁵ documented that over the last two hundred years the bankruptcies of sovereign issuers always occurred in waves, as a result of an economic crisis or an abrupt drying up of international capital flows. In such crisis periods, up to 50 per cent of the countries in the world found themselves in a state of bankruptcy, while in quieter years this ratio fluctuated between 0-10 per cent. This means that sovereign bankruptcies become much more correlated in crisis periods. Accordingly, the global component – at least partly – shows fundamental information, namely the development of the probabilities of bankruptcies.

Concerning the financial intermediary system's ability to take risks (iii) one can conclude that in the event of a negative shock to the capital of the financial system, forced sales may

⁵ Carmen M. Reinhart and Kenneth S. Rogoff, (2008): *This Time is Different: A Panoramic View of Eight Centuries of Financial Crises*, NBER, <http://ideas.repec.org/p/nbr/nberwo/13882.html>.

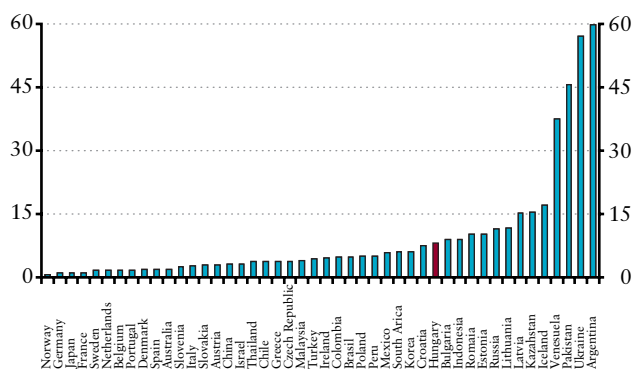
lead to a liquidity spiral.⁶ In this situation, the financing position of institutional participants, which can be considered as marginal investors, has an important impact on developments in asset prices. This common factor results in excessive correlation in the price of every risky asset, which is a general feature of financial crises. In a case study Acharya, Schaefer and Zhang (2007)⁷ documented that following the downgrading of GM and Ford in 2005 the correlation of US corporate CDS spreads increased in a similar manner. This downgrade triggered forced sales, because many institutional investors could not hold instruments with a rating worse than BBB, and it caused enormous losses to banks active in this market. The authors demonstrated that this excessive correlation was related to the financing problems of these market participants. At present, excessive correlation can be observed in the prices of all major asset groups (Chart 2). For example, the global component of CDSs explains 57 per cent of the price of developed market equities and 22 per cent of the exchange rate of the dollar (calculated on differences). Perhaps this is the reason why market players use the latter as an indicator of global investor sentiment.

THE MAGNITUDE OF SENSITIVITY OF INDIVIDUAL COUNTRIES TO THE GLOBAL FACTOR

While the global component broadly explains the dynamics of sovereign CDSs, this does not mean that a country's fundamentals do not matter. The differences in CDS dynamics across countries are primarily explained by the extent to which they are sensitive to the global factor. Chart 3 illustrates the strength of the relationship between individual CDSs and the global component. The figures may be interpreted as regression coefficients (hereinafter: beta). This means that in response to a global shock that adds 1 basis point to the CDS of Germany, the CDS spreads of the Czech Republic, Hungary and Argentina react with a 4, 8 and 60 basis point increase, respectively.

We should see the change in the riskiness of a country in a change in its beta, i.e. a change in its sensitivity to global shocks. The principal component analysis assumes a linear relationship, that is constant in time, between the main components and the individual CDSs, and as this relationship proved to be very strong, it means that the betas may change very little over time. Presumably, the underlying reason is that the probability of bankruptcy is determined by the less variable debt type stock data (e.g. external debt-to-GDP

Chart 3
Sensitivity of selected countries to the global factor



Source: MNB.

ratio), rather than by the flow type variables that adjust more easily (e.g. fiscal deficit).

Credit spreads of risky countries respond to the changes in global sentiment in a more sensitive manner. Firstly, as a result of the same magnitude of deterioration in the global economic activity, the probability of bankruptcy of countries that are already excessively indebted increases to a greater degree. Secondly, if the global component grows (declines) because international investors' financing position deteriorates (improves), they reduce (increase) their positions also in proportion to their fundamental riskiness.

THE IMPACT OF THE GLOBAL COMPONENT ON THE EXCHANGE RATES OF REGIONAL CURRENCIES

In emerging countries with floating exchange rate regime, strong correlation is observed between changes in CDS spreads and the shifts in the exchange rate. However, it is difficult to determine the direction of causality here. Presumably, the CDS and the exchange rate risk premium are determined by the same factors. Therefore, a higher CDS may mean a higher exchange rate risk premium, but a weaker (real) exchange rate adds to the probability of bankruptcy as well, because it entails a higher debt burden.⁸ As the global component provides a good explanation for the CDS prices of individual countries, and individual exchange rate depreciations probably have a weaker effect on it, it is worth examining the impact of the global factor on individual exchange rates. Table 2 presents the results of the regression that examines the effect of the global component (PC1) on

⁶ Markus K. Brunnermeier and Lasse Heje Pedersen (2008): Market Liquidity and Funding Liquidity, *The Review of Financial Studies*. <http://ideas.repec.org/p/nbr/nberwo/12939.html>.

⁷ Viral V Acharya, Stephen M Schaefer and Yili Zhang, (2007): Liquidity Risk and Correlation Risk: A Clinical Study of the General Motors and Ford Downgrade of May 2005, *Financial Economics*. <http://ideas.repec.org/p/cpr/ceprdp/6619.html>.

⁸ These CDS contracts provide protection against the default of bonds denominated in foreign currency.

Table 2**Impact of the global main component on the currencies of the region**

| | $\Delta PC1_t$ | $\Delta PC1_{t-1}$ | R ² |
|---------------------------------------|----------------|--------------------|----------------|
| $\log(\text{HUF}_t/\text{HUF}_{t-1})$ | 0.85*** | -0.45*** | 0.32 |
| $\log(\text{CZK}_t/\text{CZK}_{t-1})$ | 0.37* | -0.53*** | 0.22 |
| $\log(\text{PLN}_t/\text{PLN}_{t-1})$ | 1.03*** | -0.45** | 0.40 |
| $\log(\text{RON}_t/\text{RON}_{t-1})$ | 0.10 | -0.27 | 0.05 |

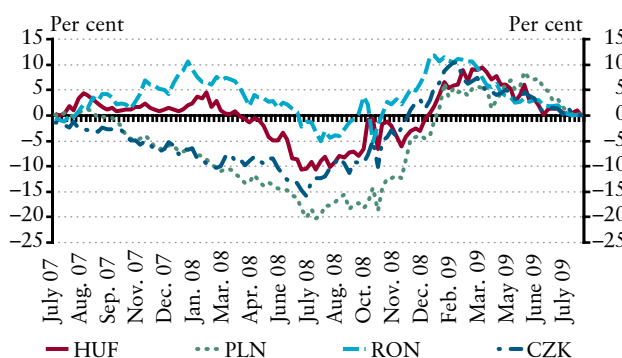
Note: Significant at 10 (*), 5 (**) and 1 (***) per cent significance level. White heteroscedasticity consistent standard errors.

the region's currencies, including the effects on the exchange rates of the forint (HUF), the Czech koruna (CZK), the Polish zloty (PLN) and the Romanian leu (RON) against the euro. The global component proves to be a very good exchange rate premium proxy. An increase in the factor results in an immediate exchange rate depreciation, at the same time forecasting a stronger exchange rate (higher yield) in the following period. The coefficients are significant in three cases, and explain a large part of the exchange rate fluctuations. The only exception is the Romanian leu, in the market of which the central bank is an active participant.⁹

If we think that most of the exchange rate movements resulting from the change in the risk premium can be filtered out with the help of the global component, it may be worth examining what the exchange rate movements there were, which were not caused by a global risk premium shock. These related to expectations about the future path of monetary policy, country-specific premium shocks not captured by the global component or other noise. Chart 4 illustrates the error terms of the regression described in Table 2; they are cumulated for better lucidity. Chart 4 shows that the appreciation trend that took place in the first half of the sample, and the regional depreciation between December

Chart 4**Portion of exchange rate movements of regional currencies not explained by the global component**

(the positive value means weakening)



Source: MNB.

2008 and February 2009 were not caused by the change in the global premium on its own, as these show up in the residua, i.e. the unexplained part of the regression. On the other hand the model is able to explain the exchange rate depreciation in October quite well, as residuals in this period decline to a low level.

⁹ If the part not explained by the global component of individual CDSs is included in the regression, it also proves to be strongly significant with the appropriate sign. However, here one cannot be sure whether the increase in the CDS is caused by the weakening of the exchange rate or vice versa.