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## Central Europe Economics

### Modelling the slope of the swap curve

#### OUR TAKE

*In this note we present a framework for analyzing CEE swap markets, by decomposing changes in the shape of swap curves into various macroeconomic factors.*

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**Piotr Kalisz, CFA**

+48-22-692-9633

piotr.kalisz@citi.com

**Arkadiusz Trzciolek**

+48-22-657-7750

arkadiusz.trzciolek@citi.com

**Aleksandra Siuzdak**

aleksandra.siuzdak@citi.com

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Our analysis is based on regression models that explain changes in slopes of swap curves (5y-2y spread) in Poland, Hungary and Czech Republic. This allows us to attribute moves in the shape of the curve to observable factors that have economic interpretation.

**Key explanatory variables include:**

- **Inflation** – In our model we use deviations of the headline inflation (lagged by one month) from central bank’s target. Parameters associated with that indicator are negative in all countries, but they are also relatively small in absolute terms (Figure 5). The strongest impact is observed in Hungary and the smallest one in Poland.
- **Domestic monetary policy** – We use a difference between central bank’s policy rate and estimates of natural rates of interest as explanatory variables. The latter are based on analysis from one of our previous reports, where we approximated  $r^*$  as a long-term median of real rates. The nominal neutral rate  $R^*$  is calculated as  $r^*$  plus the inflation target. As expected the model shows that tighter monetary policy contributes to flattening of the curve (negative parameter estimates).
- **Slope of the euro area curve** – Changes in core market interest rates tend to have statistically significant (and positive) impact on CEE swap curves. In absolute terms, changes in the slope of the euro swap curve have a stronger impact than domestic factors like inflation or central bank’s policy rate.
- **Market momentum** – We use lagged changes in the slope of CEE curves as explanatory variables. The aim is to approximate the market momentum (or positive autocorrelation in the data) – a phenomenon where periods of widening spreads are followed by even more widening.

Estimated model parameters are shown in Figure 5. Initially the model included also a constant among independent variables but parameter estimates associated with that term turned out statistically insignificant in all countries.

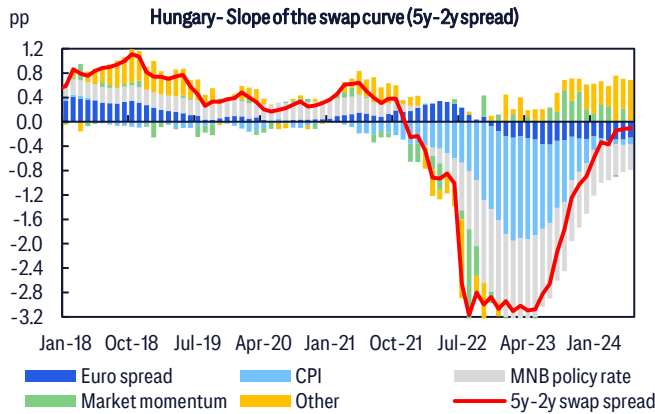
Figures 2-4 present the decomposition of the slope curve in Poland, Hungary and Czech Republics based on changes in macroeconomic variables. All in all, our estimates suggest the sharp drop in inflation was the major force standing behind steepening of curves over last year, with gradual monetary policy easing playing also an important, though smaller role.

**Figure 1. Slopes of CEE swap curves (5Y-2Y) – Descriptive statistics (sample Jan 2010 – Jun 2024)**

	SLOPE_CZ	SLOPE_HU	SLOPE_PL
Mean	0.054	0.060	0.167
Median	0.225	0.347	0.281
Maximum	0.790	1.111	0.749
Minimum	-1.578	-3.174	-1.098
Std. Dev.	0.535	0.985	0.424
Skewness	-1.265	-2.193	-1.145
Kurtosis	3.865	7.041	3.630

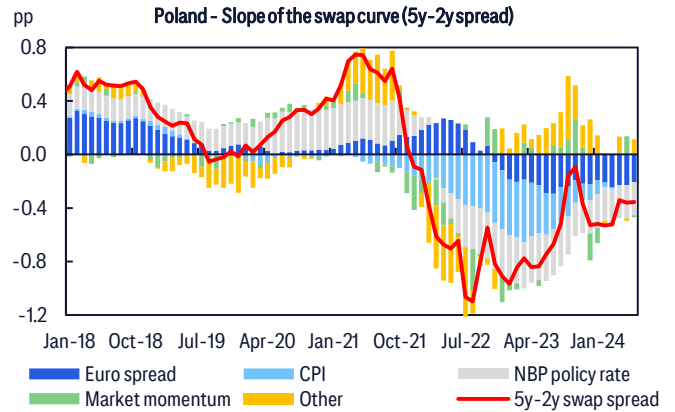
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**Figure 3. Hungary – decomposition of changes in the slope of the swap curve**



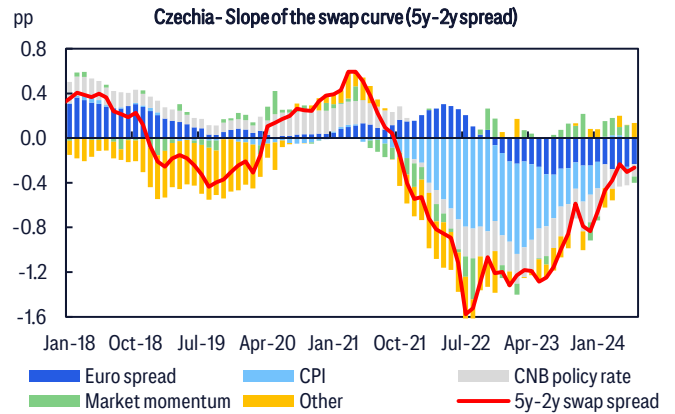
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**Figure 2. Poland – decomposition of changes in the slope of the swap curve**



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**Figure 4. Czech Republic – decomposition of changes in the slope of the swap curve**



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**Figure 5. Estimation results (dependent variables: 5y-2y spread for PLN, HUF and CZK swap curves)**

**POLAND**

<b>Variables</b>	<b>Coefficient</b>	<b>p-value</b>
Euro area spread (5y-2y)	0.538	0.000
Policy rate-R*	-0.097	0.000
Inflation (deviation from target, lagged 1 months)	-0.029	0.000
Change in slope of PLN swap curve (lagged 1 m.)	0.729	0.000
Adjusted R-squared	0.845	-
ADF test for residuals	-5.07	0.000

**HUNGARY**

<b>Variables</b>	<b>Coefficient</b>	<b>p-value</b>
Euro area spread (5y-2y)	0.682	0.000
Policy rate-R*	-0.111	0.000
Inflation (deviation from target, lagged 1 months)	-0.073	0.000
Change in slope of HUF swap curve (lagged 1 m.)	0.954	0.000
Adjusted R-squared	0.937	-
ADF test for residuals	-4.20	0.001

**CZECH REPUBLIC**

<b>Variables</b>	<b>Coefficient</b>	<b>p-value</b>
Euro area spread (5y-2y)	0.601	0.000
Policy rate-R*	-0.070	0.000
Inflation (deviation from target, lagged 1 months)	-0.054	0.000
Change in slope of CZK swap curve (lagged 1 m.)	0.804	0.000
Adjusted R-squared	0.910	-
ADF test for residuals	-3.55	0.008

## Chief Economist Office

### Piotr Kalisz, CFA

Chief Economist  
+48 (22) 692-9633  
[piotr.kalisz@citi.com](mailto:piotr.kalisz@citi.com)

### Arkadiusz Trzciotek, CFA

Senior Economist  
+48 (22) 657-7750  
[arkadiusz.trzciotek@citi.com](mailto:arkadiusz.trzciotek@citi.com)

### Aleksandra Siuzdak

Intern  
[aleksandra.siuzdak@citi.com](mailto:aleksandra.siuzdak@citi.com)

## Citi Handlowy

Senatorska 16, 00-923 Warszawa, Polska

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