

26 August 2025 | 5 pages

Central Europe Economics View

Yield curve and its predictive power in CEE

OUR TAKE

While the shape of the yield curve is widely perceived as a useful indicator of future recessions in developed economies, our analysis shows that results are more mixed in case of CEE. In particular, the curve has no predictive power in case of the Czech and Romania's economy. As far as Hungary and Poland are concerned, the shape of yield curve does a much better job as an indicator of future recessions, but with only a very short lead, which significantly limits its usefulness for investors.

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The tendency of the yield curve to flatten and invert ahead of recessions makes it potentially a useful indicator of future contractions. For this reason analysts and central banks in a number of countries – mostly developed economies – use models based on term spread to inform their decisions.

To investigate the link between the shape of the curve and recession risks in Central Europe we estimated a series of probit models for Czechia, Hungary, Poland and Romania. As explanatory variables we use the slope of the swap curve (10y-1y, 10y-2y), the slope of the government bond curve (10y-2y for Czechia, Poland and Romania, 10y-3y in Hungary) and confidence indicators (ESI, manufacturing PMI). Our models were designed to estimate probability of a recession 4 quarters ahead but we experimented also with shorter leads.

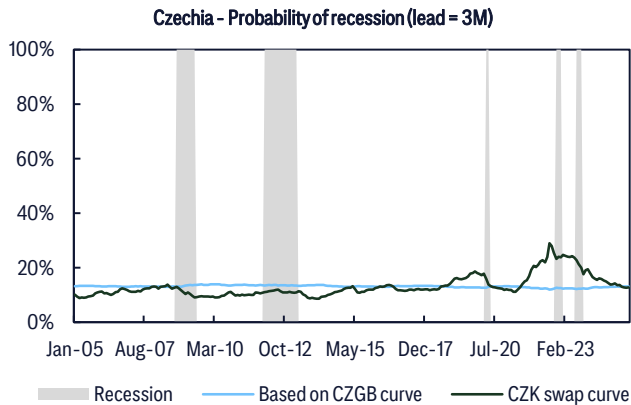
Periods of recession were identified as quarters with negative GDP growth rate (QoQ in seasonally and working day adjusted terms), but we also took into account other indicators, especially labour market data and monthly data on industrial output and retail sales. In case of a single quarter of negative growth we used that additional information to assess whether there was a noticeable weakening of economic activity to decide whether the particular period should be included in a sample as 'recession period'.

Results from our models are presented on Figures 1-6. Key conclusions can be summarized as follows:

- Slope of the curve (both for swaps and bonds) performs poorly as a predictor of future recessions in Czechia, regardless of the forecasting horizon. This is also true for Romania.
- For Hungary and Poland, bond and swap curves are a relatively better indicator of recession probability, but only with a very short lead of 3 months. In case of a longer leads the predictive power of the curve was close to zero. This significantly limits usefulness of yield curve for prediction for both policymakers and investors, as three months before the onset of recession usually other economic data already signals economic weakness. However, the curve (at least in Hungary and Poland) may be an auxiliary indicator helping to assess the stance of the economy.
- In CEE countries PMI and ESI business surveys can be useful as coincident indicators. Probit models based on results of these surveys provide relatively good estimates of recession probability in a given month, but they can't provide insight regarding future recession risks.

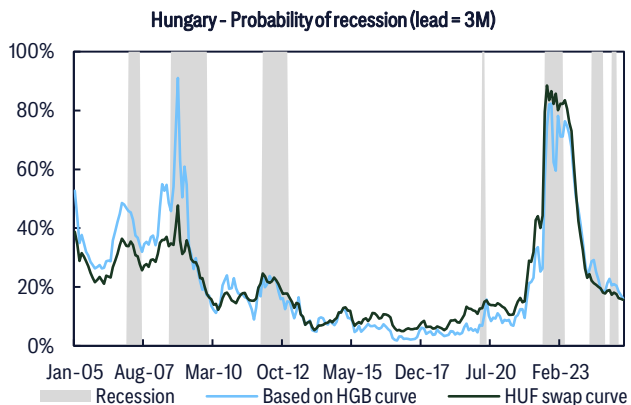
In Figure 9 we provide also a table summarizing what a given level of the slope of the curve or a given level of PMI/ESI implies in terms of recession probability, based on results from our probit models.

Figure 1. Czechia - Recession probability based on probit models using slope of the curve as explanatory variables



Source: Citi Handlowy Estimates

Figure 3. Hungary - Recession probability based on probit models using slope of the curve as explanatory variables



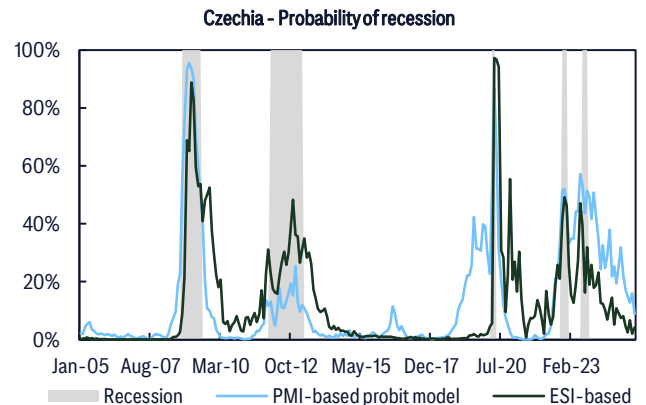
Source: Citi Handlowy Estimates

Figure 5. Poland - Recession probability based on probit models using slope of the curve as explanatory variables



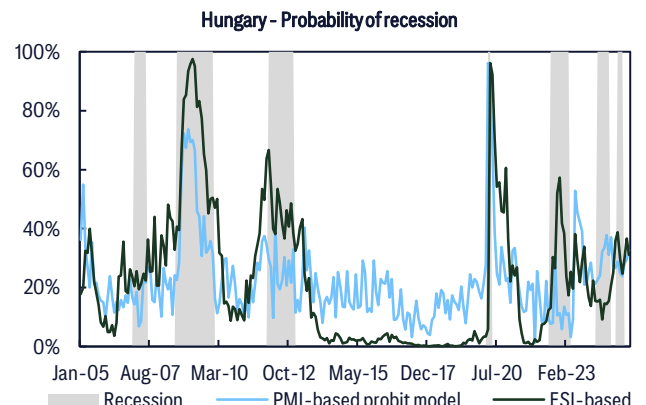
Source: Citi Handlowy Estimates

Figure 2. Czechia - Recession probability based on probit models using confidence indicators



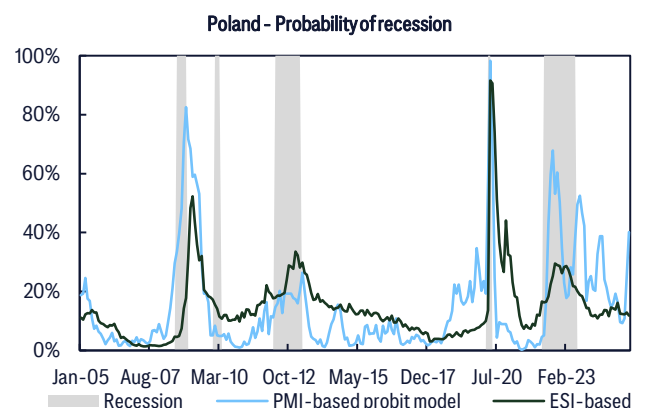
Source: Citi Handlowy Estimates

Figure 4. Hungary - Recession probability based on probit models using confidence indicators



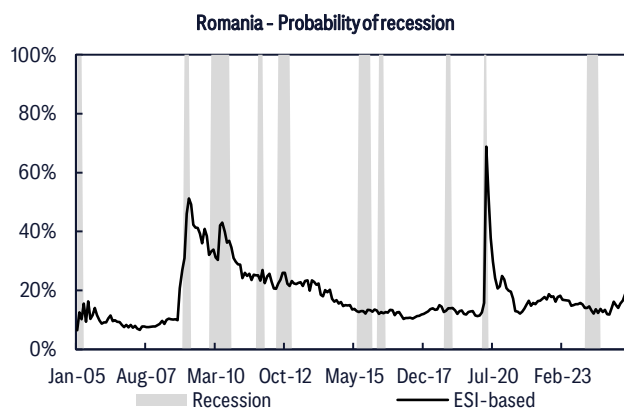
Source: Citi Handlowy Estimates

Figure 6. Poland - Recession probability based on probit models using confidence indicators



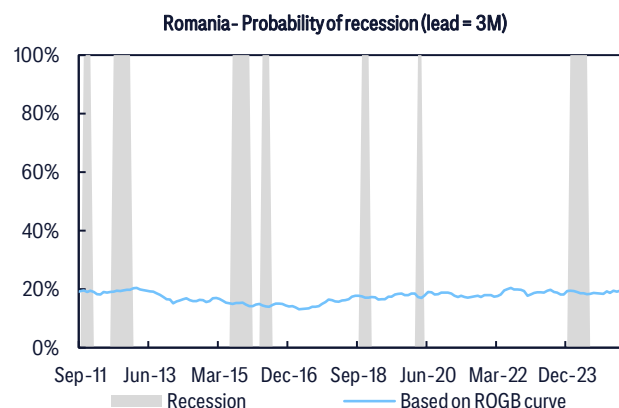
Source: Citi Handlowy Estimates

Figure 7. Romania - Recession probability based on probit models using slope of the curve as explanatory variable



Source: Citi Handlowy Estimates

Figure 8. Romania - Recession probability based on probit models using confidence indicators



Source: Citi Handlowy Estimates

Figure 9. What given slope of the curve and confidence indicators imply in terms of recession probability?

Probability of recession					Probability of recession			
ESI Index	CZ	HU	PL	RO	PMI Index	CZ	HU	PL
60	99.1%	99.6%	80.6%	65.8%	35	87.0%	85.7%	93.8%
70	90.4%	95.6%	64.4%	52.2%	40	62.3%	70.1%	73.5%
80	60.3%	77.5%	45.0%	38.3%	45	30.7%	49.3%	38.8%
90	21.6%	42.1%	26.8%	25.9%	50	9.4%	28.8%	11.6%
100	3.4%	12.5%	13.3%	15.9%	55	1.6%	13.5%	1.7%
110	0.2%	1.8%	5.4%	8.8%	60	0.2%	5.0%	0.1%
120	0.0%	0.1%	1.8%	4.4%	65	0.0%	1.4%	0.0%

Probability of recession after 3m					Probability of recession after 3m			
Bond curve slope	CZ	HU	PL	RO	Swap curve (10y-2y)	CZ	HU	PL
-200	12.0%	73.4%	98.3%	26.9%	-200	26.6%	52.0%	98.8%
-150	12.2%	62.4%	93.7%	25.2%	-150	23.2%	43.7%	93.0%
-100	12.4%	50.3%	82.2%	23.6%	-100	20.1%	35.8%	75.7%
-50	12.6%	38.1%	62.5%	22.1%	-50	17.2%	28.4%	46.9%
0	12.8%	27.1%	38.8%	20.6%	0	14.6%	21.8%	19.6%
50	13.0%	17.9%	18.8%	19.2%	50	12.3%	16.2%	5.1%
100	13.2%	11.0%	6.8%	17.8%	100	10.3%	11.6%	0.8%

Source: Citi Handlowy Estimates

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