

Closer to New York than to Frankfurt?

The expectations hypothesis in Poland, the US and the euro area.

Marcin Dec

Kozminski University & FAME|GRAPE, Warsaw

Working paper · SSRN 6695444 · doi:10.2139/ssrn.6695444 · under peer review



NCN Preludium UMO-2020/37/N/HS4/02202

Motivation

THE QUESTION

- Under the pure expectations hypothesis (PEH), long yields average expected future short rates plus a constant premium. Its sharpest implementation is the Fama–Bliss type-1 regression of future yield changes on the scaled forward-spot spread: the null is slope $\beta = 1$, intercept zero.
- Four decades of US evidence reject PEH on the FB1 grid, with β estimates drifting toward and past zero. The euro-area AAA panel is the other natural benchmark.
- The question: does a less-liquid sovereign curve, here Poland, behave like either benchmark, and **what do cross-market differences in rejection actually identify**: curve structure, or regime exposure and test power?

| Data and test design

THREE PANELS, FIVE FAMILIES, TWO INFERENCE METHODS

- **Panels.** 256 monthly observations, 2005:01–2026:04. Poland: LW-NSS-fitted zero curves on the BondSpot panel. US: GSW zero-coupon panel. Euro area: ECB AAA spot-rate curve.
- **Test families.** Fama–Bliss type-1 (yield change) and type-2 (holding-period return), Cochrane–Piazzesi single-factor, Thornton conventional and contrarian: 90 (h, n) cells per market on the FB grid, 9 horizons $\times$ 10 maturities.
- **Inference.** Newey–West HAC (bandwidth = h) against a wild block bootstrap, run cell by cell. The comparison of the two is itself an object of interest (Bauer–Hamilton 2018).

The workhorse regressions

ESTIMATING EQUATIONS AND NULLS

Fama–Bliss type-1, per horizon h and maturity n (months):

$$y_{t+h}^{(n-h)} - y_t^{(n)} = \alpha_{h,n} + \beta_{h,n} \frac{h}{n-h} \left(f_t^{(n-h,n)} - y_t^{(n)} \right) + \varepsilon_{t+h}, \quad H_0: \beta_{h,n} = 1, \alpha_{h,n} = 0$$

Cochrane–Piazzesi single factor, average excess return on the restricted forward-rate combination:

$$\overline{rX}_{t+12} = b \left(\hat{\gamma}' f_t \right) + \eta_{t+12}$$

- Overlap of h -period returns induces $MA(h-1)$ errors; inference is Newey–West with bandwidth h and, in parallel, a wild block bootstrap that resamples residuals under the null with per-cell fixed seeds.

Headline: PEH rejections across markets and inference methods

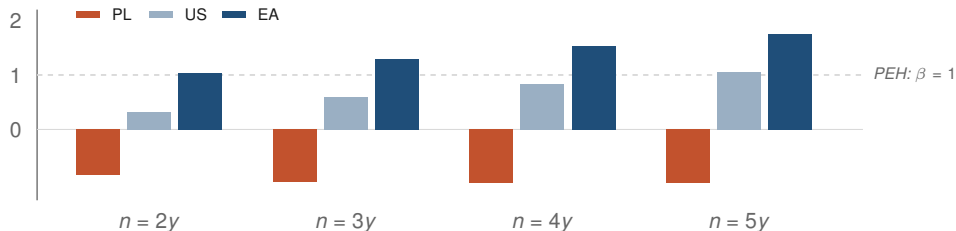
REJECTIONS AT 5%, BY TEST FAMILY

Test family	PL		US		EA	
	NW	boot	NW	boot	NW	boot
FB1 (yield change)	0/30	0/30	2/30	0/30	30/30	2/30
FB2 (holding period)	0/30	0/30	2/30	0/30	20/30	1/30
CP (single factor)	0/4	0/4	1/4	0/4	4/4	0/4
Thornton (contrarian)	0/26	0/26	1/26	0/26	21/26	1/26
Total	0/90	0/90	6/90	0/90	75/90	4/90

Poland never rejects under either method; the US rejects sparsely under NW and not at all under bootstrap; the euro area rejects on 75 of 90 cells asymptotically and on 4 under the bootstrap.

FB1 slopes at $h = 12$ months: three distinct configurations

POINT ESTIMATES BY MATURITY



Polish slopes cluster at or below zero (-0.84 to -0.99), US slopes rise toward the null with maturity (0.32 to 1.06), euro-area slopes overshoot it (1.03 to 1.75). Sample 2005:01–2026:04.

| The euro-area rejection is bootstrap-fragile

ASYMPTOTIC VERSUS BOOTSTRAP INFERENCE

- Euro-area rejections fall from 75/90 under Newey–West to 4/90 under the wild block bootstrap; by family: FB1 $30 \rightarrow 2$, FB2 $20 \rightarrow 1$, CP $4 \rightarrow 0$, Thornton $21 \rightarrow 1$.
- The US pattern is the same in miniature ($6 \rightarrow 0$), while the Polish cells reject under neither method.
- The gap quantifies the size distortion of HAC t -statistics in overlapping-return regressions with persistent regressors (Bauer–Hamilton 2018): on this sample configuration the asymptotic test is oversized by roughly an order of magnitude.

Power: what the Polish non-rejection can and cannot mean

SIMULATION EVIDENCE

- Simulated power of the FB1 test on the Polish sample configuration: adequate only at the longest horizons (0.94 at $h = 60\text{--}72$ months under a unit-slope alternative), and low (0.2–0.3) at short and medium horizons.
- The Polish zero-out-of-ninety therefore cannot be read as support for PEH: at most horizons the test could not have detected a violation of plausible magnitude, so the non-rejection is uninformative there.
- Polish point estimates sit at least as far from the null as the US ones, on the opposite side of zero, with wide standard errors driven by the persistence of the forward-spread regressor.

Subsample evidence: the non-rejection is a post-2020 phenomenon

SAMPLE SPLITS

- Pre-2020, the Polish median FB1 slope is 0.58 with 15 of 32 cells rejecting: a configuration much closer to the US benchmark.
- In the full sample and in the 2010+ window the median slope flips negative and rejections drop to zero.
- Structural-break tests (sup-Wald) date the US and euro-area breaks at the 2008 crisis; the Polish breaks arrive late, in 2019 and 2022, coinciding with the domestic policy cycle, two years or more after the global one.

Regime evidence: the euro-area anomaly has a habitat in time

REGIME SPLITS

- The euro-area contrarian (Campbell–Shiller type) anomaly is concentrated in the pre-2015 and the 2015–2021 negative-deposit-rate regimes, and is absent after 2021.
- Pooled cross-market equality tests cannot reject equal slopes across the three markets (Wald p between 0.13 and 0.53); the PL–US–EA ranking is an ordering of point estimates without formal separation.
- Together with the break geography, the cross-market differences line up with differences in regime exposure across the three observation windows.

Interpretation

A REGIME-AND-POWER READING

- Poland is a clean monetary-regime counterfactual: the one market in the triple that avoided a GFC recession, crisis-era QE and the negative-rate regime. Its curve met those shocks only through its own, later policy cycle.
- Cross-market PEH rejection then tracks two sample characteristics: the regimes a curve lived through, and the power of the test on that sample. Both are properties of the observation window.
- Practical corollary for term-structure work on less-liquid markets: report bootstrap inference next to HAC, report power, and treat non-rejection on short samples as uninformative.

Data and econometrics

SPECIFICATION SUMMARY

- **Regressions.** FB1/FB2 on the 9×10 (h, n) grid, Cochrane–Piazzesi single-factor, Thornton conventional and contrarian, per market; pooled cross-market panels for the equality tests.
- **Inference.** Newey–West with bandwidth = h ; wild block bootstrap with per-cell fixed seeds (exact reproducibility). Residual diagnostics motivate both: zero-mean but serially correlated (ρ_1 0.88–0.99), heteroskedastic, non-normal, the $MA(h-1)$ structure induced by overlapping returns.
- **Robustness.** Power simulations, subsample splits, sup-Wald break tests, regime splits for the euro area, macro-spanning augmentation of the FB regressor.

Companion data and replication

YIELDCARTOGRAPHY.COM

- The paper's test suite re-runs monthly as the fitted-curve panel grows, with per-cell fixed bootstrap seeds: yieldcartography.com/eh-tests.
- The frozen paper sample (2005:01–2026:04) is archived unchanged; any test script run standalone reproduces the paper exactly.
- The underlying LW-NSS, GSW and ECB AAA panels update daily on [/curves/](https://yieldcartography.com/curves/); CSVs are downloadable from the dashboards.

Thank you.

Marcin Dec

Kozminski University & FAME|GRAPE, Warsaw

mdec@kozminski.edu.pl · ORCID 0000-0002-6220-8267

Dec, M. (2026). Closer to New York than to Frankfurt? The Expectations Hypothesis in Poland, the US and the Euro Area. SSRN 6695444.
doi:10.2139/ssrn.6695444 · under peer review

Research supported by the National Science Centre, Poland · Preludium UMO-2020/37/N/HS4/02202



yieldcartography.com/slides/eh/