Peace priced in-and-out
A market-implied probability of Ukranian peace
Bond Pricing Model Analysis using QuantLib

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Abstract

This research piece estimates the market-implied probability of a peaceful resolution to the war in Ukraine using QuantLib-based sovereign bond pricing. By comparing the market prices of Ukrainian bonds with and without contingent GDP-linked step-up clauses (notably XS2895057177 and XS2895056955), and modeling theoretical prices under both peace and status quo scenarios, we derive a daily probability measure based on financial market expectations. The findings in this research note build upon analyses conducted by Goldman Sachs, as reported in the Financial Times and The Economist[1] [2]. It provide data-driven lens to gauge war termination expectations, with implications for policymakers, investors, and international financial institutions.

Results are derived under model assumptions that remain open to discussion.

1 Introduction

Ukraine's sovereign bond market has embedded clues about investors' expectations for a future peace resolution in the ongoing war. In particular, differences in pricing between Ukraine's restructured Eurobonds. Indeed, some with contingent "step-up" GDP-linked payments triggered by a peace scenario can be used to infer the market-implied probability of a peace deal. We develop a quantitative model (implemented in Python with QuantLib) that prices two key Ukrainian bonds under war (no peace) and peace scenarios. By calibrating to market yields and bond structures, we estimate the implied probability that investors assign to a "peace scenario". The model suggests that this implied peace probability has fluctuated significantly over time, surging when political developments (such as the prospect of a U.S.-brokered ceasefire) raised hopes of a near-term settlement, and falling back when those hopes waned. (see Figure 4)

Key findings include:

1. The 2035 maturity "Step-Up" B Notes (ISIN XS2895057177), which features extra GDP-linked payments if Ukraine's economy outperforms (as would be expected after peace) consistently trades richer than the comparable 2034 Step Up B Notes (ISIN XS2895056955) with no such contingency.1

2. Using the 2034 bond's yield as a baseline war-yield curve, and a constructed peace-yield curve (with a 400 basis point spread compression, floored at 12%), we compute theoretical prices for the 2035 bond under both scenarios.

3. The observed market price of the 2035 bond can be replicated as a probability-weighted mix of the "war" and "peace" valuations. This yields an implied probability of peace (or, equivalently, of the GDP step-up clause paying off).

[1] The Economic Consequences of the (Ukraine) Peace - Financial Times
[2] Investors think the Russia-Ukraine war will end soon - The Economist

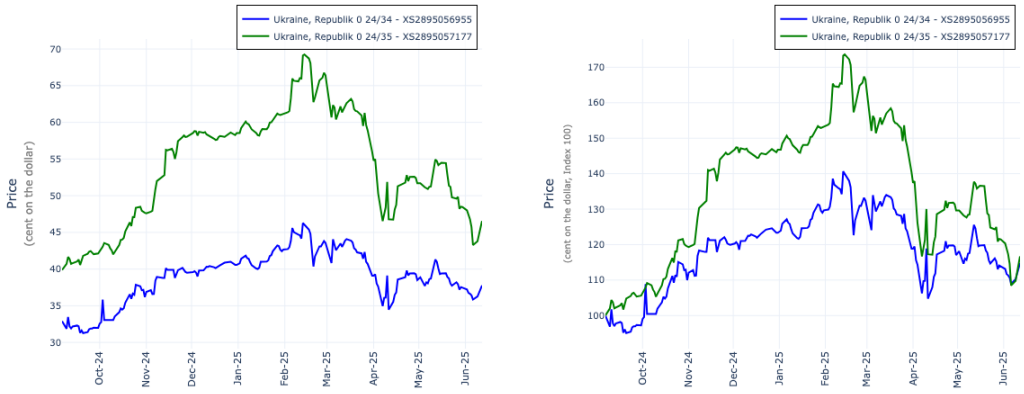

Figure 1: Step-Up B Notes due 2034 vs. GDP-contingent Step-Up B Notes due 2035 price development (LHS) and indexed performance (RHS).

2 Ukraine's bonds restructuring and GDP-linked features

Ukraine completed a major sovereign debt restructuring in August–September 2024, covering ~$20.5 billion of Eurobonds.[3] The deal provided critical debt relief, including a 37% principal haircut and coupon reductions that together trimmed $8.5 billion from Ukraine's debt stock and slashed debt service by over $22 billion through 2033. The restructuring was executed via an exchange offer for 13 series of sovereign Eurobonds (plus some state-guaranteed bonds), and introduced new bonds maturing between 2029 and 2036[4]. These new series were issued in two categories – "Step-Up A" and "Step-Up B" notes – for each maturity year. Step-Up refers to the coupon schedule: due to the war, coupons were set at 0% until 2027, then gradually stepping up to higher rates in later years. For example, the 2035 notes pay 0% until 2027, then 3.00% from 2027 to 2033, and 7.75% from 2033 to maturity.[5]

Some of these bonds carry additional contingent payout claims linked to Ukraine's economics performance, comparable with the GDP warrants issued in the 2015 restructuring.[6] Specifically, the Step-Up B notes due 2035 (ISIN XS2895057177) include a GDP-linked "principal increase" provision that is triggered by a peace scenario in effect. The bond's terms stipulate that if Ukraine's economy outperforms a baseline forecast (as one would expect following an end to the war and successful reconstruction), bondholders will receive an extra payment of principal in 2030. This trigger will be assessed in late 2029: if Ukraine's 2028 GDP significantly exceeds the IMF-projected baseline (by at least 3% in nominal terms, with certain real GDP conditions), then additional bonds (fungible with the 2035s) will be issued to Step-Up B 2035 holders, effectively increasing the principal. In other words, the 2035 B bond contains an embedded value recovery instrument: a one-time GDP-linked payoff if Ukraine's economy rebounds strongly by 2028, synonym of a durable peace.

3 Data and Yield Curve Construction

Data: We use cleaned price from Börse Frankfurt database (2034 Notes, 2035 Notes) and computed yield data for the two bonds over time. The prices are quoted in cents on the dollar (i.e. percentage of face value). For example, as of mid-June 2025, the 2035 Step-Up bond trades around 47 cents, while the 2034 bond trades near 37 cents. We primarily focus on yield to maturity (YTM) as a summary of each bond's pricing, and then build yield curves for scenario pricing.

Market Yield Curve: We treat the 2034 bond as a proxy for Ukraine's sovereign yield curve under the status quo (war continues) scenario. Its YTM reflects the market's required return given current war conditions, without pricing in any extra peace-related payoff. On each date in our sample, we derive a flat yield curve (for simplicity) that produces the 2034 bond's observed price via discounting its cashflows. In effect, we assume the entire term structure of Ukrainian yields

[3] White&Case - Ukraine concludes historic restructuring of US$20.5 billion of international bonds
[4] Ministery of Finance of Ukraine (MoF) - Terms and conditions of the notes - Step-up B Notes due 2034
[5] Ministery of Finance of Ukraine (MoF) - Terms and conditions of the notes - Step-up B Notes due 2035
[6] Reuters - What are Ukraine's GDP warrants and why are they creating problems for Kyiv?

in a no- peace scenario is characterized by a constant yield (or a simple extrapolation) equal to the 2034 bond's YTM. This is admittedly a simplification (a true term structure would involve multiple maturities) but given limited liquid benchmarks, it is a practical starting point.

Peace Scenario Yield Curve: We model a hypothetical yield curve for a peaceful Ukraine, i.e. how yields might look if a credible ceasefire or resolution is in place. We assume that peace would catalyze a sharp rally in Ukrainian bonds, compressing spreads by about 400 basis points (4.0%) relative to war levels. This assumption is based on historical precedent and judgment: a reduction of ∼$600 bps in yield roughly captures the kind of risk-premium drop observed when extremely high-yield distressed debt returns to a more "normal" high-yield range.

For instance, Ukraine's 5-year CDS spreads and bond yields jumped by thousands of basis points after the full-scale invasion. A 400 bps compression would take a wartime yield of, say, 18% down to 14%. However, we floor the peace scenario yield at 12%. In other words, we do not assume a return to pre-war yields (∼$7–8%) in the near term. 12% is chosen as a minimum to account for credit risk that would still be present. Each day, we take the war curve and subtract 400 bps (not going below 12%) to get the peace scenario curve. This dynamic approach is important: when overall market yields rise or fall (due to global factors or changing perceptions of Ukraine's situation), the peace scenario yield adjusts in tandem (always 400 bps tighter, until hitting the floor). This ensures that our peace scenario pricing remains consistent with prevailing conditions rather than a static assumption.2

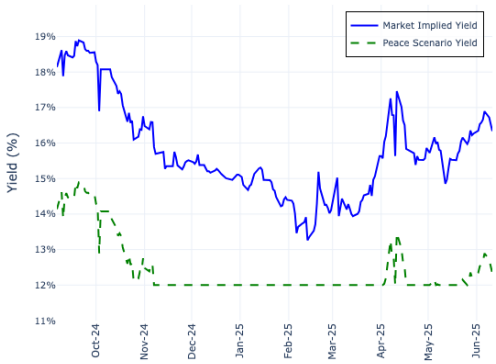

Figure 2: Daily Market-Implied vs. Peace-Scenario Yields (400 bps reduction)

Why 400bps ?: This yield reduction is justified with a mix of qualitative reasoning and market context. During period of optimistic news (rumours of ceasefire talks, strong international support), Ukraine's bond prices have jumped significantly, implying yield drops in the hundreds of basis point. One notable instance was the post-U.S. election rally in late 2024, when the prospect of a negotiated end to the war under the incoming Trump administration caused bond prices to surge. Longer-dated bonds gained ∼6 cents which corresponds to 100-200 bps yield drop[7]. A full peace deal could be expected to have an even larger impact.

Comparable patterns have been observed in other sovereign restructuring. For example in Ghana, during the several restructuring talks and deals between 2022-2025, yields on domestic debt felll by several hundreds basis points following IMF program approval and debt relief measures.[8][9] Another example is the case of Argentina who undergo debt restructuring after the 2020 crisis.

In light of these empirical episodes, a 400 basis point reduction attached to the Russian war in Ukraine resolution and durable scenario is a conservative yet reasonable midpoint. It is large enough to reflect the financial relief that peace would provide, but cautious compared to the full yield collapses seen in past restructurings. It captures a peace dividend without assuming a best-case scenario, aligning with observed market reactions during optimistic moments and providing a defensible benchmark for scenario analysis. This assumption is explicitly disclosed and subjected to sensitivity analysis.

[7]Financial Times - Ukraine's bonds jump as investors bet Trump will end war
[8]IMF Begins Talks as Ghana Is Set to Seek as Much as $1.5 Billion - Bloomberg
[9]Ghana, IMF Reach Deal on $370 Milion Disbursement - Bloomberg

Dynamic Peace Curve: The peace scenario yield is modelled as dynamically linked to the prevailing market (war) yield, based on the observed yield of the 2034 bond (XS2895056955) on each pricing date. In the codegr, this is achieved using QuantLib's FlatForward curve construction, where the market yield (extracted from the 2034 bond's price) defines the base yield curve.

4 Pricing Logic and Theoretical Valuations

To estimate the market-implied probability of peace, we compare how the 2035 Step-Up B bond (XS289505717) is priced relative to the 2034 bond (XS2895056955), adjusting for the extra value the 2035 bond deliver under a peace-triggered payout.

We define the key components of formula as follow:

- **Market Price**: The actual observed price of the two bonds in the market.
- **TP XS2895056955**: The model price of the 2034 bond using the war yield curve. It represents the benchmark value of a bond under current war conditions, without any contingent payout.
- **TP no Peace XS289505717**: The model price of the 2035 bond assuming no peace scenario occurs, i.e. no extra payout is triggered. This is calculated by discounting the regular scheduled cashflows (3% coupon from 2027, stepping up to 7.75% from 2033, and principal repayment at maturity) using the war yield.
- **TP_add Peace XS289505717**: The additional value that the 2035 bond would have under a peace scenario. This reflects the extra payment that would be made in 2030 if the GDP-linked condition is triggered and is discounted using the peace yield curve.

The implied peace probability is computed using the formula:

$$\text{Probability } (\%) = 100 \times \frac{\text{Price 2035} - \text{Price 2034} + \text{TP 2034} - \text{TP\_noPeace 2035}}{\text{TP\_add Peace 2035}}$$

In short, the formula asks: "What portion of the total peace upside is already reflected in current prices?" That share is taken as the market-implied probability of peace; the likelihood that the extra payment will materialize, as perceived by investors. If peace were somehow certain, the 2035 bond would trade up toward TP_Peace (i.e. TP_noPeace + additional cashflows in a peace scenario : TP_add Peace). If war were sure to continue and no extra payments ever made, the bond would trade near TP_noPeace. In reality, the bond's observed market price (P_market) will lie in between, reflecting a probability-weighted mix of these scenarios.3

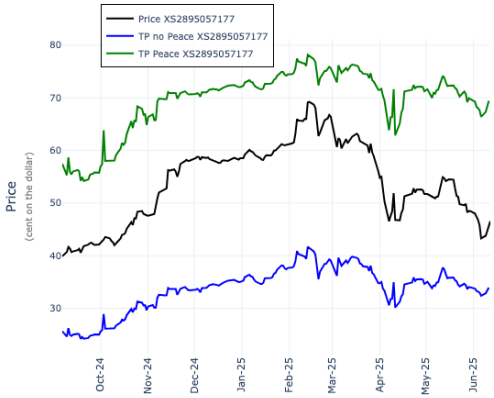

Figure 3: Observed market price vs. Theoretical Peace and No Peace pricings.

5 Conclusion

Using this framework, we calculate the time series of the market-implied peace probability from September 2024 (just after the new bonds began trading post-restructuring) through mid-June 2025.

The evolution of this implied probability is plotted in Figure 4 below:

Figure 4: Implied Probability of a Ukrainian Peace Resolution, derived from bond market pricing.

Our QuantLib/Python-based bond model illustrates a way to extract market-implied probabilities for geopolitical outcomes. By exploiting the unique design of Ukraine's restructured bonds we back out the chance of peace that is consistent with observed market prices. As of mid-2025, that probability has been highly volatile but non-negligible, reflecting both hope and uncertainty.

Ukraine's case is a quasi-real-time experiment in contingent sovereign debt instrument. The GDP-linked step-ups were intended to align debt payment with peace recover, effectively making creditors share some upside if Ukraine's economy rebounds. The market willingness to pay for these features, that have been observed at the beginning of the year validates that such instruction do carry value and are taken seriously by investors. The pricing we observe can inform debates on possibly restructuring the warrants (e.g. a high implied peace probability might encourage Ukraine to attempt restructuring those claims before they potentially come due; indeed, Ukraine has been trying to renegotiate the 3.2bn GDP warrants, back in April 2024, without success).[10] We stress our probability estimates based on model assumptions, notably the 400 bps spread compression. If investors expect a bigger rally (or smaller), the true probability would differ. Adjusting the spread compression dynamically (e.g. making it state-dependent) could refine the model. Moreover, the model assumes a binary outcome (peace resolution or war continuation). Reality could be messier (e.g. partial peace, temporary ceasefire, ..., that doesn't fully unlock the country growth). Nonetheless, the model's relatives moves are informative even though absolute levels might contains errors.

In conclusion, our analysis documents how hopes for an end to Russia's war have been alternately built up and crushed in the past year. As Ukraine and its partners navigate the tough choices ahead, this "peace probability index" can be one of many indicators to watch. The model's assumptions, especially the extent of yield compression on peace, are critical and are grounded in historical data and restructuring terms. While not a crystal ball, this bond-pricing approach provides a real-time market gauge of peace sentiment, useful for policymakers and analysts monitoring war outcomes, debt valuations, and contingent fiscal liabilities.

[10] What are Ukraine's GDP warrants and why are they creating problems for Kyiv? - Reuters, April 24, 2025