REVISTA MEXICANA DE ECONOMÍA Y FINANZAS
Nueva Época
REMEF
(THE MEXICAN JOURNAL OF ECONOMICS AND FINANCE)

**Revista Mexicana de Economía y Finanzas, Nueva Época**

Volumen 21 Número 2, abril - junio 2026, pp. 1-16, e1430

DOI: https://doi.org/10.21919/remef.v21i2.1430

*(Received: September 12, 2025; Accepted: February 15, 2026; Published: April 1, 2026)*

# Can Public Information Replicate Institutional Bond Price Vendors?

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**Abstract**

This paper aims to determine whether a transparent, vendor-style bond pricing framework built exclusively from public information can match the pricing accuracy of institutional vendors. The methodology constructs Treasury-based yield curves using Nelson–Siegel–Svensson specifications, prices benchmark U.S. Treasuries across repeated cross-sections, and evaluates performance against market dirty prices using MAE, RMSE, percentage errors and distributional diagnostics. Results show that the Daily Treasury Yield Curve Rate (DYCR) benchmark consistently outperforms the proposed public-information vendor-style model across maturities, market conditions, and all error metrics. The study recommends practitioners continue using DYCR as a defensible baseline and encourages researchers to explicitly incorporate the proprietary information elements embedded in vendor pricing rather than relying on curve engineering alone. Limitations arise from incomplete public transaction coverage, finite sample size, and the inherent absence of proprietary dealer intelligence. The study's originality lies in testing whether institutional pricing performance can be structurally replicated without non-public inputs. The evidence concludes that model sophistication alone is insufficient and that institutional vendors' informational advantages carry meaningful pricing value.

*JEL Classification: C13, G12.*

*Keywords: Bond valuation, Public data framework, Price estimation.*

# ¿Puede la información pública replicar a los proveedores institucionales de precios de bonos?

**Resumen**

Este estudio tiene como objetivo evaluar si un marco transparente de valuación de bonos basado exclusivamente en información pública puede igualar el desempeño de los valuadores institucionales. La metodología construye curvas de rendimiento del Tesoro con especificaciones Nelson–Siegel–Svensson, valúa bonos del Tesoro estadounidense en cortes transversales repetidos y compara los precios sucios con el mercado mediante MAE, RMSE, errores porcentuales y análisis de distribución. Los resultados muestran que la tasa oficial DYCR supera de manera consistente al modelo de información pública en todos los horizontes, condiciones de mercado y métricas. Se recomienda que los practicantes continúen utilizando DYCR como referencia confiable y que la investigación futura incorpore explícitamente los elementos de información propietaria usados por los proveedores. Las limitaciones provienen de la cobertura pública incompleta de transacciones, el tamaño muestral y la ausencia inevitable de inteligencia de mercado propietaria. La originalidad radica en evaluar si la arquitectura institucional puede replicarse sin datos no públicos. Se concluye que la sofisticación metodológica por sí sola no basta y que la ventaja informativa de los proveedores tiene valor económico real.

*Clasificación JEL: C13, G12.*

*Palabras clave: valuación de bonos, marco con datos públicos, estimación de precios.*

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*No funding source was received for the development of this research.

# 1. Introduction

The valuation of fixed-income securities fundamentally depends on the ability to construct reliable yield curves that generate internally consistent bond prices. Institutional pricing vendors play a central role in this process, supplying reference valuations used by asset managers, risk systems, regulators, and benchmark administrators. However, their pricing frameworks rely on information that is only partially observable to external users, including proprietary quotes, dealer inventory dynamics, and liquidity intelligence. This raises a central empirical and policy-relevant question: can vendor-level pricing performance be replicated using only publicly available information, transparent methodologies, and reproducible data pipelines?

A broad academic literature demonstrates that high-quality yield curves can be estimated from public sources using parametric specifications such as Nelson–Siegel and Svensson, and that these curves can support robust valuation, forecasting, and policy analysis. The construction and simulation of yield curves using parametric specifications has been widely studied in both the international and regional literature. In particular, Márquez Diez-Canedo, Nogués Nivón, and Vélez Grajales (2003) document that parsimonious curve-based approaches can generate coherent term structures suitable for valuation and risk analysis, reinforcing the feasibility of transparent yield curve construction from observable market data. Central banks, market authorities, and international institutions routinely publish public yield curve estimates precisely because they enable transparent market functioning. Yet, the existence of sophisticated public-data methodologies does not guarantee that they equal the performance of institutional vendors in replicating observed market prices. The practical gap between theoretical feasibility and empirical pricing accuracy remains insufficiently quantified.

While the academic literature has extensively documented the feasibility of constructing high-quality yield curves from publicly available data using parametric specifications such as Nelson–Siegel and Svensson, most existing studies focus on estimation accuracy, curve dynamics, or forecasting performance. Far less attention has been devoted to assessing whether such public-information-based frameworks can replicate observed market prices at the level of precision achieved by institutional bond pricing vendors. As a result, there remains limited empirical evidence on whether a valuation framework that is structurally similar to institutional vendor models, but restricted exclusively to publicly available information, can achieve comparable pricing accuracy when benchmarked against observed market prices.

This paper addresses that gap. It constructs a vendor-style bond pricing framework built exclusively from public information, mimicking institutional architecture while deliberately excluding any non-public inputs. The framework integrates Treasury-based term structure estimation, Nelson–Siegel–Svensson curve fitting, and spread-adjusted pricing conventions consistent with institutional practice. Its performance is benchmarked against the Daily Treasury Yield Curve Rate (DYCR), a widely used, operationally simple, and publicly available valuation baseline.

The contribution of this study is twofold. First, it provides systematic empirical evidence on whether structural replication of vendor architectures is sufficient to match real-world pricing when informational replication is not possible. Second, it offers policy-relevant insight into the economic value embedded in proprietary vendor inputs by quantifying the degree to which public frameworks fall short (or potentially succeed) relative to observed market prices. In doing so, the paper informs practitioners who rely on transparent valuation, regulators concerned with pricing reliability, and researchers examining the frontier between public-data analytics and institutional market intelligence.

The evidence presented here shows that while public-information frameworks can generate coherent and theoretically defensible valuations, they do not eliminate the pricing advantage of institutional vendors. The findings therefore speak directly to the limits of transparency-based replication and to the continuing economic relevance of proprietary information in bond pricing.

The remainder of the paper proceeds as follows. After establishing the conceptual background and positioning the study within the related literature, the manuscript presents the construction of the public-information vendor-style pricing framework and describes the empirical design. It then reports the pricing results and performance comparisons, followed by a discussion of their economic implications. The paper concludes by summarizing the main findings and outlining their broader relevance.

# 2. Theoretical Framework

A complementary stream of applied research has examined how Treasury prices behave in real trading environments, highlighting the informational frictions and liquidity dynamics that institutional vendors incorporate. Fleming (2003) documents how U.S. Treasury security prices respond to trading activity, demonstrating that liquidity conditions, order flow, and market depth materially affect pricing beyond curve fundamentals. This highlights that purely public-data models may omit elements of market microstructure that are routinely incorporated in institutional vendor systems.

Amihud (2002) provides robust evidence that illiquidity materially influences asset prices in equity markets, highlighting that market frictions carry valuation consequences. This supports the broader premise that liquidity information contains pricing-relevant content beyond standard fundamental curves. Similarly, market transparency research provides additional empirical grounding. Goldstein, Hotchkiss, and Sirri (2007) analyze TRACE implementation and show that transaction reporting improves transparency but does not eliminate trading frictions or informational asymmetries. Their findings support the idea that publicly observable prices only partially reflect the information environment faced by institutional participants.

The valuation of fixed-income securities relies fundamentally on the theory of the term structure of interest rates, which provides the foundation for deriving discount factors and ensuring consistency across maturities (Fabozzi, 2016). Within this framework, an arbitrage-free yield curve is essential to maintain internal coherence in bond pricing, a principle widely applied by commercial vendors through curve-fitting and smoothing techniques.

The academic literature has established robust models to estimate such yield curves from publicly available data. Gürkaynak, Sack, and Wright (2007) demonstrated that U.S. Treasury zero-coupon yield curves can be constructed using the Svensson parametric specification, generating a smooth and arbitrage-free dataset that closely reflects institutional practice. Their methodology has become a benchmark for both researchers and market analysts.

The theoretical foundation of this approach stems from the Nelson–Siegel model (Nelson & Siegel, 1987), which introduced a parsimonious functional form for capturing the level, slope, and curvature of the term structure. Svensson (1994) extended this model by adding an additional curvature factor, providing greater flexibility in fitting long-term yields. These parametric models remain central in both academic and applied contexts.

Further contributions by Diebold and Li (2006) adapted the Nelson–Siegel specification into a dynamic factor model for forecasting the evolution of the term structure. Their results validated the empirical usefulness of the Nelson–Siegel framework, strengthening its role as a practical tool for yield curve modeling. Similarly, Anderson and Sleath (2001) provided evidence that official institutions can construct reliable nominal and real yield curves using public market data, illustrating the feasibility of transparent, reproducible approaches to fixed-income valuation.

A growing body of applied work shows that high-quality fixed-income valuation can be anchored on publicly released term structures curated by official institutions. For the euro area, the European Central Bank (2018) documents and publishes daily yield curves estimated with the Svensson specification, clarifying model design and operational guardrails for public use. In the United States, the Treasury describes its official par yield curve as derived from indicative bid quotes using a monotone-convex methodology (U.S. Department of the Treasury, 2025), while the Federal Reserve Board publishes daily nominal zero-coupon yield curve parameters estimated with the Gürkaynak–Sack–Wright approach (Federal Reserve Board, 2025). These resources enable transparent valuation workflows without vendor feeds.

Methodologically, recent contributions refine the Nelson–Siegel–Svensson (NSS/DNS) toolkit often used with public data. Banholzer et al. (2024) revisits estimation choices for Nelson–Siegel and Svensson, highlighting practical issues researchers face when fitting curves. Similarly, Deqing et al. (2021) demonstrates that dynamic Nelson–Siegel specifications estimated in a state-space framework can efficiently handle missing data, a feature that is particularly valuable when using sparse public sources.

# 3. Methodology

The objective of this paper is to evaluate the pricing performance of a transparent, vendor-style bond pricing framework constructed exclusively from public information, relative to a standard Daily Treasury Yield Curve Rate (DYCR) benchmark, using observed market dirty prices. Although the individual components employed here (risk-free term structure estimation, Nelson–Siegel–Svensson curve fitting, and spread-adjusted valuation) have each been examined in prior academic and practitioner work, their integration under a strictly public-information constraint represents a novel contribution within the scope of transparent, non-proprietary valuation frameworks. In practice, vendor pricing is not just a statistical exercise: it is an institutional process that combines observable yields, proprietary quotes, liquidity signals, and dealer intelligence. This study constructs a vendor-style architecture that mimics that institutional process structurally but removes every non-public element. The innovation is therefore methodological and conceptual: it tests whether the architecture itself is sufficient, or whether the missing proprietary layer is indispensable.

Demonstrating empirically that structural replication without informational replication fails adds evidence to an important and under-documented question in fixed-income pricing.

Every component of the vendor-style bond pricing framework arises from freely accessible public sources and transparent computational steps. There are no licensing fees, no vendor subscriptions, and no proprietary pipelines. Because of this, these valuations can basically be considered cost-free.

A key methodological choice lies in how empirical evidence is constructed. Unlike equities, there is no comprehensive, free, transaction-level database for U.S. Treasuries. Public TRACE coverage is partial, fragmented, and irregular (FINRA, 2025). Pricing performance is assessed by comparing model-implied dirty prices against observed dirty market prices using absolute and squared error metrics, percentage errors, and distributional characteristics. The goal is not simply to show numerical differences, but to determine whether a public-information vendor-style framework can credibly rival an operational benchmark under realistic data and information constraints.

## 3.1 Price Vendor Style Model Creation

The methodology consists of three sequential components: construction of a smooth risk-free yield curve from U.S. Treasury data, valuation of bond cash flows under standard market conventions to obtain a risk-free benchmark price, and incorporation of an additive spread adjustment to account for non-Treasury pricing components such as credit risk, liquidity premia, and issue-specific effects. All prices reported in this study are dirty prices, defined as the sum of the clean price and accrued interest.

**Bond Cash Flow Specification**

For each bond, contractual cash flows are generated assuming:

- Semiannual coupon payments,
- Face value normalized to 100,
- Coupon rate as specified in the input dataset,
- Final principal repayment at maturity.

Coupon dates are constructed by stepping backward from the maturity date in six-month increments, consistent with U.S. fixed-income market conventions. Only cash flows occurring strictly after the valuation (settlement) date are included in the pricing.

**Accrued Interest and Day-Count Conventions**

Accrued interest is computed using the ACT/ACT (Treasury) convention, defined as:

$$AI = C * \frac{Days\ Since\ Last\ Coupon}{Days\ In\ Coupon\ Period}$$

where $C$ is the semiannual coupon payment.

Time-to-payment for discounting purposes is measured using ACT/365F, defined as the actual number of calendar days between the valuation date and the cash-flow date divided by 365. This separation between accrual and discounting conventions mirrors standard vendor implementations and market practice.

**Construction of the Risk-Free Yield Curve**

Treasury Data

The risk-free term structure is derived from U.S. Treasury Constant Maturity (CMT) par yields, obtained from the Federal Reserve Economic Data (FRED) database. Available maturities range from short-term bills to long-dated bonds (up to 30 years). When the valuation date does not coincide with a publication date, yields are forward-filled to the most recent available observation.

Yield Transformation

CMT yields are quoted on a bond-equivalent yield (BEY) basis with semiannual compounding. To ensure consistency with continuous-time discounting, each yield is transformed into an approximately equivalent continuously compounded rate:

$$z(T) = 2ln\left(1 + \frac{y(T)}{2}\right)$$

where $y(T)$ denotes the BEY yield at maturity T.

Nelson–Siegel–Svensson Curve Fitting

A smooth risk-free zero-rate curve is obtained by fitting the Nelson–Siegel–Svensson (NSS) functional form directly to the transformed Treasury yields. The NSS specification is given by:

$$z(T) = \beta 0 + \beta 1 \frac{1 - e^{-T/\tau_1}}{T/\tau_1} + \beta 2 \left(\frac{1 - e^{-T/\tau_1}}{T/\tau_1} - e^{-T/\tau_1}\right) + \beta 3 \left(\frac{1 - e^{-T/\tau_2}}{T/\tau_2} - e^{-T/\tau_2}\right)$$

where $\beta 0, \beta 1, \beta 2, \beta 3$ control the level, slope, and curvature of the curve, and $T_1, T_2$ determine the decay rates.

Parameters are estimated via nonlinear least squares with economically motivated bounds to ensure numerical stability and realistic curve shapes. The fitted NSS curve is interpreted as a continuous-compounded risk-free zero-rate function.

Risk-Free Bond Valuation

Given the fitted zero-rate curve discount factors are computed as:

$$DF(t) = exp(-z(t)\, t)$$

The clean price of the bond is obtained as the present value of all future cash flows:

$$P_{clean}(RF) = \sum_i CF_i * DF(t_i)$$

where $CF_i$ denotes the $i - th$ cash flow occurring at time $t_i$.

The full risk-free price is then:

$$P_{dirty}(RF) = P_{clean}(RF) + AI$$

This price represents a pure Treasury-curve valuation and serves as the baseline vendor benchmark.

**Spread-Adjusted Vendor-Style Pricing**

Empirically, market bond prices often deviate from Treasury-based valuations due to credit risk, liquidity premia, tax considerations, and microstructure effects. To account for these factors, the model incorporates an additive continuous-compounded spread $S$, yielding adjusted discount factors:

$$DF_s(t) = exp(-(z(t) + s)\ t)$$

The corresponding dirty price is:

$$P_{dirty}(s) = \sum_{i} CF_i * exp(-(z(t_i) + s)\, t_i) + AI$$

Two spread specifications are considered:

1. Bond-specific z-spread

For each bond, the spread is solved numerically such that the model-implied dirty price equals the observed market dirty price. This measure captures the total compensation demanded by the market over the risk-free curve.

2. Date-level spread adjustment

A single spread is estimated per valuation date by minimizing the sum of squared pricing errors across all bonds observed on that date. This approach approximates vendor-style calibration procedures and avoids overfitting at the individual bond level.

## 3.2 Daily Treasury Yield Curve Rate Benchmark

Prices using the Daily Treasury Yield Curve Rate corresponding to each bond's remaining maturity. In this approach:

- A single constant-maturity Treasury yield is used,
- The yield is converted to a continuous-compounded rate,
- All cash flows are discounted using this flat rate.

This reflects a simplified valuation approach commonly used in practice and serves as a transparent operational benchmark rather than a structural pricing model. Daily Treasury yield curve rates were taken from YCharts (2025).

## 3.3 Assessment

To assess whether the observed difference in pricing accuracy between the DYCR benchmark and the public-information vendor-style model is statistically meaningful, a nonparametric bootstrap procedure is employed using mean absolute error (MAE) as the primary evaluation metric.

Given the limited sample size and the irregular availability of public transaction data, bootstrap inference provides a flexible, assumption-light framework that does not rely on asymptotic normality. Pricing errors are resampled with replacement at the observation level for 5,000 replications, preserving the paired structure of the errors across valuation methods. For each replication, MAE is recomputed for both approaches, as well as the difference in MAE between them. Confidence intervals are constructed from the empirical distribution of the bootstrapped statistics.

## 3.4 Sample and Observation Design

Unlike equity markets, there is no comprehensive and freely accessible database of U.S. Treasury transaction prices. The only openly available transaction-level information is selectively disclosed through FINRA's Treasury TRACE data, which cover a limited subset of trades and dates.

The empirical sample is organized around 15 valuation dates and a total of 90 individual bond valuations. The cross section consists of six fixed-rate U.S. Treasury bonds with remaining maturities of approximately 2, 3, 5, 10, 20, and 30 years. These maturities correspond to standard benchmark tenors commonly used in both academic research and institutional pricing practice. Valuations are performed repeatedly across the selected dates, resulting in 90 observations. This approach mirrors the operational framework of commercial pricing vendors, which produce repeated cross-sectional valuations over time rather than relying on long time series of transaction prices for individual securities.

The revised sample spans July, August, November, and December 2025 and includes the following dates: July 7; August 7 and 28; November 26 and 28; and December 1, 2, 3, 4, 5, 8, 9, 10, 11, and 12. The configuration intentionally combines standard trading days with dates associated with calendar effects, liquidity distortions, and major monetary policy events.

The normal dates correspond to periods of routine market activity, characterized by standard liquidity conditions and the absence of major scheduled announcements, such as the mid-year observations in July and August. In contrast, several dates were chosen to capture non-normal market environments. Notably, Friday, November 28, 2025, falls on the day after Thanksgiving, a session marked by shortened trading hours and atypical liquidity conditions in U.S. fixed-income markets. Such trading days are widely recognized by practitioners as posing particular challenges for yield curve construction and pricing consistency.

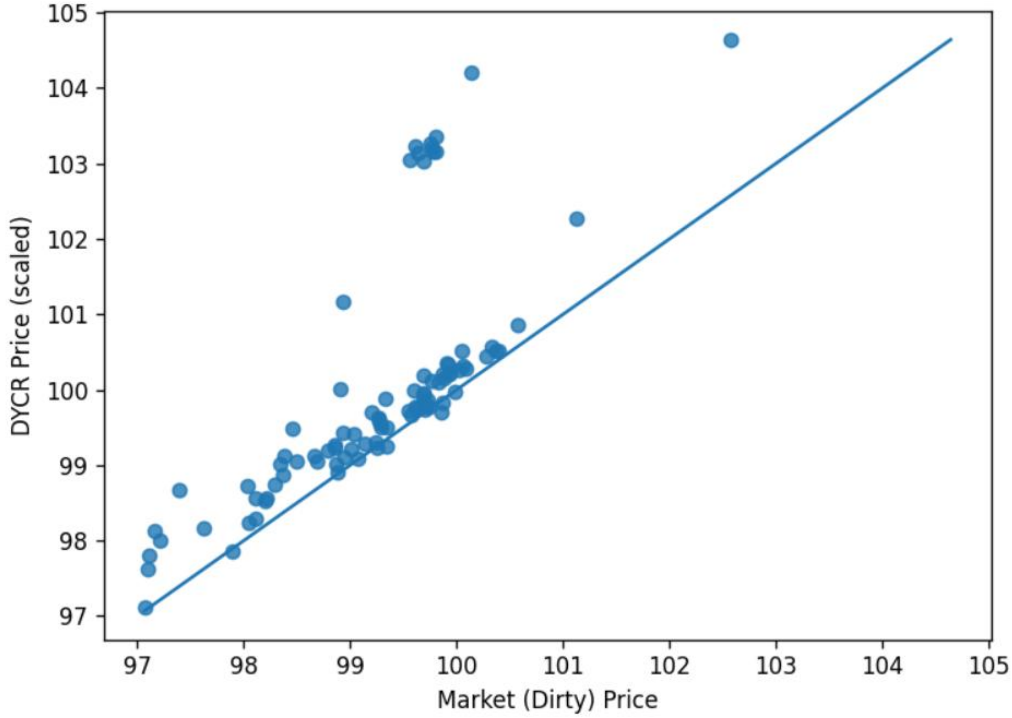
A further subset of observations forms a focused mini panel around a major monetary policy event. Specifically, the period from December 8 to December 12, 2025 covers the days immediately before, during, and after a Federal Open Market Committee (FOMC) meeting: Monday, December 8 (pre-FOMC); Tuesday, December 9 (FOMC day 1); Wednesday, December 10 (FOMC decision day); Thursday, December 11 (post-FOMC); and Friday, December 12 (post-FOMC and week close). These dates are typically associated with elevated uncertainty, rapid repricing of expectations, and potential shifts in both the level and slope of the yield curve.

# 4. Results

Across the full sample of bonds and valuation dates, the DYCR benchmark consistently exhibits a closer alignment with market dirty prices than the proposed vendor-style model. At the aggregate level, DYCR produces substantially lower pricing errors, as reflected in both absolute and squared error measures. In particular, the mean absolute error and root mean squared error for DYCR are less than half of those observed for the vendor-style framework, indicating a materially tighter fit to market prices. This pattern is also evident in percentage terms, where DYCR displays a markedly lower mean absolute percentage error.

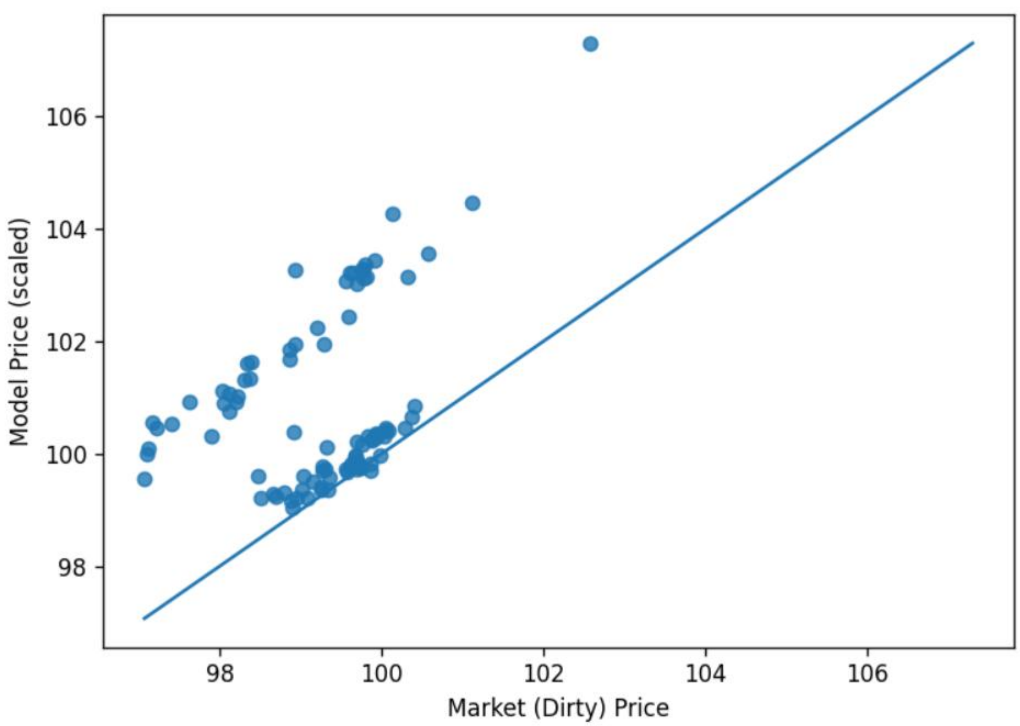
In the following plots, each dot represents one bond on one valuation date. The straight line is the 45-degree "perfect-fit" line, where the DYCR or Public Information model price equals the market price. We can see that DYCR prices align more closely with market prices (the 45-degree line).

**Figure 1.** DYCR price vs. Market




Source: Prepared by the author

**Figure 2**. Public-Information Model vs. Market




Source: Prepared by the author

The following table reports the overall pricing performance of the DYCR benchmark and the public-information vendor-style model across the full sample of 90 observations. Performance is evaluated using mean absolute error (MAE), root mean squared error (RMSE), mean absolute percentage error (MAPE), pricing bias, and $R^2$.

**Table 1**. Overall Pricing Performance: DYCR vs Public-Information Vendor-Style Model

| Method | N | MAE | RMSE | MAPE (%) | Bias (Pred-True) | R2 |
|---|---|---|---|---|---|---|
| DYCR | 90 | 0.7385 | 1.2876 | 0.7426 | 0.7314 | -0.9178 |
| Model | 90 | 1.6147 | 2.1816 | 1.6304 | 1.6102 | -4.5056 |

Source: Prepared by the author

**Table 2**. Bootstrap Confidence Intervals for Mean Absolute Pricing Errors (MAE)

| Metric | DYCR Mean | 95% Confidence Interval | Public-Information Model Mean | 95% Confidence Interval | Difference (Model – DYCR) | 95% Confidence Interval |
|---|---|---|---|---|---|---|
| MAE | 0.739 | [0.520 , 0.974] | 1.617 | [1.318 , 1.921] | 0.878 | [0.642 , 1.118] |

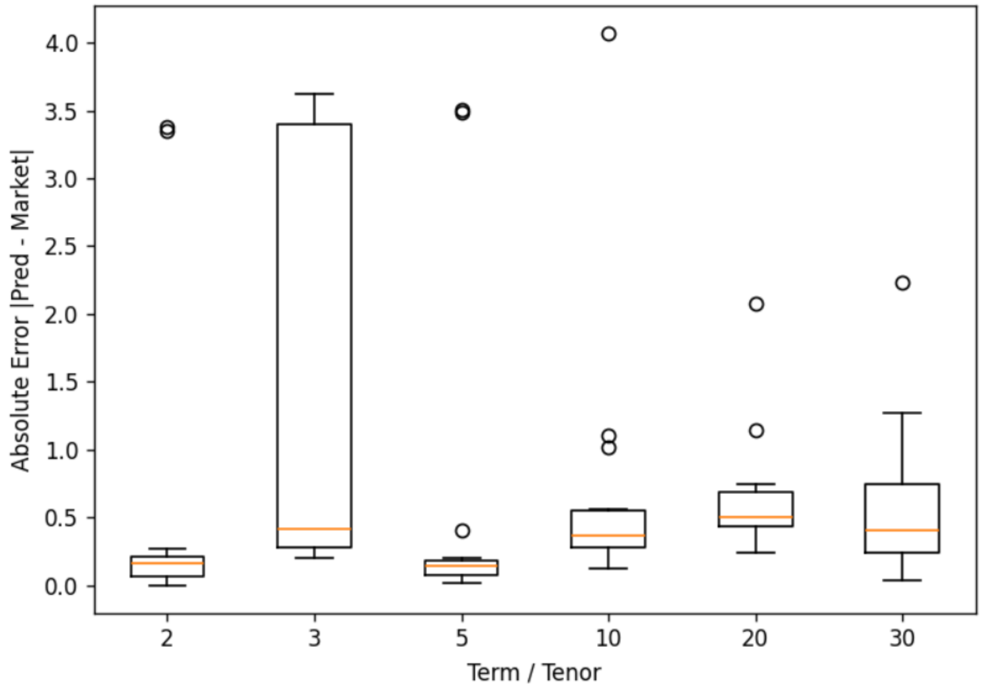
Source: Prepared by the author

Error distributions further reinforce this result. The DYCR errors are more tightly concentrated around zero, with lower dispersion and smaller extreme deviations relative to the vendor-style model. While both approaches exhibit positive average pricing bias (indicating a tendency to overprice relative to observed dirty prices) the magnitude of this bias is notably smaller for DYCR. Median errors tell a similar story, suggesting that the superior performance of DYCR is not driven by a small subset of observations but holds across the central portion of the error distribution.

When results are disaggregated by maturity, the dominance of DYCR remains broadly intact across the term structure. For short- and medium-term bonds, both approaches deliver relatively small errors, but DYCR generally maintains a slight advantage in terms of lower average deviations. As maturity increases, pricing errors widen for both methods; however, the deterioration is more pronounced for the vendor-style framework. Long-dated bonds exhibit the largest gaps between model-implied prices and market prices, with DYCR retaining a comparatively more stable performance profile across maturities.

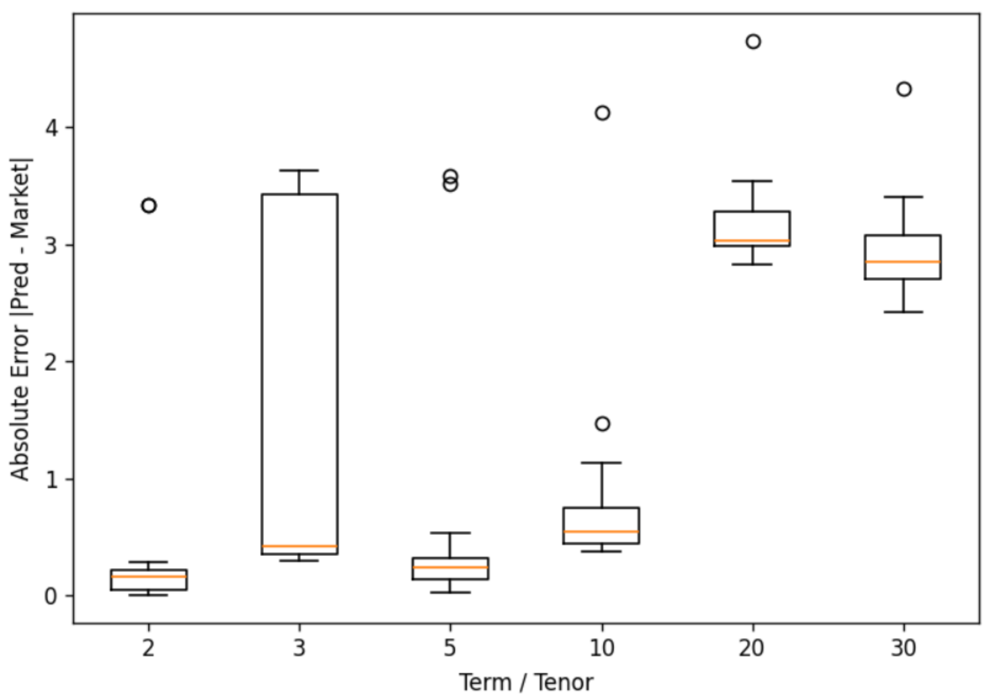
The bootstrap analysis confirms that the superior pricing performance of the DYCR benchmark is not only economically relevant but also statistically distinguishable. The mean absolute error for DYCR is 0.739, with a 95% confidence interval of [0.520, 0.974], while the public-information model exhibits a MAE of 1.617, with a 95% confidence interval of [1.318, 1.921]. Moreover, the confidence interval for the difference in MAE between the two approaches, equal to [0.642, 1.118], does not include zero, indicating a statistically meaningful performance gap.

**Figure 3.** Distribution of absolute pricing errors by maturity (DYCR)




Source: Prepared by the author

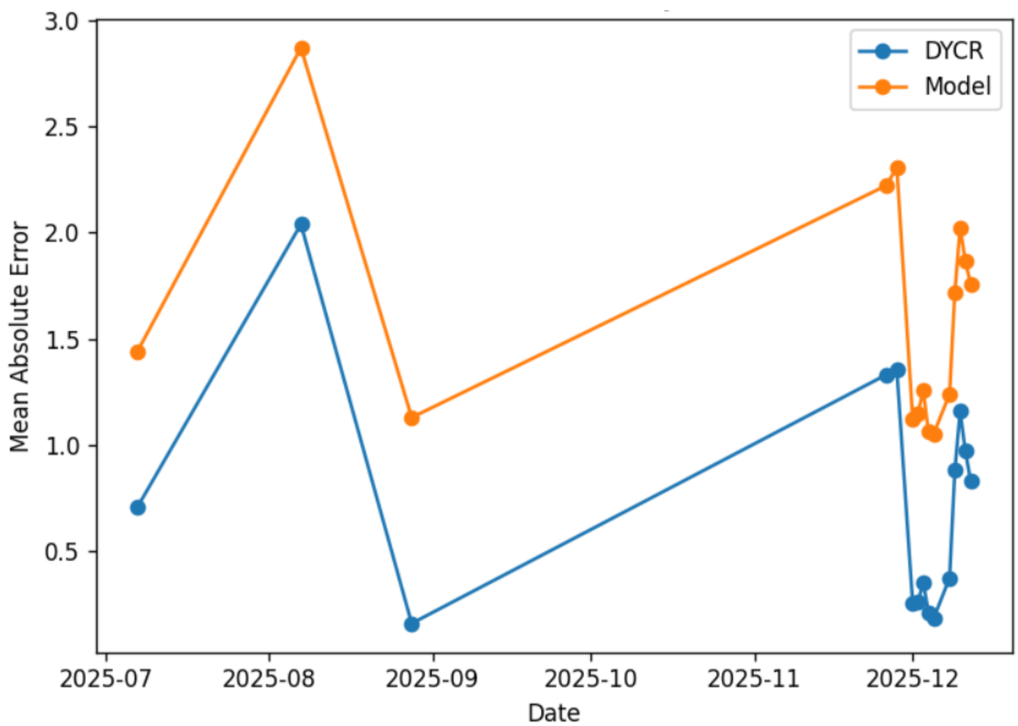
**Figure 4.** Distribution of absolute pricing errors by maturity (Model)




Source: Prepared by the author

A similar pattern emerges in the time-series breakdown by valuation date. Although the overall level of pricing error varies across dates (reflecting changing market conditions) the DYCR benchmark remains consistently closer to observed dirty prices than the vendor-style model on each valuation date considered. No valuation date shows a reversal in relative performance, suggesting that the superior fit of DYCR is not confined to a particular market snapshot. In the following plot, we can see how DYCR consistently produces lower errors across routine trading days, holiday-affected sessions, and Federal Reserve event windows.

**Figure 5**. Time evolution of mean absolute pricing errors.




Source: Prepared by the author

## 5. Discussion

The discrepancy between public-information valuations and market prices is economically meaningful. First, the errors are persistent, not random. A method that repeatedly prices further from reality carries real financial consequences: it can misstate the cost of capital, distort performance attribution, and bias decisions based on valuation signals. Second, error dispersion matters. The wider and less stable distribution of vendor-style model errors implies higher valuation uncertainty, hardly a trivial problem in environments where basis points translate into millions of dollars. Finally, when long-maturity bonds show larger deviations, the economic relevance intensifies, because these securities typically anchor long-horizon risk, duration management, and liability matching strategies. The gap, therefore, is not an artifact. It has economic weight.

These findings are consistent with prior empirical research emphasizing the role of liquidity, market microstructure, and information asymmetries in fixed-income pricing. Fleming (2003) documents that U.S. Treasury prices respond to trading activity and liquidity conditions beyond what can be captured by smooth yield curves. Similarly, Goldstein, Hotchkiss, and Sirri (2007) show that increased transparency does not eliminate informational frictions embedded in transaction prices. The persistent outperformance of the DYCR benchmark observed in this study aligns with this literature, suggesting that publicly constructed curve-based valuation frameworks omit pricing-relevant information that institutional pricing systems routinely incorporate. This result is also consistent with broader surveys of term structure modeling, which emphasize that yield curve models provide a useful but incomplete representation of bond pricing dynamics when informational frictions are present (Vasicek and Venegas-Martínez, 2021).

The observed performance gap does not arise from computational deficiencies or curve misspecification, but from differences in the underlying information sets. While the public-information framework replicates the structural components of institutional pricing, such as curve smoothing, standard discounting conventions, and spread adjustments, it necessarily excludes proprietary inputs related to contemporaneous liquidity conditions, dealer inventories, and market-making behavior. As a result, the public model produces valuations that are internally coherent and theoretically defensible, yet systematically less aligned with observed market prices.

Systematically higher and more volatile pricing deviations imply potential distortions in net asset values, incorrect duration assessments, misleading relative-value signals, and unreliable benchmarking against market prices. For risk management, the implications are even more direct. VaR, expected shortfall, stress testing frameworks, and liquidity measures rely on price levels and their dynamics. If the underlying valuations deviate structurally from the market, then reported risk metrics may understate or overstate exposures.

From an applied perspective, these results imply that transparency and methodological sophistication alone are insufficient to replicate institutional pricing accuracy. For practitioners relying exclusively on public data, curve-based valuations remain useful as benchmarks or reference points, but should not be interpreted as substitutes for vendor prices in contexts where valuation precision, risk measurement, or regulatory reporting are critical. At the same time, the findings must be interpreted within the empirical constraints of the study. The limited availability of public transaction data restricts sample size and precludes stronger causal claims, reinforcing the conclusion that the analysis is diagnostic rather than inferential.

# 6. Conclusions

This research set out to evaluate whether a transparent, vendor-style bond pricing framework constructed exclusively from public information can replicate the pricing performance of institutional vendors when benchmarked against observed market dirty prices. The empirical evidence provides a clear and consistent answer: it cannot.

Across all valuation dates, maturities, and error metrics, the standard discounted yield curve rate (DYCR) benchmark systematically outperforms the proposed vendor-style public-information model. This superiority is not episodic, nor driven by a small number of extreme observations. Instead, the performance gap is stable over time, persistent across the term structure, and evident in both central tendency and dispersion measures of pricing errors. Even under market conditions that are typically challenging for curve-based valuation (such as holiday-affected trading sessions and periods surrounding major monetary policy announcements) the relative ranking of the two approaches remains unchanged.

From an empirical diagnostic perspective, these results indicate that, within the scope of the empirical design considered here, incorporating realistic bond pricing conventions, curve smoothing, and spread adjustments does not, by itself, close the gap between public-information pricing models and observed market prices. The vendor-style framework examined in this study represents a plausible and institutionally motivated alternative to DYCR, yet it fails to deliver superior accuracy. In this sense, the findings are negative but highly informative: they show that model sophistication alone is insufficient when the information set is restricted to publicly available inputs.

More importantly, the results offer a strong insight into the information content embedded in institutional vendor prices. The systematic underperformance of the public-information model is consistent with the presence of pricing-relevant inputs used by commercial vendors that are not observable in public datasets. These may include proprietary dealer quotes, inventory considerations, liquidity adjustments, or other elements of market microstructure that cannot be inferred from Treasury yield curves and bond characteristics alone. The inability of a carefully constructed public framework to match vendor accuracy underscores the economic value of such non-public information.

Finally, the findings reaffirm the role of DYCR as a robust and defensible baseline for bond pricing in the absence of proprietary data. Despite its relative simplicity, DYCR consistently delivers closer alignment with market prices than a more elaborate vendor-style construction. This highlights its usefulness not only as a practical valuation tool, but also as a methodological benchmark against which more complex pricing models should be evaluated.

# 7. Recommendations and Limitations

Practitioners should continue to use the Daily Treasury Yield Curve Rates (DYCR) as a practical and defensible baseline. For researchers, the results suggest that methodological sophistication alone is not enough, replication attempts should explicitly account for the missing information vendors use (such as dealer quotes, inventory pressures, and microstructure signals) rather than assuming curve engineering can substitute for it.

The analysis is constrained by the availability and nature of public data. Transaction coverage is incomplete, the sample of bonds and dates remains finite, and no public dataset can realistically capture the proprietary intelligence embedded in institutional pricing. The implication is straightforward but important: relying solely on public inputs may be perfectly adequate for baseline valuation and benchmarking, but it is unlikely to replace institutional vendors where precision, accountability, and risk sensitivity matter most.

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