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Term Funding Premium—Time Is Money After All[*]

Srini Ramaswamy[†], Seth Searls[‡], Hugo De Vere[§] and Ipek Ozil[±]

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Abstract

Term premium plays an important role in understanding the evolution of interest rates, and has even been the target of monetary policy when short-term rates were at or near an effective lower bound. It is commonly defined as the difference between a long-term interest rate and the geometric average of short-term rates over the same horizon, making it unobservable. While many approaches exist to estimate term premium, they treat term premium as the market's price for bearing interest rate risk. Although such frameworks have sufficed historically, they cannot explain the premium embedded in Treasury Floating Rate Notes (which carry no interest rate risk), or the premium implicit in swap spreads. In this paper, we present evidence from financial markets arguing for the explicit recognition of a different kind of premium that is associated with terming out funding without bearing interest rate risk - we call this term funding premium. We argue that in a market where the extension of term funding and the bearing of term interest rate risk are separable, it is useful to think of traditional notions of term premium as being comprised of term *funding* premium and term *rate* premium. We describe a model-independent approach to estimating term funding premium, define term rate premium as the difference between term premium (from three commonly used estimation models) and term funding premium, and examine their empirical characteristics. Finally, we identify a few possible applications to policy. Term funding premium has the potential to serve as a real-time signal of Treasury market stress. It may also have a role to play defining "convenience yields" and in guiding optimal Treasury issuance decisions.

JEL Classification: E43, G12, E44

Keywords: Term structure of interest rates; term funding premium; term premium; term rate premium; swap spreads

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1 Introduction

Term premium is an important construct used in understanding the term structure of interest rates. The essential idea is to express long-term yields (such as, for instance, the 10-year Treasury yield) as the sum of two components:

- The geometric average of expected short rates over the relevant time horizon, which is often called the *expectations component* and reflects the returns that are expected by an investor who simply holds and repeatedly rolls short-term investments over the entire time period spanned by the long-term bond, and
- An additional risk premium (called the *term premium*) demanded by the investor as compensation for immunizing the borrower against the uncertainty in short-term rates [1] over the life of the long-term bond.

One problem with this construct is that neither component is directly observable – the market's expected average of short-term rates over some future horizon is generally unknown, as is the term premium demanded by investors. The sum of the two, however, is just the yield to maturity on the long-term bond. Despite being unobservable, term premium has historically been useful as a way of understanding the factors driving moves in interest rates (see Backus and Wright 2007; Diercks and Asnani 2024). Term premium is also often useful as an input into the monetary policy decision making process (see Logan 2023a; Diercks et al. 2017). Term premium has even been the target of monetary policy when short-term rates have been at the effective lower bound. Former Fed Chair Bernanke, for instance, noted (see Bernanke 2013) that:

> "Although estimated effects vary, a growing body of research supports the view that LSAPs are effective at bringing down term premiums and thus reducing longer-term rates. Of course, the Federal Reserve has used this unconventional approach to lowering longer-term rates because, with short-term rates near zero, it can no longer use its conventional approach of cutting the target for the federal funds rate."

Consequently, it has been the subject of extensive study for many decades, and researchers have developed various methods to estimate the term premium priced into different maturity points along the Treasury yield curve. Broadly, these methods employ three different approaches to estimating expectations for short-term rates in the future:

- Market-based approaches that infer expectations solely based on the information contained in the yield curve. These approaches calibrate the parameters governing interest-rate dynamics, enabling parametric inference of future short-rate expectations (Duffee 2002; Cochrane and Piazzesi 2005; Christensen et al. 2011; Adrian et al. 2013).
- Survey-based approaches that rely directly on survey measures of future short-rate expectations (such as surveys of primary dealers and market participants), which are therefore model-independent (Clarida 2019; Perli 2023).
- Hybrid approaches that seek to blend information from surveys as well as macroeconomic data with information embedded in the yield curve (Kim and Wright 2005; Hördahl and Tristani 2014).

[1] In principle, investors may require additional compensation for bearing all kinds of risk, such as credit risk and liquidity risk for instance. But our focus in this paper is exclusively on the Treasury market, which is generally assumed to be default-risk free. Historically, researchers have tended to assume that term premium, as defined here, is the dominant form of risk premium in the Treasury market.

For surveys of term premium estimation methods, see Kim and Orphanides 2007 and Cohen et al. 2018.

Despite their many flavors, all these models share one common philosophical undercurrent – they are all based on the assumption that the term premium embedded in a long-term bond's yield stems from the stochastic nature of short-term yields (in the case of the early term structure models) or the stochastic nature of one or more factors that drive yields across all maturities (in the case of more recent models that permit the yield curve to be generated by market factor(s)), which therefore makes a fixed-rate long-term bond risky. In other words, these models effectively only admit one form of risk (stochastic interest rates) and term premium is the investor's compensation for taking on this risk by accepting a fixed yield to maturity.

To our knowledge, most of these models do not permit the existence of another source that might account for some portion of the term premium. This poses a problem when applied to the Treasury market, because they cannot explain the non-zero premium in Treasury Floating Rate Notes (FRNs), for instance. FRNs are Treasury securities that pay a coupon that is calculated as a fixed spread over floating Treasury bill yields. The fixed spread is determined by the market at auction. As we will discuss shortly, its existence provides direct evidence that investors can require compensation for extending longer-term financing even when bearing no interest rate risk. Moreover, given the similarity between an asset-swapped Treasury note or bond and FRNs, the persistence of long-term Treasury asset-swap spreads at significantly positive levels [2] suggests that this premium is a broad-based feature of the Treasury market as a whole and not a special feature of the FRN market. We call this *term funding premium*, and this is the main focus of this paper.

One notable exception can be found in Durham 2025, where there is an explicit recognition of a different sort of premium also being embedded into term premia. Here, the author ascribes this orthogonal risk premium to liquidity characteristics, and allows it to depend on an observable liquidity factor synthesized from market variables such as various kinds of liquidity differentials. Liquidity characteristics may well warrant an incremental risk premium - this is quite pronounced in the TIPS [3] market, for instance (see D'Amico et al. 2018). But liquidity premia cannot explain the upward-sloping term structure of the asset-swap spread curve, as we will discuss later. Nevertheless, this work is similar in spirit to our own, with respect to the argument that term premium as commonly understood does include more than just compensation for bearing short-term interest rate risk.

The outline of this paper is as follows. In section 2 we discuss evidence from the markets that supports the existence of a form of premium that is related to maturity extension but unrelated to bearing interest rate risk. We use this to argue in favor of decomposing term premium into two constituent quantities that we call *term funding premium* and *term rate premium*, where the latter is the portion of term premium that represents compensation for bearing interest rate risk. In section 3 we introduce a model-independent way to measure term funding premium in each maturity sector, using market data from the swap spread term structure. We first introduce a quantity that we call *unit maturity extension premium* (UMEP for short) that is calculated from the term structure of swap spreads, as opposed to a single maturity point, at a point in time. We then define *term funding premium* at each maturity point as the UMEP scaled by modified duration. Finally, we define *term rate premium* as simply term premium minus term funding premium, which

[2] Consistent with the convention in bond markets, we use the term *asset-swap spread* to denote the spread pickup over the benchmark floating rate used in the swap. Thus, a positive asset-swap spread indicates a bond yield that is higher than the swap yield. Occasionally, we will also use the term *swap spread*, omitting the "asset" prefix - this refers to the negative of the asset-swap spread, consistent with the terminology used in the US Treasury and swap markets.

[3] Treasury Inflation-Protected Securities, which are Treasury bonds linked to the US Consumer Price Index.

makes it model-dependent since term premium is a model-estimated quantity while term funding premium is calculable from market data. In section 4 we discuss an empirical model that uses a common set of factors to explain the variation in term funding premium as well as term rate premium (based on three widely followed term premium models). Using a common set of factors for all these quantities helps drive a better understanding of term funding premium vis-à-vis term rate premium, by characterizing the factors that are most important in driving each. Finally, in section 5, we explore policy implications for the public sector.

2 Unbundling term premium into term *rate* premium and term *funding* premium

In this section, we first detail the evidence from the markets for a form of risk premium that is unrelated to interest rate risk in the Treasury market. We then argue that it is necessary (and useful) to unbundle this component, which we call term *funding* premium, from term premium as it is usually understood, leaving behind term *rate* premium (our terminology for this residual risk premium) as the investor's compensation for bearing short term interest rate risk (and any other risks that investors require compensation for bearing). This distinction is necessitated by the fact that extending the maturity of a loan and taking on long-term interest rate risk are separate, and separable, actions in today's markets.

2.1 Evidence for Term Funding Premium from Treasury Floating Rate Notes

The most direct evidence for a different sort of risk premium within the Treasury market can be found in Treasury Floating Rate Notes (abbreviated henceforth as FRNs). The U.S. Treasury launched the 2-year Floating Rate Note in January of 2014 (Treasury 2014). These are notes with a two year term, but pay a floating coupon (with quarterly frequency) that is effectively a spread over 3-month (or more precisely, 13 week) Treasury bill yields at auction (see U.S. Department of the Treasury for details). The spread is set at the auction of the FRN and fixed until maturity, and thus represents an excess return to the investor over a strategy of simply holding 3-month Treasury bills and rolling them at maturity for a period of two years.

The FRN's fixed spread is the one pricing degree of freedom that can be varied so that the issue is auctioned at a price of par. Therefore, it is reasonable to interpret this as the excess return (over T-bills) required by the investor to merely extend the maturity of the investment from three months to two years. Importantly, the maturity extension comes without additional interest rate risk [4] since the FRN investor receives the floating returns from rolling Treasury bills, plus the additional spread. Therefore, the fact that FRN spreads are non-zero [5] (see Figure 1) is strong and direct evidence for a premium that is associated only with maturity extension, separate from any premium that might represent compensation for bearing interest rate risk. We call this *term funding premium*. To our knowledge, this premium has not been discussed or acknowledged in publicly available literature, but some of the authors of this paper have introduced the concept earlier in a proprietary research note to investor clients (see Ramaswamy et al. 2024).

[4] The non-zero fixed spread over Treasury bill yields represents a fixed annuity that carries a smaller amount of interest rate risk. This is second order in nature, and a risk that is better thought of as spread risk rather than interest rate risk since it arises from a non-zero spread in the first place.

[5] The spread can be slightly different than zero for technical reasons. The floating index rate is reset each week to the most recent clearing yield of the 13-week Treasury bill. Therefore, even though the FRN produces floating returns linked to Treasury bills, it is not exactly the same return as holding a 13-week Treasury bill to maturity. This can create slippage in periods when the 13-week Treasury bill yield is volatile, such as when the Fed is active in hiking or cutting rates. But this effect does not explain non-zero FRN spreads in Fed-on-hold periods when short-term rates have been stable.

Figure 1: Two-year Treasury Floating Rate Note Spread

Source: Bloomberg L.P.

The rationale for our choice of terminology is as follows. When an investor chooses to buy a long-term bond with a fixed coupon instead of a short-term bond, we ought to think of this switch as being composed of two separate actions:

i. taking on interest rate risk by fixing the interest rate to term instead of charging a floating interest rate, and

ii. taking on term-funding risk by granting the borrower funding for a longer term instead of rolling short-term funding.

The first action results in the investor taking on interest rate risk, and merits a premium that we might call *term rate premium*. The second - taking on term funding risk - warrants compensation that we call *term funding premium*. Conceptually, the sum of these two is what is commonly called term premium.

These two actions are frequently bundled together, as in the case of an investor who chooses to buy (say) a 2-year Treasury note instead of a 3-month Treasury bill. But they need not be - each risk can be taken independently.

- *Extending term financing without taking interest rate risk*: An investor buying 2-year FRNs takes on term-funding risk without taking on any interest rate risk. More generally, an investor who buys (say) a 10-year Treasury note with a fixed coupon and pays fixed in a maturity-matched swap is in the same position of taking on term-funding risk without taking interest rate risk.

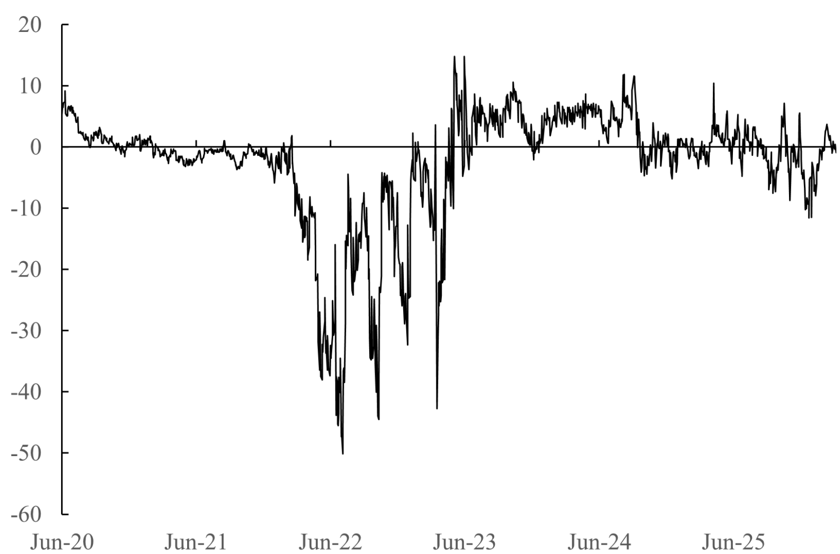
- *Taking interest rate risk without taking on term funding risk*: Consider an investor who (i) implements a strategy of buying 3-month Treasury bills and rolling them at maturity repeatedly over a (say) 10-year horizon, but also (ii) receives fixed versus paying a floating rate in a 10-year swap at the inception of this strategy. This investor takes on term interest rate risk, while only providing short-term financing at any point in time.

The first of the two observations above highlights that any Treasury bond can be asset-swapped to create a ”synthetic” floating rate note with the same maturity as the bond. Moreover, the floating rate used in the swap market in the U.S. now is a risk-free benchmark rate (the *Secured Overnight Financing Rate*, or SOFR) that is broadly representative of overnight rates on risk-free loans that are collateralized by Treasuries (see Alternative Reference Rates Committee 2018). as the floating rate. In other words, *an asset-swapped Treasury bond is qualitatively very similar to a Treasury-issued FRN of the same maturity.* This permits us to make two inferences. First, term funding premium is not a narrow feature of the FRN market since any Treasury security can be transformed into a synthetic Treasury FRN. Second, it suggests that term funding premium is an important component of Treasury asset-swap spreads. We discuss this further below.

2.2 Evidence from Treasury Asset-Swap Spreads

The fact that term funding premium is not idiosyncratic to just the FRN market is significant. If it were, it might be tempting to simply dismiss it as a quirky feature of a relatively small slice of the Treasury market with little broader relevance. But the observation above puts that notion to rest - any Treasury note or bond can be purchased and asset-swapped, producing coupon payments that are not fixed but vary with the floating rate used in the swap. Moreover, as noted earlier, the SOFR risk-free benchmark rate is broadly representative of short term rates associated with Treasury collateral. Thus, any Treasury note or bond can be asset-swapped to create a synthetic FRN that produces cash flows that are very similar to an actual Treasury-issued FRN (were it to exist). Empirical evidence supporting this claim can be found in the fact that three-month Treasury bills themselves trade at an asset-swap spread that is noisy and close to zero most of the time (see Figure 2), with occasional exceptions that can arise because of flights to quality or other factors idiosyncratic to the Treasury bill market.

Figure 2: Three month Treasury bill spread over SOFR

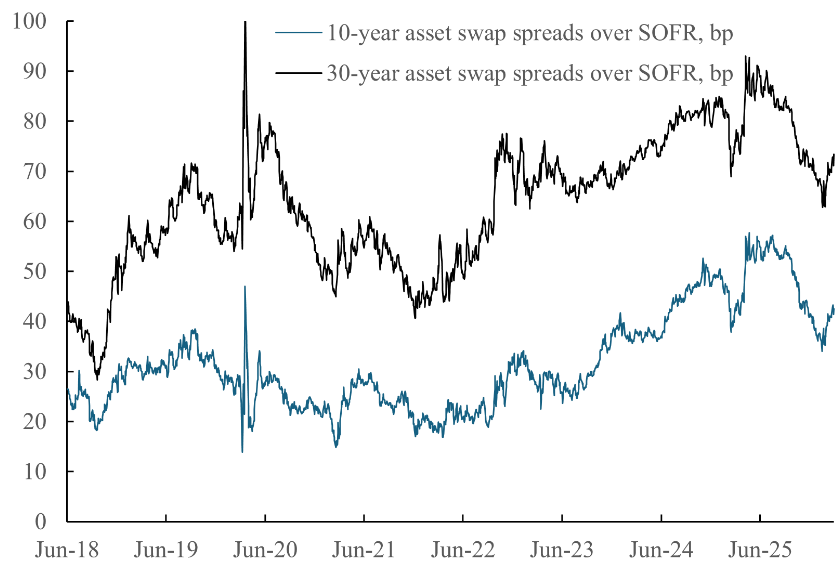


Source: Bloomberg L.P.

Therefore, a significantly non-zero spread over SOFR is evidence of the existence of a premium that is unrelated to bearing interest rate risk - term funding premium, in other words. Historical data suggests that this premium is indeed significant – as seen in Figure 3, the asset swap spread levels of ten and 30-year Treasuries have persisted at significantly positive levels for the past seven years since SOFR came into existence as a benchmark rate. As of this writing, 10-year Treasuries can be swapped to produce a synthetic floating rate note that yields SOFR plus a spread of around 45 basis points. This is a significant fraction of the overall term premium - the ACM measure of term premium in the 10-year sector (Adrian et al. 2013), for instance, is currently near 70 basis points. This suggests that interpreting term premium estimates as compensation solely for bearing interest rate risk is likely not tenable. Moreover, this observation is not unique to the ACM model – 10-year term premium from the Kim-Wright model (Kim and Wright 2005) stands near 65 basis points, which only strengthens our argument.

In short, the evidence from swap spreads over many years is rather compelling in pointing to term funding premium, but it is worth contemplating why it has not received more attention in the literature even though there have been times in the past when it was elevated as we will see in the next section. Our guess is that a confluence of factors likely played a role. First, there was no FRN market until 2014, and therefore no direct evidence to force a reckoning. Second, before the transition to a risk-free rate benchmark in 2018, the swap market predominantly used Libor as the short-rate index. This likely helped to mask the existence of term funding premium by introducing a credit element into the swap spread. Lastly, in the pre-GFC[6] era when the footprint of sovereign debt was much smaller, term funding premium was generally low or even negative, as our estimates suggest (see Figure 5). That said, even though term premium models have not yet evolved (at least in the published literature) to address term funding premium head-on, it has not gone unnoticed – anecdotal evidence suggests that practitioners sometimes fit term premium models to the swap yield curve instead of the Treasury yield curve as a way of side-stepping this issue, and some researchers (see Durham 2025, D'Amico et al. 2018) have included liquidity factors in their models, which indicates clear recognition of a missing element in previous approaches.

Figure 3: Asset-swap spread over SOFR for ten- and 30-year Treasuries



Source: J.P. Morgan Securities LLC.

[6] "GFC" refers to the Great Financial Crisis of 2007-08.

2.3 Conceptual reasons for the existence of term funding premium

Thus far, we have discussed the evidence for the existence of non-zero term funding premium. Before discussing our approach to measuring term funding premium, it is useful to consider the conceptual reasons for its existence. There are at least three possible reasons why merely extending term financing, without bearing any interest rate risk, is still worthy of additional compensation to investors.

1. *Opportunity cost:* By committing principal for a longer horizon, without taking on interest rate risk, the investor locks in some spread over the risk-free-rate for the life of the investment. In so doing, the investor foregoes other alternative uses for those funds that are also free of interest rate risk. Such opportunities could include remunerated cash such as bank reserves, which could become attractive when SOFR declines relative to the interest rate on reserve balances (abbr. IORB), currency-hedged foreign currency cash holdings (which might become attractive if and when cross-currency basis swap markets enable attractive entry points), or even short-term credit floaters for that matter if spreads on such assets were to widen by enough to appeal to the investor [7] Conceptually, there is a universe of alternatives whose valuations (measured as a spread over SOFR) are in general volatile and can change with time, and the investor is no worse off if those alternatives should richen further but incurs an opportunity cost if those alternatives were to cheapen. In other words, the economics of committing principal for a longer term resemble the economics of being short a put option on these alternatives. This warrants a premium. As an aside, the ability to sell the position does not erase the need for this premium. In an environment where the alternatives were to become more attractive, for instance, the investor could choose to sell the longer term bond, but the buyer would need to be compensated for selling the (now more valuable) put option.

2. *Future marginal balance sheet cost:* A second possible reason for the existence of term funding premium stems from the fact that levered institutions (such as banks and hedge funds) are subject to marginal balance sheet costs that can vary significantly and are difficult to predict over long horizons. A bank that is leverage capital constrained, for instance, may incur significant capitalization costs from holding Treasuries. In contrast, a bank whose capital requirements are not binding will have zero marginal cost of capital. Moreover, any given bank can find itself capital constrained at some points in time, but not bound by them at others. This makes balance sheet costs unpredictable, and (in a similar vein to the previous point) a levered investor who extends term financing to a borrower is in some sense selling a put option on future balance sheet costs – should future balance sheet costs fall, the investor would be content to hold the position, but the investor suffers if future balance sheet costs were to rise above some breakeven threshold. Therefore, a levered institution (such as a bank) that buys a long term asset of any kind, including Treasuries, will require compensation for this risk in the form of an additional premium.

3. Lastly, having established that there is at least some basis for maturity extension to warrant a premium, its very existence also becomes a source of risk if the premium can fluctuate with time. In other words, the fact that the discount margin on a FRN can exhibit volatility imbues FRNs with spread risk, which in principle requires its own risk premium.

[7] The widely followed "basis trade" offers a real world example of this. Due to various reasons, asset managers prefer to reserve a portion of their investable cash for alternate yield-enhancing strategies, even when obliged to buy long duration Treasuries because of their benchmarks. This leads them to replace the risk via Treasury futures, which indirectly forces hedge funds into long basis positions - see Glicoes et al. 2024. The scale of this phenomenon suggests that there is significant value to preserving balance sheet flexibility.

In summary, non-zero FRN spreads and significantly elevated asset-swap spreads in long-dated Treasuries provide compelling evidence for the existence of term funding premium. We can interpret this premium as arising from at least three different sources - the opportunity cost of committing principal to term and foregoing all other possible alternative investments for the relevant time horizon, the uncertainty of future balance sheet costs [8], and spread risk. We now turn to the issue of measuring term funding premium in the next section [9].

3 Measuring Term Funding Premium

3.1 Defining Unit Marginal Extension Premium

Rather than seeking to estimate term funding premium from "bottoms-up" model-based approaches, we instead define a measure that relies only on the observable term structure of swap spreads. In earlier sections, we have pointed to significantly elevated asset-swap spreads as evidence for term funding premium. But it is neither correct nor useful to define term funding premium at each maturity as simply the asset-swap spread in that maturity. Defining term funding premium in – say – the 10-year sector as simply the 10-year asset-swap spread accomplishes little more than creating new terminology with no additional insight into how term funding premium at different maturities might be related. It is incorrect because there is no reason *ex ante* to expect that term funding premium is the sole factor driving swap spreads. Indeed, while we believe term funding premium is an important and significant component of asset-swap spreads, several other factors can influence the level of asset-swap spreads:

- Financing rates and financing market conditions.
- Idiosyncratic flows in one maturity point (e.g., the 10-year) that may not be a broader reflection of investors' appetite for maturity extension.
- Issue-specific abundance or scarcity.
- Issue-specific special characteristics, such as trading special in repo markets or being deliverable into futures contracts.
- Short term fluctuations due to exogenous factors that add noise to the level of swap spreads, such as swings in Treasury bill supply due to debt ceiling management.
- Banking system leverage constraints and/or balance sheet costs, which can impact that availability of leverage for speculative investors such as hedge funds who often intermediate the transfer of Treasuries from the auction to the ultimate real-money investors.

Because of these reasons and more, it would be presumptuous to simply use the level of swap spread as a measure of term funding premium. Having conceded that point, it follows that term funding premium is best extracted not from the swap spread at any single maturity point, but from

[8] Durham 2025 explores the use of an observable liquidity factor, which is based in part upon measuring bond pricing errors relative to fitted curves. Balance sheet costs can impact such differentials and cause relative mispricings to persist. Thus, although we do not explicitly focus on liquidity risk as a central theme, it is likely that such risks are one among several that are behind the existence of a pronounced term funding premium.

[9] Having discussed the possible drivers behind the existence of term funding premium, it is natural to seek a bottoms-up calculation of what its fair value ought to be, as a function of market variables. This is indeed a worthwhile area of further research, in our view. But we do not pursue that here, and instead simply seek to measure term funding premium empirically as it is priced into the market. This suffices for our main purpose in this paper.

the collection of swap spreads at all maturity points – i.e., the term structure of swap spreads. In other words, our measure of term funding premium must (i) utilize information from swap spreads at all available maturities, but (ii) ultimately produce a term funding premium estimate for any given Treasury note or bond.

We do this by first observing that the term structure of asset-swap spreads is roughly linear when plotted against the modified duration of the on-the-run[10] bond at each maturity point. Table 1 lists asset-swap spreads on 6-month, 2-year, 3-year, 5-year, 7-year , 10-year and 30-year[11] on-the-run Treasuries as well as their modified durations as of three selected historical dates, and includes statistics from regressing the former versus the latter as of those dates to illustrate this point.

Table 1: Treasury asset-swap spreads and modified durations for benchmark bonds at various maturities as of selected dates, and statistics from regressing the asset-swap spread versus modified duration as of those dates

	4/18/2018		**2/2/2023**		**2/3/2025**		**2/27/2026**	
	M. Dur*	**ASW****	**M. Dur**	**ASW**	**M. Dur**	**ASW**	**M. Dur**	**ASW**
Market data								
6M	0.5	11.3	0.5	-3.3	0.5	4.0	0.5	2.18
2Y	1.9	13.6	1.9	-3.4	1.9	15.7	1.9	17.2
3Y	2.8	17.3	2.8	9.2	2.7	22.0	2.8	21.4
5Y	4.6	27.6	4.5	19.7	4.4	29.5	4.5	27.9
7Y	6.2	36.3	6.1	28.0	5.8	38.6	6.0	36.0
10Y	8.5	38.6	8.3	28.4	7.8	45.9	8	42.5
30Y	19.2	58.9	18.1	62.5	15.5	81.3	15.8	73.4
Regression Stats								
Beta	2.6		3.8		5.0		4.3	
Intercept	12.9		-2.4		6.6		7.0	
R-squared	93%		95%		99%		98%	

Source: J.P. Morgan Securities LLC; authors' calculations.
* Modified duration of the benchmark bond at each maturity, in years.
** Asset-swap spread of the benchmark bond at each maturity, in basis points.

Motivated by this relationship, we write the following (at a particular point in time t):

$$s_t^m = \Pi_t d_t^m + \alpha_t + \epsilon_t^m \quad m \in B \tag{1}$$

where $B = \{6M, 2Y, 3Y, 5Y, 7Y, 10Y, 30Y\}$ is the set of chosen benchmark "tenors" or original-issue maturity points [12], s_t^m and d_t^m denote the asset-swap spread [13] and modified duration respectively of the benchmark Treasury with maturity m at time t, α_t denotes the intercept of the fit and ϵ_t^m denotes the fitted error. Lastly, Π_t represents the value of the slope of the regression fit at time t

[10] Treasury market parlance typically refers to the most-recently issued Treasury security in each maturity sector as the "on-the-run" or "hot run" bond in that sector

[11] The Treasury began issuing 20-year bonds in 2020. Our decision to exclude the 20-year point was motivated by a desire to have a consistent set of points for the longest possible amount of history.

[12] Although instruments are generally described by their time to maturity, it will be less confusing to think of m as indexing a set of discrete instruments issued by Treasury, rather than indexing absolute or relative time.

[13] There are several different notions of swap spreads, a discussion of which is beyond the scope of this article. For our purposes, we define the asset-swap spread of a given bond as its yield minus the yield of a maturity-matched par fixed-versus-SOFR swap.

and is an important quantity for our purposes. We define Π_t to be the *Unit Marginal Extension Premium* (abbreviated UMEP), denoting the premium associated with extending chronological maturity by the amount of time needed to increase modified duration by one year.

3.2 Modified duration as a transformed measure of time-to-maturity

We stress the somewhat nuanced wording here - UMEP is *not* the marginal premium associated with extending the term of a loan by one chronological year. Nor is it a premium associated with bearing duration risk, despite the appearance of modified duration in equation 1. Rather, one can interpret this as the marginal premium associated with extending some transformed measure of time by a unit amount. The transformation reflects the fact that not all maturity increments are created equal. For instance, extending maturity from one to two years is likely not the same as extending principal from (say) 29 to 30 years. Moreover, it is also likely that extending maturity from 29 to 30 years is likely to be less material in a high yield environment, and more material if yields are near zero. In other words, the amount of additional compensation demanded by a lender for a chronological unit of principal extension is likely to vary with yield levels as well as maturity.

Given that observation, one can wonder if there exists some transformation $\hat{M}(y, m)$ of chronological time to maturity (denoted by m) that could depend on yields (denoted by y) such that the marginal premium demanded by investors for extending principal maturity by one unit of transformed time is relatively constant. Fortunately, the stable linear relationship between asset-swap spreads of different maturities versus their respective modified durations suggests that such a transformation exists, and $\hat{M}(y, m)$ is simply the function that specifies the modified duration of a par bond (i.e., a bond with a coupon equal to the prevailing yield to maturity) with a time to maturity of m years at a yield y. *This is the sense in which the occurrence of modified duration in equation 1 is to be understood.* Figure 4 helps to characterize this transformed measure of time by showing the amount of chronological maturity extension needed at various maturity points and yield levels to produce an increase of one year in modified duration. As evident there, for low yield levels and/or low starting maturities, the amount of chronological extension needed for a one year modified duration increase is somewhat close to one year. But at longer maturities and/or at higher yield levels, a sizeable increase in chronological time is needed to produce the same one year extension in modified duration.

3.3 Defining a metric for term funding premium

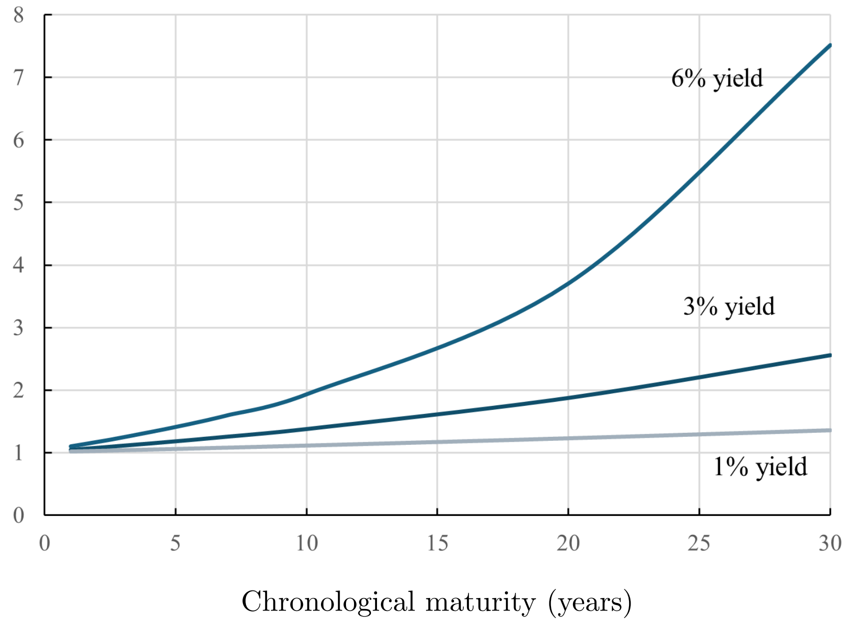
Having defined the Unit Marginal Extension Premium, the term funding premium embedded in any given Treasury bond b is given by the product of UMEP and the bond's modified duration. In particular, for benchmark sectors and for a given point in time t, we can write :

$$\tau_t^m = \Pi_t d_t^m \quad \forall m \in B \tag{2}$$

where as in equation 1, B refers to the set of benchmark maturity points, d_t^m denotes the modified duration of the benchmark bond with maturity m, Π_t denotes the Unit Marginal Extension Premium at time t, and τ_t^m denotes the term funding premium embedded in the benchmark maturity point m.

It is worth noting that the intercept from equation 1 plays no role in the definition of term funding premium. Thus, our measure of term funding premium is invariant under a parallel shift of asset-swap spreads at all maturities by a constant amount. This is a desirable property - parallel shifts of the entire term structure of swap spreads can occur due to reasons unrelated to our

Figure 4: The maturity increment needed to increase par bond modified duration by one year versus maturity, for various selected yield levels



Source: Authors' calculations.

focus here (such as moves in the basis between repo rates and SOFR or credit risk premia), and measurements of term funding premia ought to remain unaffected by such shifts.

3.4 Historical trends in Term Funding Premia

Before proceeding to analyze term funding premia in the next section, it is useful to review the historical data. Figure 5 shows the history of UMEP over the past fifteen years [14]. The UMEP was relatively stable at lower levels (around 2 bp per year of modified duration) before starting to climb in Q1 2022 as the hiking cycle began. More recently, it has been trending higher as deficit concerns have come to the fore. These observations suggest empirical drivers for UMEP that we will pursue further in the next section.

Having taken pains to not simply identify term funding premium with the swap spread, it is natural to ask how closely the two track each other in various maturity points. Figure 6 shows the history of term funding premium as well as the asset-swap spread in the 2-year note sector, and highlights that there is a lot more variability in the latter. It is noteworthy that term funding premium is a lot more stable than the asset-swap spread - by choosing to define term funding premium in a manner that uses information from a range of maturities, the resulting metric is less responsive to noise in a given sector. This is very apparent in the front end, where two-year asset-swap spreads can fluctuate because of short term swings in T-bill supply, financing market

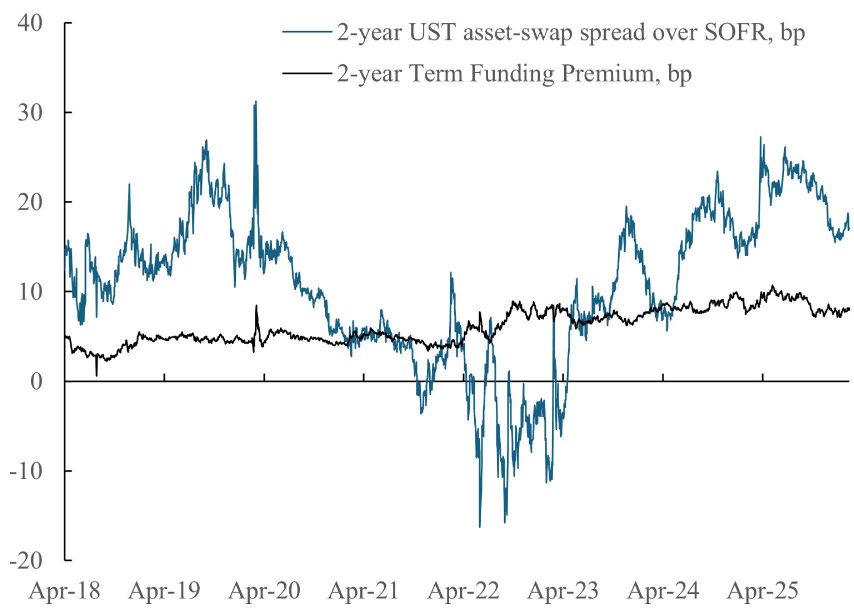
[14] Before the launch of SOFR as a risk-free benchmark rate, Libor was the predominant floating rate used in interest rate swaps. However, for the purposes of defining UMEP, Libor swap spreads would not be appropriate. Therefore, we use Treasury spreads relative to the Fed Funds Overnight Index Swap rate for dates prior to SOFR's launch, as an approximation to SOFR swap spreads. This is likely a reasonable choice, because overnight SOFR typically trades close to the fed funds rate, with significant deviations limited to brief periods around month-end or quarter-end dates.

Figure 5: Unit Marginal Extension Premium over time

Source: J.P. Morgan Securities LLC, authors' calculations.
For dates before April 2018, UMEP is estimated using Fed Funds OIS swap spreads, which are typically close to SOFR swap spreads. 7-year bond data prior to its reintroduction period (late 2009) were backfitted using linear interpolation..

conditions or banking system leverage costs that can be unrelated to term funding premium. Figure

Figure 6: Term funding premium and asset-swap spread in the 2-year sector

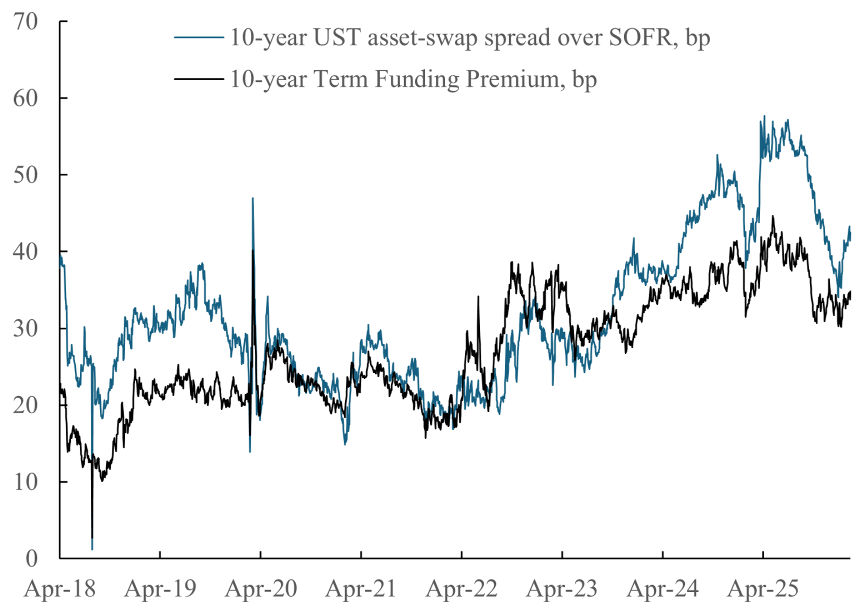


Source: J.P. Morgan Securities LLC, authors' calculations. .

7 shows the same two data series - term funding premium and asset-swap spread - but for the 10-

year sector of the Treasury market. Here too, term funding premium is not entirely similar to the asset-swap spread but it is much more closely correlated, suggesting that longer maturity swap spreads are reflections of term funding premium to a greater extent, in comparison to shorter maturities. Figure 8 corroborates this notion, as it shows an even closer relationship between term funding premium in the 30-year sector and the corresponding asset-swap spread.

Figure 7: Term funding premium and asset-swap spread in the 10-year sector



Source: J.P. Morgan Securities LLC, authors' calculations.

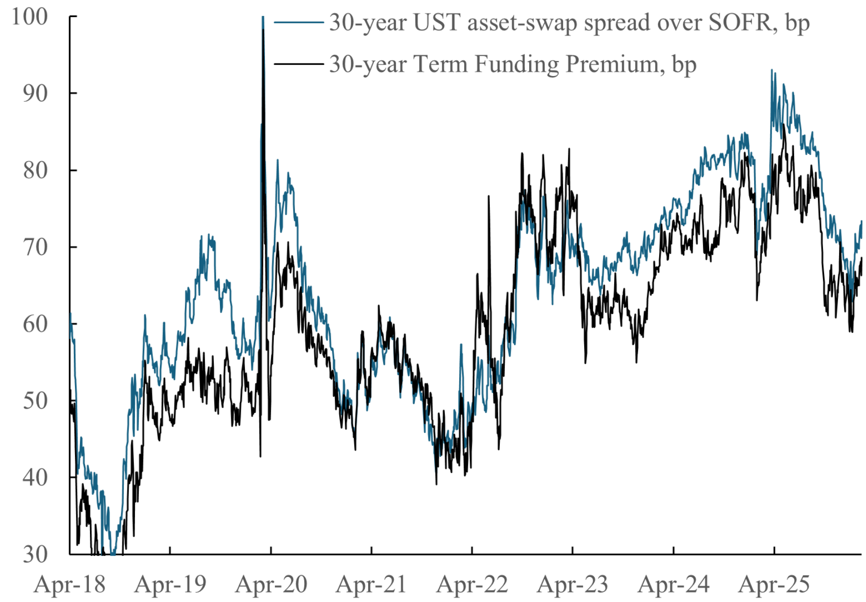
3.5 Term Rate Premium

In section 2 we observed that an investor's decision to buy a long term bond instead of a short-term bond is conceptually decomposable into two decisions - extending the maturity of the investment without taking on any interest rate risk, and choosing to bear interest rate risk as a separate and distinct choice. Following from this construct, we further observed that term premium as it is commonly measured in many models can be thought of as the sum of term funding premium and term rate premium.

One way to decompose term premium into term funding premium and term rate premium is by developing new term structure models where these two premia are both endogenous components. This would be analogous to the approach of Durham 2025, where the author uses a market-based liquidity factor along with factors driving yields to decompose term premium into liquidity premium and "frictionless" term premium. Here, we have chosen a different approach that relies on estimating term funding premium from term structure of swap spreads, because of the close relationship between the two. Having chosen our approach to estimating term funding premium in all the maturity points, we therefore estimate term rate premium as the difference between term premium and term funding premium.

Figure 9 illustrates this using the ACM model (see Adrian et al. 2013) estimate for term premium in the 10-year sector. This chart shows the ACM term premium in the 10-year sector, 10-

Figure 8: Term funding premium and asset-swap spread in the 30-year sector



Source: J.P. Morgan Securities LLC, authors' calculations.

year term funding premium (calculated as described in equation 2) and 10-year term rate premium (the difference between the two). As seen in the chart, the distinction between term premium and term rate premium has become more material in recent years, the reasons for which we will explore in the next section.

4 Empirical Analysis of Term Funding Premium and Term Rate Premium

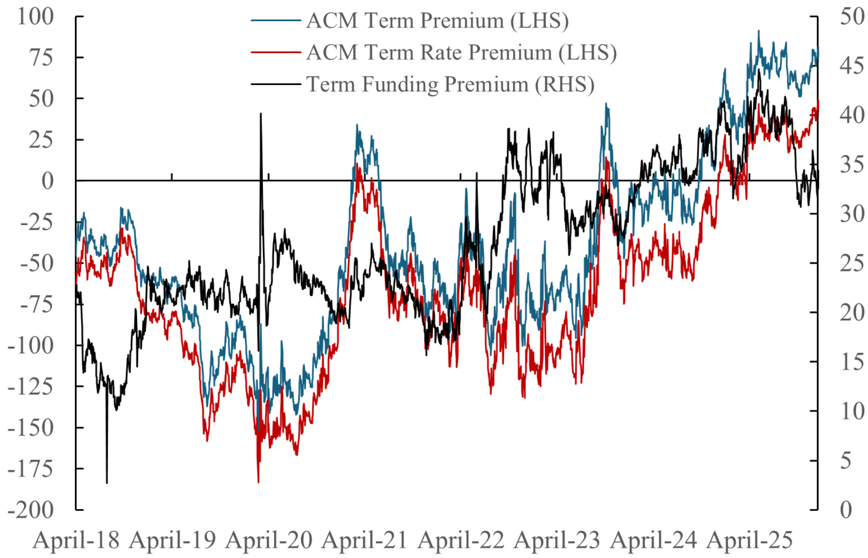
4.1 Overview of the empirical model

Our goal in this section is to gain a better understanding of the similarities and differences between term funding premium and term rate premium. We do this by enumerating a set of macroeconomic and financial market variables that can plausibly impact each or both of these components, and then regressing term funding premium, term rate premium as well as term premium (i.e., the sum of the two) against the same set of factors [15]. Examining the numerical as well as statistical significance of the various factors in explaining the different components of term premium will help to facilitate such a comparison. We limit ourselves to the 10-year maturity sector in the interest of brevity and because it suffices for our purposes.

We use monthly data since January 2019. This is shorter history than desired, because our approach to measuring term funding premium from the term structure of asset-swap spreads is only valid in the post-Libor era, which limits us to the period since 2019 or so. Although we have used OIS swap spreads as an approximation to examine longer term history (see, for instance, Figure 5), we are somewhat cautious about using that in estimation models. Therefore, our choice

[15] Even though term premium is just the sum of term funding premium and term rate premium, we include it here for completeness as well as quick-reference purposes – it is insightful to see the dependence of term premium on each individual factor, and then drill down into which of the components drives the dependence.

Figure 9: A decomposition of ACM term premium into term funding premium and term rate premium in the 10-year sector (units in bps)



Source: J.P. Morgan Securities LLC, Bloomberg, authors' calculations.

of history is unavoidably short, but reasonably adequate nonetheless – it spans a wide range of values for term funding premium as well as its drivers and includes periods of very low as well as high interest rates.

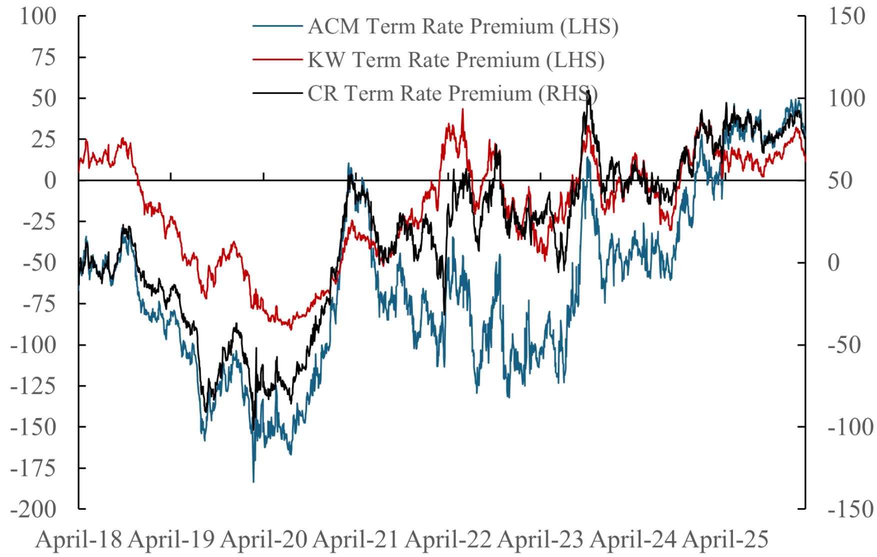
While term funding premium is computed directly from market data and is therefore model-independent, term premium – and therefore term rate premium – is model-dependent. As such, any empirical analysis of the underlying drivers must account for the variation across different models. We address this by performing our analysis here on term rate premia estimated from three popular and widely-used models – the Adrian et al. 2013 model, the Christensen et al. 2011 model, and the Kim and Wright 2005 model. Figure 10 plots term rate premia in the 10-year sector from all three models. As can be seen, the series are sufficiently different, and we therefore include all three in our empirical analysis so that any empirical conclusions drawn are likely to be robust.

4.2 Independent factors

We use the following five independent factors to explain four dependent quantities (term funding premium and term rate premia based on the three models mentioned above). For convenience and completeness, we also present regression models for the three different measures of term premium. The factors are listed below, in no particular order.

1. **A measure of Treasury supply**. It is well documented in the literature that Treasury supply impacts yield levels, especially through the term premium channel (see Plante et al. 2025, Phillot 2025, Laubach 2009, Krishnamurthy and Vissing-Jorgensen 2012). Our measure of treasury supply is slightly different than what has been previously studied. Because we seek to explain the constituents of term-premium, we measure supply in a way that differentiates by maturity: specifically, we use the monthly issuance of coupon Treasuries weighted by modified duration and expressed in billions of 10-year equivalents. In addition, we subtract the

Figure 10: Term rate premium in the 10-year sector implied from three different term premium models (units in bps)



Source: Bloomberg L.P., Federal Reserve Board of Governors, Federal Reserve Bank of New York, Federal Reserve Bank of San Francisco, authors' calculations. ACM = Adrian, Crump and Moench; KW = Kim and Wright; CR = Christensen and Rudebusch .

Fed's monthly Treasury purchases (also measured in billions of dollars of 10-year equivalents) since these purchases reduce the net supply to private market participants, and since the historical period encompasses significant variation in the Fed's purchases of Treasuries.

2. **The unemployment rate gap**, measured as the difference between the actual unemployment rate and the Congressional Budget Office (CBO) estimate of the natural-rate [16]. We use this as a proxy for the state of the business cycle, which may be expected to correlate with term premium (see Tanaka 2025, Cohen et al. 2018) and thus its constituents.

3. **The equity-bond correlation**, measured as the rolling 6-month correlation between daily returns on the S&P500 index and daily returns on 10-year Treasuries. The rationale for this factor is that Treasuries can offer diversification benefits to stock market investors when the correlation is low or negative, thereby impacting the attractiveness of Treasuries overall (see Molenaar et al. 2024).

4. **Dealer holdings of Treasuries**, measured in billions of dollars. Since dealers merely intermediate the transfer of securities from the Treasury to investors, the size of dealer holdings serves as a proxy measure for the mismatch between supply and end-investor demand at a point in time. All else equal, a rise in dealer holdings might be expected to correlate to a cheapening of Treasuries. This variable turns out to be most significant in explaining term funding premium, as we will discuss below. Figure 11 shows a time series of this variable.

5. **Rate volatility**, measured as the 3-month moving average of the implied volatility on 1-year expiry options on 10-year fixed-versus-SOFR swaps. Since term rate premium, by definition,

[16] If we denote the unemployment rate at a point in time by U and the natural rate of unemployment by U^*, then the unemployment gap is defined as $U - U^*$.

is the compensation required by investors for bearing interest rate risk, it is natural to expect measures of term premia to positively correlate to measures of uncertainty of long-term rates such as implied volatilities.

Figure 11: Primary dealer holdings of U.S. government securities (units in billions of dollars)

Source: Federal Reserve Bank of New York, Bloomberg L.P.

4.3 Empirical results

Statistics from these regressions are summarized in Table 2, and we make the following observations.

- Dealer holdings emerges as one of the most significant factors driving term funding premium. This makes intuitive sense - when there is a mismatch between the quantity or timing of supply of long-term Treasuries and demand for them, dealers (who have the least appetite for extending term funding) are forced to step in to buy Treasuries rather than unlevered bond investors (who are typically mandated to own these assets and thus have the greatest appetite for extending term funding). But do dealer holdings also matter for term rate premia? This variable is *numerically* significant for measures of term rate premia, but its *statistical* significance is less consistent - it is most significant for the case of the ACM model term rate premium, and less significant for the others. Finally, the importance of this variable in driving term funding premium is sufficient to make it somewhat statistically significant in driving all three measures of term premium. Collectively, the message from these coefficients is that intermediation by dealers is not a statistically compelling factor in influencing the market's premium for bearing interest rate risk, but is significant in driving term funding premium. This is consistent with the notion that dealers typically fully hedge the interest rate risk of their holdings with interest rate swaps or Treasury futures, but demand a higher premium than unlevered investors for extending term funding on their balance sheets.

- Monthly duration supply (ex Fed purchases) is a numerically and statistically significant driver of all measures of term premium and term rate premium, but - notably - is insignificant in explaining term funding premium. The intuition here is two-fold. First, the aggregate quantity of duration risk being supplied can and does influence unlevered investors' price for bearing interest rate risk (i.e., term rate premium). Second, with respect to term funding premium, the *mismatch between duration supply and end-investor demand* (proxied by dealer holdings) is much more important than the aggregate amount of Treasury supply, because such a mismatch is amplified by the significant difference in the willingness to extend term funding. Unlevered investors are typically indexed to some benchmark that is representative of the bond fund universe, and are therefore mandated to extend term funding. In contrast, levered investors such as dealers typically fund their positions in overnight repo markets, and are thus exposed to a significant difference between the term of their own funding and the term of the funding they extend when buying a long-term bond.

- The unemployment gap is statistically significant and material for term rate premium, but numerically insignificant for term funding premium. Interestingly, the coefficient for this variable is negative in our model (meaning that term rate premia decline when the unemployment rate rises relative to the natural rate). This is the opposite of other findings in the literature[17], where authors find that term premium increases as the economy weakens (see, for instance, the results in Bauer et al. 2014; Backus and Wright 2007; Cochrane and Piazzesi 2005). We think there are two likely explanations for this difference. First, we also include a measure of Treasury duration supply as a factor, whereas the other authors do not. It is typically the case that Treasury supply rises in a recession and the positive coefficient found elsewhere is the result of supply expectations. Effectively, in our model, we are disentangling the impact of supply expectations from demand, which also typically rises as the economy weakens. Second, much of the literature on the counter-cyclical nature of term premia is from ten to twenty years ago, and therefore is possibly more representative of the "global savings glut" era than the present. Several characteristics of that era, such as the convenience "premium" for long-dated Treasuries are not true today. That said, more research is needed to fully understand the shift in the sign of this coefficient.

- As expected, rate volatility is a statistically significant driver of term rate premium in most cases. In addition, it is also a statistically significant factor driving term funding premium - although not directly relevant, this is likely because the *implied* volatility of interest rates can reflect broader notions of risk premia in the markets. Therefore, it is a plausible driver of term funding premium.

[17]We note here that Durham 2025 find that liquidity premium rise during recessions, but the sign of the coefficient on frictionless term premium is ambiguous.

Table 2: Model coefficients and statistics from regressing term funding premium, term rate premium and term premium (all in the 10-year maturity sector) versus a common set of five factors

	Common	*ACM*		*CR*		*KW*	
	TFP	**TRP**	**TP**	**TRP**	**TP**	**TRP**	**TP**
Dealer holdings of USTs ($bn)	0.038*	0.172*	0.211*	0.071**	0.110*	0.030	0.068**
	(0.004)	(0.048)	(0.049)	(0.034)	(0.036)	(0.025)	(0.026)
Rate volatility*	4.3*	-1.1	3.2	11.5*	15.8*	10.1*	14.4*
	(0.416)	(4.670)	(4.809)	(3.360)	(3.493)	(2.476)	(2.529)
UST duration supply ex Fed**	0.017	1.0*	1.0*	0.8*	0.8*	0.369*	0.386*
	(0.014)	(0.154)	(0.159)	(0.111)	(0.116)	(0.082)	(0.084)
Equity–bond correlation***	-1.905***	-3.6	-5.5	9.6	7.7	-6.5	-8.4
	(1.053)	(11.817)	(12.170)	(8.503)	(8.839)	(6.265)	(6.400)
Unemployment gap (%)****	0.341***	-7.0*	-6.7*	-4.8*	-4.5**	-7.1*	-6.8*
	(0.204)	(2.293)	(2.361)	(1.650)	(1.715)	(1.216)	(1.242)
Intercept	-8.0	-290.1	-298.1	-203.4	-211.5	-149.6	-157.7
Adj. R^2 (pp)	83.1	66	69.3	79	81.3	72.4	78

Notes: TFP refers to the term funding premium in the 10-year sector. TRP and TP refer to the term rate premium and term premium, respectively, measured in basis points. ACM = Adrian, Crump and Moench; KW = Kim and Wright; CR = Christensen and Rudebusch.
All regressions are estimated using monthly data from January 2019 through Dec 2025. March and April 2020 are excluded as outliers, leaving 82 monthly observations.
Reported values are coefficients with standard errors in parentheses. Standard errors are non-robust.
*, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.
* Rate volatility measured as the 3-month moving average of 1Yx10Y swaption implied volatility (basis points per day).
** Monthly UST gross issuance weighted by duration and measured in $bn 10-year equivalents, minus Fed purchases in the same units.
*** Rolling 6-month correlation of daily returns in the S&P 500 total return index with the Treasury 10-year bond index.
**** Defined as the unemployment rate minus its estimated neutral value, in percentage points

5 Policy relevance and avenues for further research

Our focus in this article has been to introduce the concept of term funding premium, rather than undertaking a deeper study of its applications to policy. But we believe the ideas in this paper might find fruitful applications to monetary and fiscal policy. We describe a few possible areas of application and exploration in this section. We also reiterate that the views in this paper are those of the authors alone. They do not represent the views of the institutions that they are affiliated with, or those of any other institution.

5.1 Monetary policy applications

5.1.1 Term funding premium as a market-functioning indicator

Term funding premium can be useful as a gauge of Treasury market dysfunction. In particular, it can potentially serve as a signal of the need for market-stabilization measures (such as official sector lending or asset purchases). It can also serve as a quantitative target in the implementation of such measures. Having a well-articulated set of diagnostic indicators that can signal when market functioning action is needed can support timely and accountable decision-making as well as good communications.

In March 2020, for instance, the Fed initiated large scale Treasury purchases with the initial goal of stabilizing the Treasury market. Asset purchases were subsequently maintained to provide monetary policy accommodation. One of the lessons from that episode was the importance of clearly distinguishing support for market functioning from monetary accommodation, recognizing that central banks have multiple distinct goals. Policymakers have underscored that it is especially critical to do so when central banks are tightening financial conditions to contain inflation, as the Bank of England was doing during its Liability-Driven-Investor (LDI) crisis in late 2022 (see Hauser 2022, Logan 2023b, Logan and Bindseil 2019). There are several ways to potentially achieve these goals, but having a set of indicators pointing to dysfunction can support communications during such periods.

Additionally, while maintaining a degree of discretion is useful, there can be benefit to automaticity in determining the timing of market liquidity interventions; relying on indicators to activate term lending operations or market-functioning purchases can provide accountability to the public on why actions were taken and can shield central bankers from potential criticism.

One such indicator is the residual from regressions of measures of Treasury illiquidity on volatility. Market dysfunction has in the past been indicated when measures of illiquidity meaningfully exceed levels predicted by its historical relationship with volatility. These types of deviations usually occur when dealer intermediation capacity is stretched. A novel way to explore dealer capacity utilization was developed by Darrell Duffie and other co-authors from the New York Federal Reserve Bank (see Duffie et al. 2023). For each primary dealer, these authors calculate in-sample historical maximums across four different measures of dealer capacity: gross and net positions from FR 2004 [18], and TRACE data on gross and net dealer-to-client flows. They then used quantile regressions to show a stronger association between illiquidity and their measures of capacity utilization in the right tail of the distribution as opposed to middle quartiles.

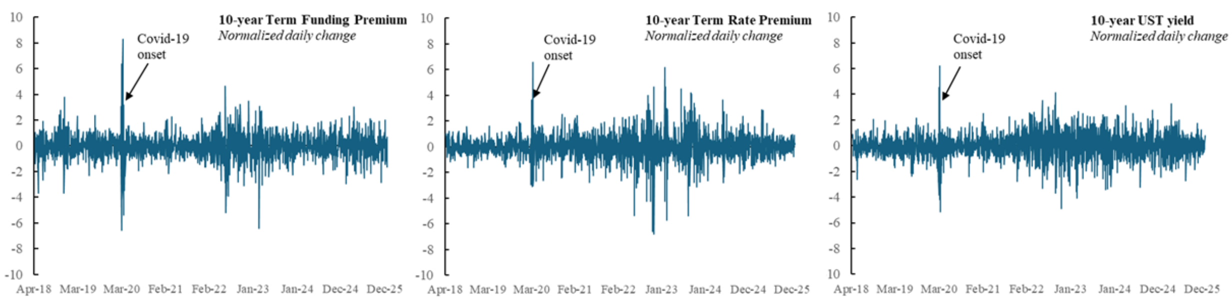
Term funding premium could serve as yet another useful diagnostic indicator. This is because normalized term funding premia appear to reflect dealer intermediation strains in real-time to a greater extent than other components of yields. As seen in Figure 12, the z-score of daily changes

[18] These reports collect market activity information from primary dealers. For more information, see `https://www.federalreserve.gov/apps/reportingforms/Report/Index/FR_2004`.

in 10-year term funding premium rose sharply at the onset of the COVID pandemic [19]. Term rate premium as well as the Treasury yield also rose considerably on a normalized basis, albeit not as much as term funding premium. But the spike in term funding premium was persistent, while yield levels and term rate premium promptly declined as markets began anticipating economic weakness and lower yields. This is seen in Figure 13, which shows the normalized weekly change in the same three metrics. As seen there, the normalized weekly change in term funding premium clearly signals distress (curing only after the initiation of market stabilization measures by the Fed), while the weekly change in yields and term rate premium are not significant. This suggests that term funding premium might be a more effective signal of distress in Treasury markets.

To be sure, the infrequent nature of market-stress events means that we do not have enough evidence from multiple episodes to assert that term funding premium can serve as a reliable and authoritative indicator. But the institutional behaviors that are known to have caused the stress - a broad-based flight to liquidity that overwhelmed market makers' ability and willingness to intermediate - are quite likely to re-emerge as characteristics of a future stress event. It is also encouraging that 10-year term funding premium in the U.K. gilt market spiked in similar fashion during the LDI crisis in September 2022 (see Figure 14).

Figure 12: Normalized daily changes in 10-year term funding premium, term rate premium and Treasury yield

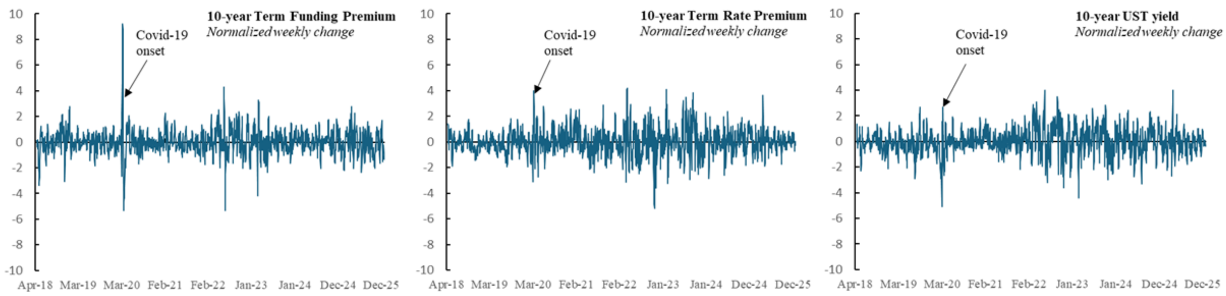


Source: J.P. Morgan Securities LLC, authors' calculations.
Calculated as the daily change in each measure (10-year term funding premium, 10-year term rate premium and 10-year Treasury yield) minus the average daily change, divided by the standard deviation of such daily changes over the period from April 2018 to December 2025. .

One ancillary benefit of targeting term funding premium is the ability to clearly demarcate between market-stabilization actions and monetary policy actions. Being able to clearly compartmentalize the two is a desirable goal - Kashyap et al. 2025 note the importance of such segregation of policy responses and even go so far as to suggest hedged Treasury purchases as a possible policy solution when market stabilization is the goal. Hedged Treasury purchases are not something the Fed currently utilizes as a policy tool, but swapped Treasury purchases would be a hypothetical policy tool to target term funding premium.

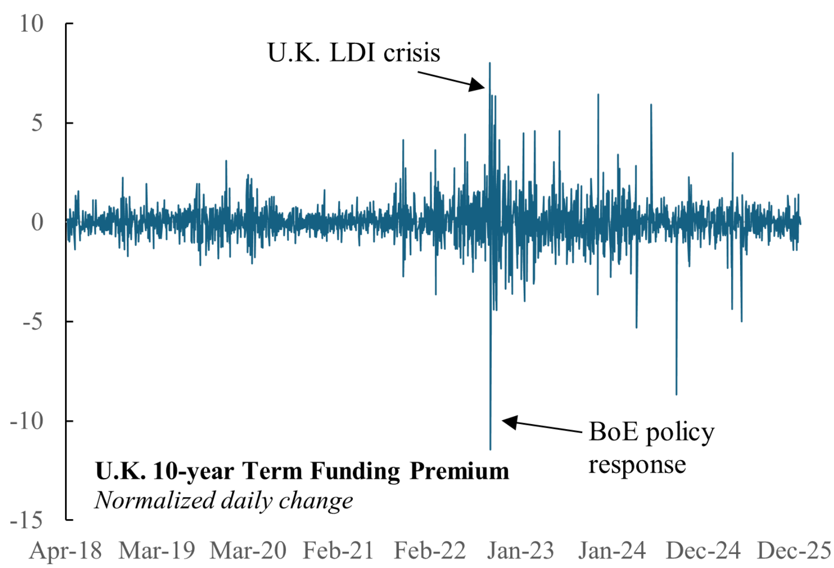
[19]The sudden onset of the Covid-19 pandemic was followed by a broad-based and sudden flight to liquidity, which produced significant deleveraging of assets including Treasuries and necessitated eventual market stabilization purchases by the Fed as well as other measures.

Figure 13: Normalized weekly changes in 10-year term funding premium, term rate premium and Treasury yield



Source: J.P. Morgan Securities LLC, authors' calculations.
Calculated as the weekly change in each measure (10-year term funding premium, 10-year term rate premium and 10-year Treasury yield) minus the average weekly change, divided by the standard deviation of such weekly changes over the period from April 2018 to December 2025. .

Figure 14: Normalized daily changes in U.K. 10-year term funding premium



Source: J.P. Morgan Securities LLC, authors' calculations.
Calculated as the daily change in 10-year term funding premium in the U.K. gilt market minus the average daily change, divided by the standard deviation of such daily changes over the period from April 2018 to December 2025. .

5.1.2 Term funding premium as a measure of convenience yield in deciding optimal balance sheet composition

In principle, term funding premium may have a role as an input in determining the optimal balance sheet size. Some researchers have argued (see Krishnamurthy and Vissing-Jorgensen 2012, Vissing-Jorgensen 2023) that a given degree of policy restraint can be achieved through various combinations of the short-term rate and central bank balance sheet size. Given that, it has been suggested that a generalized notion of the Friedman rule might argue for flattening the "convenience yield" [20] across different Treasury maturities. One key difficulty in such an approach is the proper measurement of convenience yield. Quantifying convenience yield by comparing Treasury yields with corporate bond yields risks producing a measure that is driven more by the illiquidity of corporate bonds than by the desirability of long-term Treasuries. Term funding premium is better suited to this purpose - by definition, it is the premium purely associated with maturity extension. Moreover, we believe that term funding premium is also a better choice than just using the swap spread itself, as other researchers have proposed (see Jiang et al. 2025) - swap spreads are specific to each individual Treasury security and can therefore be impacted by issue-specific idiosyncratic forces, whereas term funding premium is extracted from the entire term structure of swap spreads. Therefore, it is likely to be a more robust and broad-based measure of convenience yield that is less sensitive to idiosyncratic factors in any given maturity sector.

5.1.3 Implications for optimal debt issuance

A corollary to the idea of term funding premium as a measure of convenience yield is that it might be a useful variable to consider in determining the optimal Treasury debt issuance profile. Currently, the U.S. Treasury determines its issuance schedule and amounts by incorporating a number of different considerations. One of those considerations is the feedback received from the Treasury Borrowing Advisory Committee (TBAC). The TBAC in turn uses an "optimal rule" framework (see Belton et al. 2018) as one of several inputs that guide its recommendations to the U.S. Treasury. This model solves a stochastic optimization problem to determine the parameters of an optimal rule that determines the issuance profile as a function of various observable macroeconomic variables, of which term premium is one. It is likely that adding term funding premia to the list might lead to an improved optimal rule - it stands to reason, for example, that FRN issuance would be preferable in periods when term funding premium is low but term rate premium is high. The incorporation of term funding premium as an additional macroeconomic variable in this framework is an area of future research.

6 Conclusion

In this paper, we have argued for the explicit recognition of term funding premium as a new form of risk premium that is distinct from compensation for bearing interest rate risk, relying on evidence from the floating rate note market and from Treasury asset swap spreads. We have defined a metric for term funding premium at any given maturity that is model-independent and can be estimated entirely from observable quantities (Treasury asset swap spreads). We then proceed to define term rate premium – the true compensation for bearing interest rate risk – as simply the difference between a given measure of term premium and term funding premium. This permits a decomposition of term premium into two components - a premium for offering term financing, and a separate premium for bearing interest rate risk. The nature of this definition makes term rate premia model-dependent, just like term premium itself. One possible direction in which our work can be extended is the development of new term structure models with multiple factors, that treat term funding premium and term rate premium (as we have called it here) in a more unified manner. Finally, we have identified policy-releavnt applications of term funding premium. Perhaps most notably, we believe term funding premium promises to be a better high frequency indicator of stress in Treasury markets as well as other developed country sovereign bond markets. Term

[20] For this purpose, convenience yield is commonly understood to mean the incremental return that investors will give up for the privilege of holding Treasuries, without any other change in credit risk or interest rate risk.

funding premium can likely also prove useful as an estimate of the “convenience yield” in Treasury notes and bonds at each maturity. It could also potentially serve as a useful variable in an “optimal rule” framework for guiding the Treasury’s issuance profiles. All of these applications to policy require further research and evaluation.

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