Sorting Bonds, Finding Issuers: What Corporate Bond Factors Trade*

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Abstract

Conventional corporate bond factors combine positions across issuers with relative positions among bonds of the same issuer. We decompose the original holdings of 20 characteristic-sorted portfolios into these two positions and examine how this distinction affects factor premia, return predictability, and asset pricing tests. We find that conventional factor premia largely reflect issuer positions, which generate substantial common return variation beyond their exposure to the bond market, while conventional portfolios capture little of the within-issuer return predictability embedded in their sorting characteristics. Five of the 20 within-issuer components have significant alphas relative to the bond market factor, even though their corresponding original portfolios do not. Our findings show that conventional bond factors can conceal pricing errors while providing overlapping issuer exposures as test assets, highlighting the importance of accounting for issuer structure in corporate bond asset pricing research.

Keywords: Corporate bond factors; characteristic-sorted portfolios; issuer selection; within-issuer variation; return predictability; test assets.

JEL Classification Codes: G11; G12; C58.

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1 Introduction

Characteristic-sorted portfolios are among the most widely used tools in modern empirical finance, but when multiple securities are issued by the same firm, the sorting characteristic does not reveal whether the resulting portfolio primarily selects issuers or securities within issuers. Sorting individual bonds into different portfolios thus can create net long and short positions across issuers, offsetting positions among bonds of the same issuer, or both. The standard long–short return of a corporate bond factor combines these two positions. An investment strategy that buys high credit spread bonds and sells low credit spread bonds is usually interpreted as a credit spread trade. Similarly, a strategy formed on duration is interpreted as a duration trade.

This distinction is important because corporate bonds possess several features that distinguish them from equities and other asset classes. Despite these differences, empirical corporate bond asset pricing research has largely borrowed insights and methodologies developed for equity research. Because these salient features have been overlooked in the literature, corporate bond factor research now faces a replication crisis. Recent work has begun uncovering the consequences of not considering peculiar features of credit markets: several proposed factors lose their apparent performance once market frictions and careful data cleaning procedures are taken into account, raising fundamental questions about what bond factors actually measure and price. Particular attention has been given to microstructure noise and look-ahead bias, data errors and cleaning conventions in transaction-based TRACE data (Dickerson, Robotti, and Rossetti, 2026; Dick-Nielsen et al., 2026), and infrequent trading and execution delays (Dickerson, Nozawa, and Robotti, 2025).

The resulting debate extends to the broader question of which systematic risks corporate bonds price. Dickerson, Mueller, and Robotti (2023) find that proposed corporate bond factors provide marginal pricing ability beyond the corporate bond market factor. Ghaderi et al. (2024), however, find stronger evidence of priced bond risk once samples are extended, highlighting the role of statistical power when using shorter samples.

Yet, the construction of corporate bond factors and bond test assets used in conventional asset pricing tests follows the equity blueprint: portfolios are constructed

by sorting individual bonds without taking into consideration whether securities are issued by the same firm.[1] We ask whether this approach accounts for the distinctive structure of the corporate bond market, in which a single issuer can have multiple securities outstanding at any point in time.

We argue that to interpret these portfolios one should distinguish the characteristic used to form the portfolios from the positions that the portfolio sorting procedure creates. For example, a credit spread factor can combine two different positions: i) an issuer-level position which goes long/short all the bonds of a given issuer, and ii) a within-issuer position, which trades bonds of the same issuer against one another. The conventional long–short factor blends all these positions into a single one. As a result, corporate bond factors do not reveal whether these two positions generate different premia, are related to expected returns, represent the same sources of systematic risk, or contribute differently when used as test assets in standard asset pricing tests.

This issue is relevant in markets where the cross-section of traded securities corresponds to a smaller number of issuers. Unlike in equity markets, where stocks usually identify a single firm, in corporate bond markets, one issuer can contribute many securities to the cross-section. Bonds of the same issuer inherit exposure to an issuer's conditions (e.g., credit conditions), but they can differ in maturity, liquidity, coupon, and duration. In our panel, a representative issuer behind the average bond-month has 18.6 bonds outstanding, and issuers with at least two bonds account for 86.8% of bond-month observations and 89.6% of market value. A bond-level factor constructed as a long–short portfolio can therefore compare issuers with different characteristic levels, bonds with different characteristics within the same issuer, or both.

Consider, for example, a credit spread factor. The long portfolio can hold all the bonds of high credit spread issuers and the short portfolio can hold all the bonds of low credit spread issuers. The same factor can also buy relatively high credit spread bonds and sell relatively low credit spread bonds of the same issuer. In the first

[1] See Fama and French (1993); Gebhardt, Hvidkjaer, and Swaminathan (2005a); Lin, Wang, and Wu (2011); Chung, Wang, and Wu (2019); Bali, Subrahmanyam, and Wen (2021); Houweling and van Zundert (2017); Israel, Palhares, and Richardson (2018); Elkamhi, Jo, and Nozawa (2024); Kelly, Palhares, and Pruitt (2023), among others.

case, the factor captures a comparison between issuers. In the second case, the factor captures an issuer-neutral comparison among bonds. Although the two components are constructed from the same characteristic, they represent different investment positions and need not earn the same premium or reflect the same return-predictive relation.

We first decompose standard characteristic-sorted portfolios into an *issuer component* and a *within-issuer component*. The first preserves the portfolio's net position in every issuer and invests that position in the portfolio of all the issuer's available bonds. The second is a dollar-neutral position within every issuer, and therefore captures relative holdings among that issuer's bond universe. We apply this decomposition to 20 signals commonly used in the corporate bond literature to construct factors, build bond portfolios, and test corporate bond asset pricing models. We interpret their economic content and attribute their payoffs to either of these two components. Returns, alphas, and factor loadings split in the same way, so we go from a factor's return to its pricing errors without changing how portfolios are formed.

Our return decomposition allows us to attribute the premium generated by the long–short factor to net positions across issuers or to relative positions among bonds of the same issuer. However, a factor's premium can be attributed to issuer positions even when within-issuer variation in the characteristic is related to expected returns. In fact, a bond factor can have a small within-issuer return premium not because within-issuer characteristic variation is not an important determinant of expected returns, but because the portfolio sorting procedure creates little within-issuer exposure. We therefore complement our analysis by decomposing the sorting characteristic into its issuer-level average and a within-issuer component which captures a bond's deviation from its issuer's average characteristic and estimate how future bond returns vary with each source of characteristic variation. This allows us to separate the exposure generated by the portfolio sorting procedure from the relation between each source of variation and expected returns.

We find that 13 of the 14 factors with absolute average returns above 20 bps per month earn between 61% and 98% of that premium from net issuer positions. The credit spread factor premium, for example, is primarily an issuer trade, with 89 bps

out of 96 bps earned through issuer positions. The return attribution reflects the exposure generated by the sorting procedure, as the credit spread difference between the long and short leg of the factor is 2.11 standard deviations across issuers and only 0.20 within issuers. On the other hand, 18 of the 24 bps of the maturity premium come from relative positions among bonds of the same issuer, with the maturity sort generating substantially more exposure to within-issuer level variation (0.91 and 2.35 standard deviations of total maturity across and within issuers, respectively).

However, the return decomposition does not reveal whether issuer-level or within-issuer variation in the characteristic is more strongly related to future returns. Using monthly Fama and MacBeth (1973) (FM) regressions of bond returns on the issuer and within-issuer components, we find that six of the 20 within-issuer slopes are significant at the 5% level, against four out of 20 issuer slopes. For credit spread, a one-standard-deviation increase in a bond's credit spread relative to its issuer's average predicts an increase of 30.05 bps in next-month return ($t = 2.96$), while the corresponding issuer-level effect is 24.14 bps ($t = 1.88$). Thus, although the standard long–short credit spread factor earns almost all of its premium through issuer positions, credit spread also predicts relative returns within issuers. Combining the estimated conditional return slopes with the characteristic exposure created by the portfolio sorting procedure allows us to understand how much of a portfolio's return can be attributed to variation on each margin.

We then explore the asset pricing implications. Our findings complement the evidence of Dickerson, Mueller, and Robotti (2023) that proposed corporate bond factors generally provide little incremental pricing ability beyond the bond market factor. Testing a conventional bond factor's alpha asks whether its average return is explained by exposure to the bond market factor but because the factor combines issuer positions with relative bond selection, an insignificant alpha does not establish that the market factor explains the average returns of both components. We explore whether bond market risk also explains the relative returns associated with the sorting characteristic within issuers. For five of the 20 factors, within-issuer alphas are statistically significant even though conventional factor alphas are not. In several of these cases, most of the average return left unexplained by the bond market is

associated with the characteristic used to construct the factor. Even within issuers, sorting on one characteristic creates exposure to other bond attributes. These exposures can carry offsetting alphas, leaving an insignificant within-issuer alpha even when the bond market factor fails to explain the relative returns associated with the sorting characteristic.

Related literature. Our paper contributes to the empirical literature on the cross-section of corporate bond returns, in particular on factor construction, the choice of test assets, and the implications for asset pricing tests. While, from a structural perspective, risky debt can be thought of as a position in a risk-free bond and a short put on the issuer's assets (Merton, 1974), with the same firm state affecting both equity and bond pricing, corporate bonds remain a distinct claim on that state (Campbell and Taksler, 2003; Schaefer and Strebulaev, 2008). Yet, empirical researchers usually start from bond characteristics, rank securities, and interpret the long–short return spread as a bond characteristic premium. We study the economic content and the implications of this research design. Our paper first contributes to the literature on factor models for corporate bonds. Fama and French (1993) were among the first to propose a factor model for equities and corporate bonds, in which equity market, size, and value factors along with term and default factors were able to capture common variation in bond returns. Later work employs portfolios formed from yield, rating, value, carry, momentum, reversal, liquidity, downside risk, and related characteristics (Gebhardt, Hvidkjaer, and Swaminathan, 2005a; Jostova et al., 2013; Houweling and van Zundert, 2017; Israel, Palhares, and Richardson, 2018; Bali, Subrahmanyam, and Wen, 2021; Bartram, Grinblatt, and Nozawa, 2025) to identify bond-specific economic mechanisms. Credit spreads reflect expected losses, risk compensation, and non-credit components (Nozawa, 2017), while bond returns also reflect illiquidity, aggregate liquidity risk, and dealer balance sheet conditions (Bao, Pan, and Wang, 2011; Lin, Wang, and Wu, 2011; He, Khorrami, and Song, 2022). The design of factors, however, generally mimics the construction of factors in the equity literature: sort securities on a characteristic and study the difference of the returns of the extreme portfolios. Thus, even when the proposed mechanism is specific to credit, liquidity, or over-the-counter

trading, the empirical payoff can still be a mixture of issuer selection and relative bond selection.

Another strand of literature focuses on equity and corporate bond market integration. Tests based on return predictability and relative pricing point to incomplete integration. Equity anomalies transmit unevenly to bonds (Gebhardt, Hvidkjaer, and Swaminathan, 2005b; Chordia et al., 2017); market-specific premia and equity–credit pricing discrepancies vary with limits to arbitrage (Choi and Kim, 2018; Kapadia and Pu, 2012); and debt–equity valuation gaps predict stock and bond returns in opposite directions (Chen, Chen, and Li, 2026). Recent work on joint pricing models nevertheless recovers substantial common structure while retaining market-specific term-structure risk or differences in the prices of common factors (Dickerson, Julliard, and Mueller, 2026; Chen et al., 2026).

Our paper also speaks to the literature on the construction of test assets. Empirical asset pricing tests employ proposed factor models to price a small cross section of characteristic sorted bond portfolios, usually one- or two-way sorts on size, rating, yield, maturity, and credit spread (Gebhardt, Hvidkjaer, and Swaminathan, 2005a; Dickerson, Mueller, and Robotti, 2023; Dickerson, Julliard, and Mueller, 2026), although there is no consensus on the pricing power of commonly proposed corporate bond factors. Yet, Lewellen, Nagel, and Shanken (2010) show that common structure among test portfolios can make cross-sectional fit easy to achieve, while Bryzgalova, Pelger, and Zhu (2025) argue that a large number of portfolios need not retain a large number of nonredundant payoffs. The bond market adds a hierarchical version of this problem since many characteristic portfolios can repeatedly repackage net positions in the same issuers while adding little variation in the bond characteristic used to form those portfolios. Our decomposition identifies whether each test asset contributes an issuer-level payoff, a within-issuer payoff, or both.

The rest of the paper proceeds as follows. Section 2 develops the portfolio, characteristic, and regression decompositions. Section 3 describes the data, portfolio construction, and issuer definition. Section 4 presents the return attribution and the predictive results. Section 5 explores the asset pricing implications. Section 6 concludes.

2 Two Positions in Characteristic-Sorted Portfolios

Suppose we want to know whether a characteristic z is related to differences in expected corporate bond returns. The usual research design to answer this question starts from sorting individual bonds into K portfolios on characteristic z. If bonds of some issuers have high values of z and bonds of other issuers have low values of z, the resulting long–short portfolio is an investment strategy that buys high-z issuers and sells low-z issuers. Conversely, if bonds of the same issuer are placed in different portfolios and are not clustered in a specific bin, the resulting long–short portfolio can take relative positions within that issuer. Sorting individual bonds into portfolios therefore does not determine whether the resulting long–short return spread is driven by issuer-level characteristic variation, within-issuer characteristic variation, or a combination of the two.

We take the standard characteristic-sorted portfolios as given and decompose their return into these two components. Unlike Dick-Nielsen et al. (2026), we do not construct alternative issuer-level or within-issuer factors. Instead, we ask which economic effects arise when individual corporate bonds are sorted into portfolios following the common blueprint used in the literature. Section 5 uses these positions to distinguish pricing restrictions on issuer allocation from those on relative bond selection.

2.1 Portfolio Weights and Returns

Let $\mathcal{B}_{i,t}$ denote the set of bonds of issuer i at time t and $\mathcal{B}^{\ell}_{i,t}$ the set of bonds of issuer i at time t that are sorted into the leg $\ell \in \{H, L\}$ of the characteristic-sorted portfolio. The weight of bond b associated with the characteristic-sorted portfolio is $q^{S}_{ib,t}$. We normalize the high and low legs to one dollar each, i.e., $\sum_i \sum_{b\in\mathcal{B}^{H}_{i,t}} q^{S}_{ib,t} = -\sum_i \sum_{b\in\mathcal{B}^{L}_{i,t}} q^{S}_{ib,t} = 1$. Because the portfolio is formed at the bond level, a given issuer may appear on the long leg, the short leg, or both. Aggregating the long and short positions of issuer i gives the net position created by the portfolio sorting procedure,

$$Q^{S}_{i,t} = \sum_{b\in\mathcal{B}_{i,t}} q^{S}_{ib,t}. \tag{1}$$

A positive $Q^S_{i,t}$ implies that the portfolio is net long issuer i, while a negative value means that it is net short.[2]

A net issuer position does not determine how the position is distributed across the issuer's bonds. We represent the issuer by a benchmark portfolio of its bonds. Let $MV_{ib,t}$ denote the bond's market value at time t when portfolios are formed and set

$$V_{i,t} \equiv \sum_{c \in \mathcal{B}_{i,t}} MV_{ic,t}, \qquad s_{ib,t} \equiv \frac{MV_{ib,t}}{V_{i,t}}, \qquad \sum_{b \in \mathcal{B}_{i,t}} s_{ib,t} = 1.$$

The weights $s_{ib,t}$ define the bond market value-weighted portfolio of issuer i's bonds. Intuitively, the weights define a synthetic issuer portfolio whose return is the weighted average return on available bonds of issuer i. The net position $Q^S_{i,t}$ is the amount of this synthetic issuer portfolio that the original sort holds long or short.

For each bond, define the unique decomposition for the given benchmark weights

$$q^I_{ib,t} \equiv s_{ib,t} Q^S_{i,t}, \qquad q^W_{ib,t} \equiv q^S_{ib,t} - q^I_{ib,t}. \tag{2}$$

The first term, $q^I_{ib,t}$, is the *issuer component*. It takes the net amount $Q^S_{i,t}$ that the portfolio invests in issuer i and allocates it across the issuer's bonds. The second term, $q^W_{ib,t}$, is the *within-issuer component* and captures the difference between the bonds actually selected by the sort and the bonds that would be held through the synthetic issuer portfolio. The within-issuer component therefore captures how the sorting rule reallocates capital among bonds of the same issuer, holding fixed its net position in that issuer. By construction,

$$q^S_{ib,t} = q^I_{ib,t} + q^W_{ib,t}, \tag{3}$$

and

$$\sum_{b \in \mathcal{B}_{i,t}} q^I_{ib,t} = Q^S_{i,t}, \qquad \sum_{b \in \mathcal{B}_{i,t}} q^W_{ib,t} = 0 \quad \text{for every } i. \tag{4}$$

As an example, suppose that the characteristic z used to sort bonds into portfolios varies mainly across issuers, so that bonds issued by the same firm tend to cluster in

[2] $Q^S_{i,t} = 0$ does not imply that the portfolio holds no bonds of issuer i: some of the issuer's bonds are held long and others short, with these positions offsetting when aggregated to the issuer level.

the same portfolio. The long leg of the factor, therefore, will hold issuers with high-z bonds, which represent the majority, if not all, of those issuers' outstanding bonds. If, within each issuer, the original portfolio holds bonds in the same proportions as the synthetic issuer portfolio, $q^S_{ib,t} = s_{ib,t}Q^S_{i,t}$, then $q^W_{ib,t} = 0$ for every bond. The long–short portfolio is, in this case, a pure issuer trade: it is long the synthetic bond portfolios of some issuers and short those of others. Its premium can therefore arise only from differences in the aggregate bond portfolio, rather than from the relative performance of bonds issued by the same firm. Conversely, if the characteristic varies within issuers such that bonds of the same issuer end up in different bins and, in aggregate, these positions offset each other, then $q^I_{ib,t} = 0$ and $q^W_{ib,t} = q^S_{ib,t}$ for that issuer. If this holds for every issuer, the portfolio is a pure within-issuer trade: it does not take a net position in the issuer but instead all of its premium comes from differences in the returns of its bonds.

Characteristics that are largely shared by bonds of the same issuer are therefore more likely to generate issuer positions, whereas characteristics that differ substantially across an issuer's bonds create greater scope for within-issuer positions. Conventional bond-level sorts can lie anywhere between these two limiting cases.

Let $r_{ib,t+1}$ denote bond b's excess return over the subsequent month. The bond-by-bond identity in equation (3) implies

$$\begin{aligned} r^S_{t+1} &\equiv \sum_i \sum_{b\in\mathcal{B}_{i,t}} q^S_{ib,t} r_{ib,t+1} \\ &= \sum_i \sum_{b\in\mathcal{B}_{i,t}} q^I_{ib,t} r_{ib,t+1} + \sum_i \sum_{b\in\mathcal{B}_{i,t}} q^W_{ib,t} r_{ib,t+1} \\ &\equiv r^I_{t+1} + r^W_{t+1}. \end{aligned} \tag{5}$$

The two returns have a direct portfolio interpretation. Define the return on issuer i's benchmark bond portfolio as

$$\bar{r}^s_{i,t+1} \equiv \sum_{b\in\mathcal{B}_{i,t}} s_{ib,t} r_{ib,t+1}. \tag{6}$$

Then

$$r^I_{t+1} = \sum_i Q^S_{i,t} \bar{r}^s_{i,t+1}, \tag{7}$$

and, because the within-issuer weights sum to zero,

$$r^W_{t+1} = \sum_i \sum_{b \in \mathcal{B}_{i,t}} q^W_{ib,t} \left(r_{ib,t+1} - \bar{r}^s_{i,t+1} \right). \tag{8}$$

Thus, the issuer component earns through net positions across issuers, whereas the within-issuer component earns from return differences among bonds of the same issuer. Because $r^S_{t+1} = r^I_{t+1} + r^W_{t+1}$, $\mu^S = \mu^I + \mu^W$, and any common linear factor projection satisfies $\alpha^S = \alpha^I + \alpha^W$ and $\boldsymbol{\beta}^S = \boldsymbol{\beta}^I + \boldsymbol{\beta}^W$.

Since the issuer's net position $Q^S_{i,t}$ is determined by the portfolio sorting procedure, and it is therefore invariant to any choice of the benchmark weights $s_{ib,t}$, the choice of the benchmark only affects how $Q^S_{i,t}$ is allocated across the issuer's bonds, and therefore how the long–short return r^S_{t+1} is divided between r^I_{t+1} and r^W_{t+1}.

A natural choice for the weights is bond market value. Under this specification, $\bar{r}^s_{i,t+1}$ is the value-weighted return on issuer i's eligible bonds, and therefore represents issuer i's component of a value-weighted market portfolio over the same eligible universe.[3]

While our within-issuer component is dollar neutral within each issuer, this does not imply factor neutrality. In fact, let $\boldsymbol{\beta}^a_t$ be the vector of factor a's risk exposures, and let $\mathcal{K}_t$ denote the set of bond-weight vectors satisfying $\sum_{b \in \mathcal{B}_{i,t}} q_{ib} = 0$ for every issuer i. Issuer-neutral positions have zero exposure to factor a, $q' \boldsymbol{\beta}^a_t = 0$ for every $q \in \mathcal{K}_t$, if and only if the factor loading is constant across bonds of the same issuer, $\beta^a_{ib,t} = \beta^a_{i,t}$. Issuer-dollar neutrality therefore removes only the part of a factor's exposure that is common to all bonds of an issuer, thus exposure generated by heterogeneity in loadings across those bonds can still affect bond returns. In fact, bonds issued by the same firm can have different contractual features and characteristics, such as coupon rate, maturity, and duration, and therefore different return sensitivities to the same interest rate movement, for example. This heterogeneity implies that duration-related risk

[3]The Internet Appendix reports the corresponding results using an equal-weighted issuer benchmark.

exposure need not disappear when the issuer's net dollar position is zero. Similarly, an issuer-level credit shock disappears from every within-issuer position if and only if its effect across all the bonds of that particular issuer is the same. On the other hand, a within-issuer component can have zero factor exposure even when risk exposures vary across the issuer's bonds. We formally show this in Appendix E.

2.2 How Breakpoints Create Within-Issuer Positions

We next explore why and how the portfolio sorting procedure generates within-issuer positions when multiple securities of the same firm are traded. Consider one leg $\ell \in \{H, L\}$ of a value-weighted characteristic-sorted portfolio. Let $q^{S,\ell}_{ib,t} \geq 0$ denote the normalized weight of bond b of issuer i in that leg, so that[4]

$$q^{S,\ell}_{ib,t} = \frac{MV_{ib,t}\mathbf{1}\{b \in \ell_t\}}{C^{\ell}_t}, \qquad C^{\ell}_t \equiv \sum_i \sum_{b \in \mathcal{B}_{i,t}} MV_{ib,t}\mathbf{1}\{b \in \ell_t\}. \tag{9}$$

Define the fraction of issuer i's eligible bond market value selected into leg ℓ as

$$\phi^{\ell}_{i,t} \equiv \sum_{b \in \mathcal{B}_{i,t}} s_{ib,t}\mathbf{1}\{b \in \ell_t\} = \frac{\sum_{b \in \mathcal{B}_{i,t}} MV_{ib,t}\mathbf{1}\{b \in \ell_t\}}{V_{i,t}}. \tag{10}$$

Thus $\phi^{\ell}_{i,t} = 0$ when the leg holds none of issuer i's bonds, $\phi^{\ell}_{i,t} = 1$ when it holds the issuer's entire eligible bond portfolio, and $0 < \phi^{\ell}_{i,t} < 1$ when the breakpoint splits the issuer's bond portfolio and selects only part of it (partial selection).

For the leg-specific decomposition, the within-issuer weight is

$$q^{W,\ell}_{ib,t} = \frac{MV_{ib,t}}{C^{\ell}_t}\left(\mathbf{1}\{b \in \ell_t\} - \phi^{\ell}_{i,t}\right). \tag{11}$$

The within-issuer position is therefore zero when an issuer is entirely inside or entirely outside the leg. It arises only when the portfolio breakpoint cuts through the issuer's

[4]By linearity of the decomposition in Eq. (2), we have additivity with respect to the individual legs:

$$q^{I}_{ib,t} = q^{I,H}_{ib,t} - q^{I,L}_{ib,t}, \qquad q^{W}_{ib,t} = q^{W,H}_{ib,t} - q^{W,L}_{ib,t}.$$

bond distribution, placing some of its bonds inside the leg and leaving others outside (Figure 1).

We summarize this partial selection with the positive mass of the leg's within-issuer weights. Writing $\pi^{\ell}_{i,t} = \sum_b q^{S,\ell}_{ib,t}$ for issuer i's weight in the leg,

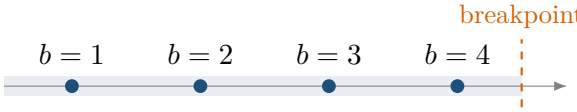
$$\mathcal{I}^{\ell}_{t} = \sum_{i} \pi^{\ell}_{i,t} \left(1 - \phi^{\ell}_{i,t}\right) = \frac{1}{2} \sum_{i} \sum_{b \in \mathcal{B}_{i,t}} \left| q^{W,\ell}_{ib,t} \right| . \tag{12}$$

$\mathcal{I}^{\ell}_{t}$ is the fraction of the leg's portfolio weight that must be reallocated within issuers to transform the issuer-benchmark allocation into the bonds actually selected by the sort (Appendix Lemma 2).

When $\mathcal{I}^{\ell}_{t} > 0$, the leg's within-issuer return can be written as

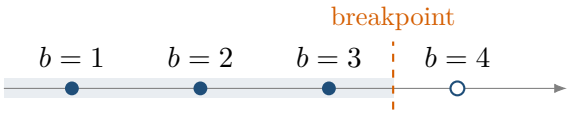
$$r^{W,\ell}_{t+1} = \mathcal{I}^{\ell}_{t}\, \mathcal{D}^{\ell}_{t+1}, \qquad \mathcal{D}^{\ell}_{t+1} = \sum_{i:\, 0<\phi^{\ell}_{i,t}<1} p^{\mathrm{sel},\ell}_{i,t} \left(\bar{r}^{\mathrm{sel},\ell}_{i,t+1} - \bar{r}^{\mathrm{uns},\ell}_{i,t+1} \right), \tag{13}$$

(a) Breakpoint above all four bonds: $\phi^{\ell}_{i,t} = 1$, $\mathcal{I}^{\ell}_{t} = 0\%$



	$b=1$	$b=2$	$b=3$	$b=4$	Sum
Leg, $q^{S,\ell}_{ib,t}$	25	25	25	25	100
Issuer, $q^{I,\ell}_{ib,t}$	25	25	25	25	100
Within, $q^{W,\ell}_{ib,t}$	0	0	0	0	0

(b) Breakpoint between $b = 3$ and $b = 4$: $\phi^{\ell}_{i,t} = 3/4$, $\mathcal{I}^{\ell}_{t} = 25\%$



	$b=1$	$b=2$	$b=3$	$b=4$	Sum
Leg, $q^{S,\ell}_{ib,t}$	33.3	33.3	33.3	0	100
Issuer, $q^{I,\ell}_{ib,t}$	25	25	25	25	100
Within, $q^{W,\ell}_{ib,t}$	+8.3	+8.3	+8.3	−25	0

Figure 1: How a breakpoint creates a within-issuer position. Issuer i has four bonds of equal market value, ordered by the characteristic z. Leg $\ell = L$ holds no other issuer and contains the bonds left of the breakpoint (shaded, filled dots). Entries are weights per \$100 of the leg.

where $p_{i,t}^{\mathrm{sel},\ell} = \pi_{i,t}^{\ell}(1-\phi_{i,t}^{\ell})/\mathcal{I}_t^{\ell}$ are normalized weights over the partially selected issuers, so that $\sum_{i:\,0<\phi_{i,t}^{\ell}<1} p_{i,t}^{\mathrm{sel},\ell} = 1$. Therefore, $\mathcal{D}_{t+1}^{\ell}$ captures the (weighted) return difference between the bonds held in leg ℓ and the bonds of the same issuers left outside.

Equation (13) sheds light on the two effects that determine the within-issuer returns. $\mathcal{I}_t^{\ell}$ captures to what extent the portfolio procedure puts bonds of the same issuers in different portfolios, while $\mathcal{D}_{t+1}^{\ell}$ captures the (weighted) return difference between bonds inside the leg and those left outside. The magnitude of the within-issuer return, therefore, might be small either because the portfolio sorting procedure creates little within-issuer exposure (small $\mathcal{I}_t^{\ell}$), or because selected and unselected bonds have comparable returns (small $\mathcal{D}_{t+1}^{\ell}$). Moreover, since $q_t^W = q_t^{W,H} - q_t^{W,L}$, the long–short within-issuer return can be written as $r_{t+1}^W = \mathcal{I}_t^H \mathcal{D}_{t+1}^H - \mathcal{I}_t^L \mathcal{D}_{t+1}^L$.

Since factors combine a long position and a short position, one might expect that the total within-issuer position can be measured by the sum of its intensities $\mathcal{I}_t^H + \mathcal{I}_t^L$. However, the combined positions $q_t^W = q_t^{W,H} - q_t^{W,L}$ of a particular issuer can partially cancel across the two legs. Therefore, the within intensity of the long–short portfolio can be represented as

$$\tfrac{1}{2}\|q_t^W\|_1 = \mathcal{I}_t^H + \mathcal{I}_t^L - \kappa_t, \qquad \kappa_t = \sum_i \left(1 - \phi_{i,t}^H - \phi_{i,t}^L\right) \min\left(\pi_{i,t}^H, \pi_{i,t}^L\right) \geq 0, \tag{14}$$

where κ_t captures the amount of across-leg cancellation. A positive κ_t arises when an issuer is partially selected into both legs, with some bonds in neither leg. We discuss this more formally in Lemma 2 in the Appendix.

The role of the breakpoint, and therefore of the distribution of the characteristics, is central in determining the economic content of a bond factor. While bonds issued by the same firm can differ substantially in maturity, coupon rate, seniority, and any other contractual feature that affects their expected returns, if all the bonds of a particular issuer end up in the same portfolio, then this bond-level heterogeneity cannot be captured by the corresponding corporate bond factor. Only when the breakpoint cuts through the issuer's bond distribution does the corporate bond factor create relative trades within that issuer. Our within-intensity metric, therefore, captures the extent to which the long–short portfolio reflects that within-variation. In other

words, a characteristic can display substantial variation across bonds of the same issuer, but the long–short portfolio can still fail to capture that effect because the portfolio breakpoints do not separate those bonds.

2.3 Issuer and Within-Issuer Characteristic Variation

A bond can have a high value of characteristic z for two different reasons: its issuer's bonds may generally have high values of z, or the bond may have a high value relative to the other bonds of the same issuer. A bond-level sort therefore combines two distinct characteristic comparisons. It can compare bonds issued by firms with different characteristic levels or compare bonds with different characteristic values within the same firm. These comparisons need not have the same economic interpretation or the same relation with expected returns. In standard equity research, this distinction is not of first-order importance, as each firm usually contributes a single common stock to the cross-section. For corporate bonds, since multiple bonds are issued by the same entity, we can separate characteristic variation within and across issuers and how they are related to portfolio returns.

Using the same benchmark weights $s_{ib,t}$ as in the portfolio decomposition, write

$$z_{ib,t} = z^I_{i,t} + z^W_{ib,t}, \qquad z^I_{i,t} \equiv \sum_{b \in \mathcal{B}_{i,t}} s_{ib,t} z_{ib,t}, \qquad z^W_{ib,t} \equiv z_{ib,t} - z^I_{i,t}, \tag{15}$$

so that $\sum_b s_{ib,t} z^W_{ib,t} = 0$ within every issuer. The issuer component $z^I_{i,t}$ is the issuer-level benchmark-weighted average of the bond-level signals, whereas $z^W_{ib,t}$ measures bond b's characteristic deviation from that average.

For credit spread, for example, $z^I_{i,t}$ is the market value-weighted spread of issuer i's eligible bonds, while $z^W_{ib,t}$ measures whether bond b trades wide or tight relative to the issuer's bond portfolio. A high $z^I_{i,t}$ therefore identifies a high-credit spread issuer, while a high $z^W_{ib,t}$ identifies a relatively wide-credit spread bond within that issuer.

To measure the characteristic difference created by the sort, define

$$G^S_t \equiv \sum_i \sum_{b \in \mathcal{B}_{i,t}} q^S_{ib,t} z_{ib,t}. \tag{16}$$

With one dollar in each leg, G_t^S is the portfolio-weighted mean characteristic in the high leg minus that in the low leg. We refer to G_t^S as the *characteristic gap* generated by the standard sort.

Substituting Eq. (15) yields

$$G_t^S = G_t^I + G_t^W, \qquad G_t^I \equiv \sum_i Q_{i,t}^S z_{i,t}^I, \qquad G_t^W \equiv \sum_i \sum_{b \in \mathcal{B}_{i,t}} q_{ib,t}^S z_{ib,t}^W. \tag{17}$$

The issuer gap G_t^I is the part of the high-minus-low characteristic difference generated by the portfolio's net positions across issuers. The within-issuer gap G_t^W is the part generated by differences in the bonds selected within those issuers. For a credit-spread sort, a large G_t^I means that the long leg holds relatively more bonds of high-spread issuers and the short leg relatively more bonds of low-spread issuers. A large G_t^W instead means that, within the issuers represented in the portfolio, the long leg holds relatively wider-spread bonds and the short leg relatively tighter-spread bonds.

Our focus is on the distinction between G_t^I and G_t^W. Creating portfolios by sorting on the characteristic z mechanically creates differences in z between the top and bottom portfolios, but it hides which of the two components creates the gap. Such a difference may arise because the long and short portfolios hold bonds of issuers with different characteristic levels, or because they hold different bonds of the same issuer.

2.4 Characteristic Variation and Returns

The return decomposition shows where the long–short premium is earned, not why one component is larger than the other. For the sorting characteristic, two objects matter: the strength of its return relation along each component and the exposure the sort creates along that component. A cross-sectional regression on issuer and within-issuer components separates the two and distinguishes their fitted contribution from that of the controls and a residual.

Each month, we regress $t+1$ bond returns on the issuer and within-issuer compo-

nents of the characteristic and of the controls at t,

$$r_{ib,t+1} = a_t + \beta_t^I \widetilde{z}_{i,t}^I + \beta_t^W \widetilde{z}_{ib,t}^W + \boldsymbol{\gamma}_t^{I\prime} \widetilde{\mathbf{X}}_{i,t}^I + \boldsymbol{\gamma}_t^{W\prime} \widetilde{\mathbf{X}}_{ib,t}^W + \varepsilon_{ib,t+1}, \tag{18}$$

where in our baseline specification we include only a constant and the two components of the sorting characteristic so that we can separate the issuer and within-issuer return relations before conditioning on other bond characteristics.

The regression gives every issuer the same weight and allocates that weight across the issuer's bonds in proportion to market value, the within-issuer weights that define the components. Issuer-level and within-issuer regressors are orthogonal, so β_t^I and β_t^W are identified from differences across issuers and from differences among bonds of the same issuer, respectively.[5]

We standardize variables by $\sigma_{z,t}$, the cross-sectional standard deviation of the total characteristic $z_{ib,t}$, and denote them with tilde, $\widetilde{z}_{i,t}^I = z_{i,t}^I/\sigma_{z,t}$ and $\widetilde{z}_{ib,t}^W = z_{ib,t}^W/\sigma_{z,t}$, so that $\widetilde{z}_{i,t}^I + \widetilde{z}_{ib,t}^W = \widetilde{z}_{ib,t}$.

We scale controls in a similar way so that the two components are measured in the same units, and β_t^I and β_t^W can be compared. Scaling each component by its own standard deviation would instead multiply each estimated slope by its component-to-total standard-deviation ratio, and a gap between the two slopes would then reflect dispersion as much as the return relation.[6]

We report the time-series averages of the monthly coefficients,

$$\widehat{\beta}^I = \frac{1}{T}\sum_{t=1}^{T} \widehat{\beta}_t^I, \qquad \widehat{\beta}^W = \frac{1}{T}\sum_{t=1}^{T} \widehat{\beta}_t^W. \tag{19}$$

$\widehat{\beta}^I$ captures the conditional return relation associated with characteristic variation

[5]The within-issuer components sum to zero within each issuer under the market-value weights, so their weighted cross-product with any issuer-level variable, including the constant, is zero. The regression then separates into two: $(\widehat{\beta}_t^W, \widehat{\boldsymbol{\gamma}}_t^W)$ equal the slopes of a regression with an issuer fixed effect, and $(\widehat{a}_t, \widehat{\beta}_t^I, \widehat{\boldsymbol{\gamma}}_t^I)$ equal the slopes of a regression of issuer-level market-value-weighted returns on issuer-level characteristics. Only the within-issuer allocation of weight matters for this separation. Equal weighting across issuers prevents issuers with many bonds from dominating the cross-section.

[6]With the same decomposed controls, a regression on the total characteristic $\widetilde{z}_{ib,t}$ estimates an average of the issuer and within-issuer slopes weighted by their respective residualized characteristic variances.

across issuers, while $\widehat{\beta}^W$ captures the relation associated with variation across bonds of the same issuer. Since the two conditional slopes are measured on the same scale, we can test whether the characteristic–return relationship differs across these two margins. Equality in every month would allow the characteristic components to be pooled into a single regressor and therefore corresponds to the standard FM regressions commonly used in the empirical finance literature (e.g., Fama and French, 1992, 2008; Gebhardt, Hvidkjaer, and Swaminathan, 2005a; Bali, Subrahmanyam, and Wen, 2021; Chordia et al., 2017).

2.5 From Predictive Slopes to Portfolio Returns

The regression slopes capture the conditional return relation per unit of issuer and within-issuer characteristic exposure and can be interpreted as the return on a zero-cost portfolio with unit exposure to the characteristic component, and zero exposure to the remaining regressors. The gaps G_t^I and G_t^W capture how much exposure to issuer and within-issuer variation is created by the conventional portfolio sorting procedure. Since these gaps are generated by the same decomposition of Section 2, we can interpret them as the characteristic gap associated with the issuer position and the characteristic gap associated with the within-issuer position, respectively. Combining the slopes with the gaps allows us to map the conditional cross-sectional relations back to the return attribution discussed in Section 2. Because the FM slopes are estimated after standardizing the characteristics, we scale the characteristic gaps similarly:

$$\widetilde{G}_t^I \equiv \sum_i Q_{i,t}^S \widetilde{z}_{i,t}^I = \frac{G_t^I}{\sigma_{z,t}}, \qquad \widetilde{G}_t^W \equiv \sum_i \sum_{b \in \mathcal{B}_{i,t}} q_{ib,t}^S \widetilde{z}_{ib,t}^W = \frac{G_t^W}{\sigma_{z,t}}, \tag{20}$$

and, analogously, for the controls $\widetilde{\mathbf{G}}_{X,t}^I \equiv \sum_i Q_{i,t}^S \widetilde{\mathbf{X}}_{i,t}^I$ and $\widetilde{\mathbf{G}}_{X,t}^W \equiv \sum_i \sum_{b \in \mathcal{B}_{i,t}} q_{ib,t}^S \widetilde{\mathbf{X}}_{ib,t}^W$.

Since all the quantities in this subsection are constructed with the same data, using the same weights from the initial decomposition leads to

$$r_{t+1}^j = \widehat{\beta}_t^j \widetilde{G}_t^j + \widehat{\boldsymbol{\gamma}}_t^{j\prime} \widetilde{\mathbf{G}}_{X,t}^j + U_{t+1}^j, \qquad j \in \{I, W\}, \tag{21}$$

where

$$U_{t+1}^{j} \equiv \sum_{i} \sum_{b \in \mathcal{B}_{i,t}} q_{ib,t}^{j} \widehat{\varepsilon}_{ib,t+1}. \tag{22}$$

Equation (21) shows that we can decompose the return of a long–short characteristic portfolio into three components. For each j, the characteristic contribution is the return on holding $\widetilde{G}_t^j$ units of the corresponding zero-cost managed portfolio, whose realized return is $\widehat{\beta}_t^j$; the control contributions are defined analogously, and the remaining position earns the residual payoff. Eq. (21) therefore allows us to compute how much of the realized return of a factor comes from the fitted contribution associated with the characteristic used to form the portfolios, a second fitted contribution associated with the controls in the cross-sectional regression, and a residual part that captures what the linear relation misses, including nonlinearities in the data and/or omitted characteristic contributions.

We denote the fitted contribution of the sorting characteristic by

$$C_{t+1}^{j} \equiv \widehat{\beta}_t^j \widetilde{G}_t^j, \qquad j \in \{I, W\}, \tag{23}$$

and report its time-series average,

$$\overline{C}^{\,j} \equiv \frac{1}{T} \sum_{t=1}^{T} \widehat{\beta}_t^j \widetilde{G}_t^j, \tag{24}$$

along with the corresponding fitted contribution of the controls and residuals. For each j, the averages of these three terms sum exactly to the average component return, and since $\widehat{\beta}_t^j \widetilde{G}_t^j = b_t^j G_t^j$, where $b_t^j = \widehat{\beta}_t^j / \sigma_{z,t}$, C_{t+1}^j and $\overline{C}^{\,j}$ are invariant to the scaling we used to report slopes and characteristic gaps. A large issuer or within-issuer cross-sectional slope can still be consistent with a small fitted characteristic contribution when the portfolio sorting procedure creates a small exposure to that issuer or within-issuer margin. This does not imply a small issuer or within-issuer return, since the control and residual components can account for a large part of that premium. On the other hand, a large issuer or within-issuer premium along with a small $\overline{C}^{\,j}$ suggests that only a small portion of that average return can be attributed to the linear conditional relation with the characteristic used to form the portfolios.

3 Data and Portfolio Construction

3.1 Corporate Bond Returns and Characteristics

The monthly panel of corporate bond returns and characteristics is from Dickerson, Robotti, and Rossetti (2026). It combines the WRDS Bond Returns database with Mergent FISD and applies the return construction and sample filters described in that study. The data run from August 2002 through January 2025 and contain 1,837,111 bond-month observations on 52,828 bonds and 7,802 six-character CUSIP issuers.

For bond b of issuer i, the end-of-month holding-period return is

$$R^{\text{end}}_{ib,t+1} = \frac{P^{\text{end}}_{ib,t+1} + AI^{\text{end}}_{ib,t+1} + C_{ib,t+1}}{P^{\text{end}}_{ib,t} + AI^{\text{end}}_{ib,t}} - 1, \tag{25}$$

where $P^{\text{end}}_{ib,t}$ is the volume-weighted clean price, $AI^{\text{end}}_{ib,t}$ is accrued interest, and $C_{ib,t+1}$ is any coupon paid during month $t+1$. We follow the standard convention and use as the monthly price the last available daily price within the last five business days of the month at time t and $t+1$. Bonds without a valid formation-month price are excluded from the universe. We include Rule 144A bonds and track bonds through and after default, and price-based signals are adjusted for measurement errors using the procedure in Dickerson, Robotti, and Rossetti (2026).[7]

Excess returns are formed by subtracting the one-month Treasury bill rate from Kenneth French's data library.

We study 20 characteristics used in the corporate bond literature (e.g., Gebhardt, Hvidkjaer, and Swaminathan, 2005a; Bao, Pan, and Wang, 2011; Israel, Palhares, and Richardson, 2018; Kelly, Palhares, and Pruitt, 2023). The credit and spread group contains credit spread (`cs`), yield to maturity (`ytm`), and the lagged-minus-current six-month log-spread change (`dcs6`). The value group contains bond book-to-market (`bbtm`), the fitted-spread deviation (`val_hz`), and the log-spread residual (`val_ipr`). Bond structure characteristics are time to maturity (`tmat`), modified duration (`md_dur`), bond age (`age`), convexity (`convx`), and bond market capitalization (`sze`). Liquidity

[7] We refer to Dickerson, Robotti, and Rossetti (2026) for a detailed explanation of the data sources, data filters, and corrections. The data are available at `https://openbondassetpricing.com`.

characteristics are Roll autocovariance (`ilq`), Amihud illiquidity (`ami`), the relative bid–ask spread (`spd_rel`), and price impact (`pi`). The remaining signals are within-month daily-return volatility (`dvol`), realized volatility (`rvol`), 95% value-at-risk (`var_95`), 6–1 momentum (`mom6_1`), and short-term reversal (`str`). Appendix Table A.1 presents the detailed description and related references.

We construct the bond market factor $MKTB$ as the value-weighted average of excess returns of all the bonds in our universe and use the single-factor bond CAPM as our benchmark model in all the results presented in this work. In the Appendix, we also use the credit factor CRF of Bai, Bali, and Wen (2019) in the corrected version of Dickerson, Mueller, and Robotti (2023).

3.2 Issuer Structure of the Corporate Bond Market

Unlike in equity markets, where typically a stock corresponds to a firm, in corporate bond markets the same issuer can have multiple bonds outstanding at any given point in time. Because we separate variation across issuers from variation across bonds of the same issuer, we first define how we identify issuers. Our baseline issuer identifier is the six-character CUSIP issuer code (`issuer_cusip`) and, in each month, we group bonds that share this code as belonging to the same issuer. The identifier is a security-market grouping convention and need not coincide exactly with the ultimate parent or with every legal-obligor definition. Appendix Table A.2 regroups the same portfolio positions by PERMNO, retaining the CUSIP grouping for bonds with missing PERMNO.

Table 1 reports descriptive statistics of issuers in our bond panel. The average issuer-month contains 3.51 bonds, but the issuer behind the average bond-month contains 18.62, because large issuers contribute proportionally more securities. Single-bond issuer-months account for 13.2% of bond-month observations and 10.4% of aggregate bond market value. Thus, 86.8% of bond-month observations and 89.6% of aggregate market value come from issuers with at least two bonds (Figure 2). Moreover, throughout the sample, bonds of multi-bond issuers account for at least 85.0% of trades and 82.8% of par volume in every month.

Table 1: Issuer Multiplicity in the Corporate Bond Panel.

The table reports the distribution of bonds across issuers. Issuer multiplicity is the number of distinct bonds per issuer-month. Panel A reports counts and shares of issuer-months and bond-months, together with average aggregate market value per month, and market-value shares by multiplicity. Panel B reports summary statistics under equal issuer-month, bond, and market-value weights. The bond-weighted and market-value-weighted medians identify the issuer-month containing the median bond observation and the median dollar, respectively. Multi-bond issuer-months have at least two issued bonds (multiplicity of two). Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

Panel A: Bonds per issuer-months

	Issuer-months		Bond-months		Market value	
Bonds-issuer	Count	%	Count	%	$bn per month	%
1	241,759	46.3	241,759	13.2	467.8	10.4
2	95,056	18.2	190,112	10.3	412.7	9.2
3	50,592	9.7	151,776	8.3	354.6	7.9
4–5	54,541	10.4	240,464	13.1	588.5	13.1
6–9	46,645	8.9	334,062	18.2	907.2	20.2
10–19	25,059	4.8	322,174	17.5	983.6	21.9
20–29	5,221	1.0	122,596	6.7	426.0	9.5
30+	3,820	0.7	234,168	12.7	360.4	8.0
All	522,693	100.0	1,837,111	100.0	4,500.8	100.0

Panel B: Selected distributional statistics

Statistic	Value
Distinct issuer CUSIPs	7,802
Mean bonds per issuer-month	3.51
Mean bonds per issuer-month, bond weighted	18.62
Median bonds per issuer-month	2
Median bonds per issuer-month, bond weighted	6
Median bonds per issuer-month, market-value weighted	7
Multi-bond share of issuer-months (%)	53.7
Multi-bond share of bond-months (%)	86.8
Multi-bond share of market value (%)	89.6

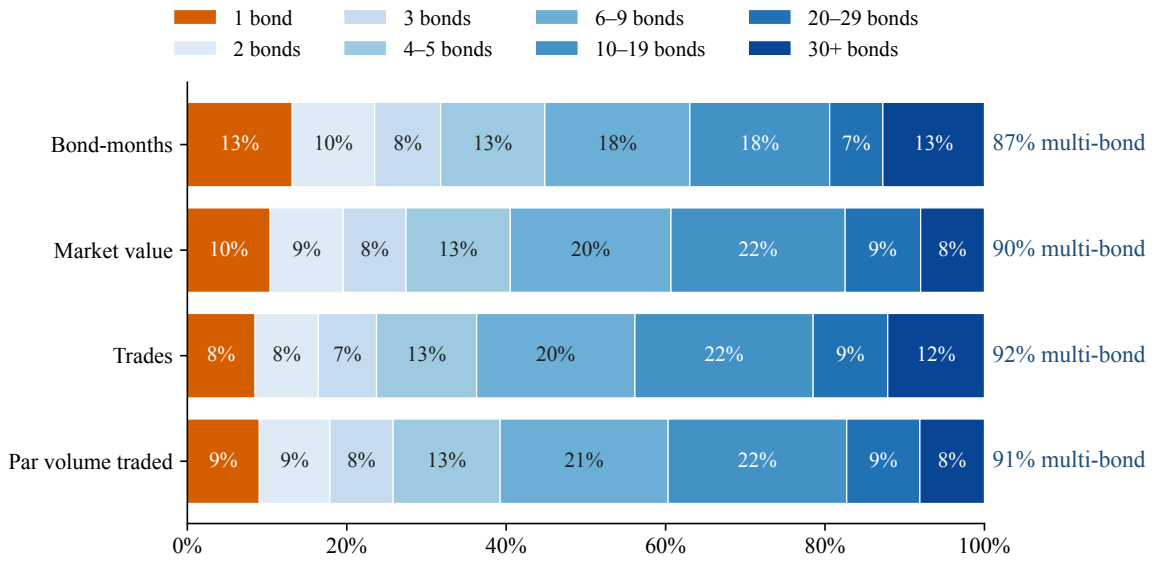


Figure 2: Bond multiplicity in the corporate bond market.

3.3 Portfolio Construction and Regression Samples

Each month, we form decile portfolios by sorting individual bonds on a given characteristic and construct a bond value-weighted long–short portfolio that buys the top decile and sells the bottom decile. We then decompose the resulting long–short factor positions into their issuer and within-issuer components.

For each characteristic, the monthly cross-sectional Fama–MacBeth regressions in Section 2.4 and the return attribution in Section 2.5 are estimated on a sample for which each bond has nonmissing values of the sorting characteristic and controls. We further restrict the sample to issuer-months with at least two eligible bonds. Because the attribution portfolios are re-formed on this restricted sample, their holdings can differ from those of the unconditional characteristic portfolios.[8]

We consider four different regression specifications. Specification (1) regresses excess returns on a constant and the issuer and within-issuer components of the sorting characteristic. Specification (2) adds maturity and log amount outstanding as controls, and specification (3) adds rating and illiquidity (Bali, Subrahmanyam, and

[8]Internet Appendix Tables IA.5–IA.14 show that our findings are qualitatively similar if we instead construct the unconditional characteristic portfolios on the restricted regression sample, or if we include single-bond issuers in the Fama–MacBeth regressions.

Wen, 2021; Bai, Bali, and Wen, 2021). Specification (4) uses rating, modified duration, market-value size, and illiquidity as controls.[9] We report results for specification (1) in the main text and relegate the other specifications to the appendix.

Finally, additional results with different portfolio construction choices, samples, and weights are reported in the Internet Appendix (Section IA.2).

4 Return Attribution and Predictive Relations

Across the 20 characteristic sorts, average long–short returns are concentrated in net issuer positions. The issuer component has the larger absolute premium for 16 of the 20 sorts although only four issuer component returns have $|t| > 1.96$, compared with six within-issuer returns, consistent with the analysis in Dickerson, Robotti, and Rossetti (2026). None of the issuer-component $MKTB$ alphas has $|t| > 1.96$ compared with seven within-issuer alphas. These results do not reveal whether the difference comes from the relation between the characteristic and subsequent returns or from the characteristic exposure created by the sort. We separate these objects by first decomposing the portfolio returns, then examining how the portfolio breakpoints generate within-issuer positions, and finally combining the cross-sectional return slopes with the characteristic gaps created by the sort.

4.1 Which Position Earns the Return?

Table 2 decomposes each value-weighted decile long–short portfolio into its issuer and within-issuer components. The first three columns report mean returns and the last three report $MKTB$ alphas. Figure 3 reports the long–short premia of conventional bond factors in descending order and their decomposed components.

The issuer component has the larger absolute mean return for 16 of the 20 characteristics. Credit spread earns 96.2 bps per month ($t = 2.52$), of which 88.9 bps is earned through net issuer positions and 7.4 bps within issuers. Yield has a similar decomposition ($105.2, 92.2, 13.1$ bps), while -44.2 of the `sze` factor's -45.1 bps is

[9] Every control is decomposed into its issuer and within-issuer components as well, and across specifications, we exclude controls that closely proxy for the sorting characteristic under consideration.

Table 2: Mean returns and $MKTB$ alphas: issuer and within-issuer components.

The table reports mean returns and $MKTB$ alphas for 20 value-weighted decile high-minus-low portfolios and their issuer and within-issuer components. Each sort buys the highest-characteristic decile and sells the lowest. Alphas are intercepts from regressions on a constant and $MKTB$. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Mean return			$MKTB$ alpha		
Signal	Total	Issuer	Within issuer	Total	Issuer	Within issuer
cs	96.2	88.9	7.4	49.8	51.3	−1.6
	(2.52)	(2.39)	(1.71)	(1.82)	(1.75)	(−0.47)
ytm	105.2	92.2	13.1	54.1	53.5	0.5
	(2.63)	(2.42)	(2.41)	(1.96)	(1.81)	(0.17)
dcs6	−50.2	−32.5	−17.6	−28.9	−13.6	−15.3
	(−2.52)	(−1.81)	(−4.48)	(−1.79)	(−0.88)	(−4.41)
bbtm	74.8	64.5	10.3	35.5	31.6	3.9
	(1.80)	(1.64)	(2.37)	(1.12)	(1.04)	(1.08)
val_hz	45.2	30.9	14.3	12.4	12.6	−0.2
	(2.29)	(1.94)	(1.91)	(1.13)	(0.97)	(−0.03)
val_ipr	50.7	37.5	13.2	30.9	23.0	7.9
	(2.68)	(2.25)	(4.02)	(2.12)	(1.62)	(3.80)
tmat	23.6	5.7	17.9	−19.6	−6.2	−13.4
	(1.35)	(0.98)	(1.47)	(−1.60)	(−1.09)	(−1.92)
md_dur	13.7	−1.9	15.6	−25.8	−10.5	−15.3
	(0.79)	(−0.28)	(1.29)	(−1.78)	(−1.36)	(−2.12)
age	9.9	7.9	2.0	7.7	4.7	3.0
	(2.16)	(1.91)	(1.43)	(2.06)	(1.39)	(2.22)
convx	14.9	−1.3	16.2	−26.0	−11.0	−14.9
	(0.86)	(−0.21)	(1.34)	(−1.92)	(−1.63)	(−2.10)
sze	−45.1	−44.2	−0.9	−8.4	−5.5	−2.9
	(−1.54)	(−1.53)	(−0.39)	(−0.45)	(−0.30)	(−1.08)
ilq	27.9	21.8	6.1	18.8	14.6	4.1
	(1.98)	(1.84)	(1.92)	(1.67)	(1.51)	(1.50)
ami	28.8	21.4	7.4	6.6	8.4	−1.9
	(1.64)	(1.42)	(1.74)	(0.68)	(0.88)	(−0.80)
spd_rel	23.2	14.3	9.0	10.5	5.6	4.9
	(1.69)	(1.23)	(2.97)	(1.06)	(0.64)	(2.39)
pi	1.0	2.8	−1.9	−0.4	2.4	−2.8
	(0.31)	(1.27)	(−1.09)	(−0.14)	(1.15)	(−1.66)
dvol	49.3	37.8	11.5	3.8	11.0	−7.2
	(1.78)	(1.62)	(1.42)	(0.24)	(0.66)	(−1.29)
rvol	53.1	42.5	10.6	4.9	14.6	−9.8
	(1.88)	(1.81)	(1.25)	(0.28)	(0.84)	(−1.83)
var_95	78.4	64.7	13.8	23.8	30.1	−6.3
	(2.65)	(2.55)	(1.70)	(1.42)	(1.61)	(−1.15)
mom6_1	0.3	6.2	−5.9	21.9	23.8	−1.9
	(0.01)	(0.26)	(−1.06)	(1.08)	(1.27)	(−0.33)
str	−9.1	3.4	−12.5	11.5	21.9	−10.4
	(−0.51)	(0.21)	(−2.61)	(0.68)	(1.45)	(−2.06)

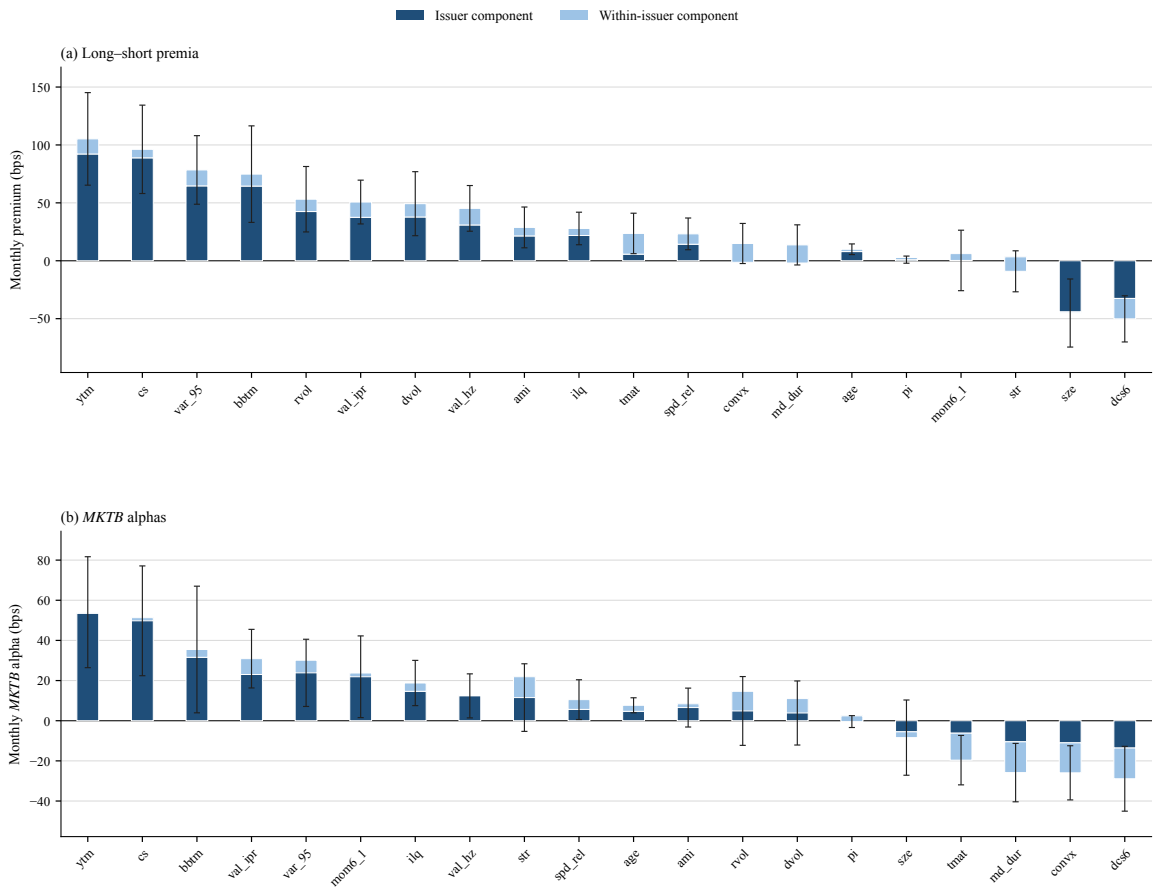


Figure 3: Decomposing average returns and $MKTB$ alphas. The figure shows the Issuer (dark blue) and Within-issuer (light blue) components of the monthly averaged returns and $MKTB$ alphas corresponding to the 20 value-weighted decile high-minus-low portfolios of Table 2 (x-axis). On the y-axis (monthly basis points), each bar sums to the total estimate of the premium/alpha; Newey-West(4) standard errors of the total estimates are displayed. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

attributed to the issuer component. Maturity, duration, convexity, and short-term reversal, on the other hand, differ. Maturity earns 17.9 of its 23.6 bps within issuers while duration and convexity have issuer components close to zero and within-issuer components of 15.6 and 16.2 bps. Reversal earns -12.5 bps within issuers ($t = -2.61$) out of total return of -9.1 bps ($t = -0.51$). For several characteristics, the issuer and within-issuer average returns have opposite signs, although in most cases at least one of the two components is not statistically different from zero. For duration and convexity, this pattern disappears after risk adjustment, with both issuer and within-issuer bond CAPM alphas turning negative.

Four issuer-component returns have $|t| > 1.96$ (`cs`, `ytm`, `val_ipr`, and `var_95`), compared with six within-issuer returns: `ytm`, `dcs6`, `bbtm`, `val_ipr`, `spd_rel`, and `str`. Because the original long–short portfolio places one unit of weight on each leg, while its issuer and within-issuer components generally have different gross exposures, their mean returns are not directly comparable as returns to equally scaled portfolios. They instead measure each component's contribution to the return of the original strategy.

The within-issuer portfolios can retain substantial exposure to $MKTB$. The within-issuer components of the maturity, duration, and convexity sorts have $MKTB$ betas of 1.04, 1.03, and 1.04, respectively, compared with 0.30 for credit spread (Internet Appendix Table **??**). Dollar neutrality within an issuer therefore does not imply market neutrality: offsetting dollar positions need not offset $MKTB$ exposure when the issuer's bonds have different factor loadings.

Against the bond market factor ($MKTB$), two of the 20 total-return alphas have $|t| > 1.96$, compared with none of the issuer-component alphas and seven within-issuer alphas. The corresponding $MKTB$ alphas show how adjusting for the bond market changes the return attribution. The within-issuer alpha is negative for 14 of the 20 sorts and has the opposite sign to the corresponding average return for nine. The decomposition therefore separates positions that differ both in their exposure to the bond market and in the average return left after adjusting for market exposure.

Comparing mean returns with $MKTB$ alphas shows that the issuer–within decomposition and exposure to the corporate bond market capture distinct dimensions of the

characteristic portfolios. For credit spread, yield, and `val_hz`, the within-issuer mean return is almost entirely absorbed by market exposure: the corresponding returns fall from 7.4, 13.1, and 14.3 bps to alphas of −1.6, 0.5, and −0.2 bps, respectively. The same pattern is found for `bbtm`. The opposite occurs for `dcs6` where its issuer component shrink from −32.5 to −13.6 bps after controlling for $MKTB$, while its within-issuer component increases only by roughly 2 bps from −17.6 to −15.3 bps and its t-statistic remains essentially unchanged (from −4.48 to −4.41). `spd_rel`, `val_ipr`, and `str` similarly retain statistically significant within-issuer alphas while their issuer alphas are insignificant. Market adjustment has a different effect for maturity, duration, and convexity. Their positive within-issuer mean returns become negative $MKTB$ alphas (−13.4, −15.3, and −14.9 bps, respectively), indicating that their positive unconditional within-issuer returns are more than accounted for by their exposure to the corporate bond market.

The decomposition identifies where a characteristic-sorted long–short portfolio earns its premium and how much of its market-adjusted return can be attributed to each component. Empirically, for some characteristics such as credit spread and yield, their within-issuer return is largely explained by exposure to the bond market factor, while for `dcs6`, `spd_rel`, `val_ipr`, and `str`, economically and statistically significant within-issuer alphas remain. Isolating within-issuer positions, can thus reveal risk-adjusted return variation not visible when looking at standard characteristic long–short factors.

4.2 Portfolio Formation and the Source of Exposure

So far, our results suggest that when firms contribute multiple securities to the cross-section of assets, the standard characteristic portfolios combine two different positions that can be economically important, but they do not explain why and how these two positions differ across long–short portfolios. In this section, we explore how and why the conventional way to sort individual bonds creates these differences. As discussed in Section 2.2, when bonds of the same firm cluster together, the portfolio tends to select or exclude all the bonds of that firm, creating an issuer position, while when bonds of the same issuer are not tightly clustered together, the selection mechanism

due to the breakpoints will generate a within-issuer position. Characteristic variation and the location of the breakpoint, therefore, provide the link between the multi-bond structure of bond markets and the composition of characteristic sorted factors.

4.2.1 Characteristic variation and issuer clustering

Table 3 describes the first part of this mechanism and reports how much of each characteristic's cross-sectional variation occurs within issuers. The extent to which a bond-level sort can distinguish securities of the same issuer depends on the distribution of the sorting characteristic used to form portfolios. When variation is concentrated across issuers, bonds of the same firm tend to occupy similar positions in the cross-sectional ranking of all individual bonds, while with greater within-issuer variation the sort can separate bonds of the same issuer.

Within-issuer variation differs across characteristics. For credit-related signals, as expected, variation occurs mainly across issuers: only 6.9% of the value-weighted variation in credit spread and 13.3% of the variation in yield occurs within issuers. Bonds of the same issuers, therefore, tend to be ranked similarly in the portfolio sorts. Conversely, for maturity, duration, and convexity, the corresponding variation shares are, respectively, 66.0%, 64.9%, and 66.6%, indicating that bonds of the same issuer do not need to cluster altogether in the cross-sectional distribution of the bonds. The within-issuer shares are 67.6% for book-to-market and 88.9% for price impact, while rating has almost no within-issuer variation, with a share of 0.9%.[10]

Thus, although all factors are constructed by sorting the same cross-section of bonds, their underlying characteristics differ substantially in the extent to which bonds of the same issuer cluster in the cross-sectional distribution.

4.2.2 Breakpoints and partial issuer selection

Variance shares describe how tightly bonds are clustered by issuers, but they do not explain, on their own, the within-issuer exposure of the resulting long–short portfolio. While a low within-issuer characteristic variation increases the probability of all the

[10]Restricting the analysis only to issuers with multiple bonds outstanding does not qualitatively change these results.

Table 3: Missingness, Within-issuer Variation and Intensity.

The table reports the percentages of bond-months without the characteristic ("Missing"), within-issuer variance shares, and average within-issuer intensities for 21 bond characteristics. The variance share is defined as: $100 \sum_{t,i,b} w_{ib,t}(z_{ib,t} - \bar{z}_{i,t}^{(w)})^2 / \sum_{t,i,b} w_{ib,t}(z_{ib,t} - \bar{z}_{t}^{(w)})^2$, calculated with weighted issuer and monthly means; equal weights set $w_{ib,t} = 1$ while value weights use its market value instead. Multi-bond columns consider issuer-months with at least two valid bonds (multiplicity of two). $\bar{\mathcal{I}}^{\ell}$ is the average intensity from Eq. (12) for the value-weighted high (H) and low (L) deciles, as in Table 4. Samples: i) for the missingness and the within-issuer variation columns: Aug. 2002–Jan. 2025, $T = 270$ months; ii) for the intensities: Sep. 2002–Dec. 2024, $T = 268$ months.

		Within-issuer variance share (%)				$\bar{\mathcal{I}}^{\ell}$ (%)	
		Equal-weighted		Value-weighted			
Signal	Missing (%)	All	Multi-bond	All	Multi-bond	H	L
Credit and spread							
`cs`	4.1	6.4	9.0	6.9	9.7	12.2	44.2
`ytm`	3.5	8.1	11.2	13.3	18.2	14.2	53.7
`dcs6`	16.0	42.9	50.3	43.0	48.9	49.4	43.5
Value							
`bbtm`	3.5	59.3	64.7	67.6	70.9	40.7	48.0
`val_hz`	14.6	31.2	36.8	40.7	47.2	38.7	54.4
`val_ipr`	14.6	30.4	36.4	30.4	35.5	31.4	48.3
Bond structure							
`tmat`	0.0	61.0	67.1	66.0	70.4	64.4	64.2
`md_dur`	3.5	60.1	65.8	64.9	69.3	63.3	64.1
`age`	0.0	31.9	41.7	39.4	48.1	40.4	46.4
`convx`	3.5	61.8	67.0	66.6	70.4	63.6	64.2
`sze`	3.5	37.1	40.2	32.6	34.9	24.1	55.5
Liquidity							
`ilq`	17.5	33.2	43.5	46.4	65.4	56.2	51.8
`ami`	14.9	52.1	64.0	44.5	77.2	59.3	40.4
`spd_rel`	5.4	47.1	57.7	55.2	66.9	59.0	56.1
`pi`	17.5	88.7	92.1	88.9	92.7	58.2	58.1
Risk and past return							
`dvol`	14.9	26.6	33.9	38.6	47.6	51.5	53.9
`rvol`	14.9	25.9	32.5	38.0	45.1	51.4	55.7
`var_95`	20.2	25.6	31.4	33.4	40.3	38.3	55.7
`mom6_1`	9.7	29.9	38.4	22.7	28.4	37.5	43.8
`str`	3.5	28.5	35.7	29.4	35.3	43.6	47.5
Rating control							
`spc_rat`	0.0	0.8	1.0	0.9	1.2	–	–

bonds of a particular issuer being held by the same portfolio, whether this happens depends on where the breakpoint falls in the characteristic distribution. For example, consider a characteristic with a very low within variation such as rating. If all bonds of issuer A have lower ratings than those of issuer B, which have lower ratings than those of issuer C, and suppose that the portfolio breakpoint falls inside the distribution of C, then the resulting portfolio holds all the bonds of issuer A and issuer B, and only a few of issuer C. According to our decomposition, thus, the portfolio will hold an issuer position in A and B, and create a within-issuer position only for issuer C. This example highlights that a high within-variation in the bond's characteristic increases the probability of creating within-issuer positions, but it is the breakpoint that can partially select issuers and create within-issuer positions. Therefore, while the variance share describes how strongly the sorting characteristic clusters bonds by issuer across the full cross-section, the intensity of Eq. (12) measures how much of a particular portfolio leg is generated by breakpoints that cut through issuer bond portfolios. A low within-issuer variance share does not imply a low intensity for every leg, since even a tightly clustered issuer distribution can be separated by the portfolio breakpoint, and, at the same time, within-issuer variation need not generate a within-issuer position if that variation occurs away from the breakpoint.

Table 4 separates the within-issuer positions generated by the portfolio sorting procedure from the returns earned on those positions. The first three columns report the average partial selection intensities of, respectively, the long, the short, and the long–short portfolios. For each portfolio, the intensity captures the portfolio weight reallocated among bonds of the same issuer relative to the issuer-benchmark allocation. A low intensity indicates that the sort creates small within-issuer positions while, on the other hand, a high intensity indicates substantial reallocation among bonds of the same issuer. Credit spread is the cleanest example of the mechanism. While its within-issuer variance share is only 6.9%, the long (short) leg has a within-issuer intensity of 12.2% (44.2%), indicating limited (greater) reallocation relative to the issuer benchmarks. The yield factor shows a similar asymmetry. The intensities of the long and short leg are, respectively, 14.2% and 53.7%. Maturity, duration, and convexity have within-issuer variance shares of roughly 66%, and both legs have

Table 4: Within-issuer Intensity, Return Contrast, and Average Returns.

For 20 bond characteristics, the table reports, in its first three columns, the average within-issuer intensities $\bar{\mathcal{I}}^{\ell}$ from Eq. (12) together with the long-short intensity $\frac{1}{2}\overline{\|q_t^W\|_1}$ from Eq. (14), in percentages. In the other six columns, the table reports the monthly average return contrasts $\bar{\mathcal{D}}^{\ell}$ from Eq. (13) and the corresponding within-issuer monthly average returns, in basis points (bps). The high/low portfolios are value-weighted deciles. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Within-issuer Intensity (%)			Return Contrast (bps)		Within-issuer Return (bps)		
Signal	$\bar{\mathcal{I}}^H$	$\bar{\mathcal{I}}^L$	$\frac{1}{2}\overline{\|q_t^W\|_1}$	$\bar{\mathcal{D}}^H$	$\bar{\mathcal{D}}^L$	H	L	$H-L$
Credit and spread								
`cs`	12.2	44.2	56.4	34.46	−10.75	4.13	−3.23	7.36
				(4.26)	(−1.30)	(3.58)	(−0.81)	(1.71)
`ytm`	14.2	53.7	67.8	43.91	−15.38	5.66	−7.40	13.06
				(4.34)	(−1.78)	(4.05)	(−1.56)	(2.41)
`dcs6`	49.4	43.5	87.2	−18.62	21.55	−9.54	8.09	−17.63
				(−3.15)	(3.08)	(−3.24)	(3.12)	(−4.48)
Value								
`bbtm`	40.7	48.0	82.4	42.57	−3.19	9.32	−1.01	10.32
				(2.89)	(−0.51)	(2.26)	(−0.35)	(2.37)
`val_hz`	38.7	54.4	87.7	24.50	−13.36	8.19	−6.15	14.34
				(2.78)	(−1.78)	(2.48)	(−1.38)	(1.91)
`val_ipr`	31.4	48.3	77.6	24.42	−13.85	7.13	−6.05	13.19
				(2.96)	(−3.36)	(3.36)	(−3.18)	(4.02)
Bond structure								
`tmat`	64.4	64.2	111.0	13.41	−14.60	8.93	−8.97	17.90
				(1.22)	(−1.79)	(1.25)	(−1.69)	(1.47)
`md_dur`	63.3	64.1	111.1	10.14	−14.25	6.77	−8.87	15.64
				(0.90)	(−1.76)	(0.94)	(−1.69)	(1.29)
`age`	40.4	46.4	80.8	6.85	1.80	2.89	0.88	2.01
				(1.97)	(0.76)	(2.09)	(0.80)	(1.43)
`convx`	63.6	64.2	111.1	11.12	−14.37	7.36	−8.88	16.24
				(0.99)	(−1.77)	(1.02)	(−1.69)	(1.34)
`sze`	24.1	55.5	78.6	0.27	2.99	0.04	0.98	−0.94
				(0.20)	(0.64)	(0.10)	(0.43)	(−0.39)
Liquidity								
`ilq`	56.2	51.8	99.9	12.78	0.47	6.35	0.30	6.05
				(1.97)	(0.10)	(1.70)	(0.11)	(1.92)
`ami`	59.3	40.4	94.8	11.04	−3.39	6.14	−1.21	7.36
				(2.32)	(−0.93)	(2.17)	(−0.75)	(1.74)
`spd_rel`	59.0	56.1	106.6	11.59	−4.60	6.39	−2.57	8.96
				(2.06)	(−2.05)	(1.92)	(−1.85)	(2.97)
`pi`	58.2	58.1	101.7	2.10	5.33	1.17	3.04	−1.87
				(0.56)	(1.85)	(0.53)	(1.79)	(−1.09)
Risk and past return								
`dvol`	51.5	53.9	99.1	14.80	−11.02	6.28	−5.21	11.49
				(1.96)	(−1.45)	(1.57)	(−1.18)	(1.42)
`rvol`	51.4	55.7	99.5	12.29	−10.60	5.05	−5.59	10.64
				(1.43)	(−1.42)	(1.11)	(−1.28)	(1.25)
`var_95`	38.3	55.7	88.8	24.19	−12.41	7.05	−6.71	13.76
				(2.59)	(−1.65)	(1.74)	(−1.52)	(1.70)
`mom6_1`	37.5	43.8	78.4	3.47	23.55	1.08	6.97	−5.90
				(0.48)	(2.07)	(0.33)	(1.62)	(−1.06)
`str`	43.6	47.5	87.2	−6.73	27.08	−2.03	10.44	−12.48
				(−1.11)	(3.34)	(−0.68)	(2.57)	(−2.61)

intensities between 63% and 65%. `pi`, whose within-issuer variance share is 88.9%, has intensities of 58.2% and 58.1%. For these characteristics, bonds of the same issuer have sufficient variation in the characteristics that portfolio breakpoints repeatedly split issuer bond portfolios.

The third column of Table 4 reports the within-issuer position of the long–short portfolio. As already discussed, since the two legs can create offsetting relative positions among bonds of the same issuer, the long–short intensity does not need to be equal to the sum of each leg's intensity, with κ of Eq. (14) capturing this overlap. The overlap is nearly zero for credit spread and yield, leaving combined within-issuer positions of 56.4% and 67.8% while it is substantially larger for maturity, duration, and convexity.

Columns four and five report average return contrasts for the long and short legs. Each contrast captures the difference between the value-weighted return of the bonds selected into the leg and that of the bonds of the same issuers left outside, weighted by each issuer's contribution to the leg's within-issuer intensity, as described in Eq. (13).

The last three columns report the average within-issuer return contributions of the long, short, and long–short portfolios in basis points per month.[11]

The table shows the importance of understanding the positions created by the portfolio procedure along with their corresponding returns. For example, while age and size create economically large within-issuer positions (their long–short intensities are 80.8% and 78.6%, respectively), the difference between selected and unselected bond returns is economically small: for age, the long- and short-leg contrasts are 6.85 and 1.80 bps per month, with t-statistics of 1.97 and 0.76 while, for size, 0.27 and 2.99 bps, with t-statistics of 0.20 and 0.64, leading to within-issuer long–short returns close to zero.

On the other hand, even though `dcs6` displays an intensity similar to those of size and age (87.2%), its return contrasts are large and statistically significant: bonds in the long leg, on average, underperform those excluded by the breakpoint location by 18.62 bps, while bonds in the short leg tend to outperform their within-issuer counterparts

[11]For each leg $\ell \in \{H, L\}$, the average contribution is $\bar{r}^{W,\ell} = T^{-1} \sum_{t=1}^{T} \mathcal{I}_t^{\ell} \mathcal{D}_{t+1}^{\ell}$, rather than, in general, $\bar{\mathcal{I}}^{\ell} \bar{\mathcal{D}}^{\ell}$, because intensity and the subsequent return contrast can covary over time.

by 21.55 bps. These two opposite effects, when combined into the long–short portfolio, reinforce each other, producing a statistically significant within-issuer return of −17.63 bps ($t = -4.48$). This contrast is important in understanding characteristic sorted premia: similar within-issuer positions can be associated with very different payoffs.

The credit spread factor exemplifies how a high contrast does not translate into a high within-issuer return. In fact, while the long leg earns 34.46 bps more than the bonds of the same issuers left outside ($t = 4.26$), its within-issuer intensity is only 12.2% and the resulting contribution of the long leg to the within-issuer return is only 4.13 bps per month ($t = 3.58$). The short-leg contrast is −10.75 bps and statistically insignificant, and the resulting within-issuer long–short return is 7.36 bps ($t = 1.71$). A strong return difference among bonds of the same issuer therefore need not translate into a large or statistically significant within-issuer premium when the portfolio places little weight on that comparison.

In general, these results suggest that the conventional bond factors proposed in the literature and constructed as long–short portfolios of individual bonds can conceal two different effects, which our decomposition is able to separate: our intensity measures how much of the bond factor is allocated to relative positions among bonds of the same issuer, while the return contrast is able to capture how much premium per unit of that position the factors earn. A small within-issuer return can therefore be explained by a small within-issuer exposure, or because those within-issuer positions, although large, earn relatively low returns. Nonetheless, while the return contrasts are useful to understand differences between the performance of bonds in the long–short legs against bonds of the same issuers excluded from the resulting long–short portfolio, they cannot establish whether these return differences are associated with the sorting characteristic or with other differences between those bonds. Next, we address this question by estimating issuer and within-issuer return slopes with cross-sectional Fama–MacBeth regressions and using the estimated conditional slopes with the portfolio's characteristic gaps to better understand where corporate bond factors earn their premia.

4.3 Predictive Relations Across and Within Issuers

The return decomposition identifies where the long–short return is earned, but it does not separate the return relation associated with the sorting characteristic from the characteristic exposure created by the portfolio. The concentration of a corporate bond factor's return in issuer positions does not establish that its characteristic predicts returns only across issuers. A characteristic can be strongly related to expected returns within issuers while contributing little to the within-issuer return of the conventional factor if the sort creates little exposure to that variation. Conversely, a portfolio can take a large position along one component of a characteristic without that component being strongly related to returns. The multiple bonds issued by the same firm allow us to separate these two objects: the Fama–MacBeth regressions of Eq. (18) allow us to investigate the cross-sectional relation between expected returns and issuer and within-issuer characteristic variation. Specifically, we report in Table 5 the time-series averages of the slope coefficients from a regression of future bond excess returns on the decomposed characteristic. The results show that a corporate bond factor can earn most of its return through issuer positions while, at the same time, within-issuer variation in the characteristic under scrutiny predicts next-month returns.

Six out of 20 within-issuer characteristic slopes are statistically significant. These characteristics belong to the credit, value, and risk groups, which, as discussed in previous sections, tend to earn most of their premium through issuer positions. This apparent contradiction can be resolved if we look at the characteristic gaps. Despite these significant within-issuer slopes, the portfolio sorting procedure creates little within-issuer exposure to a statistically significant within-issuer relation. Credit spread and yield are the clearest examples. Their within-issuer coefficients are large in magnitude (30.05 and 27.70 bps per standard deviation of the total characteristic) and statistically significant, but their average within-issuer characteristic gaps are only 0.200 and 0.439 standard deviations of their respective total characteristics.

Since each slope is the payoff of a zero-cost portfolio with unit exposure to its characteristic component and zero exposure to every other included regressor, combining the characteristic gaps with the slopes gives us a measure of the characteristic contribution to its portfolio return: the fitted characteristic position holds $\widetilde{G}_t^j$ units

of the corresponding portfolio, so $C^j_{t+1} = \widehat{\beta}^j_t \widetilde{G}^j_t$, with $j \in \{I, W\}$, is its realized next-month return.

Table 6 reports the average component return, the characteristic contribution, and the residual payoff for each characteristic and provides a decomposition of how much of the within-issuer information the conventional long–short corporate bond factor actually represents. $C^j_{t+1} = \widehat{\beta}^j_t \widetilde{G}^j_t$ measures, in fact, the return attributed to that exposure by the fitted linear characteristic–return relation. Under specification (1), the remaining payoff, $U^j_{t+1} = r^j_{t+1} - C^j_{t+1}$, captures the part of the component return not accounted for by this relation (which can include omitted characteristics and nonlinear relations). The distinction among the slope coefficients, the characteristic gaps, and the fitted contribution is particularly relevant because it makes clear that the economic contribution of a characteristic depends jointly on its return slope and the exposure created by the portfolio procedure. This is evident for the credit spread and yield factors. Their issuer positions earn 87.76 and 91.83 bps, compared with within-issuer returns of 8.18 and 15.50 bps, and their fitted characteristic contributions are highly concentrated in issuer positions (47.34 and 49.83 bps, compared with 4.01 and 10.59 bps within issuers). Nevertheless, for both characteristics, within-issuer contributions are statistically significant and account for approximately 49% and 68% of their respective within-issuer returns. The larger issuer contributions therefore do not establish that the issuer-level characteristic relations are stronger: they reflect the characteristic exposures generated by the portfolios. The conventional long–short factors capture measurable returns associated with within-issuer variation, but these make a relatively small contribution to the overall factor return.

For `dcs6`, within-issuer variation contributes −17.97 bps per month ($t = -5.16$), accounting for approximately 92% of the within-issuer return of −19.62 bps, while for `val_ipr` the contribution is 15.03 bps ($t = 4.62$), virtually identical to the within-issuer return of 15.01 bps. In both cases, the average residual payoff is small and statistically insignificant, suggesting that although issuer positions earn larger absolute mean returns for both signals, the fitted within-issuer characteristic contributions are economically relevant. Thus, the dominance of issuer positions in the conventional factor does not imply that its within-issuer payoff is not an important driver of the

factor.

The same conclusion cannot be inferred from a significant within-issuer return alone. For `spd_rel`, the within-issuer component earns 9.41 bps per month ($t = 2.56$), but its characteristic contribution is only 1.55 bps and statistically insignificant ($t = 0.38$). Most of that return is captured by the residual payoff of 7.86 bps ($t = 2.32$). Thus, although the sort earns a significant return from relative positions among bonds of the same issuer, little of that return is captured by the fitted linear relation with the sorting characteristic.

The predictive evidence persists when controlling for additional bond characteristics. Appendix Tables A.3 and A.4 show that all six within-issuer slopes that are statistically significant under our baseline specification have the same signs and are significant across all four specifications. The within-issuer characteristic contributions for credit spread, yield, `dcs6`, and `val_ipr` also remain statistically significant across regression specifications.

These results show that to clearly understand the economic content of a long–short portfolio when multiple securities of the same firm are traded in the same market, separating issuer and within-issuer returns is not enough. A corporate bond factor premium does not reveal whether the characteristic used to construct it is related to expected returns through variation at the bond or issuer level, nor whether the portfolio creates enough exposure to the relevant source of characteristic variation. Combining the return slopes with the characteristic gaps makes this distinction explicit and identifies when the payoff to an issuer or within-issuer position is related to the characteristic used to form the portfolio, and when, on the other hand, the realized return reflects variation not captured by the fitted linear relation with the characteristic at hand.

5 Asset Pricing Across and Within Issuers

Corporate bond research imports portfolio construction methodologies directly from equity research. Because a firm can have multiple bonds outstanding, the resulting portfolios combine issuer allocation with bond selection within a particular issuer.

Table 5: Issuer and Within-issuer Slopes and Gaps.

The table reports the Issuer and Within-issuer average monthly predictive slopes (in basis points per standard deviation) together with their difference, and the average characteristic gaps (standardized) for the 20 characteristic-sorted value-weighted high-minus-low decile portfolios. The predictive slopes correspond to the regression coefficients from Eq. (19). The gaps are defined in Eq. (20). Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Slopes (bps per SD)			Gaps (SD)	
Signal	$\overline{\beta}^{I}$	$\overline{\beta}^{W}$	$\overline{\beta}^{I} - \overline{\beta}^{W}$	$\overline{\widetilde{G}}^{I}$	$\overline{\widetilde{G}}^{W}$
Credit and spread					
`cs`	24.14	30.05	−5.92	2.107	0.200
	(1.88)	(2.96)	(−0.51)		
`ytm`	25.30	27.70	−2.40	2.058	0.439
	(1.95)	(2.50)	(−0.20)		
`dcs6`	−10.50	−12.87	2.37	1.915	1.621
	(−1.24)	(−4.31)	(0.33)		
Value					
`bbtm`	19.73	11.93	7.80	0.949	0.783
	(1.76)	(1.36)	(0.70)		
`val_hz`	15.71	13.83	1.88	1.749	1.410
	(2.50)	(2.63)	(0.30)		
`val_ipr`	15.75	14.93	0.82	2.298	1.175
	(2.30)	(3.80)	(0.16)		
Bond structure					
`tmat`	1.47	6.71	−5.24	0.914	2.351
	(0.30)	(1.39)	(−1.33)		
`md_dur`	−8.23	6.74	−14.97	1.011	2.486
	(−1.10)	(1.28)	(−1.98)		
`age`	4.34	−1.22	5.56	1.614	1.325
	(2.60)	(−0.79)	(2.34)		
`convx`	−6.60	5.28	−11.88	0.949	2.419
	(−1.01)	(1.11)	(−1.89)		
`sze`	−6.33	−0.35	−5.98	2.705	0.910
	(−1.62)	(−0.41)	(−1.64)		
Liquidity					
`ilq`	20.60	1.65	18.96	0.548	0.980
	(1.68)	(0.36)	(1.56)		
`ami`	13.07	6.63	6.44	0.622	1.135
	(1.08)	(1.52)	(0.56)		
`spd_rel`	11.25	0.64	10.61	1.241	2.101
	(1.63)	(0.28)	(1.49)		
`pi`	3.88	−4.30	8.18	0.225	1.125
	(0.45)	(−1.10)	(0.75)		
Risk and past return					
`dvol`	22.64	8.44	14.19	1.375	1.571
	(1.83)	(1.65)	(1.43)		
`rvol`	23.78	9.11	14.67	1.376	1.485
	(1.86)	(1.65)	(1.44)		
`var_95`	27.52	19.79	7.73	1.830	1.072
	(1.95)	(2.52)	(0.68)		
`mom6_1`	8.18	−4.86	13.04	1.851	0.861
	(0.85)	(−0.83)	(1.46)		
`str`	18.10	−7.31	25.40	1.624	1.131
	(2.37)	(−1.61)	(3.27)		

Table 6: Contribution of the Characteristic: Issuer and Within-issuer Returns

With respect to the issuer and within-issuer components, the table reports for 20 characteristics: the monthly average returns $\overline{r}^{\,j}$, the fitted contribution of the sorting characteristic $\overline{C}^{\,j}$ from Eq. (24), and the residual payoff $\overline{U}^{\,j}$ from Eq. (22). All positions are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Issuer positions (bps)			Within-issuer positions (bps)		
Signal	$\overline{r}^{\,I}$	$\overline{C}^{\,I}$	$\overline{U}^{\,I}$	$\overline{r}^{\,W}$	$\overline{C}^{\,W}$	$\overline{U}^{\,W}$
Credit and spread						
`cs`	87.76	47.34	40.42	8.18	4.01	4.17
	(2.47)	(1.73)	(2.68)	(1.70)	(2.01)	(1.12)
`ytm`	91.83	49.83	42.00	15.50	10.59	4.91
	(2.53)	(1.80)	(2.67)	(2.52)	(2.36)	(1.39)
`dcs6`	−31.48	−28.69	−2.79	−19.62	−17.97	−1.65
	(−1.79)	(−1.36)	(−0.36)	(−4.44)	(−5.16)	(−0.84)
Value						
`bbtm`	67.64	26.37	41.26	12.58	5.34	7.23
	(1.94)	(1.78)	(1.55)	(2.44)	(1.23)	(1.46)
`val_hz`	24.48	29.82	−5.34	15.64	13.91	1.73
	(1.69)	(2.16)	(−0.99)	(1.88)	(1.77)	(0.72)
`val_ipr`	30.94	39.49	−8.55	15.01	15.03	−0.02
	(2.15)	(2.16)	(−1.20)	(3.90)	(4.62)	(−0.01)
Bond structure						
`tmat`	5.51	1.01	4.50	19.78	16.34	3.44
	(1.02)	(0.22)	(1.95)	(1.51)	(1.44)	(1.14)
`md_dur`	−1.75	−9.12	7.37	17.13	17.35	−0.23
	(−0.27)	(−1.16)	(2.10)	(1.31)	(1.32)	(−0.10)
`age`	5.93	6.99	−1.06	−0.08	−1.63	1.55
	(1.36)	(2.50)	(−0.29)	(−0.04)	(−0.79)	(0.87)
`convx`	−0.51	−6.92	6.41	17.74	13.73	4.01
	(−0.08)	(−1.07)	(2.47)	(1.35)	(1.18)	(1.55)
`sze`	−33.21	−18.12	−15.09	−0.88	−0.55	−0.32
	(−1.42)	(−1.69)	(−0.87)	(−0.42)	(−0.66)	(−0.18)
Liquidity						
`ilq`	19.58	11.35	8.23	7.03	1.29	5.74
	(1.57)	(2.03)	(0.86)	(1.91)	(0.66)	(1.59)
`ami`	19.30	8.44	10.86	8.32	0.19	8.14
	(1.30)	(1.36)	(0.91)	(1.75)	(0.09)	(1.85)
`spd_rel`	13.90	12.95	0.95	9.41	1.55	7.86
	(1.16)	(1.47)	(0.13)	(2.56)	(0.38)	(2.32)
`pi`	3.56	1.59	1.97	−2.57	−1.34	−1.22
	(1.52)	(1.36)	(0.90)	(−1.12)	(−1.21)	(−0.59)
Risk and past return						
`dvol`	32.52	36.99	−4.47	13.06	9.50	3.56
	(1.39)	(1.85)	(−0.40)	(1.42)	(1.23)	(0.80)
`rvol`	37.26	40.04	−2.79	11.43	9.63	1.79
	(1.60)	(1.88)	(−0.25)	(1.21)	(1.21)	(0.39)
`var_95`	66.71	69.91	−3.20	14.38	15.28	−0.90
	(2.69)	(2.50)	(−0.28)	(1.57)	(1.96)	(−0.25)
`mom6_1`	14.01	7.99	6.01	−6.13	0.04	−6.17
	(0.62)	(0.37)	(0.59)	(−0.87)	(0.01)	(−1.88)
`str`	−5.64	23.74	−29.38	−12.56	−5.04	−7.52
	(−0.28)	(1.78)	(−2.35)	(−2.35)	(−1.14)	(−2.37)

Asset pricing tests using these portfolios as factors or as test assets therefore cannot separate these two margins. Even when issuer positions earn most of a factor's premium, a proposed factor model can price the aggregate portfolio without pricing its within-issuer component, and a within-issuer alpha need not be associated with the sorting characteristic under scrutiny. We test within-issuer alphas to measure how choosing bonds within issuers changes risk-adjusted performance while holding net issuer allocations fixed. We then decompose each component alpha into the alphas of the fitted characteristic contribution and the remaining payoff, and compare market exposure and common variation across the issuer and within-issuer components.

5.1 Within-Issuer Alphas

Our decomposition can also be applied to risk-adjusted returns. Using the bond CAPM as our benchmark factor model, we have $\widehat{\alpha}(r^S) = \widehat{\alpha}(r^I) + \widehat{\alpha}(r^W)$. While standard asset pricing tests target $\widehat{\alpha}(r^S)$, we now ask whether the bond CAPM can explain each component separately, so that we can understand whether returns of bonds within the same issuer are consistent with the bond CAPM.

Table 2 shows why the distinction matters for corporate bond asset pricing research. Credit spread earns 7.4 bps per month within issuers ($t = 1.71$), but its within-issuer $MKTB$ alpha is -1.6 bps ($t = -0.47$). For `dcs6`, the within-issuer alpha of -15.3 bps is statistically significant ($t = -4.41$), while its total and issuer alphas are not. Although the two component alphas are similar in magnitude, the issuer alpha is imprecisely estimated, so a test on the conventional portfolio fails to detect this within-issuer deviation from the average return implied by the bond CAPM.

Across the 20 long–short factors, seven within-issuer alphas are statistically significant at the conventional level, while only for two factors the null that the total alpha is zero can be rejected at the 5% significance level. Only for two of the seven factors with statistically significant within-issuer alphas the total alpha, the object usually assessed in standard asset pricing research, is significant as well. A test of the total portfolio's alpha therefore cannot separately assess departures from the benchmark that arise from bond selection, even when issuer positions dominate average factor returns.

5.2 Characteristic Relations and Component Alphas

Following Section 4.3, we separate the $MKTB$ alpha of each issuer and within-issuer component into the fitted characteristic contribution and the residual payoff. Under the baseline specification,[12]

$$\widehat{\alpha}(r^j) = \widehat{\alpha}(C^j) + \widehat{\alpha}(U^j), \qquad j \in \{I, W\}. \tag{26}$$

Tables 6 and 7 show that under our baseline specification, credit spread and yield generate positive fitted within-issuer returns, but neither characteristic contribution has a statistically significant $MKTB$ alpha. Conditioning on other bond characteristics reveals a different pattern. When maturity and amount outstanding are introduced as controls, the within-issuer characteristic-contribution alphas of credit spread and yield are 3.18 and 8.76 bps per month ($t = 2.32$ and 3.62) and both remain positive and significant after adding rating and illiquidity, and in the alternative specification with modified duration and market-value size (Appendix Table A.5). Thus, the fitted payoffs associated with relative spread and yield differences contain a component that the bond market factor cannot explain and that, as argued before, remains hidden when individual bonds are sorted into portfolios.

For `dcs6`, `md_dur`, and `convx`, even though their total portfolio alphas are insignificant, much of the within-issuer alpha (which is statistically different from zero) can be attributed to the fitted payoff associated with the characteristic used to form the portfolios. Our decomposition therefore reveals characteristic-related deviations from bond CAPM pricing that tests on conventional factor returns may not detect. For `cs` and `ytm`, aggregation masks the relation at a further level: the net within-issuer alpha is insignificant, while the conditional characteristic contribution has a significant alpha that other characteristics offset. For `val_hz` and `str`, within-issuer characteristic-contribution alphas become statistically significant under specifications (2)–(4), while for `tmat`, the contribution alpha is negative and significant under every specification. These results suggest that the $MKTB$ factor leaves systematic differences in relative

[12] With additional controls, the equation includes the fitted contribution alphas of the controls as well.

Table 7: $MKTB$ alphas in Issuer and Within-issuer characteristic contributions.

With respect to the issuer and within-issuer components, the table reports for 20 characteristics the decomposition in Eq. (26): the monthly average $MKTB$ alpha returns $\widehat{\alpha}(r^j)$, the associated fitted contribution $\widehat{\alpha}(C^j)$ from Eq. (24), and the residual payoff $\widehat{\alpha}(U^j)$ from Eq. (22). The monthly $MKTB$ alpha are the estimated intercepts resulting from the regression of the characteristic-sorted portfolios onto a constant and $MKTB$. All positions are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Issuer positions (bps)			Within-issuer positions (bps)		
Signal	$\widehat{\alpha}(r^I)$	$\widehat{\alpha}(C^I)$	$\widehat{\alpha}(U^I)$	$\widehat{\alpha}(r^W)$	$\widehat{\alpha}(C^W)$	$\widehat{\alpha}(U^W)$
Credit and spread						
`cs`	46.89	27.09	19.80	−2.08	0.36	−2.44
	(1.73)	(1.13)	(1.72)	(−0.60)	(0.23)	(−0.77)
`ytm`	49.58	28.13	21.45	1.43	2.76	−1.33
	(1.82)	(1.18)	(1.77)	(0.44)	(0.94)	(−0.44)
`dcs6`	−11.32	−6.54	−4.78	−16.93	−15.09	−1.84
	(−0.74)	(−0.40)	(−0.60)	(−4.33)	(−5.52)	(−0.88)
Value						
`bbtm`	30.69	14.35	16.33	5.56	0.82	4.74
	(1.17)	(1.20)	(0.78)	(1.26)	(0.19)	(1.03)
`val_hz`	6.30	13.45	−7.14	−0.58	0.32	−0.91
	(0.51)	(1.40)	(−1.04)	(−0.08)	(0.05)	(−0.43)
`val_ipr`	16.17	24.85	−8.68	8.34	12.25	−3.92
	(1.29)	(1.78)	(−1.31)	(3.29)	(4.51)	(−1.98)
Bond structure						
`tmat`	−4.20	−5.86	1.66	−14.31	−11.76	−2.56
	(−0.72)	(−1.31)	(0.57)	(−1.88)	(−2.09)	(−0.79)
`md_dur`	−7.54	−13.85	6.31	−16.48	−15.41	−1.07
	(−0.97)	(−1.74)	(1.81)	(−2.07)	(−2.29)	(−0.39)
`age`	2.27	6.78	−4.52	1.72	3.07	−1.36
	(0.65)	(2.34)	(−1.16)	(1.04)	(2.24)	(−0.95)
`convx`	−7.19	−11.48	4.29	−16.20	−15.17	−1.03
	(−0.98)	(−1.68)	(1.50)	(−2.09)	(−2.29)	(−0.40)
`sze`	−2.11	−13.38	11.27	−2.40	−1.45	−0.95
	(−0.12)	(−1.42)	(0.85)	(−1.21)	(−1.79)	(−0.54)
Liquidity						
`ilq`	10.99	7.25	3.75	4.30	−0.23	4.53
	(1.08)	(1.63)	(0.48)	(1.38)	(−0.12)	(1.36)
`ami`	5.57	2.85	2.72	−2.40	−1.92	−0.48
	(0.59)	(0.70)	(0.36)	(−0.88)	(−0.88)	(−0.16)
`spd_rel`	5.35	5.59	−0.24	3.31	−3.58	6.89
	(0.58)	(0.77)	(−0.04)	(1.42)	(−1.10)	(2.40)
`pi`	3.00	0.66	2.35	−4.18	−1.37	−2.81
	(1.40)	(0.53)	(1.11)	(−1.97)	(−1.33)	(−1.49)
Risk and past return						
`dvol`	5.42	18.31	−12.89	−8.14	−4.92	−3.22
	(0.34)	(1.26)	(−1.45)	(−1.39)	(−0.83)	(−0.81)
`rvol`	8.29	18.58	−10.30	−11.40	−6.08	−5.32
	(0.51)	(1.20)	(−1.14)	(−1.99)	(−1.01)	(−1.30)
`var_95`	31.16	43.54	−12.38	−8.39	−2.97	−5.41
	(1.71)	(1.92)	(−1.15)	(−1.49)	(−0.60)	(−1.68)
`mom6_1`	32.21	26.49	5.72	−1.24	4.35	−5.60
	(1.69)	(1.41)	(0.62)	(−0.17)	(0.73)	(−1.73)
`str`	17.05	30.96	−13.91	−10.11	−2.61	−7.50
	(1.03)	(2.49)	(−1.31)	(−1.78)	(−0.55)	(−2.34)

bond returns unexplained: within the same issuer, characteristics have conditional average returns that cannot be explained solely by market exposure. Aggregating these positions can make the conventional portfolios' returns consistent with bond CAPM pricing even when the bond market factor fails to explain the within-issuer returns.

Having a larger cross-section of characteristic sorted portfolios might not help in revealing pricing errors concealed by conventional portfolios. In fact, if different sorts generate similar issuer positions, the resulting portfolios might share much of the same return variation. We examine this possibility by assessing the common variation of the 20 long–short portfolios and their issuer and within-issuer components by extracting principal components from the correlation matrix of the portfolio returns. The first two PCs explain 70%, 71%, and 63% of the variance in the conventional, issuer, and within-issuer cross-sections, respectively (Appendix Table A.6, Panel A). For the first PC extracted from the conventional cross-section, which explains 55% of the variance, a time-series regression on a constant and $MKTB$ yields an R^2 of 0.50. Adding the issuer component of the credit spread sort as a regressor raises the R^2 to 0.86 (Panel B; Appendix Table A.7 reports the corresponding regressions for all 20 sorts).[13] Thus, much of the common variation among conventional factors beyond their bond market exposure is captured by the issuer positions of a single characteristic sort. Different sorting characteristics therefore need not generate distinct sources of return variation.

This strong factor structure generated by the bond portfolios matters for the choice of test assets in asset pricing tests. As highlighted by Lewellen, Nagel, and Shanken (2010), when test assets share much of the same return variation, cross-sectional pricing tests may have limited power to distinguish among competing asset pricing models. Yet, explaining common variation does not imply explaining average returns. In our data, the bond market factor ($MKTB$) alone explains 80% of the

[13]We use credit spread to illustrate the role of issuer allocation in a conventional bond factor. Regressing each of the 20 total long–short returns on a constant, $MKTB$, and the same issuer credit-spread component gives an in-sample mean R^2 of 0.60, compared with 0.33 for $MKTB$ alone. Replacing the issuer credit-spread component with the issuer component of `ytm`, `bbtm`, or `rvol` gives mean R^2s of 0.60, 0.62, and 0.63, respectively. In the PC1 regression, using the total credit-spread portfolio instead gives an R^2 of 0.89. After removing $MKTB$ from both returns, the total credit spread portfolio and its issuer component have a correlation of 0.995.

variation in within-issuer PC1, while five characteristics have statistically significant within-issuer alphas and insignificant conventional alphas indicating that $MKTB$ can closely capture the variation in within-issuer returns while failing to explain expected returns on individual portfolios.

Portfolio construction therefore matters for asset pricing tests along two different dimensions. Aggregating issuer and within-issuer positions can hide characteristic-related pricing errors, while similar issuer allocation can make conventionally distinct factors very similar as test assets. Empirical corporate bond asset pricing research has adopted the machinery of equity research to construct test asset portfolios and long–short factors. In a market where firms can issue multiple securities, our results show that tests based on conventional bond portfolios can fail to reject the bond CAPM even when the model fails to explain characteristic-related payoffs within issuers.

6 Conclusion

In this paper, we examine the economic content of corporate bond factors by separating issuer allocation from within-issuer bond selection. We propose a decomposition of the original portfolio holdings to separate these two positions and investigate the sources of factor premia, the predictive content of the sorting characteristics used to construct the factors, and the ability of the bond market factor to explain the expected returns of the resulting positions.

Our empirical results show that issuer positions account for most of the conventional long–short factor premia. For 13 of the 14 factors with absolute average returns above 20 bps per month, issuer components account for between 61% and 98% of the average return. Credit spread and yield primarily select issuers, while maturity, duration, and convexity generate substantial relative positions among bonds of the same issuer. We show that these differences arise from the distribution of bond characteristics across and within issuers and the location of portfolio breakpoints, which jointly determine the positions created by the conventional portfolio procedure.

However, the fact that conventional bond factors are primarily driven by issuer

positions does not imply that the sorting characteristics predict returns primarily across issuers. We show that the predictive relations across and within issuers need not align with the characteristic exposures generated by conventional sorts. Credit spread and yield, for example, exhibit significant within-issuer predictive relations, but the corresponding sorts create relatively little exposure to this variation. For `dcs6` and `val_ipr`, the fitted characteristic contributions instead account for most of the within-issuer returns. More generally, these findings show that the return attributed to a sorting characteristic depends jointly on its predictive relation and the exposure generated by portfolio construction.

Our results also have implications for corporate bond asset pricing tests. An insignificant alpha for a conventional factor does not establish that the bond market factor explains both issuer allocation and within-issuer bond selection. Five of the 20 factors have statistically significant within-issuer $MKTB$ alphas while their conventional alphas are not statistically different from zero. For three of these, much of the within-issuer alpha can be related to the fitted contribution of the sorting characteristic. Moreover, different sorting characteristics can generate similar issuer positions and generate substantial common variation in factor returns and we show that much of such common variation among conventional factors beyond their bond market exposure can be captured by the issuer component of a single characteristic sort. Conventional factors can therefore conceal pricing errors in relative bond returns while providing overlapping issuer exposures as test assets.

We complement recent evidence on the robustness and incremental pricing power of corporate bond factors (Dick-Nielsen et al., 2026; Dickerson, Robotti, and Rossetti, 2026; Dickerson, Mueller, and Robotti, 2023), and, more broadly, caution against borrowing methodologies developed for equity research and applying them verbatim to corporate bond research, without taking into consideration the distinctive features of corporate bond markets. Our findings highlight the need for factor construction methodologies tailored to the structure of corporate bond markets. We leave the development and evaluation of factor construction tools to future research.

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Appendix

A Characteristic Definitions

Table A.1: Definitions and References for the Corporate Bond Characteristics.

The table reports the definitions of the 20 bond characteristics used in the empirical analysis. Columns report the signal mnemonic, the characteristic family, the definition, and a representative reference using the same or a closely related characteristic. The dagger marks a retracted 2019 article, listed only as a historical reference for the signal.

Signal	Family	Description	Reference
`cs`	Credit and spread	Annualized yield minus the maturity-matched Treasury yield.	Kelly, Palhares, and Pruitt (2023)
`ytm`	Credit and spread	Annualized yield to maturity.	Gebhardt, Hvidkjaer, and Swaminathan (2005a)
`dcs6`	Credit and spread	Log credit spread at $t-6$ minus log credit spread at t, using a one-month bandwidth when needed.	Kelly, Palhares, and Pruitt (2023)
`bbtm`	Value	Par price divided by the bond's market price.	Bartram, Grinblatt, and Nozawa (2025)
`val_hz`	Value	Percentage deviation of the observed credit spread from its fitted fair spread.	Houweling and van Zundert (2017)
`val_ipr`	Value	Residual from a monthly regression of log credit spread on bond characteristics.	Israel, Palhares, and Richardson (2018)
`tmat`	Bond structure	Years remaining until maturity.	–
`md_dur`	Bond structure	First-order price sensitivity to a yield change.	Kelly, Palhares, and Pruitt (2023)
`age`	Bond structure	Years since issuance.	Kelly, Palhares, and Pruitt (2023)
`convx`	Bond structure	Second-order price sensitivity to a yield change.	–
`sze`	Bond structure	Dirty price times amount outstanding, in millions of dollars.	Houweling and van Zundert (2017)
`ilq`	Liquidity	Negative autocovariance of within-month daily log returns, multiplied by 100.	Bao, Pan, and Wang (2011)
`ami`	Liquidity	Monthly mean of daily absolute return divided by daily dollar volume.	–
`spd_rel`	Liquidity	Volume-weighted bid–ask spread divided by the quote midpoint.	–
`pi`	Liquidity	Negated signed-volume coefficient from a daily return-reversal regression; requires at least five daily returns.	–
`dvol`	Volatility and tail risk	Within-month standard deviation of daily returns.	–
`rvol`	Volatility and tail risk	Square root of the within-month sum of squared daily returns.	–
`var_95`	Volatility and tail risk	Five-percentile loss from the rolling empirical daily-return distribution.	Bai, Bali, and Wen (2019)†
`mom6_1`	Momentum and reversal	Cumulative return from months $t-5$ through $t-1$.	Gebhardt, Hvidkjaer, and Swaminathan (2005a)
`str`	Momentum and reversal	Return in month $t-1$.	Bai, Bali, and Wen (2019)†

B Issuer Grouping

Table A.2: Return Decomposition under CUSIP and PERMNO Issuer Groupings.

The table reports the monthly average returns of the 20 value-weighted decile high-minus-low portfolios of Table 2 and their issuer and within-issuer components under alternative issuer groupings. Issuer CUSIP groups bonds by the six-character CUSIP issuer code. PERMNO, positions fixed, keeps the original portfolio positions and return weights and recomputes the issuer benchmarks within PERMNO groups; unlinked bonds, 10.8% of bond-months, retain their CUSIP issuer groups. Δ Within is the PERMNO-minus-CUSIP change in the within-issuer mean return. PERMNO, re-sorted, re-forms the deciles on the PERMNO-linked universe, changing both the sample and the breakpoints. Issuer and within-issuer components sum to the total. All estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Total	Issuer CUSIP		PERMNO, positions fixed		Δ Within	PERMNO, re-sorted		
Signal		Issuer	Within	Issuer	Within		Total	Issuer	Within
cs	96.2	88.9	7.4	81.3	14.9	7.6	79.1	66.5	12.6
	(2.52)	(2.39)	(1.71)	(2.35)	(2.47)		(2.41)	(2.21)	(2.21)
ytm	105.2	92.2	13.1	83.6	21.6	8.6	89.7	68.1	21.7
	(2.63)	(2.42)	(2.41)	(2.38)	(2.90)		(2.62)	(2.28)	(2.83)
dcs6	−50.2	−32.5	−17.6	−26.7	−23.5	−5.9	−47.3	−23.5	−23.7
	(−2.52)	(−1.81)	(−4.48)	(−1.60)	(−4.35)		(−2.45)	(−1.50)	(−4.11)
bbtm	74.8	64.5	10.3	60.0	14.8	4.5	72.2	55.0	17.2
	(1.80)	(1.64)	(2.37)	(1.71)	(1.98)		(2.10)	(1.96)	(2.20)
val_hz	45.2	30.9	14.3	25.5	19.7	5.4	46.2	24.8	21.4
	(2.29)	(1.94)	(1.91)	(1.68)	(2.33)		(2.33)	(1.65)	(2.36)
val_ipr	50.7	37.5	13.2	31.6	19.1	5.9	51.5	31.2	20.3
	(2.68)	(2.25)	(4.02)	(2.02)	(4.30)		(2.73)	(2.03)	(4.26)
tmat	23.6	5.7	17.9	2.4	21.2	3.3	24.2	2.7	21.5
	(1.35)	(0.98)	(1.47)	(0.51)	(1.53)		(1.38)	(0.63)	(1.50)
md_dur	13.7	−1.9	15.6	−4.8	18.5	2.9	14.9	−3.7	18.6
	(0.79)	(−0.28)	(1.29)	(−0.79)	(1.35)		(0.85)	(−0.63)	(1.32)
age	9.9	7.9	2.0	5.0	5.0	3.0	9.2	4.2	5.0
	(2.16)	(1.91)	(1.43)	(1.77)	(1.61)		(2.05)	(1.79)	(1.61)
convx	14.9	−1.3	16.2	−4.0	18.9	2.7	16.8	−2.3	19.1
	(0.86)	(−0.21)	(1.34)	(−0.73)	(1.37)		(0.96)	(−0.42)	(1.34)
sze	−45.1	−44.2	−0.9	−37.3	−7.8	−6.8	−16.9	−8.6	−8.3
	(−1.54)	(−1.53)	(−0.39)	(−1.49)	(−1.25)		(−1.02)	(−0.79)	(−1.07)
ilq	27.9	21.8	6.1	18.8	9.1	3.0	22.1	13.9	8.2
	(1.98)	(1.84)	(1.92)	(1.87)	(1.91)		(1.77)	(1.63)	(1.74)
ami	28.8	21.4	7.4	17.9	10.9	3.6	22.8	13.2	9.6
	(1.64)	(1.42)	(1.74)	(1.34)	(1.98)		(1.59)	(1.32)	(1.72)
spd_rel	23.2	14.3	9.0	10.9	12.3	3.3	21.8	9.9	11.9
	(1.69)	(1.23)	(2.97)	(1.23)	(2.29)		(2.03)	(1.65)	(2.18)
pi	1.0	2.8	−1.9	3.2	−2.2	−0.4	1.1	2.8	−1.7
	(0.31)	(1.27)	(−1.09)	(1.46)	(−1.02)		(0.45)	(1.38)	(−0.82)
dvol	49.3	37.8	11.5	33.6	15.7	4.2	49.0	31.7	17.3
	(1.78)	(1.62)	(1.42)	(1.63)	(1.57)		(1.97)	(1.86)	(1.60)
rvol	53.1	42.5	10.6	38.4	14.7	4.1	50.5	35.0	15.5
	(1.88)	(1.81)	(1.25)	(1.89)	(1.36)		(1.95)	(1.95)	(1.38)
var_95	78.4	64.7	13.8	59.5	18.9	5.2	65.9	47.0	18.9
	(2.65)	(2.55)	(1.70)	(2.46)	(2.03)		(2.41)	(2.20)	(1.88)
mom6_1	0.3	6.2	−5.9	8.7	−8.4	−2.5	−11.1	−2.0	−9.1
	(0.01)	(0.26)	(−1.06)	(0.41)	(−1.09)		(−0.46)	(−0.11)	(−1.09)
str	−9.1	3.4	−12.5	2.8	−11.9	0.5	−1.9	9.9	−11.7
	(−0.51)	(0.21)	(−2.61)	(0.18)	(−2.21)		(−0.14)	(0.97)	(−2.04)

C Alternative Regression Specifications

Table A.3: Issuer and Within-issuer Slopes under Alternative Control Sets.

The table reports the Issuer and Within-issuer average monthly predictive slopes (in basis points per standard deviation of the total characteristic) together with their difference, for the 20 characteristic-sorted value-weighted high-minus-low decile portfolios, under the four control sets of the regression specifications (1)–(4) in Section 3.3. The predictive slopes correspond to the regression coefficients from Eq. (19); specification (1) repeats Table 5. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Issuer slope $\overline{\beta}^{I}$				Within-issuer slope $\overline{\beta}^{W}$				Difference $\overline{\beta}^{I} - \overline{\beta}^{W}$			
Signal	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Credit and spread												
cs	24.14	24.24	15.22	16.01	30.05	33.25	37.59	37.68	−5.92	−9.01	−22.36	−21.67
	(1.88)	(1.87)	(1.17)	(1.23)	(2.96)	(3.70)	(4.44)	(4.47)	(−0.51)	(−0.93)	(−2.47)	(−2.46)
ytm	25.30	24.54	15.52	16.26	27.70	32.16	35.63	39.48	−2.40	−7.62	−20.11	−23.22
	(1.95)	(1.89)	(1.18)	(1.25)	(2.50)	(3.57)	(4.16)	(4.48)	(−0.20)	(−0.78)	(−2.17)	(−2.71)
dcs6	−10.50	−10.35	−6.10	−6.95	−12.87	−12.71	−12.42	−12.57	2.37	2.36	6.32	5.62
	(−1.24)	(−1.22)	(−0.88)	(−0.99)	(−4.31)	(−5.17)	(−5.20)	(−5.00)	(0.33)	(0.32)	(1.02)	(0.89)
Value												
bbtm	19.73	19.22	3.77	4.17	11.93	9.78	5.68	5.59	7.80	9.44	−1.91	−1.42
	(1.76)	(1.74)	(0.24)	(0.27)	(1.36)	(1.15)	(0.69)	(0.66)	(0.70)	(0.85)	(−0.14)	(−0.10)
val_hz	15.71	16.30	13.27	12.70	13.83	15.54	16.80	17.53	1.88	0.76	−3.53	−4.83
	(2.50)	(2.52)	(2.30)	(2.18)	(2.63)	(4.41)	(4.74)	(5.05)	(0.30)	(0.12)	(−0.65)	(−0.87)
val_ipr	15.75	14.98	11.22	11.06	14.93	14.85	16.46	16.50	0.82	0.13	−5.24	−5.44
	(2.30)	(2.23)	(1.91)	(1.89)	(3.80)	(4.34)	(4.48)	(4.11)	(0.16)	(0.02)	(−1.14)	(−1.16)
Bond structure												
tmat	1.47	1.19	4.93	5.00	6.71	6.62	6.53	6.65	−5.24	−5.43	−1.60	−1.65
	(0.30)	(0.24)	(1.07)	(1.09)	(1.39)	(1.38)	(1.36)	(1.38)	(−1.33)	(−1.34)	(−1.03)	(−1.03)
md_dur	−8.23	−8.15	0.90	0.84	6.74	6.63	6.50	6.65	−14.97	−14.78	−5.60	−5.81
	(−1.10)	(−1.09)	(0.18)	(0.17)	(1.28)	(1.26)	(1.23)	(1.26)	(−1.98)	(−1.95)	(−1.76)	(−1.79)
age	4.34	3.61	1.55	1.65	−1.22	−0.32	−0.44	−0.56	5.56	3.94	1.98	2.22
	(2.60)	(2.36)	(1.11)	(1.16)	(−0.79)	(−0.32)	(−0.44)	(−0.67)	(2.34)	(2.55)	(1.36)	(1.49)
convx	−6.60	−6.57	1.84	1.81	5.28	5.20	5.09	5.19	−11.88	−11.77	−3.25	−3.39
	(−1.01)	(−0.99)	(0.40)	(0.40)	(1.11)	(1.10)	(1.07)	(1.10)	(−1.89)	(−1.86)	(−1.58)	(−1.61)
sze	−6.33	−5.98	0.88	0.71	−0.35	−0.34	−0.15	−0.37	−5.98	−5.64	1.04	1.08
	(−1.62)	(−1.55)	(0.60)	(0.48)	(−0.41)	(−0.53)	(−0.25)	(−0.67)	(−1.64)	(−1.62)	(0.76)	(0.83)
Liquidity												
ilq	20.60	20.94	17.15	17.17	1.65	1.56	1.44	1.51	18.96	19.38	15.71	15.66
	(1.68)	(1.69)	(1.50)	(1.51)	(0.36)	(0.35)	(0.32)	(0.34)	(1.56)	(1.58)	(1.40)	(1.41)
ami	13.07	12.68	11.14	11.22	6.63	6.19	6.07	6.08	6.44	6.49	5.07	5.14
	(1.08)	(1.01)	(0.92)	(0.96)	(1.52)	(1.45)	(1.42)	(1.43)	(0.56)	(0.54)	(0.44)	(0.46)
spd_rel	11.25	10.10	7.06	7.55	0.64	−0.75	−0.85	−1.45	10.61	10.85	7.91	9.00
	(1.63)	(1.29)	(0.98)	(1.14)	(0.28)	(−0.37)	(−0.42)	(−0.71)	(1.49)	(1.37)	(1.09)	(1.32)
pi	3.88	3.33	3.00	2.84	−4.30	−4.25	−4.31	−4.36	8.18	7.58	7.31	7.20
	(0.45)	(0.39)	(0.32)	(0.31)	(−1.10)	(−1.09)	(−1.10)	(−1.11)	(0.75)	(0.70)	(0.63)	(0.62)
Risk and past return												
dvol	22.64	25.70	13.36	13.91	8.44	7.20	3.44	3.20	14.19	18.51	9.92	10.71
	(1.83)	(1.85)	(0.86)	(0.94)	(1.65)	(1.81)	(0.79)	(0.80)	(1.43)	(1.59)	(0.76)	(0.87)
rvol	23.78	26.09	15.12	16.06	9.11	7.97	5.21	5.32	14.67	18.12	9.91	10.74
	(1.86)	(1.91)	(1.06)	(1.15)	(1.65)	(1.80)	(1.21)	(1.29)	(1.44)	(1.62)	(0.84)	(0.94)
var_95	27.52	27.56	19.94	20.44	19.79	19.67	18.30	18.52	7.73	7.89	1.64	1.92
	(1.95)	(1.93)	(1.63)	(1.66)	(2.52)	(3.33)	(3.45)	(3.50)	(0.68)	(0.68)	(0.17)	(0.20)
mom6_1	8.18	8.58	4.73	4.27	−4.86	−5.02	−5.31	−5.93	13.04	13.61	10.04	10.20
	(0.85)	(0.91)	(0.54)	(0.49)	(−0.83)	(−1.06)	(−1.16)	(−1.31)	(1.46)	(1.65)	(1.32)	(1.38)
str	18.10	16.55	13.14	12.79	−7.31	−11.57	−12.11	−13.84	25.40	28.12	25.25	26.63
	(2.37)	(2.13)	(1.99)	(1.94)	(−1.61)	(−3.01)	(−3.22)	(−3.87)	(3.27)	(3.68)	(3.55)	(3.85)

Table A.4: Contribution of the Characteristic under Alternative Control Sets.

With respect to the issuer and within-issuer components, the table reports for 20 characteristics: the monthly average returns $\overline{r}^{\,j}$, the fitted contribution of the sorting characteristic $\overline{C}^{\,j}$ from Eq. (24) under the four control sets of the regression specifications (1)–(4) in Section 3.3, and the average characteristic gaps (standardized) $\overline{G}^{\,j}$ of Table 5. Specification (1) repeats Table 6; the returns and the gaps do not depend on the control set. All positions are in basis points, and the gaps are in standard deviations of the total characteristic. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Issuer positions						Within-issuer positions					
		$\overline{C}^{\,I}$ by control set						$\overline{C}^{\,W}$ by control set				
Signal	$\overline{r}^{\,I}$	(1)	(2)	(3)	(4)	$\overline{G}^{\,I}$	$\overline{r}^{\,W}$	(1)	(2)	(3)	(4)	$\overline{G}^{\,W}$
Credit and spread												
cs	87.76	47.34	47.17	27.42	29.09	2.107	8.18	4.01	5.39	6.27	6.53	0.200
	(2.47)	(1.73)	(1.72)	(0.99)	(1.06)		(1.70)	(2.01)	(3.61)	(4.42)	(4.66)	
ytm	91.83	49.83	47.87	28.73	30.20	2.058	15.50	10.59	13.18	14.35	16.18	0.439
	(2.53)	(1.80)	(1.73)	(1.03)	(1.09)		(2.52)	(2.36)	(4.21)	(4.80)	(5.23)	
dcs6	−31.48	−28.69	−28.82	−17.55	−19.36	1.915	−19.62	−17.97	−17.08	−16.82	−17.16	1.621
	(−1.79)	(−1.36)	(−1.36)	(−1.03)	(−1.12)		(−4.44)	(−5.16)	(−7.59)	(−7.56)	(−7.65)	
Value												
bbtm	67.64	26.37	25.39	9.80	10.63	0.949	12.58	5.34	4.78	4.24	4.26	0.783
	(1.94)	(1.78)	(1.75)	(0.86)	(0.95)		(2.44)	(1.23)	(1.37)	(1.32)	(1.38)	
val_hz	24.48	29.82	30.87	24.87	23.64	1.749	15.64	13.91	17.43	19.24	20.67	1.410
	(1.69)	(2.16)	(2.25)	(1.98)	(1.89)		(1.88)	(1.77)	(4.76)	(5.07)	(6.83)	
val_ipr	30.94	39.49	37.54	27.72	27.45	2.298	15.01	15.03	15.21	16.98	16.88	1.175
	(2.15)	(2.16)	(2.10)	(1.81)	(1.79)		(3.90)	(4.62)	(5.35)	(5.62)	(5.15)	
Bond structure												
tmat	5.51	1.01	0.72	3.96	4.03	0.914	19.78	16.34	16.12	15.95	16.22	2.351
	(1.02)	(0.22)	(0.16)	(0.94)	(0.97)		(1.51)	(1.44)	(1.42)	(1.40)	(1.42)	
md_dur	−1.75	−9.12	−9.08	0.25	0.19	1.011	17.13	17.35	17.09	16.79	17.15	2.486
	(−0.27)	(−1.16)	(−1.15)	(0.05)	(0.04)		(1.31)	(1.32)	(1.30)	(1.28)	(1.30)	
age	5.93	6.99	5.79	2.52	2.70	1.614	−0.08	−1.63	−0.38	−0.52	−0.57	1.325
	(1.36)	(2.50)	(2.25)	(1.08)	(1.14)		(−0.04)	(−0.79)	(−0.28)	(−0.39)	(−0.52)	
convx	−0.51	−6.92	−6.90	1.25	1.23	0.949	17.74	13.73	13.54	13.33	13.57	2.419
	(−0.08)	(−1.07)	(−1.05)	(0.28)	(0.28)		(1.35)	(1.18)	(1.17)	(1.15)	(1.17)	
sze	−33.21	−18.12	−17.26	2.58	2.09	2.705	−0.88	−0.55	−0.40	−0.24	−0.37	0.910
	(−1.42)	(−1.69)	(−1.62)	(0.64)	(0.52)		(−0.42)	(−0.66)	(−0.69)	(−0.43)	(−0.77)	
Liquidity												
ilq	19.58	11.35	11.71	9.74	9.60	0.548	7.03	1.29	1.00	0.97	0.99	0.980
	(1.57)	(2.03)	(2.03)	(1.84)	(1.81)		(1.91)	(0.66)	(0.59)	(0.57)	(0.59)	
ami	19.30	8.44	8.50	7.44	7.24	0.622	8.32	0.19	−0.12	−0.23	−0.22	1.135
	(1.30)	(1.36)	(1.30)	(1.23)	(1.25)		(1.75)	(0.09)	(−0.06)	(−0.12)	(−0.11)	
spd_rel	13.90	12.95	10.84	7.90	8.47	1.241	9.41	1.55	−0.68	−0.79	−1.92	2.101
	(1.16)	(1.47)	(1.10)	(0.83)	(0.97)		(2.56)	(0.38)	(−0.19)	(−0.23)	(−0.55)	
pi	3.56	1.59	1.37	1.17	1.19	0.225	−2.57	−1.34	−1.44	−1.52	−1.52	1.125
	(1.52)	(1.36)	(1.20)	(1.05)	(1.07)		(−1.12)	(−1.21)	(−1.28)	(−1.35)	(−1.35)	
Risk and past return												
dvol	32.52	36.99	39.93	21.35	22.53	1.375	13.06	9.50	8.31	7.32	7.14	1.571
	(1.39)	(1.85)	(1.80)	(0.83)	(0.92)		(1.42)	(1.23)	(1.57)	(1.20)	(1.34)	
rvol	37.26	40.04	41.69	21.09	23.03	1.376	11.43	9.63	8.90	8.71	9.32	1.485
	(1.60)	(1.88)	(1.86)	(0.89)	(1.00)		(1.21)	(1.21)	(1.61)	(1.47)	(1.74)	
var_95	66.71	69.91	69.21	53.02	53.85	1.830	14.38	15.28	16.18	15.33	15.58	1.072
	(2.69)	(2.50)	(2.46)	(2.25)	(2.28)		(1.57)	(1.96)	(3.05)	(3.03)	(3.25)	
mom6_1	14.01	7.99	9.73	5.50	4.38	1.851	−6.13	0.04	−1.64	−2.12	−3.67	0.861
	(0.62)	(0.37)	(0.46)	(0.28)	(0.23)		(−0.87)	(0.01)	(−0.46)	(−0.61)	(−1.24)	
str	−5.64	23.74	21.42	12.56	11.71	1.624	−12.56	−5.04	−10.15	−10.04	−12.45	1.131
	(−0.28)	(1.78)	(1.58)	(1.04)	(0.96)		(−2.35)	(−1.14)	(−2.99)	(−3.12)	(−3.98)	

Table A.5: $MKTB$ Alphas in Characteristic Contributions under Alternative Control Sets.

With respect to the issuer and within-issuer components, the table reports for 20 characteristics the monthly average $MKTB$ alpha returns $\widehat{\alpha}(r^j)$ and the $MKTB$ alphas of the fitted contribution of the sorting characteristic $\widehat{\alpha}(C^j)$ from Eq. (24), under the four control sets of the regression specifications (1)–(4) in Section 3.3. Specification (1) repeats Table 7; $\widehat{\alpha}(r^j)$ does not depend on the control set. The monthly $MKTB$ alphas are the estimated intercepts resulting from the regression of the characteristic-sorted portfolios onto a constant and $MKTB$. All positions are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

	Issuer positions					Within-issuer positions				
		$\widehat{\alpha}(C^I)$ by control set					$\widehat{\alpha}(C^W)$ by control set			
Signal	$\widehat{\alpha}(r^I)$	(1)	(2)	(3)	(4)	$\widehat{\alpha}(r^W)$	(1)	(2)	(3)	(4)
Credit and spread										
`cs`	46.89	27.09	23.63	10.89	10.84	−2.08	0.36	3.18	4.12	4.83
	(1.73)	(1.13)	(1.00)	(0.44)	(0.44)	(−0.60)	(0.23)	(2.32)	(3.18)	(3.47)
`ytm`	49.58	28.13	24.17	11.61	11.93	1.43	2.76	8.76	10.00	13.49
	(1.82)	(1.18)	(1.02)	(0.47)	(0.49)	(0.44)	(0.94)	(3.62)	(4.42)	(4.64)
`dcs6`	−11.32	−6.54	−6.43	−0.66	−0.97	−16.93	−15.09	−14.90	−14.67	−15.06
	(−0.74)	(−0.40)	(−0.39)	(−0.05)	(−0.07)	(−4.33)	(−5.52)	(−8.45)	(−8.42)	(−8.71)
Value										
`bbtm`	30.69	14.35	13.12	2.15	2.18	5.56	0.82	2.49	2.04	3.00
	(1.17)	(1.20)	(1.11)	(0.19)	(0.20)	(1.26)	(0.19)	(0.72)	(0.64)	(0.95)
`val_hz`	6.30	13.45	16.75	12.46	10.59	−0.58	0.32	12.68	14.10	18.97
	(0.51)	(1.40)	(1.51)	(1.22)	(1.01)	(−0.08)	(0.05)	(3.73)	(4.16)	(6.96)
`val_ipr`	16.17	24.85	22.37	16.51	15.28	8.34	12.25	13.39	14.63	15.06
	(1.29)	(1.78)	(1.68)	(1.45)	(1.36)	(3.29)	(4.51)	(5.53)	(5.99)	(5.64)
Bond structure										
`tmat`	−4.20	−5.86	−6.07	−6.03	−5.96	−14.31	−11.76	−11.85	−11.89	−11.72
	(−0.72)	(−1.31)	(−1.32)	(−2.14)	(−2.08)	(−1.88)	(−2.09)	(−2.11)	(−2.10)	(−2.07)
`md_dur`	−7.54	−13.85	−13.79	−10.73	−10.75	−16.48	−15.41	−15.55	−15.75	−15.51
	(−0.97)	(−1.74)	(−1.71)	(−2.39)	(−2.38)	(−2.07)	(−2.29)	(−2.31)	(−2.32)	(−2.28)
`age`	2.27	6.78	7.43	5.00	4.47	1.72	3.07	1.75	1.82	0.53
	(0.65)	(2.34)	(2.65)	(1.84)	(1.55)	(1.04)	(2.24)	(1.39)	(1.53)	(0.45)
`convx`	−7.19	−11.48	−11.41	−8.77	−8.75	−16.20	−15.17	−15.24	−15.34	−15.20
	(−0.98)	(−1.68)	(−1.65)	(−2.37)	(−2.35)	(−2.09)	(−2.29)	(−2.31)	(−2.31)	(−2.28)
`sze`	−2.11	−13.38	−11.75	−1.52	−1.92	−2.40	−1.45	−0.87	−0.83	−0.84
	(−0.12)	(−1.42)	(−1.30)	(−0.35)	(−0.45)	(−1.21)	(−1.79)	(−1.36)	(−1.37)	(−1.49)
Liquidity										
`ilq`	10.99	7.25	7.71	6.54	6.43	4.30	−0.23	0.53	0.49	0.68
	(1.08)	(1.63)	(1.63)	(1.56)	(1.53)	(1.38)	(−0.12)	(0.30)	(0.28)	(0.39)
`ami`	5.57	2.85	2.81	2.58	2.83	−2.40	−1.92	−0.92	−1.02	−0.65
	(0.59)	(0.70)	(0.62)	(0.61)	(0.70)	(−0.88)	(−0.88)	(−0.43)	(−0.48)	(−0.31)
`spd_rel`	5.35	5.59	3.46	0.84	1.95	3.31	−3.58	−1.55	−1.59	−1.61
	(0.58)	(0.77)	(0.39)	(0.10)	(0.25)	(1.42)	(−1.10)	(−0.47)	(−0.49)	(−0.49)
`pi`	3.00	0.66	0.43	0.24	0.18	−4.18	−1.37	−1.45	−1.54	−1.55
	(1.40)	(0.53)	(0.35)	(0.21)	(0.15)	(−1.97)	(−1.33)	(−1.40)	(−1.48)	(−1.48)
Risk and past return										
`dvol`	5.42	18.31	20.79	4.15	5.17	−8.14	−4.92	2.74	−0.91	4.34
	(0.34)	(1.26)	(1.20)	(0.20)	(0.26)	(−1.39)	(−0.83)	(0.58)	(−0.18)	(0.86)
`rvol`	8.29	18.58	20.24	2.54	3.44	−11.40	−6.08	1.84	−0.47	4.94
	(0.51)	(1.20)	(1.17)	(0.13)	(0.18)	(−1.99)	(−1.01)	(0.38)	(−0.10)	(0.98)
`var_95`	31.16	43.54	43.86	31.56	32.50	−8.39	−2.97	7.13	6.58	10.94
	(1.71)	(1.92)	(1.88)	(1.65)	(1.68)	(−1.49)	(−0.60)	(1.67)	(1.56)	(2.68)
`mom6_1`	32.21	26.49	27.11	18.82	18.48	−1.24	4.35	1.33	0.83	−1.84
	(1.69)	(1.41)	(1.43)	(1.12)	(1.10)	(−0.17)	(0.73)	(0.37)	(0.23)	(−0.67)
`str`	17.05	30.96	28.19	18.55	18.61	−10.11	−2.61	−8.62	−8.34	−11.12
	(1.03)	(2.49)	(2.25)	(1.50)	(1.54)	(−1.78)	(−0.55)	(−2.41)	(−2.51)	(−3.36)

D Common Variation in Long–Short Returns

Table A.6: Common Variation in Long–Short Returns.

The table reports the common variation in the 20 value-weighted decile high-minus-low portfolio returns and in their issuer and within-issuer components, where Total denotes the conventional long–short portfolio. Panel A reports the variance shares of the first principal components extracted from the correlation matrix of the 20 returns in each cross-section, before market adjustment. Appendix Figure A.1 plots the first 15 eigenvalues before and after factor adjustment. Panel B reports the in-sample R^2 from regressions of the first principal component (PC1) of each cross-section on a constant and the listed portfolios; the credit-spread rows add either the issuer component or the total return of the same `cs` portfolio, and Appendix Table A.7 reports both specifications for all 20 sorts. $MKTB$ is the value-weighted excess return on all corporate bonds in the sample; CRF is the corrected credit risk factor series from Dickerson, Mueller, and Robotti (2023). Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Total	Issuer	Within issuer
Panel A: Variance explained (%)			
First component	54.8	56.3	53.4
Second component	15.3	14.3	9.6
Third component	7.5	8.1	8.3
First two components	70.2	70.6	63.0
First three components	77.7	78.7	71.3
Panel B: R^2 of the first principal component			
$MKTB$ only	0.50	0.20	0.80
$MKTB$ and CRF	0.63	0.47	0.84
$MKTB$ and issuer component of `cs`	0.86	0.86	0.84
$MKTB$ and total return of `cs`	0.89	0.87	0.83

Table A.7: PC1 Regressions on the Bond Market and Characteristic Portfolios.

The table reports the in-sample R^2 from regressions of the first principal component (PC1) of each cross-section on a constant, $MKTB$, and one added portfolio return. Column groups identify the dependent PC1, computed separately from the correlation matrices of the 20 total, issuer, and within-issuer returns before market adjustment, where Total denotes the conventional long–short portfolio. $MKTB$ is the value-weighted excess return on all corporate bonds in the sample; CRF is the corrected credit risk factor series from Dickerson, Mueller, and Robotti (2023). Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

Dependent PC1	Total		Issuer		Within issuer	
Added return	Issuer	Total	Issuer	Total	Issuer	Total
$MKTB$ only	0.502		0.196		0.797	
$MKTB$ and CRF	0.631		0.474		0.844	
Credit and spread						
`cs`	0.864	0.887	0.859	0.874	0.839	0.827
`ytm`	0.863	0.874	0.855	0.858	0.839	0.831
`dcs6`	0.824	0.816	0.745	0.723	0.812	0.808
Value						
`bbtm`	0.896	0.893	0.883	0.861	0.826	0.819
`val_hz`	0.825	0.765	0.743	0.563	0.809	0.799
`val_ipr`	0.835	0.842	0.793	0.789	0.824	0.817
Bond structure						
`tmat`	0.680	0.603	0.626	0.499	0.881	0.920
`md_dur`	0.785	0.672	0.799	0.627	0.876	0.913
`age`	0.541	0.552	0.222	0.233	0.815	0.813
`convx`	0.779	0.660	0.789	0.604	0.875	0.914
`sze`	0.653	0.655	0.479	0.481	0.819	0.819
Liquidity						
`ilq`	0.751	0.729	0.585	0.544	0.802	0.801
`ami`	0.865	0.844	0.766	0.673	0.805	0.797
`spd_rel`	0.866	0.833	0.755	0.685	0.800	0.798
`pi`	0.537	0.523	0.240	0.214	0.799	0.806
Risk and past return						
`dvol`	0.947	0.922	0.910	0.791	0.809	0.797
`rvol`	0.932	0.906	0.885	0.771	0.807	0.797
`var_95`	0.866	0.869	0.829	0.769	0.823	0.802
`mom6_1`	0.762	0.744	0.613	0.566	0.802	0.798
`str`	0.545	0.549	0.280	0.276	0.805	0.800

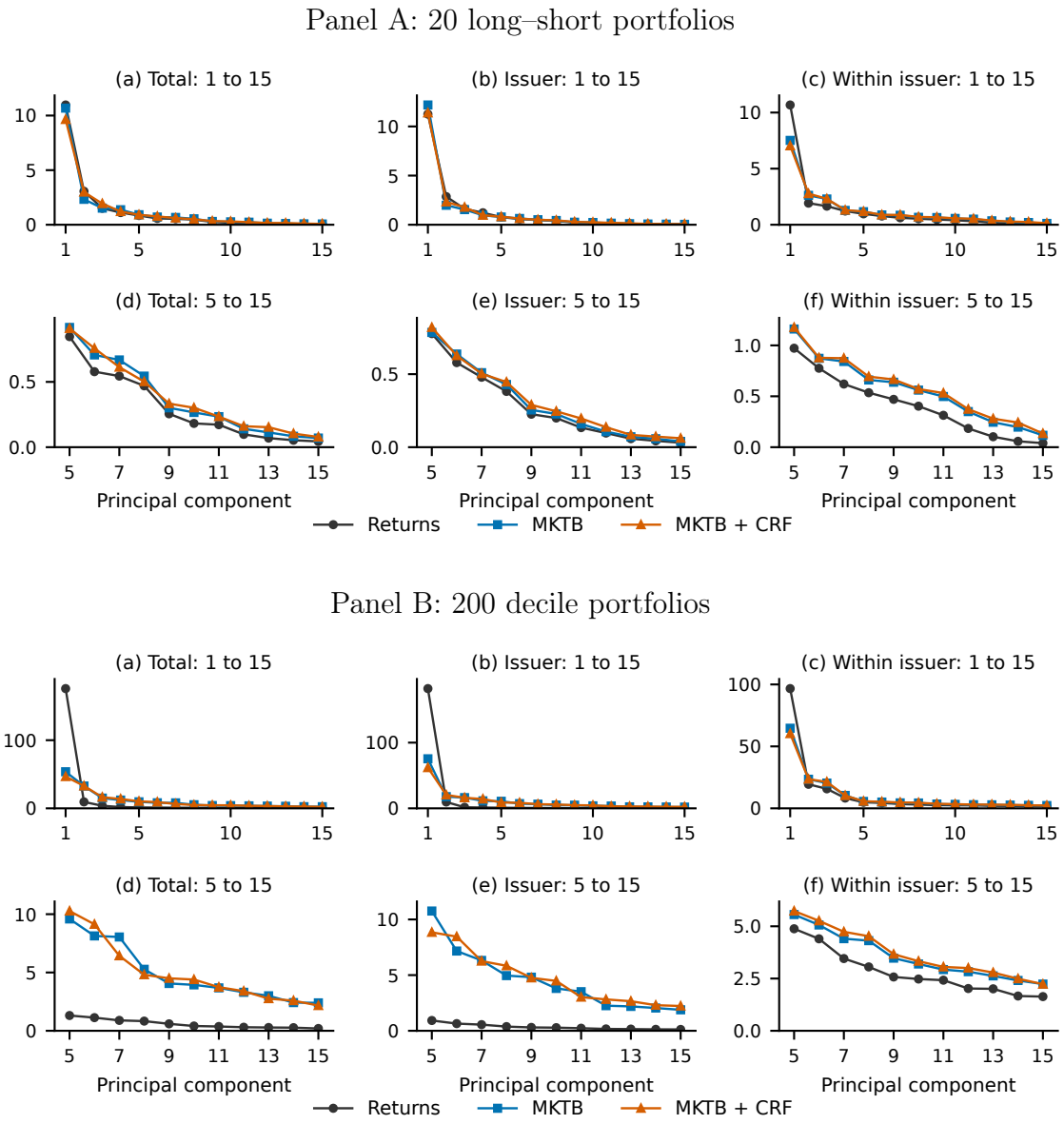


Figure A.1: Eigenvalues of the correlation matrices of long–short and decile portfolio returns. The figure shows the first 15 eigenvalues of the correlation matrix of the 20 value-weighted decile high-minus-low portfolio returns (Panel A) and of the 200 decile portfolio returns (Panel B), for the Total, Issuer, and Within-issuer cross-sections. In each panel, the top row reports the eigenvalues sorted from highest to lowest and the bottom row enlarges eigenvalues 5 to 15. Black circles are the eigenvalues of the returns; blue squares and orange triangles are the eigenvalues of the residual correlation matrices relative to the $MKTB$ factor model and to $MKTB$ plus the credit risk factor CRF, respectively. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

E Issuer and Within-issuer Sorting Geometry

Consider forming a benchmark portfolio at date t. Let $\mathcal{I}_t = \{1, \ldots, J_t\}$ denote the set of issuers and let $\mathcal{B}_{i,t}$ denote issuer i's eligible bonds. Denoting $n_{i,t} = |\mathcal{B}_{i,t}|$, the total number of eligible bonds is $\mathcal{N}_t := \sum_{i \in \mathcal{I}_t} n_{i,t}$. In vector notation, a bond vector can be written as $x_t = (x_{i,b,t})_{i \in \mathcal{I}_t,\, b \in \mathcal{B}_{i,t}} \in \mathbb{R}^{\mathcal{N}_t}$.

For every issuer i, consider the bond-level weights $s_{i,b,t} \geq 0$ satisfying $\sum_{b \in \mathcal{B}_{i,t}} s_{i,b,t} = 1$. At issuer level, the vector $s_{i,t} = (s_{i,b,t})_{b \in \mathcal{B}_{i,t}} \in \mathbb{R}^{n_{i,t}}$ describes how one dollar invested in the benchmark portfolio of issuer i is distributed across that issuer's eligible bonds. The baseline is Market-Value weighted (VW), $s^{\mathrm{VW}}_{i,b,t} = MV_{i,b,t}/V_{i,t} = \frac{MV_{i,b,t}}{\sum_{c \in \mathcal{B}_{i,t}} MV_{i,c,t}}$, while Equal-Weighted (EW) weights are: $s^{\mathrm{EW}}_{i,b,t} = 1/n_{i,t}$.

Here below, we will provide a general treatment of the decomposition of Issuer and Within-issuer components (Section 2.1). Lemma 1 shows that the decomposition is unique for a fixed benchmark.

E.1 Issuer and Within-issuer decomposition: an operator approach

Define the issuer aggregation operator $A_t : \mathbb{R}^{\mathcal{N}_t} \to \mathbb{R}^{J_t}$ by

$$(A_t x_t)_i \equiv \sum_{b \in \mathcal{B}_{i,t}} x_{i,b,t}.$$

Define the benchmark spreading operator $D_{s,t} : \mathbb{R}^{J_t} \to \mathbb{R}^{\mathcal{N}_t}$ by

$$(D_{s,t} c_t)_{i,b} \equiv s_{i,b,t} c_{i,t}, \qquad c_t = (c_{i,t})_{i \in \mathcal{I}_t} \in \mathbb{R}^{J_t}.$$

Thus, while A_t collapses a bond-level vector into one total position per issuer, $D_{s,t}$ takes the issuer-level amount $c_{i,t}$ and *spreads* it across issuer i's bonds in the benchmark proportions $s_{i,b,t}$. We define the issuer-benchmark operator as the composition of the

previous:

$$P_{s,t} \equiv D_{s,t}A_t : \mathbb{R}^{\mathcal{N}_t} \to \mathbb{R}^{\mathcal{N}_t}, \qquad (P_{s,t}x_t)_{i,b} = s_{i,b,t} \sum_{c \in \mathcal{B}_{i,t}} x_{i,c,t}.$$

Hence $P_{s,t}$ preserves the total position in each issuer but replaces the original allocation across that issuer's bonds by the benchmark allocation. The associated issuer-neutral subspace is

$$\mathcal{K}_t \equiv \ker(A_t) = \left\{ x_t \in \mathbb{R}^{\mathcal{N}_t} : \sum_{b \in \mathcal{B}_{i,t}} x_{i,b,t} = 0 \text{ for every } i \in \mathcal{I}_t \right\}.$$

Lemma 1 (Issuer and Within-issuer Projections)**.** *At every formation date t,*

$$\begin{aligned} A_t D_{s,t} = I_{J_t}, \qquad P_{s,t}^2 = P_{s,t}, \qquad A_t P_{s,t} = A_t, \\ \operatorname{range}(P_{s,t}) = \operatorname{range}(D_{s,t}) = \left\{ x_t : \ x_{i,b,t} = s_{i,b,t} c_{i,t} \text{ for some } c_t \in \mathbb{R}^{J_t} \right\}, \\ \ker(P_{s,t}) = \ker(A_t) = \operatorname{range}(I_{\mathcal{N}_t} - P_{s,t}). \end{aligned}$$

where: $\dim \operatorname{range}(P_{s,t}) = J_t, \dim \mathcal{K}_t = \mathcal{N}_t - J_t$, *and* $\mathbb{R}^{\mathcal{N}_t} = \operatorname{range}(P_{s,t}) \oplus \mathcal{K}_t$.
Thus a bond-level portfolio $q_t^S \in \mathbb{R}^{\mathcal{N}_t}$ has the unique decomposition

$$q_t^I \equiv P_{s,t} q_t^S, \qquad q_t^W \equiv (I_{\mathcal{N}_t} - P_{s,t}) q_t^S, \qquad q_t^S = q_t^I + q_t^W. \tag{A.1}$$

The issuer component preserves the original net position in every issuer, $A_t q_t^I = A_t q_t^S$, while the within-issuer component is issuer neutral, $A_t q_t^W = 0$.

Proof. The proof proceeds for each claim:

1. For any $c_t \in \mathbb{R}^{J_t}$ and issuer i,

$$(A_t D_{s,t} c_t)_i = \sum_{b \in \mathcal{B}_{i,t}} s_{i,b,t} c_{i,t} = c_{i,t} \sum_{b \in \mathcal{B}_{i,t}} s_{i,b,t} = c_{i,t}.$$

   Hence $A_t D_{s,t} = I_{J_t}$. Using this identity, $P_{s,t}^2 = D_{s,t} A_t D_{s,t} A_t = D_{s,t} I_{J_t} A_t = P_{s,t}$, so $P_{s,t}$ is idempotent. Similarly, $A_t P_{s,t} = A_t D_{s,t} A_t = A_t$.

2. Because $P_{s,t} = D_{s,t}A_t$, $\text{range}(P_{s,t}) \subseteq \text{range}(D_{s,t})$. For the converse, for some c_t, take any $D_{s,t}c_t = y_t \in \text{range}(D_{s,t})$, and apply the $P_{s,t}$ projection:

$$P_{s,t}y_t = D_{s,t}A_tD_{s,t}c_t = D_{s,t}c_t = y_t.$$

Thus every vector in $\text{range}(D_{s,t})$ belongs to $\text{range}(P_{s,t})$, proving equality.

3. If $x_t \in \ker(A_t)$, then $P_{s,t}x_t = D_{s,t}A_tx_t = 0$, so $\ker(A_t) \subseteq \ker(P_{s,t})$.
Conversely, if $P_{s,t}x_t = 0$, then: $A_tx_t = A_tP_{s,t}x_t = 0$, where the first equality uses $A_tP_{s,t} = A_t$. Hence, $\ker(P_{s,t}) = \ker(A_t) = \mathcal{K}_t$. Notice that if a bond-level vector d_t is constant within each issuer, $d_{i,b,t} = d_{i,t}$ for every $b \in \mathcal{B}_{i,t}$, then $x_t'd_t = 0$ for $x_t \in \mathcal{K}_t$.
For the last equality, because $P_{s,t}$ is idempotent, we can write: $P_{s,t}(I_{\mathcal{N}_t} - P_{s,t}) = 0$, so $\text{range}(I_{\mathcal{N}_t} - P_{s,t}) \subseteq \ker(P_{s,t})$. If instead $y_t \in \ker(P_{s,t})$, then $y_t = (I_{\mathcal{N}_t} - P_{s,t})y_t$, proving the reverse inclusion. Therefore $\text{range}(I_{\mathcal{N}_t} - P_{s,t}) = \ker(P_{s,t}) = \mathcal{K}_t$.

4. The property $A_tD_{s,t} = I_{J_t}$ implies that $D_{s,t}$ is injective and that A_t has rank J_t. It follows that:

$$\dim \text{range}(P_{s,t}) = \dim \text{range}(D_{s,t}) = J_t, \qquad \dim \mathcal{K}_t = \mathcal{N}_t - \dim \text{range}(P_{s,t})$$

5. Every $x_t \in \mathbb{R}^{\mathcal{N}_t}$ satisfies

$$x_t = P_{s,t}x_t + (I_{\mathcal{N}_t} - P_{s,t})x_t,$$

with the first term in $\text{range}(P_{s,t})$ and the second in $\mathcal{K}_t$. Their intersection is trivial: if $y_t \in \text{range}(P_{s,t}) \cap \ker(P_{s,t})$, then $y_t = P_{s,t}z_t$ for some z_t and also $P_{s,t}y_t = 0$, whereas idempotence implies $P_{s,t}y_t = P_{s,t}^2z_t = P_{s,t}z_t = y_t$. Hence $y_t = 0$. This proves the direct sum and the uniqueness of Eq. (A.1). Applying A_t to that decomposition and using $A_tP_{s,t} = A_t$ gives $A_tq_t^I = A_tq_t^S$ and $A_tq_t^W = 0$. □

E.2 Within-issuer Intensity

Parallel to Eq. (9)–(10), we introduce the main quantities.

Let $\omega_{i,b,t} > 0$ be arbitrary formation-date base weights and define $\Omega_{i,t} \equiv \sum_{b \in \mathcal{B}_{i,t}} \omega_{i,b,t}$ and $s_{i,b,t} \equiv \frac{\omega_{i,b,t}}{\Omega_{i,t}}$. For a (nonempty) normalized portfolio leg ℓ, let $d^{\ell}_{i,b,t} := 1\{b \in \mathcal{B}^{\ell}_{i,t}\}$ indicate whether the bond (i,b) belongs to that leg and define $C^{\ell}_t \equiv \sum_i \sum_{b \in \mathcal{B}^{\ell}_{i,t}} \omega_{i,b,t}$ and $q^{S,\ell}_{i,b,t} \equiv \frac{\omega_{i,b,t} d^{\ell}_{i,b,t}}{C^{\ell}_t}$, so that $q^{S,\ell}_t \geq 0$ and $\sum_{i \in \mathcal{I}_t} \sum_{b \in \mathcal{B}_{i,t}} q^{S,\ell}_{i,b,t} = \sum_{i \in \mathcal{I}_t} \sum_{b \in \mathcal{B}^{\ell}_{i,t}} q^{S,\ell}_{i,b,t} = 1$. In words, we suppose the same weighting scheme applies to both (i) the benchmark proportions within an issuer and (ii) the weights inside the selected leg. For each issuer, define its selection fraction $\phi^{\ell}_{i,t} \equiv \sum_{b \in \mathcal{B}_{i,t}} s_{i,b,t} d^{\ell}_{i,b,t} = \frac{\sum_{b \in \mathcal{B}_{i,t}} \omega_{i,b,t} d^{\ell}_{i,b,t}}{\Omega_{i,t}}$ and the leg's total weight in issuer i, $\pi^{\ell}_{i,t} \equiv \sum_{b \in \mathcal{B}_{i,t}} q^{S,\ell}_{i,b,t}$. Applying the issuer-benchmark projector to the leg gives

$$(P_{s,t} q^{S,\ell}_t)_{i,b} = s_{i,b,t} \pi^{\ell}_{i,t} = \frac{\omega_{i,b,t}}{\Omega_{i,t}} \frac{\Omega_{i,t} \phi^{\ell}_{i,t}}{C^{\ell}_t} = \frac{\omega_{i,b,t} \phi^{\ell}_{i,t}}{C^{\ell}_t}.$$

Hence its within-issuer component is

$$q^{W,\ell}_{i,b,t} \equiv \left[(I_{\mathcal{N}_t} - P_{s,t}) q^{S,\ell}_t \right]_{i,b} = \frac{\omega_{i,b,t}}{C^{\ell}_t} \left(d^{\ell}_{i,b,t} - \phi^{\ell}_{i,t} \right).$$

which parallels Eq. (11). Finally, define the within-issuer intensity:

$$I^{\ell}_t \equiv \sum_{i \in \mathcal{I}_t} \pi^{\ell}_{i,t} \left(1 - \phi^{\ell}_{i,t} \right).$$

Lemma 2 (Intensity as total variation and contrast)**.** *Consider $q^{S,\ell}_t$ and its associated within-issuer intensity I^{ℓ}_t, as previously defined. We have:*

$$\left\| q^{W,\ell}_t \right\|_1 = 2 I^{\ell}_t, \qquad I^{\ell}_t = d_{\mathrm{TV}} \left(q^{S,\ell}_t, P_{s,t} q^{S,\ell}_t \right) \in [0, 1),$$

where, for nonnegative portfolio-weight vectors p and q, each summing to one, on the same (finite) bond universe,

$$d_{\mathrm{TV}}(p, q) \equiv \frac{1}{2} \sum_{i \in \mathcal{I}_t} \sum_{b \in \mathcal{B}_{i,t}} |p_{i,b} - q_{i,b}|.$$

Moreover, if $I_t^\ell > 0$, let $\tau \geq 0$ and let $x_{t+\tau} = (x_{i,b,t+\tau})$ be any scalar bond-level outcome observed on the formation-date bond universe. For every partially selected issuer define the benchmark-weighted selected and unselected means

$$\bar{x}_{i,t+\tau}^{\mathrm{sel},\ell} \equiv \frac{\sum_{b\in\mathcal{B}_{i,t}} \omega_{i,b,t} d_{i,b,t}^\ell x_{i,b,t+\tau}}{\Omega_{i,t}\phi_{i,t}^\ell}, \quad \bar{x}_{i,t+\tau}^{\mathrm{uns},\ell} \equiv \frac{\sum_{b\in\mathcal{B}_{i,t}} \omega_{i,b,t}(1-d_{i,b,t}^\ell) x_{i,b,t+\tau}}{\Omega_{i,t}(1-\phi_{i,t}^\ell)}.$$

Define the nonnegative weights $p_{i,t}^{\mathrm{sel},\ell} \equiv \pi_{i,t}^\ell(1-\phi_{i,t}^\ell)/I_t^\ell$. The weights $p_{i,t}^{\mathrm{sel},\ell}$ sum to one over partially selected issuers, and

$$\sum_{i\in\mathcal{I}_t}\sum_{b\in\mathcal{B}_{i,t}} q_{i,b,t}^{W,\ell} x_{i,b,t+\tau} = I_t^\ell \sum_{i:\,0<\phi_{i,t}^\ell<1} p_{i,t}^{\mathrm{sel},\ell}\left(\bar{x}_{i,t+\tau}^{\mathrm{sel},\ell} - \bar{x}_{i,t+\tau}^{\mathrm{uns},\ell}\right).$$

Proof. The proof proceeds for each claim. We suppress the leg superscript ℓ where there is no ambiguity:

1. The within-issuer weight of a selected bond ($d_{i,b,t} = 1$) has nonnegative weight: $q_{i,b,t}^{W,\ell} = \frac{\omega_{i,b,t}}{C_t^\ell}\left(1-\phi_{i,t}^\ell\right)$, whereas an unselected bond has nonpositive weight: $q_{i,b,t}^{W} = -\frac{\omega_{i,b,t}}{C_t}\phi_{i,t} \leq 0$. Therefore the positive mass contributed by issuer i is

$$\sum_{b:d_{i,b,t}=1} q_{i,b,t}^{W,\ell} = \frac{(1-\phi_{i,t})}{C_t}\sum_{b\in\mathcal{B}_{i,t}} \omega_{i,b,t} d_{i,b,t}^\ell = \frac{(1-\phi_{i,t}^\ell)}{C_t^\ell}(\Omega_{i,t}\phi_{i,t}^\ell) = \pi_{i,t}^\ell(1-\phi_{i,t}^\ell),$$

   and the absolute negative mass contributes the same amount as well. Thus the issuer contributes $2\pi_{i,t}(1-\phi_{i,t})$ to the ℓ_1 norm. Summing over issuers gives $\|q_t^{W,\ell}\|_1 = 2I_t^\ell$.

2. Both $q_t^{S,\ell}$ and $P_{s,t}q_t^{S,\ell}$ are nonnegative and sum to one. To see the latter:

$$\sum_{i\in\mathcal{I}_t}\sum_{b\in\mathcal{B}_{i,t}} (P_{s,t}q_t^{S,\ell})_{i,b} = \sum_{i\in\mathcal{I}_t}\pi_{i,t}^\ell \sum_{b\in\mathcal{B}_{i,t}} s_{i,b,t} = \sum_{i\in\mathcal{I}_t}\pi_{i,t}^\ell = 1.$$

   Therefore they are nonnegative portfolio-weight vectors on the same finite support, each summing to one:

$$d_{\mathrm{TV}}\left(q_t^{S,\ell}, P_{s,t}q_t^{S,\ell}\right) = \frac{1}{2}\left\|q_t^{S,\ell} - P_{s,t}q_t^{S,\ell}\right\|_1 = \frac{1}{2}\|q_t^{W,\ell}\|_1 = I_t^\ell.$$

Because $\sum_i \pi^\ell_{i,t} = 1$ and every represented issuer has $\phi^\ell_{i,t} > 0$, I^ℓ_t is a weighted average of numbers $1 - \phi^\ell_{i,t}$ that lie in $[0, 1)$.

3. For partially selected issuers, since $\pi^\ell_{i,t} = (\Omega_{i,t}\phi^\ell_{i,t})/C^\ell_t$, the selected contribution of issuer i is

$$\sum_{b:d^\ell_{i,b,t}=1} q^{W,\ell}_{i,b,t} x_{i,b,t+\tau} = \frac{1-\phi^\ell_{i,t}}{C^\ell_t} \sum_b \omega_{i,b,t} d^\ell_{i,b,t} x_{i,b,t+\tau} = \pi^\ell_{i,t}(1-\phi^\ell_{i,t})\bar{x}^{\mathrm{sel},\ell}_{i,t+\tau},$$

where the last equality is by definition of the selected average. Similarly, the unselected contribution is

$$\sum_{b:d^\ell_{i,b,t}=0} q^{W,\ell}_{i,b,t} x_{i,b,t+\tau} = -\frac{\phi^\ell_{i,t}}{C^\ell_t} \sum_b \omega_{i,b,t}(1-d^\ell_{i,b,t}) x_{i,b,t+\tau} = -\pi^\ell_{i,t}(1-\phi^\ell_{i,t})\bar{x}^{\mathrm{uns},\ell}_{i,t+\tau}.$$

By adding the two of them and summing over issuers, the result is obtained once dividing and multiplying by I^ℓ_t. The definition of I^ℓ_t immediately gives $\sum_i p^{\mathrm{sel},\ell}_{i,t} = \frac{1}{I^\ell_t}\sum_{i\in\mathcal{I}_t} \pi^\ell_{i,t}(1-\phi^\ell_{i,t}) = 1$.

□

Combined position of the two legs. Let $q^W_t = q^{W,H}_t - q^{W,L}_t$, where the two legs select disjoint bond sets, so that $\phi^H_{i,t} + \phi^L_{i,t} \le 1$ for every issuer. For a bond selected by the high leg, $q^{W,H}_{i,b,t} \ge 0$ and $q^{W,L}_{i,b,t} = -s_{i,b,t}\pi^L_{i,t} \le 0$, so $|q^W_{i,b,t}| = |q^{W,H}_{i,b,t}| + |q^{W,L}_{i,b,t}|$; the same holds for a bond selected by the low leg. For a bond selected by neither leg, $q^{W,H}_{i,b,t} = -s_{i,b,t}\pi^H_{i,t}$ and $q^{W,L}_{i,b,t} = -s_{i,b,t}\pi^L_{i,t}$, so

$$|q^W_{i,b,t}| = s_{i,b,t}\left|\pi^H_{i,t} - \pi^L_{i,t}\right| = s_{i,b,t}\left(\pi^H_{i,t} + \pi^L_{i,t}\right) - 2s_{i,b,t}\min\left(\pi^H_{i,t}, \pi^L_{i,t}\right).$$

Within issuer i, the benchmark weights of the bonds selected by neither leg sum to $1 - \phi^H_{i,t} - \phi^L_{i,t}$. Summing over bonds and issuers and using $\|q^{W,\ell}_t\|_1 = 2I^\ell_t$ from the lemma,

$$\|q^W_t\|_1 = 2\left(I^H_t + I^L_t\right) - 2\kappa_t, \qquad \kappa_t \equiv \sum_{i\in\mathcal{I}_t}\left(1-\phi^H_{i,t}-\phi^L_{i,t}\right)\min\left(\pi^H_{i,t}, \pi^L_{i,t}\right) \ge 0,$$

which is Eq. (14) of the main text. Each summand of κ_t is nonnegative, and $\kappa_t > 0$ if and only if some issuer contributes bonds to both legs and retains bonds selected by neither.

Internet Appendix

Sorting Bonds, Finding Issuers: What Corporate Bond Factors Trade

IA.1 Market Betas

Table IA.1: $MKTB$ Betas: Issuer and Within-issuer Components.

The table reports $MKTB$ betas for the 20 value-weighted decile high-minus-low portfolios of Table 2 and their issuer and within-issuer components. Betas are slopes from regressions on a constant and $MKTB$. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

Signal	Total	Issuer	Within issuer
cs	1.546	1.249	0.297
ytm	1.703	1.286	0.417
dcs6	−0.708	−0.630	−0.078
bbtm	1.309	1.095	0.214
val_hz	1.094	0.610	0.483
val_ipr	0.659	0.482	0.176
tmat	1.439	0.396	1.043
md_dur	1.316	0.285	1.031
age	0.075	0.108	−0.033
convx	1.360	0.323	1.037
sze	−1.222	−1.287	0.065
ilq	0.303	0.239	0.064
ami	0.740	0.433	0.307
spd_rel	0.423	0.287	0.136
pi	0.046	0.014	0.033
dvol	1.512	0.891	0.621
rvol	1.607	0.927	0.680
var_95	1.816	1.150	0.667
mom6_1	−0.719	−0.585	−0.134
str	−0.687	−0.617	−0.070

IA.2 Robustness Across Samples, Issuer Definitions, and Construction Choices

Table IA.2: Issuer and Within-issuer Components across Samples and Issuer Keys.

The table reports the issuer and within-issuer components of the monthly average returns (Panel A) and $MKTB$ alphas (Panel B) of Table 2 across samples and issuer keys. The 20 value-weighted decile high-minus-low portfolios are formed on all bonds with CUSIP issuers (main specification), on the PERMNO-linked sample with PERMNO issuers, on investment-grade (rating 1–10) and non-investment-grade (11–22) bonds, and on bonds with up to 5, over 5 to 10, and over 10 years to maturity, with breakpoints from each sample. Each column is estimated on its own sample. Alphas are intercepts from regressions on a constant and $MKTB$. All estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

Panel A: Mean returns

	All bonds		PERMNO-linked		Rating universe				Years to maturity					
	CUSIP issuers		PERMNO issuers		Investment grade		Non-investment grade		Up to 5		5 to 10		Over 10	
Signal	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within
Credit and spread														
cs	88.9	7.4	66.5	12.6	32.9	9.5	85.2	16.4	109.8	4.6	74.1	4.0	73.5	5.3
	(2.39)	(1.71)	(2.21)	(2.21)	(1.76)	(1.46)	(1.57)	(3.39)	(2.80)	(3.43)	(1.44)	(2.53)	(1.79)	(4.55)
ytm	92.2	13.1	68.1	21.7	37.5	19.9	82.2	17.7	110.6	5.1	74.4	4.6	74.7	7.8
	(2.42)	(2.41)	(2.28)	(2.83)	(2.15)	(2.32)	(1.48)	(3.34)	(2.84)	(2.87)	(1.45)	(2.72)	(1.84)	(5.01)
dcs6	−32.5	−17.6	−23.5	−23.7	−25.1	−16.0	−36.2	−17.5	−35.5	−7.6	−40.8	−8.0	−64.2	−15.1
	(−1.81)	(−4.48)	(−1.50)	(−4.11)	(−1.83)	(−3.60)	(−1.11)	(−4.03)	(−1.86)	(−4.46)	(−1.98)	(−5.65)	(−2.85)	(−4.64)
Value														
bbtm	64.5	10.3	55.0	17.2	28.9	13.3	90.6	21.5	87.4	6.3	74.2	4.6	61.5	3.8
	(1.64)	(2.37)	(1.96)	(2.20)	(2.02)	(2.47)	(1.61)	(3.05)	(2.38)	(2.28)	(1.41)	(2.05)	(1.85)	(1.41)
val_hz	30.9	14.3	24.8	21.4	20.7	15.7	62.0	7.9	48.5	5.9	37.9	6.1	31.1	6.9
	(1.94)	(1.91)	(1.65)	(2.36)	(1.57)	(1.91)	(2.06)	(2.73)	(2.57)	(3.57)	(1.89)	(3.76)	(3.67)	(3.93)
val_ipr	37.5	13.2	31.2	20.3	27.8	14.9	23.9	4.3	50.2	6.2	43.9	6.3	33.8	8.7
	(2.25)	(4.02)	(2.03)	(4.26)	(2.40)	(3.54)	(0.83)	(1.23)	(2.59)	(4.43)	(2.11)	(3.50)	(3.50)	(3.35)
Bond structure														
tmat	5.7	17.9	2.7	21.5	8.1	17.7	4.7	21.7	5.4	6.5	−6.8	1.4	0.3	2.5
	(0.98)	(1.47)	(0.63)	(1.50)	(1.41)	(1.40)	(0.55)	(2.38)	(1.43)	(1.82)	(−1.21)	(0.52)	(0.04)	(0.62)
md_dur	−1.9	15.6	−3.7	18.6	4.0	15.3	−25.7	20.2	−5.6	6.7	−40.5	−1.3	−36.3	−2.3
	(−0.28)	(1.29)	(−0.63)	(1.32)	(0.67)	(1.21)	(−1.58)	(2.42)	(−1.22)	(1.79)	(−1.22)	(−0.52)	(−1.31)	(−0.64)
age	7.9	2.0	4.2	5.0	7.4	2.1	17.7	−0.6	4.1	−3.3	−1.8	−0.7	6.7	−1.1
	(1.91)	(1.43)	(1.79)	(1.61)	(2.38)	(1.68)	(2.15)	(−0.29)	(1.17)	(−1.71)	(−0.52)	(−0.51)	(0.93)	(−0.46)
convx	−1.3	16.2	−2.3	19.1	5.2	16.0	−22.2	21.0	−4.1	6.6	−37.5	−1.0	−19.4	0.3
	(−0.21)	(1.34)	(−0.42)	(1.34)	(0.90)	(1.27)	(−1.39)	(2.42)	(−0.93)	(1.79)	(−1.36)	(−0.41)	(−0.86)	(0.07)
sze	−44.2	−0.9	−8.6	−8.3	−4.1	0.2	−72.2	5.3	−46.1	2.5	−52.0	−5.9	−39.9	10.3
	(−1.53)	(−0.39)	(−0.79)	(−1.07)	(−0.46)	(0.09)	(−1.50)	(0.55)	(−1.80)	(1.09)	(−1.46)	(−1.59)	(−1.48)	(1.42)
Liquidity														
ilq	21.8	6.1	13.9	8.2	9.5	6.3	31.8	10.3	38.8	−0.1	14.2	3.6	27.0	2.5
	(1.84)	(1.92)	(1.63)	(1.74)	(1.28)	(1.60)	(1.73)	(2.34)	(2.44)	(−0.08)	(1.07)	(2.80)	(2.07)	(1.09)
ami	21.4	7.4	13.2	9.6	8.3	6.0	67.8	10.9	30.7	2.8	21.3	0.4	18.8	3.3
	(1.42)	(1.74)	(1.32)	(1.72)	(1.25)	(1.33)	(1.72)	(2.26)	(1.81)	(1.92)	(1.14)	(0.35)	(1.15)	(1.48)
spd_rel	14.3	9.0	9.9	11.9	12.3	8.3	15.6	10.9	21.4	2.7	17.1	4.5	13.8	1.6
	(1.23)	(2.97)	(1.65)	(2.18)	(1.87)	(2.62)	(0.67)	(2.28)	(1.39)	(1.57)	(1.44)	(3.44)	(0.95)	(0.79)
pi	2.8	−1.9	2.8	−1.7	4.2	−0.5	−25.9	−2.2	−0.3	−0.2	6.3	−1.4	−3.6	5.8
	(1.27)	(−1.09)	(1.38)	(−0.82)	(2.08)	(−0.39)	(−1.05)	(−0.55)	(−0.09)	(−0.15)	(1.34)	(−1.26)	(−0.63)	(1.87)
Risk and past return														
dvol	37.8	11.5	31.7	17.3	25.2	12.7	42.6	10.1	60.3	3.7	38.2	2.0	17.2	1.3
	(1.62)	(1.42)	(1.86)	(1.60)	(2.25)	(1.42)	(0.96)	(1.59)	(2.08)	(1.55)	(1.35)	(1.31)	(0.98)	(0.48)
rvol	42.5	10.6	35.0	15.5	23.7	10.5	43.0	9.8	65.7	4.0	42.8	1.5	26.1	1.8
	(1.81)	(1.25)	(1.95)	(1.38)	(2.06)	(1.11)	(0.96)	(1.72)	(2.36)	(1.75)	(1.57)	(0.86)	(1.17)	(0.68)
var_95	64.7	13.8	47.0	18.9	26.4	15.6	63.3	11.6	87.4	6.7	67.5	4.6	71.6	6.9
	(2.55)	(1.70)	(2.20)	(1.88)	(2.38)	(1.59)	(1.26)	(2.66)	(2.98)	(2.69)	(1.83)	(3.10)	(3.27)	(1.88)
mom6_1	6.2	−5.9	−2.0	−9.1	−10.6	−6.1	33.4	−3.1	12.8	−3.5	1.4	−2.9	−4.7	−4.9
	(0.26)	(−1.06)	(−0.11)	(−1.09)	(−0.81)	(−0.88)	(0.98)	(−0.74)	(0.55)	(−1.66)	(0.05)	(−2.12)	(−0.17)	(−2.43)
str	3.4	−12.5	9.9	−11.7	2.5	−12.6	−11.7	−12.1	9.3	−5.6	2.3	−6.8	−21.4	−14.9
	(0.21)	(−2.61)	(0.97)	(−2.04)	(0.33)	(−2.24)	(−0.21)	(−3.24)	(0.46)	(−3.46)	(0.17)	(−5.12)	(−1.31)	(−6.87)

Table IA.2: Issuer and Within-issuer Components across Samples and Issuer Keys (continued).

Panel B: MKTB alphas

	All bonds		PERMNO-linked		Rating universe				Years to maturity					
	CUSIP issuers		PERMNO issuers		Investment grade		Non-investment grade		Up to 5		5 to 10		Over 10	
Signal	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within
Credit and spread														
cs	51.3	−1.6	41.6	1.4	8.8	−3.9	53.6	10.8	63.1	2.8	36.5	2.4	51.8	5.4
	(1.75)	(−0.47)	(1.62)	(0.38)	(0.50)	(−0.71)	(1.18)	(2.25)	(2.24)	(3.10)	(0.87)	(2.06)	(1.45)	(4.71)
ytm	53.5	0.5	42.1	5.3	12.8	0.9	48.0	9.9	63.9	2.7	35.8	2.2	51.8	6.9
	(1.81)	(0.17)	(1.67)	(1.47)	(0.84)	(0.18)	(1.04)	(2.27)	(2.28)	(2.20)	(0.86)	(1.86)	(1.50)	(4.54)
dcs6	−13.6	−15.3	−7.2	−19.9	−12.0	−13.5	2.3	−18.9	−12.4	−7.1	−20.5	−6.8	−51.0	−14.7
	(−0.88)	(−4.41)	(−0.51)	(−4.07)	(−0.81)	(−3.61)	(0.09)	(−5.07)	(−0.78)	(−4.90)	(−1.19)	(−5.54)	(−2.55)	(−4.45)
Value														
bbtm	31.6	3.9	29.7	8.4	14.1	6.0	44.4	13.7	43.1	3.3	28.2	1.7	37.8	−0.7
	(1.04)	(1.08)	(1.34)	(1.33)	(1.12)	(1.34)	(0.96)	(2.47)	(1.64)	(1.82)	(0.69)	(0.95)	(1.45)	(−0.29)
val_hz	12.6	−0.2	8.0	4.4	2.6	−0.1	41.7	4.7	25.0	3.0	19.9	4.9	28.5	6.9
	(0.97)	(−0.03)	(0.59)	(0.55)	(0.18)	(−0.02)	(1.73)	(1.84)	(1.46)	(2.59)	(1.29)	(3.83)	(3.19)	(3.97)
val_ipr	23.0	7.9	17.1	14.0	14.8	6.7	17.4	7.4	27.2	5.0	27.9	5.6	39.6	10.2
	(1.62)	(3.80)	(1.27)	(4.64)	(1.26)	(2.77)	(0.75)	(2.00)	(1.72)	(3.90)	(1.75)	(3.86)	(4.18)	(4.42)
Bond structure														
tmat	−6.2	−13.4	−3.5	−15.8	−5.8	−14.9	−2.6	4.8	−0.2	−2.4	−9.5	−4.6	−6.3	−6.3
	(−1.09)	(−1.92)	(−0.71)	(−1.97)	(−1.34)	(−1.93)	(−0.47)	(0.96)	(−0.06)	(−1.64)	(−1.67)	(−2.39)	(−0.74)	(−2.04)
md_dur	−10.5	−15.3	−7.7	−17.8	−7.2	−16.9	−19.1	2.8	−4.5	−2.6	−25.1	−5.2	−34.0	−9.6
	(−1.36)	(−2.12)	(−1.12)	(−2.16)	(−1.19)	(−2.06)	(−1.60)	(0.57)	(−0.90)	(−1.45)	(−0.89)	(−2.25)	(−1.47)	(−2.74)
age	4.7	3.0	2.0	5.5	5.3	3.1	10.0	0.7	5.0	1.1	0.2	1.6	18.7	4.2
	(1.39)	(2.22)	(0.89)	(1.92)	(1.92)	(2.29)	(1.54)	(0.31)	(1.64)	(0.88)	(0.06)	(1.36)	(2.61)	(1.81)
convx	−11.0	−14.9	−6.7	−17.7	−6.4	−16.4	−16.2	3.8	−3.2	−2.5	−24.7	−5.5	−20.4	−8.6
	(−1.63)	(−2.10)	(−1.03)	(−2.16)	(−1.07)	(−2.02)	(−1.54)	(0.77)	(−0.63)	(−1.45)	(−1.05)	(−2.72)	(−1.04)	(−2.66)
sze	−5.5	−2.9	3.1	−3.9	5.2	−2.1	−12.1	−1.4	−13.4	3.3	−6.6	−5.8	−12.9	3.9
	(−0.30)	(−1.08)	(0.26)	(−0.54)	(0.47)	(−1.09)	(−0.37)	(−0.17)	(−0.80)	(1.27)	(−0.29)	(−1.75)	(−0.71)	(0.77)
Liquidity														
ilq	14.6	4.1	9.7	4.9	3.6	2.5	20.2	9.0	27.5	−0.3	11.5	4.4	25.2	4.2
	(1.51)	(1.50)	(1.38)	(1.26)	(0.56)	(0.74)	(1.33)	(2.30)	(2.05)	(−0.23)	(0.90)	(3.19)	(2.20)	(1.82)
ami	8.4	−1.9	5.5	−1.4	1.6	−4.4	18.1	7.5	17.8	1.5	10.5	−0.1	12.8	3.8
	(0.88)	(−0.80)	(0.81)	(−0.55)	(0.37)	(−1.55)	(0.72)	(1.88)	(1.47)	(1.20)	(0.78)	(−0.10)	(1.06)	(1.95)
spd_rel	5.6	4.9	5.0	5.7	6.4	4.1	−13.8	8.2	7.2	1.7	10.1	4.8	11.8	3.6
	(0.64)	(2.39)	(0.92)	(1.58)	(1.23)	(1.78)	(−0.72)	(1.91)	(0.52)	(0.99)	(0.96)	(3.19)	(0.94)	(1.71)
pi	2.4	−2.8	3.4	−3.7	4.4	−1.0	−12.1	−6.0	1.2	−1.1	6.4	−1.7	−8.2	4.9
	(1.15)	(−1.66)	(1.25)	(−1.72)	(1.80)	(−0.65)	(−0.82)	(−1.26)	(0.34)	(−0.75)	(1.41)	(−1.33)	(−1.05)	(1.67)
Risk and past return														
dvol	11.0	−7.2	14.7	−6.2	9.8	−8.2	−8.6	3.5	27.0	0.2	13.2	0.5	6.9	−0.8
	(0.66)	(−1.29)	(1.00)	(−1.12)	(0.96)	(−1.34)	(−0.22)	(0.71)	(1.14)	(0.14)	(0.58)	(0.29)	(0.47)	(−0.27)
rvol	14.6	−9.8	16.1	−10.6	5.7	−12.7	−5.6	1.6	33.0	−0.2	16.7	−0.9	10.0	−1.2
	(0.84)	(−1.83)	(1.03)	(−1.92)	(0.52)	(−2.01)	(−0.15)	(0.37)	(1.46)	(−0.18)	(0.74)	(−0.61)	(0.57)	(−0.35)
var_95	30.1	−6.3	26.0	−5.6	6.0	−8.3	13.8	4.4	47.5	2.6	37.1	2.9	38.7	0.9
	(1.61)	(−1.15)	(1.52)	(−1.03)	(0.77)	(−1.25)	(0.33)	(1.24)	(2.12)	(1.35)	(1.32)	(1.88)	(2.31)	(0.28)
mom6_1	23.8	−1.9	12.6	−3.4	2.6	−1.6	56.9	−0.6	24.3	−1.9	24.8	−1.7	12.2	−3.2
	(1.27)	(−0.33)	(0.88)	(−0.43)	(0.22)	(−0.21)	(1.96)	(−0.18)	(1.16)	(−1.03)	(1.03)	(−1.34)	(0.55)	(−1.53)
str	21.9	−10.4	19.8	−8.0	9.6	−9.4	39.0	−9.7	30.0	−4.6	13.5	−6.3	−10.6	−13.7
	(1.45)	(−2.06)	(1.75)	(−1.35)	(0.95)	(−1.51)	(1.06)	(−2.67)	(1.85)	(−3.24)	(0.90)	(−4.94)	(−0.61)	(−6.19)

Table IA.3: Contribution of the Characteristic under Control Set (4) across Samples and Issuer Keys.

With respect to the issuer and within-issuer components, the table reports for 20 characteristics the monthly average fitted contribution of the sorting characteristic $\overline{C}^{j}$ from Eq. (24) under control set (4) of Section 3.3 (PANEL A), as in Table A.4, and its $MKTB$ alpha $\widehat{\alpha}(C^{j})$ (PANEL B), as in Table A.5, for the samples and issuer keys of Table **??**. Each column is estimated on its own regression sample, on which the high-minus-low portfolios are re-formed. All positions are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months; issuers with at least two eligible bonds (multiplicity of two).

Panel A: Mean fitted contributions $\overline{C}^{I}$ and $\overline{C}^{W}$

	All bonds		PERMNO-linked		Rating universe				Years to maturity					
	CUSIP issuers		PERMNO issuers		Investment grade		Non-investment grade		Up to 5		5 to 10		Over 10	
Signal	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within
Credit and spread														
cs	29.09	6.53	17.60	7.22	35.23	17.05	25.68	15.43	54.70	4.48	52.12	6.14	48.53	10.30
	(1.06)	(4.66)	(0.66)	(3.46)	(2.25)	(7.41)	(0.54)	(3.74)	(1.74)	(2.68)	(1.25)	(4.62)	(1.31)	(6.07)
ytm	30.20	16.18	16.50	15.21	37.20	39.01	24.70	19.67	54.58	6.93	52.38	9.26	45.19	14.16
	(1.09)	(5.23)	(0.64)	(3.52)	(2.42)	(7.87)	(0.53)	(4.14)	(1.75)	(2.71)	(1.30)	(5.34)	(1.26)	(6.36)
dcs6	−19.36	−17.16	−15.77	−19.77	−22.29	−14.22	−12.31	−22.84	−25.16	−11.23	−27.79	−10.83	−37.05	−19.92
	(−1.12)	(−7.65)	(−0.87)	(−6.71)	(−2.01)	(−7.51)	(−0.40)	(−5.10)	(−1.67)	(−5.20)	(−1.39)	(−7.39)	(−1.96)	(−5.21)
Value														
bbtm	10.63	4.26	4.96	3.12	19.47	7.98	24.51	10.44	21.34	6.08	28.15	7.81	44.76	11.49
	(0.95)	(1.38)	(0.52)	(0.70)	(1.94)	(2.37)	(0.97)	(1.73)	(1.47)	(2.20)	(1.12)	(3.45)	(1.33)	(4.04)
val_hz	23.64	20.67	30.97	26.46	22.88	23.97	38.37	8.61	27.47	8.54	22.53	10.33	23.03	11.33
	(1.89)	(6.83)	(2.08)	(6.22)	(2.70)	(8.66)	(1.55)	(2.20)	(1.89)	(4.60)	(1.28)	(4.41)	(2.01)	(4.38)
val_ipr	27.45	16.88	31.89	23.68	27.60	15.60	43.58	17.89	19.32	9.21	18.42	11.49	22.23	15.86
	(1.79)	(5.15)	(1.91)	(5.78)	(3.00)	(5.63)	(1.05)	(4.09)	(1.30)	(4.25)	(1.14)	(3.48)	(1.89)	(6.00)
Bond structure														
tmat	4.03	16.22	0.50	17.23	4.31	14.36	8.77	20.59	−0.56	10.63	5.01	1.53	0.89	3.50
	(0.97)	(1.42)	(0.14)	(1.30)	(1.10)	(1.21)	(1.24)	(2.24)	(−0.27)	(2.12)	(1.09)	(0.42)	(0.21)	(0.92)
md_dur	0.19	17.15	−2.12	18.24	2.52	16.42	−2.49	16.47	−3.90	9.87	−20.87	−0.07	−18.80	−3.39
	(0.04)	(1.30)	(−0.46)	(1.24)	(0.54)	(1.21)	(−0.20)	(1.74)	(−1.27)	(2.01)	(−0.94)	(−0.02)	(−1.10)	(−0.74)
age	2.70	−0.57	1.15	−1.85	3.55	−0.13	−4.00	−1.23	−2.49	−0.14	−0.59	−1.07	−7.63	−6.29
	(1.14)	(−0.52)	(0.38)	(−0.94)	(2.05)	(−0.11)	(−0.51)	(−0.64)	(−0.83)	(−0.16)	(−0.11)	(−0.70)	(−0.81)	(−2.19)
convx	1.23	13.57	−1.01	14.13	2.28	12.63	2.84	15.11	−3.62	9.27	−9.99	0.24	−7.46	−0.95
	(0.28)	(1.17)	(−0.27)	(1.09)	(0.55)	(1.05)	(0.33)	(2.00)	(−1.32)	(1.99)	(−0.73)	(0.07)	(−0.63)	(−0.21)
sze	2.09	−0.37	0.43	0.50	0.70	0.25	0.31	−2.71	5.07	−0.49	3.86	−0.40	10.35	0.56
	(0.52)	(−0.77)	(0.21)	(0.29)	(0.21)	(0.64)	(0.02)	(−2.42)	(1.08)	(−1.55)	(0.72)	(−1.49)	(1.82)	(1.16)
Liquidity														
ilq	9.60	0.99	4.24	4.62	2.73	2.00	27.35	−1.03	12.56	0.68	12.23	−3.35	18.42	2.76
	(1.81)	(0.59)	(1.20)	(1.62)	(0.67)	(1.69)	(1.60)	(−0.27)	(1.38)	(0.44)	(1.57)	(−0.92)	(2.01)	(0.79)
ami	7.24	−0.22	2.50	−0.79	2.90	1.95	39.50	−0.16	1.80	−1.73	13.43	−2.14	16.88	5.04
	(1.25)	(−0.11)	(0.66)	(−0.23)	(1.01)	(1.52)	(1.28)	(−0.04)	(0.25)	(−0.68)	(1.77)	(−0.56)	(1.81)	(1.23)
spd_rel	8.47	−1.92	1.32	−2.39	3.22	−0.03	10.09	−5.28	−6.91	−6.29	7.18	−1.71	0.57	−3.32
	(0.97)	(−0.55)	(0.26)	(−0.48)	(0.62)	(−0.01)	(0.62)	(−0.94)	(−0.65)	(−1.77)	(0.59)	(−0.75)	(0.05)	(−0.65)
pi	1.19	−1.52	0.33	−1.49	−0.34	−0.44	−2.84	−6.78	−4.21	0.13	1.25	−0.74	−3.29	1.80
	(1.07)	(−1.35)	(0.24)	(−0.90)	(−0.42)	(−0.83)	(−0.60)	(−1.09)	(−1.42)	(0.08)	(0.60)	(−0.49)	(−0.66)	(0.58)
Risk and past return														
dvol	22.53	7.14	15.36	4.80	18.42	7.93	28.89	6.64	39.37	5.14	−2.67	5.26	−3.86	4.33
	(0.92)	(1.34)	(0.83)	(0.58)	(1.92)	(3.13)	(0.66)	(0.69)	(1.27)	(1.14)	(−0.08)	(1.15)	(−0.13)	(0.64)
rvol	23.03	9.32	18.95	8.58	20.79	7.81	31.95	10.57	38.39	4.96	14.48	7.32	14.71	1.21
	(1.00)	(1.74)	(1.02)	(1.07)	(2.08)	(3.26)	(0.75)	(1.15)	(1.36)	(1.17)	(0.49)	(1.26)	(0.58)	(0.21)
var_95	53.85	15.58	40.00	17.34	23.18	16.51	71.33	16.83	78.46	9.42	55.40	6.50	55.11	14.18
	(2.28)	(3.25)	(1.99)	(3.39)	(2.62)	(4.42)	(1.61)	(2.89)	(2.83)	(1.99)	(1.76)	(3.88)	(2.27)	(4.23)
mom6_1	4.38	−3.67	−4.53	−4.58	−10.04	−4.90	25.19	−5.02	13.49	−0.75	0.03	−3.73	−21.49	−5.27
	(0.23)	(−1.24)	(−0.26)	(−1.08)	(−0.93)	(−2.41)	(0.61)	(−1.20)	(0.85)	(−0.29)	(0.00)	(−2.43)	(−1.00)	(−3.64)
str	11.71	−12.45	23.74	−10.54	0.75	−18.11	35.72	−12.38	18.55	0.80	−11.15	−8.54	−0.39	−26.46
	(0.96)	(−3.98)	(2.61)	(−2.38)	(0.10)	(−6.63)	(1.10)	(−2.61)	(1.12)	(0.32)	(−0.51)	(−4.81)	(−0.01)	(−4.48)

Table IA.3: Contribution of the Characteristic under Control Set (4) across Samples and Issuer Keys (continued).

Panel B: MKTB alphas of the fitted contributions

	All bonds		PERMNO-linked		Rating universe				Years to maturity					
	CUSIP issuers		PERMNO issuers		Investment grade		Non-investment grade		Up to 5		5 to 10		Over 10	
Signal	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within
Credit and spread														
cs	10.84	4.83	5.02	5.55	17.25	14.73	−0.49	10.23	23.61	2.85	24.89	4.95	20.11	10.65
	(0.44)	(3.47)	(0.21)	(2.65)	(1.06)	(5.84)	(−0.01)	(2.77)	(0.83)	(1.95)	(0.69)	(3.87)	(0.67)	(6.06)
ytm	11.93	13.49	4.15	12.55	19.90	33.89	−1.20	14.50	24.05	5.03	25.24	8.05	16.27	14.46
	(0.49)	(4.64)	(0.18)	(3.00)	(1.25)	(7.79)	(−0.03)	(3.29)	(0.85)	(2.03)	(0.72)	(4.59)	(0.57)	(6.44)
dcs6	−0.97	−15.06	−0.03	−17.27	−11.95	−12.63	18.90	−18.86	−9.33	−9.64	−3.58	−9.76	−16.28	−20.84
	(−0.07)	(−8.71)	(0.00)	(−7.56)	(−1.10)	(−8.26)	(0.74)	(−4.99)	(−0.63)	(−6.09)	(−0.21)	(−7.73)	(−1.00)	(−4.42)
Value														
bbtm	2.18	3.00	0.88	0.94	8.81	6.91	14.60	7.24	12.47	4.67	13.32	5.99	14.78	11.77
	(0.20)	(0.95)	(0.09)	(0.21)	(1.05)	(2.39)	(0.55)	(1.25)	(0.93)	(1.79)	(0.55)	(3.32)	(0.81)	(4.25)
val_hz	10.59	18.97	17.85	23.94	15.29	20.77	15.17	9.25	15.65	8.34	2.07	9.29	17.63	12.46
	(1.01)	(6.96)	(1.59)	(6.10)	(1.87)	(7.66)	(0.64)	(2.56)	(1.13)	(4.83)	(0.13)	(5.33)	(1.61)	(5.66)
val_ipr	15.28	15.06	18.18	21.79	19.40	13.65	21.89	16.85	4.61	8.64	6.36	8.96	22.93	16.47
	(1.36)	(5.64)	(1.61)	(6.49)	(2.24)	(5.91)	(0.71)	(3.93)	(0.35)	(4.18)	(0.44)	(3.06)	(1.64)	(6.58)
Bond structure														
tmat	−5.96	−11.72	−7.48	−15.50	−5.17	−14.95	0.21	7.75	−3.58	−0.96	2.25	−5.96	−1.80	−4.19
	(−2.08)	(−2.07)	(−2.64)	(−2.32)	(−1.71)	(−2.22)	(0.03)	(1.21)	(−1.97)	(−0.63)	(0.47)	(−2.23)	(−0.38)	(−1.55)
md_dur	−10.75	−15.51	−9.91	−18.12	−8.52	−17.50	−7.15	−0.04	−5.29	−1.68	−11.07	−6.84	−19.64	−12.55
	(−2.38)	(−2.28)	(−2.30)	(−2.39)	(−2.19)	(−2.23)	(−0.62)	(−0.01)	(−1.62)	(−1.04)	(−0.63)	(−2.44)	(−1.26)	(−3.24)
age	4.47	0.53	3.15	0.16	5.16	1.10	1.19	−0.42	0.63	−0.61	3.40	−0.46	5.49	−4.37
	(1.55)	(0.45)	(0.96)	(0.08)	(2.27)	(0.99)	(0.15)	(−0.22)	(0.25)	(−0.69)	(0.60)	(−0.32)	(0.63)	(−1.52)
convx	−8.75	−15.20	−8.66	−17.86	−7.38	−17.21	−1.84	2.21	−5.18	−1.85	−4.55	−6.88	−11.33	−10.29
	(−2.35)	(−2.28)	(−2.68)	(−2.39)	(−2.06)	(−2.31)	(−0.22)	(0.50)	(−1.81)	(−1.23)	(−0.39)	(−2.58)	(−1.05)	(−2.59)
sze	−1.92	−0.84	1.04	−1.39	−5.22	−0.35	3.13	−2.98	0.94	−0.89	1.74	−0.50	1.51	0.03
	(−0.45)	(−1.49)	(0.36)	(−0.70)	(−1.23)	(−0.92)	(0.22)	(−2.42)	(0.21)	(−2.30)	(0.31)	(−1.65)	(0.27)	(0.06)
Liquidity														
ilq	6.43	0.68	4.70	4.35	−1.86	1.41	17.14	−1.32	5.87	−0.20	8.98	−1.42	10.52	2.72
	(1.53)	(0.39)	(1.37)	(1.51)	(−0.37)	(1.22)	(1.44)	(−0.37)	(0.77)	(−0.12)	(1.31)	(−0.51)	(1.43)	(0.84)
ami	2.83	−0.65	3.35	−1.15	0.15	1.81	18.41	−3.09	−2.84	−3.32	8.68	−0.34	10.75	6.01
	(0.70)	(−0.31)	(0.83)	(−0.32)	(0.04)	(1.48)	(1.09)	(−0.63)	(−0.47)	(−1.15)	(1.25)	(−0.13)	(1.45)	(1.45)
spd_rel	1.95	−1.61	0.69	−2.28	−0.76	0.89	−1.79	−5.65	−14.04	−5.28	−1.34	−0.91	−9.32	−1.35
	(0.25)	(−0.49)	(0.14)	(−0.47)	(−0.13)	(0.34)	(−0.12)	(−1.07)	(−1.24)	(−1.58)	(−0.12)	(−0.45)	(−0.98)	(−0.28)
pi	0.18	−1.55	0.66	−1.56	−1.24	−0.64	−2.12	−4.16	−2.66	−0.04	0.53	−0.51	−6.94	0.12
	(0.15)	(−1.48)	(0.52)	(−0.90)	(−0.99)	(−1.27)	(−0.50)	(−0.84)	(−1.16)	(−0.03)	(0.23)	(−0.38)	(−1.02)	(0.04)
Risk and past return														
dvol	5.17	4.34	3.95	1.02	9.25	5.77	−3.85	1.04	17.88	4.48	−34.30	4.03	−14.24	2.11
	(0.26)	(0.86)	(0.25)	(0.13)	(0.87)	(2.25)	(−0.10)	(0.11)	(0.59)	(1.13)	(−1.01)	(0.93)	(−0.54)	(0.31)
rvol	3.44	4.94	6.35	2.58	10.74	4.00	−3.05	2.90	15.98	3.80	−19.39	4.82	0.08	−1.46
	(0.18)	(0.98)	(0.41)	(0.34)	(0.97)	(1.62)	(−0.08)	(0.35)	(0.60)	(1.04)	(−0.69)	(0.96)	(0.00)	(−0.25)
var_95	32.50	10.94	26.78	11.68	10.80	13.46	34.94	11.05	58.29	5.90	23.06	5.88	29.94	12.85
	(1.68)	(2.68)	(1.59)	(2.89)	(1.30)	(3.50)	(0.92)	(2.28)	(2.27)	(1.72)	(0.91)	(2.88)	(1.61)	(3.74)
mom6_1	18.48	−1.84	7.68	−1.91	−0.38	−3.25	44.96	−2.80	20.27	0.77	15.60	−3.02	−11.28	−5.50
	(1.10)	(−0.67)	(0.56)	(−0.49)	(−0.04)	(−1.52)	(1.28)	(−0.74)	(1.36)	(0.32)	(0.78)	(−2.50)	(−0.57)	(−3.84)
str	18.61	−11.12	25.06	−8.11	3.04	−16.27	50.64	−9.79	24.08	1.34	10.37	−8.05	17.84	−26.02
	(1.54)	(−3.36)	(2.53)	(−1.65)	(0.28)	(−6.22)	(1.62)	(−2.04)	(1.42)	(0.54)	(0.58)	(−4.60)	(0.89)	(−4.09)

Table IA.4: Differences across Universes: Issuer and Within-issuer Components.

The table reports, for the issuer and within-issuer components of the 20 value-weighted decile high-minus-low portfolios of Table **??**, the monthly difference between two universes: non-investment grade (NIG) minus investment grade (IG), and over 10 years minus up to 5 years to maturity. The columns report the mean return and the $MKTB$ alpha of each difference. All estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Mean return				$MKTB$ alpha			
	NIG − IG		Over 10 − up to 5 years		NIG − IG		Over 10 − up to 5 years	
Signal	Issuer	Within	Issuer	Within	Issuer	Within	Issuer	Within
Credit and spread								
`cs`	52.3	7.0	−36.2	0.7	44.8	14.7	−11.3	2.7
	(1.29)	(1.12)	(−1.28)	(0.47)	(1.25)	(3.11)	(−0.55)	(1.95)
`ytm`	44.7	−2.2	−36.0	2.6	35.3	9.0	−12.1	4.2
	(1.04)	(−0.31)	(−1.23)	(1.46)	(0.93)	(1.63)	(−0.59)	(2.33)
`dcs6`	−11.1	−1.5	−28.6	−7.5	14.3	−5.4	−38.7	−7.6
	(−0.45)	(−0.36)	(−2.64)	(−2.27)	(0.65)	(−1.43)	(−2.84)	(−2.35)
Value								
`bbtm`	61.7	8.2	−25.9	−2.5	30.2	7.7	−5.3	−4.0
	(1.33)	(1.83)	(−1.24)	(−0.70)	(0.75)	(1.64)	(−0.37)	(−1.40)
`val_hz`	41.3	−7.7	−17.4	1.0	39.1	4.9	3.5	3.9
	(1.72)	(−1.07)	(−0.97)	(0.52)	(1.60)	(0.75)	(0.21)	(2.29)
`val_ipr`	−4.0	−10.6	−16.4	2.4	2.6	0.8	12.4	5.2
	(−0.17)	(−2.06)	(−0.85)	(0.86)	(0.14)	(0.19)	(0.71)	(2.03)
Bond structure								
`tmat`	−3.4	4.1	−5.0	−4.0	3.2	19.6	−6.1	−3.9
	(−0.44)	(0.43)	(−0.56)	(−1.45)	(0.51)	(1.91)	(−0.59)	(−1.28)
`md_dur`	−29.7	4.9	−30.7	−9.0	−12.0	19.7	−29.5	−7.1
	(−1.87)	(0.54)	(−1.24)	(−2.97)	(−1.15)	(2.14)	(−1.47)	(−2.26)
`age`	10.3	−2.8	2.6	2.3	4.7	−2.4	13.7	3.1
	(1.30)	(−1.28)	(0.33)	(1.19)	(0.71)	(−1.16)	(1.90)	(1.43)
`convx`	−27.5	5.1	−15.4	−6.4	−9.8	20.1	−17.2	−6.1
	(−1.70)	(0.54)	(−0.76)	(−2.27)	(−0.98)	(2.05)	(−1.02)	(−1.96)
`sze`	−68.1	5.2	6.2	7.8	−17.3	0.7	0.6	0.6
	(−1.52)	(0.52)	(0.40)	(1.10)	(−0.58)	(0.08)	(0.04)	(0.14)
Liquidity								
`ilq`	22.2	4.0	−11.8	2.6	16.6	6.5	−2.3	4.5
	(1.38)	(0.76)	(−1.19)	(0.87)	(1.16)	(1.28)	(−0.24)	(1.56)
`ami`	59.4	4.9	−11.9	0.5	16.5	11.9	−5.1	2.4
	(1.66)	(0.92)	(−1.12)	(0.20)	(0.71)	(2.05)	(−0.57)	(1.02)
`spd_rel`	3.3	2.7	−7.6	−1.0	−20.3	4.1	4.5	1.9
	(0.17)	(0.53)	(−0.79)	(−0.43)	(−1.16)	(0.85)	(0.47)	(0.84)
`pi`	−30.1	−1.6	−3.3	6.0	−16.5	−5.0	−9.4	6.0
	(−1.16)	(−0.37)	(−0.48)	(1.73)	(−0.99)	(−0.99)	(−0.94)	(1.87)
Risk and past return								
`dvol`	17.4	−2.6	−43.1	−2.4	−18.4	11.6	−20.1	−1.1
	(0.45)	(−0.32)	(−2.77)	(−0.67)	(−0.46)	(1.55)	(−1.44)	(−0.34)
`rvol`	19.3	−0.7	−39.6	−2.2	−11.4	14.3	−23.1	−1.0
	(0.50)	(−0.09)	(−2.64)	(−0.77)	(−0.30)	(1.94)	(−1.76)	(−0.30)
`var_95`	36.9	−4.0	−15.8	0.2	7.9	12.8	−8.9	−1.7
	(0.86)	(−0.47)	(−1.09)	(0.11)	(0.20)	(1.89)	(−0.59)	(−0.72)
`mom6_1`	44.0	3.0	−17.4	−1.4	54.2	0.9	−12.1	−1.3
	(1.50)	(0.48)	(−1.18)	(−0.64)	(2.06)	(0.14)	(−0.85)	(−0.58)
`str`	−14.2	0.5	−30.7	−9.4	29.5	−0.3	−40.6	−9.1
	(−0.27)	(0.09)	(−1.92)	(−5.02)	(0.88)	(−0.06)	(−3.03)	(−4.62)

Table IA.5: Construction Choices for `cs` and `ytm`.

The table reports the `cs` (PANEL A) and `ytm` (PANEL B) sorts under alternative construction choices. The first five columns report, on the portfolio sample, the objects of Table 4: within-issuer intensities (on formation-date weights), monthly return contrasts, and the within-issuer return. The other columns report, on the regression sample of Section 3.3 with the portfolios re-formed, the component returns, the fitted contributions (issuer: set (4); within-issuer: sets (1) and (4)), and the within-issuer $MKTB$ alphas. The last group changes only the regression columns, the row *Portfolios formed on the regression sample* only the portfolio columns. Equal-weighted benchmarks weight an issuer's eligible bonds equally, holding the sort's issuer positions fixed. Excluding defaulted bonds keeps standard returns only. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^{W})$	
Specification	$\bar{\mathcal{I}}^{H}$	$\bar{\mathcal{I}}^{L}$	$\bar{\mathcal{D}}^{H}$	$\bar{\mathcal{D}}^{L}$	$\bar{r}^{W}$	$\bar{r}^{I}$	(4)	$\bar{r}^{W}$	$\widehat{\alpha}(r^{W})$	(1)	(4)	(1)	(4)
Panel A: `cs`													
Main specification	12.2	44.2	34.46	−10.75	7.36	87.76	29.09	8.18	−2.08	4.01	6.53	0.36	4.83
			(4.26)	(−1.30)	(1.71)	(2.47)	(1.06)	(1.70)	(−0.60)	(2.01)	(4.66)	(0.23)	(3.47)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	21.0	48.6	62.44	−8.95	17.46	105.66	31.62	18.49	7.96	4.64	7.36	0.75	5.83
			(3.06)	(−1.20)	(2.48)	(2.38)	(1.04)	(2.70)	(1.20)	(1.94)	(4.35)	(0.38)	(3.50)
Equal-weighted benchmarks	20.5	47.3	−2.19	−9.56	3.04	92.28	35.82	3.66	−5.91	3.85	6.16	0.63	4.65
			(−0.41)	(−1.25)	(0.71)	(2.52)	(1.32)	(0.77)	(−1.69)	(2.00)	(4.42)	(0.38)	(3.36)
Both equal-weighted	12.9	45.2	47.43	−11.24	9.31	113.93	39.91	10.22	0.99	4.31	6.75	1.02	5.42
			(3.56)	(−1.48)	(2.12)	(2.43)	(1.34)	(2.20)	(0.23)	(2.01)	(4.23)	(0.53)	(3.40)
Number of portfolios													
Quintiles	10.9	31.3	32.36	−14.02	5.98	50.28	16.34	6.60	−1.69	2.41	4.32	0.01	3.62
			(4.15)	(−1.64)	(1.64)	(2.29)	(0.93)	(1.54)	(−0.46)	(1.57)	(4.39)	(0.00)	(3.54)
Terciles	11.9	20.7	25.52	−16.35	4.52	32.93	10.50	5.21	−1.79	1.89	3.49	−0.09	2.97
			(3.22)	(−1.92)	(1.42)	(2.07)	(0.90)	(1.34)	(−0.52)	(1.47)	(4.36)	(−0.07)	(3.55)
Formation sample													
Portfolios formed on the regression sample	17.7	49.3	29.87	−10.21	8.18	87.76	29.09	8.18	−2.08	4.01	6.53	0.36	4.83
			(3.72)	(−1.27)	(1.70)	(2.47)	(1.06)	(1.70)	(−0.60)	(2.01)	(4.66)	(0.23)	(3.47)
Return definition													
Duration-adjusted returns	12.2	44.2	36.51	−10.29	8.17	89.41	30.30	8.81	3.60	5.33	6.73	3.01	5.30
			(4.51)	(−2.54)	(3.24)	(2.55)	(1.11)	(3.02)	(1.35)	(2.99)	(4.75)	(1.73)	(3.65)
Issuer key													
PERMNO-linked sample, PERMNO issuers	20.9	54.1	38.71	−12.95	12.63	66.06	17.60	13.36	1.50	4.60	7.22	0.76	5.55
			(3.33)	(−1.55)	(2.21)	(2.38)	(0.66)	(2.24)	(0.40)	(1.79)	(3.46)	(0.34)	(2.65)
Sample filters													
Excluding defaulted bonds	12.2	44.3	30.02	−10.63	6.59	67.22	34.26	7.39	−2.52	3.52	5.93	0.36	4.97
			(4.29)	(−1.29)	(1.55)	(2.31)	(1.26)	(1.57)	(−0.70)	(1.76)	(4.52)	(0.20)	(3.74)
Excluding Rule 144A bonds	15.3	45.4	31.06	−10.76	7.10	86.40	29.06	7.42	−4.52	4.32	8.94	−1.86	7.05
			(3.40)	(−1.30)	(1.39)	(2.43)	(1.08)	(1.34)	(−1.08)	(1.33)	(5.84)	(−0.64)	(4.67)
Regression sample and controls													
Single-bond issuers included	12.2	44.2	34.46	−10.75	7.36	86.31	27.35	6.96	−2.06	3.31	5.58	0.16	4.19
			(4.26)	(−1.30)	(1.71)	(2.37)	(0.99)	(1.60)	(−0.64)	(1.88)	(4.79)	(0.11)	(3.61)
Rating-class dummies in (1)	12.2	44.2	34.46	−10.75	7.36	87.76	29.09	8.18	−2.08	4.10	6.53	0.46	4.83
			(4.26)	(−1.30)	(1.71)	(2.47)	(1.06)	(1.70)	(−0.60)	(2.05)	(4.66)	(0.28)	(3.47)
Panel B: `ytm`													
Main specification	14.2	53.7	43.91	−15.38	13.06	91.83	30.20	15.50	1.43	10.59	16.18	2.76	13.49
			(4.34)	(−1.78)	(2.41)	(2.53)	(1.09)	(2.52)	(0.44)	(2.36)	(5.23)	(0.94)	(4.64)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	22.8	56.6	63.95	−14.83	22.79	108.13	31.94	24.77	10.14	11.44	17.19	3.39	14.60
			(3.08)	(−1.78)	(2.80)	(2.42)	(1.06)	(3.04)	(1.75)	(2.36)	(4.93)	(1.05)	(4.51)
Equal-weighted benchmarks	22.4	55.4	2.64	−15.21	8.62	96.19	36.40	11.14	−2.34	11.13	16.82	4.08	14.39
			(0.45)	(−1.85)	(1.68)	(2.57)	(1.33)	(1.90)	(−0.69)	(2.50)	(4.65)	(1.26)	(4.15)
Both equal-weighted	14.7	54.2	49.95	−16.02	13.95	117.15	39.83	15.75	2.46	11.37	17.02	4.35	14.73
			(3.61)	(−1.92)	(2.54)	(2.48)	(1.34)	(2.62)	(0.71)	(2.50)	(4.55)	(1.33)	(4.14)
Number of portfolios													
Quintiles	15.5	42.5	42.39	−16.57	11.72	52.42	16.31	13.98	0.59	9.69	14.43	3.58	12.80
			(3.80)	(−1.78)	(2.32)	(2.43)	(0.95)	(2.33)	(0.17)	(2.45)	(5.12)	(1.20)	(4.76)
Terciles	19.7	30.3	34.49	−17.32	10.46	33.03	10.78	12.02	−0.64	9.14	13.58	3.61	12.22
			(3.29)	(−1.77)	(2.10)	(2.19)	(0.98)	(2.01)	(−0.16)	(2.50)	(5.11)	(1.28)	(4.79)
Formation sample													
Portfolios formed on the regression sample	21.3	59.4	44.07	−15.15	15.50	91.83	30.20	15.50	1.43	10.59	16.18	2.76	13.49
			(4.12)	(−1.77)	(2.52)	(2.53)	(1.09)	(2.52)	(0.44)	(2.36)	(5.23)	(0.94)	(4.64)
Return definition													
Duration-adjusted returns	14.2	53.7	40.77	−7.17	8.36	90.61	31.04	9.86	2.26	7.32	15.33	2.78	13.30
			(3.91)	(−1.41)	(2.31)	(2.51)	(1.13)	(2.26)	(0.68)	(1.96)	(4.85)	(0.83)	(4.25)
Issuer key													
PERMNO-linked sample, PERMNO issuers	24.6	64.7	54.80	−16.70	21.66	65.62	16.50	21.85	5.17	12.21	15.21	3.99	12.55
			(3.14)	(−1.93)	(2.83)	(2.38)	(0.64)	(2.86)	(1.46)	(2.36)	(3.52)	(1.11)	(3.00)
Sample filters													
Excluding defaulted bonds	14.4	53.8	48.67	−15.38	13.37	71.34	35.35	15.65	1.69	9.84	15.22	2.26	13.31
			(4.06)	(−1.78)	(2.45)	(2.45)	(1.29)	(2.57)	(0.50)	(2.17)	(5.09)	(0.72)	(4.70)
Excluding Rule 144A bonds	18.6	54.8	41.54	−15.48	13.27	89.93	30.01	14.80	−1.21	11.26	20.08	0.51	17.14
			(3.73)	(−1.78)	(2.09)	(2.46)	(1.11)	(2.11)	(−0.30)	(1.97)	(6.16)	(0.13)	(5.60)
Regression sample and controls													
Single-bond issuers included	14.2	53.7	43.91	−15.38	13.06	89.95	28.07	12.57	−0.06	8.87	13.75	2.17	11.50
			(4.34)	(−1.78)	(2.41)	(2.41)	(1.01)	(2.29)	(−0.02)	(2.29)	(5.28)	(0.84)	(4.69)
Rating-class dummies in (1)	14.2	53.7	43.91	−15.38	13.06	91.83	30.20	15.50	1.43	10.63	16.18	2.79	13.49
			(4.34)	(−1.78)	(2.41)	(2.53)	(1.09)	(2.52)	(0.44)	(2.37)	(5.23)	(0.94)	(4.64)

Table IA.6: Construction Choices for `dcs6` and `bbtm`.

The table reports the `dcs6` (Panel A) and `bbtm` (Panel B) sorts under the construction choices of Table IA.5, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{\,I}$			$\overline{C}^{\,W}$		$\widehat{\alpha}(C^W)$	
Specification	$\bar{\mathcal{I}}^H$	$\bar{\mathcal{I}}^L$	$\bar{\mathcal{D}}^H$	$\bar{\mathcal{D}}^L$	$\bar{r}^W$	$\bar{r}^I$	(4)	$\bar{r}^W$	$\widehat{\alpha}(r^W)$	(1)	(4)	(1)	(4)
Panel A: `dcs6`													
Main specification	49.4	43.5	−18.62	21.55	−17.63	−31.48	−19.36	−19.62	−16.93	−17.97	−17.16	−15.09	−15.06
			(−3.15)	(3.08)	(−4.48)	(−1.79)	(−1.12)	(−4.44)	(−4.33)	(−5.16)	(−7.65)	(−5.52)	(−8.71)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	53.1	48.3	−15.99	35.89	−22.59	−42.84	−20.79	−26.87	−23.68	−19.56	−18.60	−16.40	−16.43
			(−3.11)	(3.03)	(−4.40)	(−1.48)	(−1.17)	(−4.37)	(−4.04)	(−5.27)	(−7.54)	(−5.58)	(−8.64)
Equal-weighted benchmarks	52.2	47.3	−18.97	14.29	−16.76	−33.29	−21.51	−17.82	−15.61	−19.67	−18.35	−16.78	−16.15
			(−3.48)	(2.64)	(−4.45)	(−1.82)	(−1.24)	(−4.32)	(−4.26)	(−5.23)	(−7.25)	(−5.75)	(−8.42)
Both equal-weighted	50.2	44.4	−19.23	24.20	−18.36	−48.59	−23.18	−21.12	−18.68	−20.58	−19.12	−17.53	−16.95
			(−3.62)	(2.99)	(−4.77)	(−1.58)	(−1.28)	(−4.76)	(−4.45)	(−5.33)	(−7.25)	(−5.77)	(−8.41)
Number of portfolios													
Quintiles	40.4	37.5	−15.59	15.60	−12.07	−22.59	−13.66	−13.33	−11.46	−12.86	−12.31	−10.82	−10.67
			(−2.82)	(3.09)	(−3.65)	(−1.66)	(−1.06)	(−3.42)	(−3.71)	(−4.93)	(−7.01)	(−5.34)	(−8.13)
Terciles	31.6	31.2	−13.83	15.90	−8.92	−16.41	−10.64	−10.45	−9.19	−9.44	−9.01	−7.93	−7.75
			(−2.66)	(3.17)	(−3.02)	(−1.79)	(−1.13)	(−3.13)	(−3.44)	(−4.80)	(−6.71)	(−5.23)	(−7.83)
Formation sample													
Portfolios formed on the regression sample	55.9	48.8	−18.70	21.21	−19.62	−31.48	−19.36	−19.62	−16.93	−17.97	−17.16	−15.09	−15.06
			(−3.14)	(3.04)	(−4.44)	(−1.79)	(−1.12)	(−4.44)	(−4.33)	(−5.16)	(−7.65)	(−5.52)	(−8.71)
Return definition													
Duration-adjusted returns	49.4	43.5	−19.25	22.57	−17.54	−32.78	−20.11	−19.81	−18.22	−18.94	−17.59	−17.18	−15.81
			(−4.07)	(3.25)	(−4.63)	(−1.85)	(−1.16)	(−4.59)	(−4.95)	(−5.42)	(−7.61)	(−6.13)	(−8.88)
Issuer key													
PERMNO-linked sample, PERMNO issuers	61.2	54.4	−18.97	25.09	−23.74	−23.37	−15.77	−24.12	−20.51	−20.96	−19.77	−17.42	−17.27
			(−3.24)	(2.65)	(−4.11)	(−1.53)	(−0.87)	(−3.97)	(−3.87)	(−5.16)	(−6.71)	(−5.48)	(−7.56)
Sample filters													
Excluding defaulted bonds	49.6	43.6	−18.45	20.57	−17.45	−29.62	−19.93	−19.12	−16.47	−17.06	−16.53	−14.40	−14.66
			(−3.12)	(2.97)	(−4.44)	(−1.80)	(−1.23)	(−4.33)	(−4.31)	(−5.03)	(−7.81)	(−5.23)	(−8.89)
Excluding Rule 144A bonds	51.3	45.7	−18.26	21.42	−17.74	−30.77	−18.96	−19.46	−16.74	−18.25	−17.54	−15.41	−15.45
			(−2.99)	(2.98)	(−4.26)	(−1.75)	(−1.12)	(−4.21)	(−4.11)	(−4.84)	(−7.62)	(−5.15)	(−8.58)
Regression sample and controls													
Single-bond issuers included	49.4	43.5	−18.62	21.55	−17.63	−33.31	−19.47	−17.23	−14.91	−15.67	−14.98	−13.19	−13.18
			(−3.15)	(3.08)	(−4.48)	(−1.84)	(−1.07)	(−4.47)	(−4.38)	(−5.14)	(−7.83)	(−5.50)	(−8.86)
Rating-class dummies in (1)	49.4	43.5	−18.62	21.55	−17.63	−31.48	−19.36	−19.62	−16.93	−17.94	−17.16	−15.08	−15.06
			(−3.15)	(3.08)	(−4.48)	(−1.79)	(−1.12)	(−4.44)	(−4.33)	(−5.15)	(−7.65)	(−5.50)	(−8.71)
Panel B: `bbtm`													
Main specification	40.7	48.0	42.57	−3.19	10.32	67.64	10.63	12.58	5.56	5.34	4.26	0.82	3.00
			(2.89)	(−0.51)	(2.37)	(1.94)	(0.95)	(2.44)	(1.26)	(1.23)	(1.38)	(0.19)	(0.95)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	44.9	49.1	55.50	−1.48	17.99	88.56	15.13	20.41	12.41	5.79	4.71	0.92	3.30
			(2.83)	(−0.32)	(2.44)	(2.04)	(1.05)	(2.78)	(1.90)	(1.28)	(1.46)	(0.21)	(1.01)
Equal-weighted benchmarks	46.3	54.0	11.94	−3.55	5.74	72.71	11.74	7.50	1.85	6.17	4.34	2.05	3.22
			(1.40)	(−0.58)	(1.68)	(2.03)	(1.20)	(1.82)	(0.46)	(1.36)	(1.29)	(0.45)	(0.93)
Both equal-weighted	37.7	48.6	44.47	−2.95	9.06	97.82	15.91	11.15	4.86	6.63	4.99	2.33	3.71
			(2.79)	(−0.57)	(2.13)	(2.13)	(1.15)	(2.42)	(1.10)	(1.47)	(1.47)	(0.53)	(1.08)
Number of portfolios													
Quintiles	41.0	40.3	29.80	−5.49	10.21	43.06	5.77	12.10	5.46	4.09	3.17	0.92	2.30
			(3.03)	(−1.02)	(2.64)	(2.11)	(0.93)	(2.63)	(1.41)	(1.29)	(1.41)	(0.29)	(0.99)
Terciles	37.5	31.2	17.23	−6.42	6.78	25.58	3.73	7.62	1.57	3.10	2.36	0.77	1.73
			(2.43)	(−1.34)	(2.04)	(1.98)	(0.92)	(2.03)	(0.47)	(1.31)	(1.42)	(0.32)	(1.00)
Formation sample													
Portfolios formed on the regression sample	46.6	54.2	44.21	−3.62	12.58	67.64	10.63	12.58	5.56	5.34	4.26	0.82	3.00
			(2.80)	(−0.56)	(2.44)	(1.94)	(0.95)	(2.44)	(1.26)	(1.23)	(1.38)	(0.19)	(0.95)
Return definition													
Duration-adjusted returns	40.7	48.0	38.51	−1.35	8.84	69.07	10.83	10.44	5.95	5.87	4.06	3.70	2.64
			(2.69)	(−0.33)	(2.44)	(2.01)	(0.97)	(2.37)	(1.41)	(1.71)	(1.33)	(1.09)	(0.85)
Issuer key													
PERMNO-linked sample, PERMNO issuers	54.4	63.5	43.50	−3.26	17.24	52.73	4.96	16.95	7.29	5.93	3.12	−0.16	0.94
			(2.49)	(−0.53)	(2.20)	(2.11)	(0.52)	(2.18)	(1.21)	(0.99)	(0.70)	(−0.03)	(0.21)
Sample filters													
Excluding defaulted bonds	41.6	48.1	37.41	−3.16	10.32	56.83	14.14	13.14	6.14	9.05	8.42	3.76	7.13
			(2.75)	(−0.50)	(2.40)	(1.96)	(1.02)	(2.57)	(1.43)	(1.90)	(2.65)	(0.80)	(2.33)
Excluding Rule 144A bonds	43.6	48.8	42.06	−2.78	10.08	68.07	10.38	12.35	5.20	4.14	3.87	−1.97	2.60
			(2.86)	(−0.45)	(2.23)	(1.95)	(0.95)	(2.35)	(1.12)	(1.01)	(1.59)	(−0.43)	(1.02)
Regression sample and controls													
Single-bond issuers included	40.7	48.0	42.57	−3.19	10.32	70.15	3.44	11.17	4.62	4.64	3.71	0.56	2.60
			(2.89)	(−0.51)	(2.37)	(1.93)	(0.43)	(2.39)	(1.21)	(1.18)	(1.36)	(0.14)	(0.93)
Rating-class dummies in (1)	40.7	48.0	42.57	−3.19	10.32	67.64	10.63	12.58	5.56	5.32	4.26	0.82	3.00
			(2.89)	(−0.51)	(2.37)	(1.94)	(0.95)	(2.44)	(1.26)	(1.23)	(1.38)	(0.19)	(0.95)

Table IA.7: Construction Choices for `val_hz` and `val_ipr`.

The table reports the `val_hz` (PANEL A) and `val_ipr` (PANEL B) sorts under the construction choices of Table IA.5, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^W)$	
Specification	$\overline{\mathcal{I}}^{H}$	$\overline{\mathcal{I}}^{L}$	$\overline{\mathcal{D}}^{H}$	$\overline{\mathcal{D}}^{L}$	$\overline{r}^{W}$	$\overline{r}^{I}$	(4)	$\overline{r}^{W}$	$\widehat{\alpha}(r^W)$	(1)	(4)	(1)	(4)
Panel A: **`val_hz`**													
Main specification	38.7	54.4	24.50	−13.36	14.34	24.48	23.64	15.64	−0.58	13.91	20.67	0.32	18.97
			(2.78)	(−1.78)	(1.91)	(1.69)	(1.89)	(1.88)	(−0.08)	(1.77)	(6.83)	(0.05)	(6.96)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	41.2	56.0	30.36	−8.24	15.35	27.28	25.29	17.28	2.28	14.06	20.55	1.06	18.83
			(3.89)	(−1.18)	(2.40)	(1.63)	(1.89)	(2.32)	(0.39)	(1.87)	(6.55)	(0.16)	(6.87)
Equal-weighted benchmarks	44.2	55.9	16.52	−13.52	13.80	24.79	23.85	15.33	−0.56	14.89	22.62	1.11	21.16
			(2.24)	(−1.88)	(1.82)	(1.65)	(1.99)	(1.83)	(−0.07)	(1.87)	(6.92)	(0.15)	(6.99)
Both equal-weighted	36.8	53.5	21.09	−11.84	12.53	29.93	26.17	14.63	0.41	14.23	21.46	1.66	20.10
			(3.26)	(−1.70)	(2.02)	(1.72)	(2.00)	(2.03)	(0.07)	(1.96)	(6.68)	(0.25)	(6.85)
Number of portfolios													
Quintiles	35.9	43.7	19.86	−13.58	10.83	18.28	17.42	11.87	−2.59	10.67	16.30	−0.40	14.95
			(2.31)	(−1.82)	(1.59)	(1.82)	(2.02)	(1.58)	(−0.39)	(1.68)	(6.97)	(−0.07)	(7.02)
Terciles	31.8	32.9	16.22	−14.99	7.97	14.41	13.31	8.71	−3.50	7.93	12.51	−0.81	11.47
			(1.96)	(−1.97)	(1.40)	(2.01)	(2.15)	(1.37)	(−0.64)	(1.59)	(7.02)	(−0.18)	(7.03)
Formation sample													
Portfolios formed on the regression sample	44.6	60.0	21.49	−13.43	15.64	24.48	23.64	15.64	−0.58	13.91	20.67	0.32	18.97
			(2.56)	(−1.81)	(1.88)	(1.69)	(1.89)	(1.88)	(−0.08)	(1.77)	(6.83)	(0.05)	(6.96)
Return definition													
Duration-adjusted returns	38.7	54.4	23.54	−11.58	13.46	24.35	23.95	14.61	6.66	14.70	21.29	8.62	21.02
			(3.28)	(−2.59)	(2.83)	(1.70)	(1.93)	(2.80)	(1.21)	(2.74)	(6.87)	(1.57)	(7.48)
Issuer key													
PERMNO-linked sample, PERMNO issuers	56.5	65.2	25.77	−15.29	21.40	21.78	30.97	21.75	4.06	19.92	26.46	3.93	23.94
			(2.98)	(−2.02)	(2.36)	(1.48)	(2.08)	(2.32)	(0.49)	(2.21)	(6.22)	(0.48)	(6.10)
Sample filters													
Excluding defaulted bonds	38.8	54.5	24.43	−13.22	14.34	24.77	23.18	15.72	−0.62	12.99	19.32	−1.30	17.02
			(2.78)	(−1.75)	(1.91)	(1.67)	(1.86)	(1.89)	(−0.09)	(1.64)	(6.80)	(−0.18)	(6.38)
Excluding Rule 144A bonds	40.8	55.4	24.88	−13.48	14.79	23.16	21.02	15.86	−1.10	13.90	22.69	−1.27	20.70
			(2.75)	(−1.78)	(1.83)	(1.60)	(1.71)	(1.83)	(−0.15)	(1.60)	(7.24)	(−0.16)	(7.24)
Regression sample and controls													
Single-bond issuers included	38.7	54.4	24.50	−13.36	14.34	30.57	33.65	14.14	−0.77	12.31	18.49	−0.11	16.98
			(2.78)	(−1.78)	(1.91)	(1.93)	(3.14)	(1.86)	(−0.12)	(1.71)	(6.84)	(−0.02)	(6.94)
Rating-class dummies in (1)	38.7	54.4	24.50	−13.36	14.34	24.48	23.64	15.64	−0.58	14.24	20.67	0.40	18.97
			(2.78)	(−1.78)	(1.91)	(1.69)	(1.89)	(1.88)	(−0.08)	(1.77)	(6.83)	(0.06)	(6.96)
Panel B: **`val_ipr`**													
Main specification	31.4	48.3	24.42	−13.85	13.19	30.94	27.45	15.01	8.34	15.03	16.88	12.25	15.06
			(2.96)	(−3.36)	(4.02)	(2.15)	(1.79)	(3.90)	(3.29)	(4.62)	(5.15)	(4.51)	(5.64)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	37.6	51.4	27.79	−8.47	12.49	18.03	28.44	14.44	9.26	15.27	17.09	12.29	15.13
			(2.79)	(−2.47)	(3.56)	(1.04)	(1.77)	(3.57)	(2.80)	(4.69)	(5.45)	(4.14)	(5.64)
Equal-weighted benchmarks	37.3	50.8	16.17	−14.81	13.31	30.95	28.98	15.00	8.54	15.21	16.94	12.28	15.07
			(3.30)	(−4.02)	(4.53)	(2.08)	(1.92)	(4.31)	(3.35)	(4.43)	(4.80)	(4.06)	(5.22)
Both equal-weighted	32.9	48.3	20.73	−15.65	11.67	18.91	30.03	13.56	9.23	14.90	16.52	11.84	14.59
			(2.63)	(−3.31)	(3.58)	(1.08)	(1.89)	(3.70)	(2.84)	(4.38)	(4.97)	(3.64)	(5.15)
Number of portfolios													
Quintiles	29.1	37.8	17.73	−13.85	10.24	21.82	21.22	11.50	6.37	11.09	12.43	8.85	10.98
			(3.85)	(−4.03)	(4.45)	(2.21)	(1.92)	(4.29)	(3.48)	(4.42)	(4.82)	(4.39)	(5.31)
Terciles	24.8	26.7	18.07	−16.66	8.59	17.20	16.73	9.51	5.73	8.05	9.02	6.37	7.94
			(4.32)	(−4.57)	(4.86)	(2.42)	(2.03)	(4.73)	(4.18)	(4.31)	(4.69)	(4.25)	(5.15)
Formation sample													
Portfolios formed on the regression sample	38.9	53.4	21.99	−14.15	15.01	30.94	27.45	15.01	8.34	15.03	16.88	12.25	15.06
			(3.10)	(−3.30)	(3.90)	(2.15)	(1.79)	(3.90)	(3.29)	(4.62)	(5.15)	(4.51)	(5.64)
Return definition													
Duration-adjusted returns	31.4	48.3	24.24	−13.27	13.41	30.92	27.66	15.14	11.12	15.21	17.07	13.18	15.69
			(3.06)	(−3.85)	(4.44)	(2.18)	(1.81)	(4.24)	(4.04)	(4.48)	(5.17)	(4.72)	(5.75)
Issuer key													
PERMNO-linked sample, PERMNO issuers	49.0	59.3	27.34	−15.56	20.30	28.71	31.89	20.85	13.68	22.53	23.68	18.89	21.79
			(2.89)	(−3.48)	(4.26)	(2.00)	(1.91)	(4.04)	(4.28)	(4.91)	(5.78)	(5.31)	(6.49)
Sample filters													
Excluding defaulted bonds	31.4	48.5	23.96	−13.90	13.14	34.02	31.21	14.84	8.25	14.17	15.38	11.53	13.85
			(3.01)	(−3.38)	(4.05)	(2.29)	(2.13)	(3.84)	(3.17)	(4.83)	(5.52)	(4.48)	(5.90)
Excluding Rule 144A bonds	33.3	49.9	23.71	−13.79	13.32	29.28	25.71	14.80	7.25	15.10	17.05	11.55	15.05
			(2.85)	(−3.16)	(3.67)	(2.04)	(1.69)	(3.60)	(2.83)	(4.71)	(5.22)	(4.84)	(5.81)
Regression sample and controls													
Single-bond issuers included	31.4	48.3	24.42	−13.85	13.19	36.31	43.27	12.92	7.34	12.89	14.39	10.57	12.87
			(2.96)	(−3.36)	(4.02)	(2.24)	(2.45)	(3.98)	(3.56)	(4.69)	(5.27)	(4.56)	(5.74)
Rating-class dummies in (1)	31.4	48.3	24.42	−13.85	13.19	30.94	27.45	15.01	8.34	15.34	16.88	12.32	15.06
			(2.96)	(−3.36)	(4.02)	(2.15)	(1.79)	(3.90)	(3.29)	(4.56)	(5.15)	(4.46)	(5.64)

Table IA.8: Construction Choices for `tmat` and `md_dur`.

The table reports the `tmat` (PANEL A) and `md_dur` (PANEL B) sorts under the construction choices of Table IA.5, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^W)$	
Specification	$\bar{\mathcal{I}}^H$	$\bar{\mathcal{I}}^L$	$\bar{\mathcal{D}}^H$	$\bar{\mathcal{D}}^L$	$\bar{r}^W$	$\bar{r}^I$	(4)	$\bar{r}^W$	$\widehat{\alpha}(r^W)$	(1)	(4)	(1)	(4)
Panel A: `tmat`													
Main specification	64.4	64.2	13.41	−14.60	17.90	5.51	4.03	19.78	−14.31	16.34	16.22	−11.76	−11.72
			(1.22)	(−1.79)	(1.47)	(1.02)	(0.97)	(1.51)	(−1.88)	(1.44)	(1.42)	(−2.09)	(−2.07)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	62.6	64.6	15.84	−12.12	17.40	0.00	4.56	20.43	−11.76	15.77	15.64	−11.28	−11.26
			(1.51)	(−1.38)	(1.48)	(0.00)	(1.01)	(1.57)	(−1.73)	(1.43)	(1.42)	(−1.96)	(−1.95)
Equal-weighted benchmarks	68.1	65.1	12.33	−15.66	18.36	4.82	4.15	20.46	−14.77	18.24	17.67	−10.93	−11.31
			(1.12)	(−1.93)	(1.46)	(0.94)	(1.10)	(1.51)	(−1.91)	(1.53)	(1.49)	(−1.96)	(−2.05)
Both equal-weighted	63.2	62.6	13.20	−14.90	17.20	0.36	5.35	20.07	−12.30	16.79	16.28	−10.53	−10.86
			(1.26)	(−1.67)	(1.45)	(0.06)	(1.21)	(1.55)	(−1.85)	(1.50)	(1.46)	(−1.89)	(−1.98)
Number of portfolios													
Quintiles	53.1	54.4	14.78	−14.68	16.01	5.06	3.91	17.80	−12.45	13.82	13.71	−10.14	−10.11
			(1.29)	(−1.74)	(1.51)	(1.10)	(1.03)	(1.54)	(−1.96)	(1.44)	(1.43)	(−2.22)	(−2.20)
Terciles	44.1	43.3	12.52	−13.69	11.95	3.62	2.87	13.49	−10.04	9.79	9.71	−7.55	−7.53
			(1.22)	(−1.57)	(1.45)	(0.96)	(0.95)	(1.49)	(−1.98)	(1.40)	(1.39)	(−2.19)	(−2.17)
Formation sample													
Portfolios formed on the regression sample	68.4	72.1	13.73	−14.57	19.78	5.51	4.03	19.78	−14.31	16.34	16.22	−11.76	−11.72
			(1.24)	(−1.80)	(1.51)	(1.02)	(0.97)	(1.51)	(−1.88)	(1.44)	(1.42)	(−2.09)	(−2.07)
Return definition													
Duration-adjusted returns	64.4	64.2	5.77	−7.18	8.90	1.14	0.61	9.84	−9.49	9.16	9.07	−6.00	−5.96
			(0.83)	(−1.12)	(1.09)	(0.41)	(0.22)	(1.11)	(−1.40)	(1.08)	(1.08)	(−0.92)	(−0.93)
Issuer key													
PERMNO-linked sample, PERMNO issuers	73.4	78.0	13.04	−15.01	21.45	2.87	0.50	22.16	−16.01	17.80	17.23	−14.88	−15.50
			(1.18)	(−1.77)	(1.50)	(0.65)	(0.14)	(1.52)	(−1.94)	(1.35)	(1.30)	(−2.27)	(−2.32)
Sample filters													
Excluding defaulted bonds	64.4	64.3	13.33	−14.33	17.70	5.56	4.18	19.52	−14.57	16.51	15.76	−11.67	−12.33
			(1.21)	(−1.76)	(1.46)	(1.03)	(1.02)	(1.49)	(−1.92)	(1.44)	(1.38)	(−2.07)	(−2.18)
Excluding Rule 144A bonds	65.8	65.8	13.42	−14.54	17.82	6.08	3.59	19.61	−15.08	16.34	16.49	−12.33	−12.04
			(1.23)	(−1.76)	(1.42)	(1.15)	(0.91)	(1.47)	(−1.92)	(1.41)	(1.42)	(−2.11)	(−2.06)
Regression sample and controls													
Single-bond issuers included	64.4	64.2	13.41	−14.60	17.90	6.08	6.67	18.09	−13.48	15.18	15.08	−11.04	−10.99
			(1.22)	(−1.79)	(1.47)	(1.04)	(1.43)	(1.48)	(−1.87)	(1.43)	(1.42)	(−2.08)	(−2.06)
Rating-class dummies in (1)	64.4	64.2	13.41	−14.60	17.90	5.51	4.03	19.78	−14.31	16.35	16.22	−11.74	−11.72
			(1.22)	(−1.79)	(1.47)	(1.02)	(0.97)	(1.51)	(−1.88)	(1.44)	(1.42)	(−2.09)	(−2.07)
Panel B: `md_dur`													
Main specification	63.3	64.1	10.14	−14.25	15.64	−1.75	0.19	17.13	−16.48	17.35	17.15	−15.41	−15.51
			(0.90)	(−1.76)	(1.29)	(−0.27)	(0.04)	(1.31)	(−2.07)	(1.32)	(1.30)	(−2.29)	(−2.28)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	60.9	63.4	9.52	−6.07	9.97	−23.06	0.39	14.01	−17.06	16.27	16.08	−14.50	−14.59
			(0.91)	(−0.63)	(0.87)	(−1.64)	(0.07)	(1.12)	(−2.33)	(1.29)	(1.27)	(−2.11)	(−2.11)
Equal-weighted benchmarks	66.7	65.0	9.59	−15.61	16.40	−2.71	0.80	18.08	−16.56	19.02	18.36	−14.71	−15.23
			(0.85)	(−1.94)	(1.31)	(−0.43)	(0.17)	(1.34)	(−2.02)	(1.40)	(1.35)	(−2.17)	(−2.25)
Both equal-weighted	61.3	61.2	7.89	−11.47	11.57	−24.38	1.44	15.33	−16.19	16.92	16.35	−13.89	−14.33
			(0.74)	(−1.26)	(1.01)	(−1.65)	(0.25)	(1.22)	(−2.24)	(1.33)	(1.29)	(−2.05)	(−2.12)
Number of portfolios													
Quintiles	53.0	54.6	14.02	−14.30	15.44	0.33	0.37	16.98	−13.10	14.83	14.66	−13.68	−13.77
			(1.22)	(−1.72)	(1.46)	(0.07)	(0.08)	(1.47)	(−2.02)	(1.31)	(1.29)	(−2.43)	(−2.42)
Terciles	43.1	43.6	11.95	−13.31	11.37	−0.49	0.15	12.90	−10.03	11.20	11.07	−10.18	−10.25
			(1.17)	(−1.55)	(1.41)	(−0.12)	(0.04)	(1.45)	(−1.97)	(1.32)	(1.30)	(−2.29)	(−2.29)
Formation sample													
Portfolios formed on the regression sample	67.1	72.2	9.89	−14.60	17.13	−1.75	0.19	17.13	−16.48	17.35	17.15	−15.41	−15.51
			(0.87)	(−1.81)	(1.31)	(−0.27)	(0.04)	(1.31)	(−2.07)	(1.32)	(1.30)	(−2.29)	(−2.28)
Return definition													
Duration-adjusted returns	63.3	64.1	2.30	−6.85	6.51	−6.25	−4.00	7.01	−11.80	7.57	7.39	−9.98	−10.07
			(0.35)	(−1.07)	(0.83)	(−1.75)	(−1.41)	(0.83)	(−1.81)	(0.79)	(0.78)	(−1.33)	(−1.35)
Issuer key													
PERMNO-linked sample, PERMNO issuers	71.6	77.9	9.19	−15.06	18.63	−3.86	−2.12	18.99	−18.10	18.88	18.24	−17.32	−18.12
			(0.82)	(−1.79)	(1.32)	(−0.66)	(−0.46)	(1.32)	(−2.09)	(1.30)	(1.24)	(−2.30)	(−2.39)
Sample filters													
Excluding defaulted bonds	63.4	64.2	10.19	−13.97	15.43	0.14	0.83	16.79	−16.78	17.40	16.55	−15.55	−16.39
			(0.90)	(−1.73)	(1.28)	(0.02)	(0.16)	(1.29)	(−2.11)	(1.32)	(1.25)	(−2.30)	(−2.41)
Excluding Rule 144A bonds	64.6	65.7	9.96	−14.17	15.38	−1.46	0.24	17.05	−17.20	17.42	17.45	−15.85	−15.72
			(0.89)	(−1.73)	(1.23)	(−0.23)	(0.05)	(1.28)	(−2.10)	(1.31)	(1.31)	(−2.28)	(−2.25)
Regression sample and controls													
Single-bond issuers included	63.3	64.1	10.14	−14.25	15.64	−1.60	2.67	15.98	−15.13	15.97	15.81	−14.36	−14.43
			(0.90)	(−1.76)	(1.29)	(−0.23)	(0.46)	(1.32)	(−2.05)	(1.31)	(1.29)	(−2.27)	(−2.27)
Rating-class dummies in (1)	63.3	64.1	10.14	−14.25	15.64	−1.75	0.19	17.13	−16.48	17.35	17.15	−15.42	−15.51
			(0.90)	(−1.76)	(1.29)	(−0.27)	(0.04)	(1.31)	(−2.07)	(1.32)	(1.30)	(−2.29)	(−2.28)

Table IA.9: Construction Choices for `age` and `convx`.

The table reports the `age` (PANEL A) and `convx` (PANEL B) sorts under the construction choices of Table IA.5, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^W)$	
Specification	$\overline{\mathcal{I}}^{H}$	$\overline{\mathcal{I}}^{L}$	$\overline{\mathcal{D}}^{H}$	$\overline{\mathcal{D}}^{L}$	$\overline{r}^{W}$	$\overline{r}^{I}$	(4)	$\overline{r}^{W}$	$\widehat{\alpha}(r^W)$	(1)	(4)	(1)	(4)
Panel A: `age`													
Main specification	40.4	46.4	6.85	1.80	2.01	5.93	2.70	−0.08	1.72	−1.63	−0.57	3.07	0.53
			(1.97)	(0.76)	(1.43)	(1.36)	(1.14)	(−0.04)	(1.04)	(−0.79)	(−0.52)	(2.24)	(0.45)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	42.7	49.7	12.04	1.22	4.43	12.60	2.82	1.12	3.19	−1.96	−0.69	3.11	0.46
			(5.02)	(0.57)	(3.51)	(1.87)	(1.08)	(0.68)	(1.82)	(−0.89)	(−0.59)	(2.19)	(0.37)
Equal-weighted benchmarks	43.1	51.1	3.72	1.51	1.15	6.70	2.51	−0.86	0.74	−0.75	−0.01	3.41	0.91
			(0.94)	(0.59)	(0.73)	(1.50)	(1.04)	(−0.46)	(0.44)	(−0.40)	(−0.01)	(2.44)	(0.79)
Both equal-weighted	34.2	48.4	7.40	−0.39	2.76	13.88	2.81	−0.16	1.88	−0.93	−0.13	3.20	0.77
			(2.53)	(−0.17)	(2.36)	(2.01)	(1.00)	(−0.10)	(1.17)	(−0.50)	(−0.12)	(2.39)	(0.68)
Number of portfolios													
Quintiles	40.0	39.7	−2.17	0.64	−0.93	5.33	1.74	−1.43	3.12	−1.36	−0.51	2.25	0.33
			(−0.92)	(0.26)	(−0.56)	(1.99)	(1.02)	(−0.71)	(2.40)	(−0.85)	(−0.59)	(2.13)	(0.36)
Terciles	34.2	31.7	−2.06	1.29	−1.16	4.22	1.20	−1.42	3.03	−1.21	−0.49	1.62	0.13
			(−0.87)	(0.53)	(−0.76)	(2.26)	(0.89)	(−0.79)	(2.81)	(−0.96)	(−0.73)	(2.07)	(0.18)
Formation sample													
Portfolios formed on the regression sample	50.4	53.1	1.95	2.11	−0.08	5.93	2.70	−0.08	1.72	−1.63	−0.57	3.07	0.53
			(0.69)	(0.87)	(−0.04)	(1.36)	(1.14)	(−0.04)	(1.04)	(−0.79)	(−0.52)	(2.24)	(0.45)
Return definition													
Duration-adjusted returns	40.4	46.4	3.40	−0.92	2.10	6.26	3.44	1.35	3.12	0.40	0.44	3.35	1.35
			(0.91)	(−0.56)	(1.62)	(1.49)	(1.44)	(0.91)	(2.37)	(0.28)	(0.46)	(3.58)	(1.39)
Issuer key													
PERMNO-linked sample, PERMNO issuers	73.9	61.9	6.71	−0.26	5.03	4.31	1.15	2.22	2.74	−1.95	−1.85	4.39	0.16
			(1.78)	(−0.10)	(1.61)	(1.54)	(0.38)	(0.71)	(0.94)	(−0.66)	(−0.94)	(1.89)	(0.08)
Sample filters													
Excluding defaulted bonds	40.4	46.4	7.57	1.71	2.32	5.70	4.37	0.09	1.80	−1.67	−1.12	3.18	0.04
			(2.43)	(0.73)	(1.88)	(1.43)	(2.07)	(0.05)	(1.09)	(−0.80)	(−1.03)	(2.37)	(0.03)
Excluding Rule 144A bonds	39.6	49.8	6.07	1.93	1.51	6.22	2.00	0.06	1.86	−1.42	−0.16	3.18	0.83
			(1.88)	(0.81)	(1.10)	(1.43)	(0.84)	(0.03)	(1.08)	(−0.72)	(−0.15)	(2.49)	(0.70)
Regression sample and controls													
Single-bond issuers included	40.4	46.4	6.85	1.80	2.01	5.76	6.13	0.22	1.58	−1.37	−0.47	2.70	0.46
			(1.97)	(0.76)	(1.43)	(1.44)	(3.17)	(0.15)	(1.16)	(−0.77)	(−0.50)	(2.30)	(0.46)
Rating-class dummies in (1)	40.4	46.4	6.85	1.80	2.01	5.93	2.70	−0.08	1.72	−1.65	−0.57	3.12	0.53
			(1.97)	(0.76)	(1.43)	(1.36)	(1.14)	(−0.04)	(1.04)	(−0.80)	(−0.52)	(2.33)	(0.45)
Panel B: `convx`													
Main specification	63.6	64.2	11.12	−14.37	16.24	−0.51	1.23	17.74	−16.20	13.73	13.57	−15.17	−15.20
			(0.99)	(−1.77)	(1.34)	(−0.08)	(0.28)	(1.35)	(−2.09)	(1.18)	(1.17)	(−2.29)	(−2.28)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	61.3	63.7	11.14	−7.55	11.58	−16.83	1.63	14.72	−16.27	12.91	12.76	−14.28	−14.30
			(1.06)	(−0.81)	(1.00)	(−1.48)	(0.33)	(1.16)	(−2.40)	(1.16)	(1.15)	(−2.13)	(−2.13)
Equal-weighted benchmarks	67.2	65.1	10.35	−15.64	16.94	−1.30	2.14	18.54	−16.48	15.07	14.63	−14.90	−15.19
			(0.92)	(−1.94)	(1.35)	(−0.22)	(0.53)	(1.37)	(−2.07)	(1.25)	(1.21)	(−2.25)	(−2.29)
Both equal-weighted	61.8	61.6	9.41	−12.51	12.95	−17.84	3.17	15.73	−15.67	13.46	13.08	−14.00	−14.24
			(0.89)	(−1.38)	(1.12)	(−1.50)	(0.65)	(1.24)	(−2.36)	(1.19)	(1.16)	(−2.14)	(−2.18)
Number of portfolios													
Quintiles	53.0	54.7	14.28	−14.41	15.62	1.85	1.26	17.36	−12.82	11.44	11.30	−12.31	−12.34
			(1.25)	(−1.73)	(1.47)	(0.39)	(0.33)	(1.50)	(−1.99)	(1.22)	(1.20)	(−2.36)	(−2.35)
Terciles	43.3	43.6	12.08	−13.27	11.48	0.49	0.86	13.08	−9.92	7.76	7.65	−8.45	−8.48
			(1.19)	(−1.54)	(1.42)	(0.12)	(0.29)	(1.46)	(−1.94)	(1.19)	(1.17)	(−2.20)	(−2.19)
Formation sample													
Portfolios formed on the regression sample	67.3	72.3	10.66	−14.67	17.74	−0.51	1.23	17.74	−16.20	13.73	13.57	−15.17	−15.20
			(0.94)	(−1.81)	(1.35)	(−0.08)	(0.28)	(1.35)	(−2.09)	(1.18)	(1.17)	(−2.29)	(−2.28)
Return definition													
Duration-adjusted returns	63.6	64.2	3.36	−7.06	7.31	−5.02	−2.44	7.70	−11.42	6.16	6.05	−9.48	−9.51
			(0.50)	(−1.10)	(0.92)	(−1.56)	(−1.06)	(0.89)	(−1.73)	(0.77)	(0.77)	(−1.54)	(−1.56)
Issuer key													
PERMNO-linked sample, PERMNO issuers	72.2	78.0	10.25	−14.69	19.08	−2.66	−1.01	19.54	−17.93	14.66	14.13	−17.19	−17.86
			(0.91)	(−1.74)	(1.34)	(−0.49)	(−0.27)	(1.35)	(−2.08)	(1.14)	(1.09)	(−2.31)	(−2.39)
Sample filters													
Excluding defaulted bonds	63.7	64.3	11.11	−13.98	16.05	0.97	1.41	17.63	−16.30	13.81	13.08	−15.17	−15.84
			(0.99)	(−1.72)	(1.32)	(0.16)	(0.33)	(1.35)	(−2.10)	(1.19)	(1.13)	(−2.29)	(−2.38)
Excluding Rule 144A bonds	64.9	65.8	11.04	−14.38	16.11	−0.21	1.12	17.57	−17.00	13.66	13.69	−15.87	−15.70
			(0.99)	(−1.75)	(1.29)	(−0.03)	(0.27)	(1.32)	(−2.13)	(1.15)	(1.16)	(−2.31)	(−2.29)
Regression sample and controls													
Single-bond issuers included	63.6	64.2	11.12	−14.37	16.24	−0.74	3.82	16.74	−14.59	12.70	12.56	−14.11	−14.12
			(0.99)	(−1.77)	(1.34)	(−0.12)	(0.79)	(1.38)	(−2.01)	(1.18)	(1.16)	(−2.28)	(−2.27)
Rating-class dummies in (1)	63.6	64.2	11.12	−14.37	16.24	−0.51	1.23	17.74	−16.20	13.78	13.57	−15.14	−15.20
			(0.99)	(−1.77)	(1.34)	(−0.08)	(0.28)	(1.35)	(−2.09)	(1.19)	(1.17)	(−2.29)	(−2.28)

Table IA.10: Construction Choices for `sze` and `ilq`.

The table reports the `sze` (PANEL A) and `ilq` (PANEL B) sorts under the construction choices of Table IA.5, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{\,I}$			$\overline{C}^{\,W}$		$\widehat{\alpha}(C^W)$	
Specification	$\overline{\mathcal{I}}^{H}$	$\overline{\mathcal{I}}^{L}$	$\overline{\mathcal{D}}^{H}$	$\overline{\mathcal{D}}^{L}$	$\overline{r}^{\,W}$	$\overline{r}^{\,I}$	(4)	$\overline{r}^{\,W}$	$\widehat{\alpha}(r^W)$	(1)	(4)	(1)	(4)
Panel A: `sze`													
Main specification	24.1	55.5	0.27	2.99	−0.94	−33.21	2.09	−0.88	−2.40	−0.55	−0.37	−1.45	−0.84
			(0.20)	(0.64)	(−0.39)	(−1.42)	(0.52)	(−0.42)	(−1.21)	(−0.66)	(−0.77)	(−1.79)	(−1.49)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	30.4	53.6	−0.07	13.90	−8.20	−46.84	2.07	−7.56	−8.13	−0.50	−0.36	−1.16	−0.69
			(−0.07)	(1.80)	(−1.64)	(−1.55)	(0.56)	(−2.07)	(−2.37)	(−0.76)	(−0.96)	(−1.81)	(−1.62)
Equal-weighted benchmarks	42.2	42.9	−0.54	−11.78	5.47	−38.79	−0.16	4.70	2.18	−1.44	−0.99	−2.66	−1.96
			(−0.33)	(−1.83)	(1.70)	(−1.56)	(−0.04)	(1.61)	(0.82)	(−1.03)	(−1.10)	(−2.03)	(−1.92)
Both equal-weighted	42.1	28.2	−1.09	3.92	−1.67	−53.63	0.06	−0.77	−2.25	−1.08	−0.71	−1.97	−1.45
			(−0.82)	(0.83)	(−0.88)	(−1.66)	(0.02)	(−0.48)	(−1.43)	(−1.03)	(−1.05)	(−2.01)	(−1.88)
Number of portfolios													
Quintiles	17.3	43.7	−0.53	3.86	−1.74	−15.00	1.77	−1.29	−1.81	−0.30	−0.25	−0.86	−0.55
			(−0.42)	(1.51)	(−1.38)	(−0.98)	(0.53)	(−0.88)	(−1.20)	(−0.56)	(−0.81)	(−1.68)	(−1.54)
Terciles	11.5	33.3	−1.34	5.57	−1.89	−13.31	1.36	−1.14	−1.91	−0.19	−0.15	−0.61	−0.38
			(−1.08)	(1.88)	(−2.02)	(−1.47)	(0.51)	(−1.37)	(−2.31)	(−0.48)	(−0.63)	(−1.63)	(−1.41)
Formation sample													
Portfolios formed on the regression sample	28.9	62.0	1.38	2.08	−0.88	−33.21	2.09	−0.88	−2.40	−0.55	−0.37	−1.45	−0.84
			(0.86)	(0.69)	(−0.42)	(−1.42)	(0.52)	(−0.42)	(−1.21)	(−0.66)	(−0.77)	(−1.79)	(−1.49)
Return definition													
Duration-adjusted returns	24.1	55.5	−0.43	3.49	−1.63	−30.59	1.94	−1.28	−2.58	−0.90	−0.53	−1.66	−0.90
			(−0.41)	(0.77)	(−0.71)	(−1.30)	(0.49)	(−0.65)	(−1.29)	(−1.48)	(−1.15)	(−2.58)	(−1.75)
Issuer key													
PERMNO-linked sample, PERMNO issuers	32.5	90.6	−0.38	9.15	−8.33	−13.09	0.43	−4.75	−2.12	−1.03	0.50	−3.88	−1.39
			(−0.24)	(1.14)	(−1.07)	(−1.22)	(0.21)	(−0.66)	(−0.31)	(−0.40)	(0.29)	(−1.49)	(−0.70)
Sample filters													
Excluding defaulted bonds	24.1	55.6	0.39	2.52	−0.53	−15.72	1.21	−2.93	−3.99	−0.49	−0.08	−1.41	−0.54
			(0.29)	(0.69)	(−0.28)	(−1.06)	(0.34)	(−1.15)	(−1.80)	(−0.59)	(−0.18)	(−1.72)	(−1.00)
Excluding Rule 144A bonds	24.5	53.1	0.35	5.79	−1.71	−33.27	2.55	−0.90	−2.71	−0.49	−0.36	−1.54	−0.88
			(0.25)	(1.55)	(−0.81)	(−1.40)	(0.66)	(−0.46)	(−1.42)	(−0.58)	(−0.78)	(−1.92)	(−1.60)
Regression sample and controls													
Single-bond issuers included	24.1	55.5	0.27	2.99	−0.94	−30.14	−3.94	−0.84	−2.17	−0.49	−0.32	−1.25	−0.72
			(0.20)	(0.64)	(−0.39)	(−1.39)	(−0.96)	(−0.45)	(−1.25)	(−0.69)	(−0.77)	(−1.80)	(−1.51)
Rating-class dummies in (1)	24.1	55.5	0.27	2.99	−0.94	−33.21	2.09	−0.88	−2.40	−0.56	−0.37	−1.49	−0.84
			(0.20)	(0.64)	(−0.39)	(−1.42)	(0.52)	(−0.42)	(−1.21)	(−0.67)	(−0.77)	(−1.90)	(−1.49)
Panel B: `ilq`													
Main specification	56.2	51.8	12.78	0.47	6.05	19.58	9.60	7.03	4.30	1.29	0.99	−0.23	0.68
			(1.97)	(0.10)	(1.92)	(1.57)	(1.81)	(1.91)	(1.38)	(0.66)	(0.59)	(−0.12)	(0.39)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	55.5	53.4	23.47	4.74	9.01	39.25	16.03	10.37	10.15	1.87	1.48	0.06	1.17
			(2.92)	(0.93)	(2.93)	(1.64)	(1.61)	(2.99)	(2.94)	(0.65)	(0.57)	(0.02)	(0.44)
Equal-weighted benchmarks	55.4	58.0	6.91	−1.04	3.87	22.05	10.79	4.56	2.18	3.01	2.63	1.42	2.04
			(1.09)	(−0.21)	(1.25)	(1.73)	(1.92)	(1.27)	(0.69)	(1.17)	(1.10)	(0.56)	(0.85)
Both equal-weighted	49.5	54.2	11.30	0.38	4.77	44.28	20.02	5.35	5.77	3.75	3.25	1.82	2.46
			(2.12)	(0.08)	(1.92)	(1.75)	(1.71)	(1.91)	(2.03)	(1.14)	(1.06)	(0.57)	(0.82)
Number of portfolios													
Quintiles	52.4	43.4	8.22	−4.68	5.56	16.43	5.39	6.70	−0.18	0.65	0.52	−0.18	0.34
			(1.40)	(−1.15)	(1.40)	(1.79)	(1.79)	(1.48)	(−0.05)	(0.61)	(0.59)	(−0.17)	(0.37)
Terciles	45.9	31.4	6.30	−5.51	4.15	13.35	3.31	4.64	−3.02	0.33	0.29	−0.17	0.17
			(1.15)	(−1.19)	(1.05)	(2.17)	(1.76)	(1.04)	(−0.93)	(0.53)	(0.56)	(−0.26)	(0.31)
Formation sample													
Portfolios formed on the regression sample	68.0	58.4	10.99	−0.16	7.03	19.58	9.60	7.03	4.30	1.29	0.99	−0.23	0.68
			(1.72)	(−0.03)	(1.91)	(1.57)	(1.81)	(1.91)	(1.38)	(0.66)	(0.59)	(−0.12)	(0.39)
Return definition													
Duration-adjusted returns	56.2	51.8	9.86	2.18	3.65	18.23	9.69	3.96	2.77	0.87	0.98	0.05	0.66
			(1.73)	(0.65)	(1.47)	(1.49)	(1.83)	(1.30)	(1.00)	(0.49)	(0.59)	(0.03)	(0.38)
Issuer key													
PERMNO-linked sample, PERMNO issuers	72.8	63.3	12.25	−0.26	8.15	12.76	4.24	8.94	5.12	5.01	4.62	2.96	4.35
			(1.69)	(−0.05)	(1.74)	(1.55)	(1.20)	(1.81)	(1.29)	(1.62)	(1.62)	(0.99)	(1.51)
Sample filters													
Excluding defaulted bonds	56.5	51.9	11.65	0.36	5.64	13.57	8.06	6.58	3.42	3.46	3.43	1.88	3.42
			(1.85)	(0.07)	(1.82)	(1.30)	(1.62)	(1.84)	(1.14)	(1.88)	(2.29)	(1.05)	(2.29)
Excluding Rule 144A bonds	57.2	55.6	13.04	0.40	6.14	21.12	9.83	7.27	4.38	1.15	0.43	−0.57	0.15
			(2.02)	(0.08)	(1.70)	(1.72)	(1.82)	(1.77)	(1.23)	(0.62)	(0.29)	(−0.30)	(0.09)
Regression sample and controls													
Single-bond issuers included	56.2	51.8	12.78	0.47	6.05	21.90	3.52	5.58	3.72	1.00	0.83	−0.30	0.56
			(1.97)	(0.10)	(1.92)	(1.84)	(0.99)	(1.79)	(1.35)	(0.60)	(0.58)	(−0.17)	(0.37)
Rating-class dummies in (1)	56.2	51.8	12.78	0.47	6.05	19.58	9.60	7.03	4.30	1.29	0.99	−0.23	0.68
			(1.97)	(0.10)	(1.92)	(1.57)	(1.81)	(1.91)	(1.38)	(0.66)	(0.59)	(−0.12)	(0.39)

Table IA.11: Construction Choices for `ami` and `spd_rel`.

The table reports the `ami` (Panel A) and `spd_rel` (Panel B) sorts under the construction choices of Table IA.5, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^{W})$	
Specification	$\bar{\mathcal{I}}^{H}$	$\bar{\mathcal{I}}^{L}$	$\bar{\mathcal{D}}^{H}$	$\bar{\mathcal{D}}^{L}$	$\bar{r}^{W}$	$\bar{r}^{I}$	(4)	$\bar{r}^{W}$	$\widehat{\alpha}(r^{W})$	(1)	(4)	(1)	(4)
Panel A: `ami`													
Main specification	59.3	40.4	11.04	−3.39	7.36	19.30	7.24	8.32	−2.40	0.19	−0.22	−1.92	−0.65
			(2.32)	(−0.93)	(1.74)	(1.30)	(1.25)	(1.75)	(−0.88)	(0.09)	(−0.11)	(−0.88)	(−0.31)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	57.6	44.2	25.94	−2.72	14.05	47.54	19.33	15.42	6.19	0.43	−0.11	−1.83	−0.56
			(2.84)	(−0.74)	(2.81)	(1.53)	(1.25)	(2.75)	(1.41)	(0.18)	(−0.05)	(−0.75)	(−0.24)
Equal-weighted benchmarks	57.9	52.1	4.99	−2.42	3.91	23.36	10.12	4.26	−5.99	1.67	1.42	−0.23	0.93
			(1.04)	(−0.87)	(0.97)	(1.49)	(1.62)	(0.94)	(−2.21)	(0.76)	(0.68)	(−0.11)	(0.44)
Both equal-weighted	49.6	49.6	13.11	−2.19	6.78	55.64	26.38	7.32	−1.20	2.31	2.09	0.51	1.59
			(2.92)	(−0.70)	(1.98)	(1.66)	(1.49)	(1.90)	(−0.51)	(0.83)	(0.78)	(0.19)	(0.60)
Number of portfolios													
Quintiles	54.5	31.1	8.42	−3.49	5.13	9.10	3.36	5.66	−3.20	−0.04	−0.22	−1.14	−0.40
			(2.05)	(−0.95)	(1.49)	(1.03)	(1.14)	(1.48)	(−1.47)	(−0.04)	(−0.21)	(−0.98)	(−0.36)
Terciles	46.8	23.0	6.16	−4.25	3.50	4.31	1.99	3.77	−3.64	0.00	−0.08	−0.63	−0.17
			(1.62)	(−1.13)	(1.26)	(0.72)	(1.09)	(1.22)	(−2.10)	(−0.01)	(−0.14)	(−0.94)	(−0.27)
Formation sample													
Portfolios formed on the regression sample	70.5	44.7	10.36	−2.98	8.32	19.30	7.24	8.32	−2.40	0.19	−0.22	−1.92	−0.65
			(2.24)	(−0.83)	(1.75)	(1.30)	(1.25)	(1.75)	(−0.88)	(0.09)	(−0.11)	(−0.88)	(−0.31)
Return definition													
Duration-adjusted returns	59.3	40.4	9.78	−2.89	6.71	18.36	7.32	7.34	1.82	0.07	−0.10	−0.96	−0.49
			(2.43)	(−1.30)	(2.23)	(1.26)	(1.27)	(2.13)	(0.74)	(0.03)	(−0.05)	(−0.45)	(−0.24)
Issuer key													
PERMNO-linked sample, PERMNO issuers	76.8	50.3	11.12	−2.93	9.58	12.31	2.50	9.93	−1.94	0.13	−0.79	−2.76	−1.15
			(2.06)	(−0.79)	(1.72)	(1.33)	(0.66)	(1.74)	(−0.74)	(0.03)	(−0.23)	(−0.75)	(−0.32)
Sample filters													
Excluding defaulted bonds	59.5	40.4	10.21	−3.41	7.00	14.66	7.22	8.06	−2.45	1.69	1.12	−0.10	1.30
			(2.32)	(−0.93)	(1.71)	(1.35)	(1.53)	(1.72)	(−0.92)	(0.80)	(0.62)	(−0.05)	(0.70)
Excluding Rule 144A bonds	59.6	41.5	10.79	−3.27	7.01	19.82	7.52	8.35	−2.71	−0.33	−0.86	−2.61	−1.30
			(2.28)	(−0.82)	(1.57)	(1.34)	(1.26)	(1.69)	(−0.91)	(−0.20)	(−0.61)	(−1.64)	(−0.89)
Regression sample and controls													
Single-bond issuers included	59.3	40.4	11.04	−3.39	7.36	20.33	2.61	6.84	−2.43	0.08	−0.20	−1.70	−0.51
			(2.32)	(−0.93)	(1.74)	(1.35)	(0.69)	(1.64)	(−0.98)	(0.04)	(−0.12)	(−0.90)	(−0.28)
Rating-class dummies in (1)	59.3	40.4	11.04	−3.39	7.36	19.30	7.24	8.32	−2.40	0.18	−0.22	−1.93	−0.65
			(2.32)	(−0.93)	(1.74)	(1.30)	(1.25)	(1.75)	(−0.88)	(0.09)	(−0.11)	(−0.89)	(−0.31)
Panel B: `spd_rel`													
Main specification	59.0	56.1	11.59	−4.60	8.96	13.90	8.47	9.41	3.31	1.55	−1.92	−3.58	−1.61
			(2.06)	(−2.05)	(2.97)	(1.16)	(0.97)	(2.56)	(1.42)	(0.38)	(−0.55)	(−1.10)	(−0.49)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	56.6	56.6	25.72	−1.94	14.91	23.17	10.54	12.29	9.19	−1.49	−5.07	−6.03	−4.17
			(2.64)	(−0.89)	(3.15)	(1.22)	(0.85)	(3.37)	(3.17)	(−0.27)	(−0.94)	(−1.28)	(−0.89)
Equal-weighted benchmarks	58.0	57.8	6.28	−5.98	6.73	16.29	9.13	7.02	1.27	1.52	−1.42	−3.54	−1.59
			(1.12)	(−2.62)	(2.30)	(1.31)	(1.04)	(1.99)	(0.54)	(0.40)	(−0.42)	(−1.13)	(−0.49)
Both equal-weighted	48.8	55.7	14.36	−6.91	10.26	27.58	11.72	7.88	5.09	−1.35	−4.22	−5.78	−3.94
			(2.28)	(−2.44)	(2.94)	(1.41)	(0.91)	(2.62)	(2.16)	(−0.27)	(−0.86)	(−1.31)	(−0.88)
Number of portfolios													
Quintiles	54.3	46.8	9.08	−5.76	7.43	13.25	6.85	7.95	−0.40	1.22	−1.03	−2.01	−0.86
			(1.85)	(−2.54)	(2.19)	(1.74)	(1.11)	(2.11)	(−0.18)	(0.48)	(−0.48)	(−1.01)	(−0.43)
Terciles	47.9	33.7	7.61	−5.59	5.44	10.60	5.40	5.68	−2.64	0.78	−0.66	−1.31	−0.54
			(1.77)	(−1.84)	(1.72)	(1.97)	(1.29)	(1.62)	(−1.46)	(0.48)	(−0.48)	(−1.03)	(−0.42)
Formation sample													
Portfolios formed on the regression sample	68.4	64.1	9.61	−4.69	9.41	13.90	8.47	9.41	3.31	1.55	−1.92	−3.58	−1.61
			(1.70)	(−2.06)	(2.56)	(1.16)	(0.97)	(2.56)	(1.42)	(0.38)	(−0.55)	(−1.10)	(−0.49)
Return definition													
Duration-adjusted returns	59.0	56.1	7.99	−2.54	5.98	12.16	8.97	6.00	2.76	−1.41	−1.95	−3.71	−1.52
			(1.56)	(−1.87)	(2.19)	(1.00)	(1.03)	(1.84)	(0.94)	(−0.34)	(−0.56)	(−0.94)	(−0.46)
Issuer key													
PERMNO-linked sample, PERMNO issuers	80.2	69.4	10.16	−5.77	11.93	9.82	1.32	10.42	2.73	1.91	−2.39	−4.91	−2.28
			(1.58)	(−2.10)	(2.18)	(1.66)	(0.26)	(1.77)	(0.71)	(0.34)	(−0.48)	(−1.05)	(−0.47)
Sample filters													
Excluding defaulted bonds	59.1	56.0	10.60	−4.19	8.25	11.17	9.06	8.81	3.01	3.04	−1.42	−2.07	−0.75
			(1.94)	(−1.88)	(2.83)	(1.24)	(1.16)	(2.46)	(1.33)	(0.73)	(−0.41)	(−0.66)	(−0.25)
Excluding Rule 144A bonds	59.8	59.3	11.76	−5.01	9.46	15.09	7.77	9.73	3.88	1.77	−1.57	−3.49	−1.02
			(2.13)	(−2.02)	(3.08)	(1.24)	(0.86)	(2.63)	(1.58)	(0.44)	(−0.47)	(−1.09)	(−0.33)
Regression sample and controls													
Single-bond issuers included	59.0	56.1	11.59	−4.60	8.96	14.34	5.00	7.58	2.68	1.34	−1.54	−3.10	−1.31
			(2.06)	(−2.05)	(2.97)	(1.34)	(0.60)	(2.45)	(1.31)	(0.38)	(−0.52)	(−1.11)	(−0.47)
Rating-class dummies in (1)	59.0	56.1	11.59	−4.60	8.96	13.90	8.47	9.41	3.31	1.53	−1.92	−3.62	−1.61
			(2.06)	(−2.05)	(2.97)	(1.16)	(0.97)	(2.56)	(1.42)	(0.37)	(−0.55)	(−1.10)	(−0.49)

Table IA.12: Construction Choices for `pi` and `dvol`.

The table reports the `pi` (Panel A) and `dvol` (Panel B) sorts under the construction choices of Table **??**, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{\,I}$			$\overline{C}^{\,W}$		$\widehat{\alpha}(C^W)$	
Specification	$\bar{\mathcal{I}}^H$	$\bar{\mathcal{I}}^L$	$\bar{\mathcal{D}}^H$	$\bar{\mathcal{D}}^L$	$\bar{r}^W$	$\bar{r}^I$	(4)	$\bar{r}^W$	$\widehat{\alpha}(r^W)$	(1)	(4)	(1)	(4)
Panel A: `pi`													
Main specification	58.2	58.1	2.10	5.33	−1.87	3.56	1.19	−2.57	−4.18	−1.34	−1.52	−1.37	−1.55
			(0.56)	(1.85)	(−1.09)	(1.52)	(1.07)	(−1.12)	(−1.97)	(−1.21)	(−1.35)	(−1.33)	(−1.48)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	59.5	58.7	13.59	6.61	3.77	2.18	1.24	4.27	1.14	−4.66	−5.02	−4.39	−4.75
			(2.80)	(2.46)	(1.77)	(0.40)	(0.82)	(1.75)	(0.61)	(−1.35)	(−1.43)	(−1.44)	(−1.54)
Equal-weighted benchmarks	56.4	56.1	−1.18	2.71	−2.17	4.08	2.08	−3.09	−4.53	−0.85	−0.83	−0.98	−0.93
			(−0.27)	(0.87)	(−1.20)	(1.66)	(2.11)	(−1.28)	(−2.03)	(−0.79)	(−0.78)	(−0.96)	(−0.93)
Both equal-weighted	54.1	53.0	5.75	0.25	2.75	3.49	2.13	2.96	−0.01	−4.28	−4.19	−4.40	−4.22
			(2.02)	(0.09)	(1.43)	(0.66)	(1.46)	(1.36)	(−0.01)	(−1.33)	(−1.33)	(−1.49)	(−1.47)
Number of portfolios													
Quintiles	53.9	53.1	2.07	4.09	−0.95	1.49	0.34	−1.26	−3.07	−0.38	−0.43	−0.41	−0.46
			(0.77)	(1.95)	(−0.77)	(0.81)	(0.89)	(−0.84)	(−2.18)	(−1.12)	(−1.24)	(−1.29)	(−1.41)
Terciles	48.2	47.1	2.67	2.87	−0.08	−1.88	0.18	0.00	−1.57	−0.14	−0.16	−0.16	−0.18
			(1.32)	(1.84)	(−0.09)	(−1.09)	(1.12)	(0.00)	(−1.32)	(−1.02)	(−1.14)	(−1.22)	(−1.32)
Formation sample													
Portfolios formed on the regression sample	70.8	70.5	2.86	6.53	−2.57	3.56	1.19	−2.57	−4.18	−1.34	−1.52	−1.37	−1.55
			(0.83)	(2.28)	(−1.12)	(1.52)	(1.07)	(−1.12)	(−1.97)	(−1.21)	(−1.35)	(−1.33)	(−1.48)
Return definition													
Duration-adjusted returns	58.2	58.1	2.01	4.05	−1.15	3.19	1.16	−1.40	−2.30	−1.35	−1.51	−1.38	−1.53
			(0.66)	(1.52)	(−0.77)	(1.39)	(1.04)	(−0.73)	(−1.24)	(−1.20)	(−1.33)	(−1.32)	(−1.45)
Issuer key													
PERMNO-linked sample, PERMNO issuers	76.7	77.5	4.68	6.75	−1.67	2.43	0.33	−1.61	−3.66	−1.34	−1.49	−1.59	−1.56
			(1.22)	(1.94)	(−0.82)	(1.59)	(0.24)	(−0.68)	(−1.51)	(−0.82)	(−0.90)	(−0.94)	(−0.90)
Sample filters													
Excluding defaulted bonds	58.3	58.2	3.52	5.97	−1.42	2.47	−0.03	−3.03	−4.44	−1.71	−1.88	−1.80	−1.97
			(1.02)	(2.10)	(−0.88)	(1.34)	(−0.04)	(−1.21)	(−1.92)	(−2.10)	(−2.29)	(−2.36)	(−2.56)
Excluding Rule 144A bonds	60.2	60.3	1.83	5.13	−1.98	3.97	1.60	−2.90	−4.54	−1.63	−1.80	−1.69	−1.85
			(0.48)	(1.78)	(−1.16)	(1.74)	(1.39)	(−1.27)	(−2.15)	(−1.48)	(−1.61)	(−1.65)	(−1.79)
Regression sample and controls													
Single-bond issuers included	58.2	58.1	2.10	5.33	−1.87	3.01	0.50	−1.48	−2.76	−1.04	−1.17	−1.08	−1.21
			(0.56)	(1.85)	(−1.09)	(1.44)	(0.53)	(−0.88)	(−1.67)	(−1.21)	(−1.34)	(−1.34)	(−1.48)
Rating-class dummies in (1)	58.2	58.1	2.10	5.33	−1.87	3.56	1.19	−2.57	−4.18	−1.35	−1.52	−1.38	−1.55
			(0.56)	(1.85)	(−1.09)	(1.52)	(1.07)	(−1.12)	(−1.97)	(−1.22)	(−1.35)	(−1.35)	(−1.48)
Panel B: `dvol`													
Main specification	51.5	53.9	14.80	−11.02	11.49	32.52	22.53	13.06	−8.14	9.50	7.14	−4.92	4.34
			(1.96)	(−1.45)	(1.42)	(1.39)	(0.92)	(1.42)	(−1.39)	(1.23)	(1.34)	(−0.83)	(0.86)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	52.6	56.2	33.41	−10.90	19.61	60.89	25.45	21.41	1.40	9.10	6.52	−5.37	3.79
			(2.64)	(−1.47)	(2.33)	(1.70)	(0.78)	(2.28)	(0.19)	(1.18)	(1.27)	(−0.90)	(0.76)
Equal-weighted benchmarks	51.6	58.6	3.79	−10.09	7.14	37.49	30.83	8.09	−12.84	12.22	13.28	−0.80	10.53
			(0.51)	(−1.44)	(0.89)	(1.56)	(1.27)	(0.88)	(−2.27)	(1.45)	(1.81)	(−0.12)	(1.51)
Both equal-weighted	45.0	57.4	16.79	−10.74	11.30	70.20	37.17	12.10	−7.03	10.65	12.18	−1.60	9.74
			(2.19)	(−1.51)	(1.58)	(1.85)	(1.13)	(1.50)	(−1.29)	(1.38)	(1.86)	(−0.25)	(1.54)
Number of portfolios													
Quintiles	49.5	41.4	12.01	−10.17	8.30	26.80	15.56	9.69	−10.31	6.35	5.01	−4.51	3.05
			(1.54)	(−1.31)	(1.11)	(1.80)	(0.97)	(1.16)	(−1.82)	(1.10)	(1.32)	(−1.00)	(0.83)
Terciles	43.3	30.0	9.05	−10.25	5.83	18.86	10.39	6.78	−10.28	4.50	3.59	−3.56	2.19
			(1.07)	(−1.29)	(0.90)	(1.86)	(0.95)	(0.94)	(−2.09)	(1.04)	(1.31)	(−1.04)	(0.82)
Formation sample													
Portfolios formed on the regression sample	62.4	59.6	13.85	−10.69	13.06	32.52	22.53	13.06	−8.14	9.50	7.14	−4.92	4.34
			(1.76)	(−1.41)	(1.42)	(1.39)	(0.92)	(1.42)	(−1.39)	(1.23)	(1.34)	(−0.83)	(0.86)
Return definition													
Duration-adjusted returns	51.5	53.9	12.19	−5.13	8.39	32.21	23.24	9.14	−1.86	8.14	6.86	1.02	4.40
			(1.88)	(−1.06)	(1.57)	(1.38)	(0.95)	(1.45)	(−0.37)	(1.39)	(1.29)	(0.21)	(0.86)
Issuer key													
PERMNO-linked sample, PERMNO issuers	68.7	64.6	16.51	−12.13	17.31	29.89	15.36	17.92	−7.02	14.07	4.80	−2.97	1.02
			(1.69)	(−1.57)	(1.60)	(1.87)	(0.83)	(1.56)	(−1.23)	(1.48)	(0.58)	(−0.42)	(0.13)
Sample filters													
Excluding defaulted bonds	52.2	53.9	15.34	−10.94	11.86	28.57	18.57	12.80	−8.99	12.60	7.09	−3.43	3.15
			(1.95)	(−1.44)	(1.44)	(1.52)	(0.90)	(1.38)	(−1.63)	(1.57)	(1.43)	(−0.59)	(0.76)
Excluding Rule 144A bonds	53.5	55.1	15.74	−10.86	11.74	31.51	20.78	13.32	−8.34	10.24	8.81	−5.48	6.73
			(2.12)	(−1.41)	(1.38)	(1.35)	(0.85)	(1.41)	(−1.35)	(1.26)	(1.80)	(−0.87)	(1.44)
Regression sample and controls													
Single-bond issuers included	51.5	53.9	14.80	−11.02	11.49	38.20	12.76	11.29	−7.69	7.90	6.37	−4.67	4.06
			(1.96)	(−1.45)	(1.42)	(1.67)	(0.65)	(1.37)	(−1.50)	(1.16)	(1.44)	(−0.88)	(0.95)
Rating-class dummies in (1)	51.5	53.9	14.80	−11.02	11.49	32.52	22.53	13.06	−8.14	9.43	7.14	−4.96	4.34
			(1.96)	(−1.45)	(1.42)	(1.39)	(0.92)	(1.42)	(−1.39)	(1.22)	(1.34)	(−0.84)	(0.86)

Table IA.13: Construction Choices for `rvol` and `var_95`.

The table reports the `rvol` (PANEL A) and `var_95` (PANEL B) sorts under the construction choices of Table **??**, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^{W})$	
Specification	$\overline{\mathcal{I}}^{H}$	$\overline{\mathcal{I}}^{L}$	$\overline{\mathcal{D}}^{H}$	$\overline{\mathcal{D}}^{L}$	$\overline{r}^{W}$	$\overline{r}^{I}$	(4)	$\overline{r}^{W}$	$\widehat{\alpha}(r^{W})$	(1)	(4)	(1)	(4)
Panel A: `rvol`													
Main specification	51.4	55.7	12.29	−10.60	10.64	37.26	23.03	11.43	−11.40	9.63	9.32	−6.08	4.94
			(1.43)	(−1.42)	(1.25)	(1.60)	(1.00)	(1.21)	(−1.99)	(1.21)	(1.74)	(−1.01)	(0.98)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	51.3	56.0	32.47	−9.78	18.22	67.31	27.70	20.57	−0.53	8.80	8.67	−6.60	4.63
			(2.59)	(−1.37)	(2.18)	(1.84)	(0.89)	(2.17)	(−0.07)	(1.13)	(1.72)	(−1.09)	(0.96)
Equal-weighted benchmarks	53.4	59.1	1.41	−10.16	6.58	42.20	30.38	6.48	−16.04	12.88	14.83	−1.88	10.54
			(0.18)	(−1.45)	(0.78)	(1.76)	(1.34)	(0.69)	(−2.72)	(1.45)	(2.07)	(−0.27)	(1.54)
Both equal-weighted	45.9	55.9	14.05	−9.94	10.05	76.64	38.33	11.24	−8.87	11.38	13.54	−2.63	9.63
			(1.76)	(−1.43)	(1.37)	(1.97)	(1.27)	(1.36)	(−1.54)	(1.39)	(2.10)	(−0.40)	(1.55)
Number of portfolios													
Quintiles	49.0	44.5	10.14	−10.26	7.81	29.25	17.66	9.02	−11.47	6.87	7.08	−5.60	3.74
			(1.22)	(−1.34)	(1.01)	(1.89)	(1.14)	(1.05)	(−1.93)	(1.09)	(1.76)	(−1.16)	(0.97)
Terciles	42.6	33.2	9.09	−9.62	6.03	19.17	12.13	6.96	−10.63	5.12	5.29	−4.46	2.77
			(1.06)	(−1.21)	(0.91)	(1.88)	(1.16)	(0.95)	(−2.15)	(1.06)	(1.75)	(−1.20)	(0.94)
Formation sample													
Portfolios formed on the regression sample	59.9	61.9	11.20	−10.60	11.43	37.26	23.03	11.43	−11.40	9.63	9.32	−6.08	4.94
			(1.31)	(−1.42)	(1.21)	(1.60)	(1.00)	(1.21)	(−1.99)	(1.21)	(1.74)	(−1.01)	(0.98)
Return definition													
Duration-adjusted returns	51.4	55.7	10.55	−4.55	7.67	37.25	23.78	7.78	−4.45	8.01	8.92	−0.23	5.07
			(1.41)	(−0.96)	(1.33)	(1.60)	(1.03)	(1.18)	(−0.84)	(1.33)	(1.68)	(−0.05)	(1.00)
Issuer key													
PERMNO-linked sample, PERMNO issuers	66.2	67.5	13.37	−12.00	15.45	34.37	18.95	15.44	−11.61	14.42	8.58	−3.71	2.58
			(1.24)	(−1.57)	(1.38)	(2.03)	(1.02)	(1.35)	(−2.05)	(1.51)	(1.07)	(−0.54)	(0.34)
Sample filters													
Excluding defaulted bonds	52.3	55.7	10.23	−10.46	9.65	31.97	19.24	10.95	−12.51	12.92	7.62	−4.16	2.39
			(1.22)	(−1.40)	(1.13)	(1.65)	(0.94)	(1.16)	(−2.28)	(1.55)	(1.55)	(−0.69)	(0.57)
Excluding Rule 144A bonds	53.1	57.5	13.12	−10.37	10.69	36.69	22.66	11.51	−12.03	9.71	9.53	−7.61	5.69
			(1.55)	(−1.37)	(1.18)	(1.57)	(0.98)	(1.18)	(−1.96)	(1.15)	(2.04)	(−1.18)	(1.34)
Regression sample and controls													
Single-bond issuers included	51.4	55.7	12.29	−10.60	10.64	42.42	16.07	9.90	−10.69	8.25	8.43	−5.74	4.67
			(1.43)	(−1.42)	(1.25)	(1.82)	(0.81)	(1.16)	(−2.04)	(1.16)	(1.83)	(−1.03)	(1.07)
Rating-class dummies in (1)	51.4	55.7	12.29	−10.60	10.64	37.26	23.03	11.43	−11.40	9.55	9.32	−6.14	4.94
			(1.43)	(−1.42)	(1.25)	(1.60)	(1.00)	(1.21)	(−1.99)	(1.20)	(1.74)	(−1.03)	(0.98)
Panel B: `var_95`													
Main specification	38.3	55.7	24.19	−12.41	13.76	66.71	53.85	14.38	−8.39	15.28	15.58	−2.97	10.94
			(2.59)	(−1.65)	(1.70)	(2.69)	(2.28)	(1.57)	(−1.49)	(1.96)	(3.25)	(−0.60)	(2.68)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	42.6	56.6	50.53	−12.54	23.52	94.59	60.97	25.01	2.80	13.25	14.02	−3.67	10.10
			(2.79)	(−1.72)	(2.52)	(2.25)	(2.03)	(2.38)	(0.35)	(1.84)	(3.58)	(−0.75)	(2.82)
Equal-weighted benchmarks	44.6	57.7	10.05	−12.85	11.09	69.39	57.54	11.71	−10.85	16.54	17.69	−1.75	12.62
			(1.28)	(−1.78)	(1.38)	(2.72)	(2.39)	(1.29)	(−1.79)	(2.06)	(3.44)	(−0.33)	(2.83)
Both equal-weighted	36.9	55.8	32.25	−13.49	15.38	102.86	64.40	16.74	−4.65	14.35	15.75	−2.14	11.49
			(2.67)	(−1.89)	(2.05)	(2.33)	(2.10)	(1.90)	(−0.74)	(2.00)	(3.85)	(−0.42)	(3.04)
Number of portfolios													
Quintiles	39.0	46.3	21.37	−12.87	12.49	39.32	35.09	14.33	−6.86	12.00	12.18	−2.65	8.63
			(2.36)	(−1.61)	(1.62)	(2.23)	(2.25)	(1.66)	(−1.16)	(1.90)	(3.28)	(−0.60)	(2.65)
Terciles	36.1	35.4	17.29	−12.77	10.06	23.52	21.52	11.33	−7.58	9.54	9.66	−2.16	6.83
			(1.86)	(−1.52)	(1.50)	(2.07)	(2.18)	(1.50)	(−1.47)	(1.88)	(3.28)	(−0.61)	(2.65)
Formation sample													
Portfolios formed on the regression sample	43.6	63.6	20.89	−11.61	14.38	66.71	53.85	14.38	−8.39	15.28	15.58	−2.97	10.94
			(2.26)	(−1.57)	(1.57)	(2.69)	(2.28)	(1.57)	(−1.49)	(1.96)	(3.25)	(−0.60)	(2.68)
Return definition													
Duration-adjusted returns	38.3	55.7	19.91	−6.56	9.92	65.96	54.74	10.00	−2.70	13.57	15.62	3.02	11.44
			(2.52)	(−1.32)	(1.90)	(2.65)	(2.32)	(1.66)	(−0.63)	(2.17)	(3.27)	(0.67)	(2.84)
Issuer key													
PERMNO-linked sample, PERMNO issuers	50.4	67.8	26.20	−12.86	18.86	50.56	40.00	18.24	−6.68	15.77	17.34	−4.27	11.68
			(2.65)	(−1.71)	(1.88)	(2.47)	(1.99)	(1.77)	(−1.18)	(1.89)	(3.39)	(−0.90)	(2.89)
Sample filters													
Excluding defaulted bonds	39.5	55.8	22.01	−12.50	13.63	52.50	37.34	14.04	−8.54	14.78	15.26	−3.07	11.49
			(2.44)	(−1.66)	(1.67)	(2.45)	(1.95)	(1.53)	(−1.51)	(1.92)	(3.42)	(−0.56)	(2.73)
Excluding Rule 144A bonds	40.6	57.4	23.91	−12.31	13.59	66.15	53.09	14.01	−9.67	14.32	15.13	−6.23	10.54
			(2.52)	(−1.60)	(1.54)	(2.66)	(2.24)	(1.46)	(−1.58)	(1.58)	(3.32)	(−1.01)	(2.73)
Regression sample and controls													
Single-bond issuers included	38.3	55.7	24.19	−12.41	13.76	68.87	47.25	12.44	−7.31	12.96	13.35	−3.03	9.41
			(2.59)	(−1.65)	(1.70)	(2.66)	(2.02)	(1.53)	(−1.38)	(1.90)	(3.32)	(−0.66)	(2.69)
Rating-class dummies in (1)	38.3	55.7	24.19	−12.41	13.76	66.71	53.85	14.38	−8.39	15.20	15.58	−3.06	10.94
			(2.59)	(−1.65)	(1.70)	(2.69)	(2.28)	(1.57)	(−1.49)	(1.95)	(3.25)	(−0.62)	(2.68)

Table IA.14: Construction Choices for `mom6_1` and `str`.

The table reports the `mom6_1` (PANEL A) and `str` (PANEL B) sorts under the construction choices of Table **??**, with the same rows and columns. Intensities are in percentages; all other estimates are in basis points. Newey–West(4) t-statistics with four lags are in parentheses. Sample: Sep. 2002–Dec. 2024, $T = 268$ months.

	Portfolio sample					Regression sample, issuer		Regression sample, within issuer					
	Intensity (%)		Contrast				$\overline{C}^{I}$			$\overline{C}^{W}$		$\widehat{\alpha}(C^{W})$	
Specification	$\widetilde{\mathcal{I}}^{H}$	$\widetilde{\mathcal{I}}^{L}$	$\widetilde{\mathcal{D}}^{H}$	$\widetilde{\mathcal{D}}^{L}$	$\overline{r}^{W}$	$\overline{r}^{I}$	(4)	$\overline{r}^{W}$	$\widehat{\alpha}(r^{W})$	(1)	(4)	(1)	(4)
Panel A: `mom6_1`													
Main specification	37.5	43.8	3.47	23.55	−5.90	14.01	4.38	−6.13	−1.24	0.04	−3.67	4.35	−1.84
			(0.48)	(2.07)	(−1.06)	(0.62)	(0.23)	(−0.87)	(−0.17)	(0.01)	(−1.24)	(0.73)	(−0.67)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	45.5	50.2	14.33	34.68	−6.26	5.56	4.28	−9.39	−3.79	−2.51	−5.76	2.92	−3.44
			(2.70)	(2.23)	(−1.07)	(0.20)	(0.20)	(−1.13)	(−0.47)	(−0.39)	(−1.54)	(0.45)	(−1.00)
Equal-weighted benchmarks	43.2	48.2	−2.33	4.60	−3.44	10.92	4.20	−3.04	1.67	1.91	−2.82	6.10	−0.94
			(−0.33)	(0.53)	(−0.66)	(0.48)	(0.22)	(−0.46)	(0.24)	(0.34)	(−0.94)	(1.01)	(−0.33)
Both equal-weighted	41.9	46.5	8.21	12.34	−1.33	−0.09	3.86	−3.74	1.50	−0.15	−4.42	5.11	−2.09
			(1.55)	(1.40)	(−0.30)	(0.00)	(0.18)	(−0.58)	(0.23)	(−0.02)	(−1.22)	(0.79)	(−0.62)
Number of portfolios													
Quintiles	35.0	41.3	3.22	16.08	−3.91	1.54	1.74	−4.27	−0.07	0.32	−2.54	4.35	−1.04
			(0.44)	(1.86)	(−0.67)	(0.10)	(0.15)	(−0.62)	(−0.01)	(0.07)	(−1.14)	(0.86)	(−0.51)
Terciles	30.6	33.8	−0.49	9.84	−2.79	1.36	0.08	−2.88	1.14	0.37	−1.81	3.79	−0.63
			(−0.07)	(1.29)	(−0.54)	(0.13)	(0.01)	(−0.48)	(0.19)	(0.10)	(−1.08)	(0.94)	(−0.40)
Formation sample													
Portfolios formed on the regression sample	43.0	50.0	3.80	21.35	−6.13	14.01	4.38	−6.13	−1.24	0.04	−3.67	4.35	−1.84
			(0.49)	(1.93)	(−0.87)	(0.62)	(0.23)	(−0.87)	(−0.17)	(0.01)	(−1.24)	(0.73)	(−0.67)
Return definition													
Duration-adjusted returns	37.5	43.8	0.07	16.93	−5.11	12.80	3.89	−5.01	−2.37	−1.49	−3.93	0.56	−2.46
			(0.01)	(1.71)	(−1.43)	(0.58)	(0.20)	(−1.13)	(−0.53)	(−0.41)	(−1.32)	(0.14)	(−0.86)
Issuer key													
PERMNO-linked sample, PERMNO issuers	49.9	56.9	5.64	25.44	−9.12	1.90	−4.53	−6.91	−0.75	−2.63	−4.58	3.35	−1.91
			(0.75)	(1.79)	(−1.09)	(0.11)	(−0.26)	(−0.78)	(−0.09)	(−0.38)	(−1.08)	(0.47)	(−0.49)
Sample filters													
Excluding defaulted bonds	37.8	44.2	2.97	19.47	−5.68	3.21	0.01	−5.11	−0.53	−0.98	−3.82	2.93	−2.36
			(0.41)	(1.93)	(−1.02)	(0.16)	(0.00)	(−0.74)	(−0.07)	(−0.18)	(−1.38)	(0.48)	(−0.88)
Excluding Rule 144A bonds	40.5	46.4	2.94	23.01	−5.84	12.74	2.53	−6.42	−0.96	−2.68	−4.65	2.44	−3.02
			(0.38)	(2.04)	(−0.92)	(0.56)	(0.13)	(−0.84)	(−0.12)	(−0.41)	(−1.63)	(0.35)	(−1.08)
Regression sample and controls													
Single-bond issuers included	37.5	43.8	3.47	23.55	−5.90	13.56	11.44	−5.31	−0.95	−0.01	−3.22	3.67	−1.65
			(0.48)	(2.07)	(−1.06)	(0.58)	(0.63)	(−0.88)	(−0.16)	(0.00)	(−1.26)	(0.71)	(−0.69)
Rating-class dummies in (1)	37.5	43.8	3.47	23.55	−5.90	14.01	4.38	−6.13	−1.24	−0.02	−3.67	4.27	−1.84
			(0.48)	(2.07)	(−1.06)	(0.62)	(0.23)	(−0.87)	(−0.17)	(0.00)	(−1.24)	(0.72)	(−0.67)
Panel B: `str`													
Main specification	43.6	47.5	−6.73	27.08	−12.48	−5.64	11.71	−12.56	−10.11	−5.04	−12.45	−2.61	−11.12
			(−1.11)	(3.34)	(−2.61)	(−0.28)	(0.96)	(−2.35)	(−1.78)	(−1.14)	(−3.98)	(−0.55)	(−3.36)
Portfolio and issuer benchmark weights													
Equal-weighted portfolios	49.6	53.2	2.63	35.16	−13.66	−3.23	8.89	−14.39	−11.81	−6.26	−14.66	−3.37	−12.83
			(0.50)	(2.98)	(−2.81)	(−0.09)	(0.55)	(−2.58)	(−1.87)	(−1.24)	(−3.97)	(−0.63)	(−3.36)
Equal-weighted benchmarks	48.2	51.6	−13.58	24.76	−16.31	−1.93	11.12	−16.27	−13.65	−10.45	−17.65	−7.78	−15.89
			(−2.25)	(3.30)	(−3.23)	(−0.09)	(0.82)	(−2.90)	(−2.31)	(−1.54)	(−2.89)	(−1.13)	(−2.64)
Both equal-weighted	46.6	50.2	−12.05	32.08	−15.71	−0.88	9.66	−16.74	−14.08	−13.54	−21.37	−10.50	−19.16
			(−1.82)	(3.20)	(−3.08)	(−0.02)	(0.55)	(−2.94)	(−2.22)	(−1.59)	(−2.65)	(−1.24)	(−2.44)
Number of portfolios													
Quintiles	40.8	44.4	−2.36	17.22	−7.08	7.96	7.70	−6.83	−4.64	−4.40	−10.04	−2.44	−9.13
			(−0.41)	(2.53)	(−1.58)	(0.88)	(1.07)	(−1.34)	(−0.82)	(−1.24)	(−4.07)	(−0.63)	(−3.45)
Terciles	35.6	37.4	−0.53	9.57	−3.26	9.43	5.13	−3.37	−1.91	−3.47	−7.74	−1.96	−7.13
			(−0.10)	(1.67)	(−0.83)	(1.73)	(1.14)	(−0.75)	(−0.39)	(−1.26)	(−4.09)	(−0.65)	(−3.48)
Formation sample													
Portfolios formed on the regression sample	51.1	54.2	−4.47	24.95	−12.56	−5.64	11.71	−12.56	−10.11	−5.04	−12.45	−2.61	−11.12
			(−0.73)	(3.13)	(−2.35)	(−0.28)	(0.96)	(−2.35)	(−1.78)	(−1.14)	(−3.98)	(−0.55)	(−3.36)
Return definition													
Duration-adjusted returns	43.6	47.5	−10.53	23.04	−13.88	−9.16	11.60	−13.33	−12.22	−6.48	−11.64	−4.92	−10.35
			(−2.03)	(3.66)	(−4.08)	(−0.45)	(0.95)	(−3.56)	(−3.40)	(−1.88)	(−3.78)	(−1.39)	(−3.23)
Issuer key													
PERMNO-linked sample, PERMNO issuers	56.0	59.9	−0.86	20.93	−11.74	6.22	23.74	−10.13	−6.11	−1.04	−10.54	2.44	−8.11
			(−0.13)	(2.59)	(−2.04)	(0.60)	(2.61)	(−1.70)	(−0.98)	(−0.19)	(−2.38)	(0.41)	(−1.65)
Sample filters													
Excluding defaulted bonds	44.1	47.7	−7.10	27.09	−12.62	3.25	14.98	−12.58	−9.66	−4.72	−13.07	−2.22	−11.36
			(−1.17)	(3.36)	(−2.64)	(0.27)	(1.74)	(−2.35)	(−1.70)	(−1.14)	(−4.58)	(−0.51)	(−3.88)
Excluding Rule 144A bonds	47.0	50.4	−5.57	26.30	−13.15	−4.89	14.32	−13.15	−10.03	−4.99	−15.04	−1.95	−14.07
			(−0.92)	(3.26)	(−2.46)	(−0.24)	(1.22)	(−2.29)	(−1.62)	(−0.95)	(−3.44)	(−0.33)	(−2.80)
Regression sample and controls													
Single-bond issuers included	43.6	47.5	−6.73	27.08	−12.48	3.29	20.01	−10.77	−8.68	−4.40	−11.01	−2.31	−9.85
			(−1.11)	(3.34)	(−2.61)	(0.19)	(1.63)	(−2.23)	(−1.70)	(−1.12)	(−4.03)	(−0.54)	(−3.38)
Rating-class dummies in (1)	43.6	47.5	−6.73	27.08	−12.48	−5.64	11.71	−12.56	−10.11	−5.03	−12.45	−2.59	−11.12
			(−1.11)	(3.34)	(−2.61)	(−0.28)	(0.96)	(−2.35)	(−1.78)	(−1.14)	(−3.98)	(−0.54)	(−3.36)