Factor-Based Private Debt Investing at the Industry and Country Level

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KEY FINDINGS

- The development of relatively liquid secondary credit markets over the past two decades has opened a new opportunity for active credit investors to enhance portfolio performance relative to a passive allocation to the credit risk premium by applying systematic investing techniques to credit investing.
- This article presents evidence of the applicability of momentum and value style investing at the US and European industry level and the European country level of leveraged loans, i.e., broadly syndicated loans to non-investment grade issuers that are actively traded on secondary loan markets.
- An important implication of this research is that active credit managers employing loan trading strategies that are industry and country neutral do not make use of a viable source of additional return.

ABSTRACT

The goal of this article is to show evidence of the applicability of style investing at the industry and country level within a booming and tradeable credit asset class: leveraged loans (i.e., broadly syndicated loans to risky corporates). We find that value and momentum characteristics in the cross sections of US industry indexes and European industry and country indexes of leveraged loans are significantly associated with future credit excess returns, and translate to economically meaningful risk-adjusted returns in the context of a systematic long-only portfolio. An important implication of this research is that active credit managers employing loan trading strategies that are industry and country neutral do not make use of a viable source of additional return.

Secondary markets for credit assets like corporate bonds and loans have evolved substantially over the past 20 years in terms of institutional investor participation, liquidity, trading volume, and transparency. We believe these developments have opened a new opportunity to apply systematic investing techniques to credit investing, allowing for significant diversification benefits within active credit strategies as well as the potential for substantial performance improvements. In this article, we take a systematic approach to credit investing with leveraged loans, a booming class of tradeable private debt to risky corporates.[1]

[1] As estimated by Fitch Ratings, at mid-year 2021, there were $1.5 trillion in institutional (non-bank) leveraged loans outstanding, almost tripling from slightly more than $0.5 trillion 10 years earlier.

While private debt as a relatively new asset class is interesting in its own right, the tradeable segment of this asset class is likely most exciting. Due to some unique features, leveraged loans are more attractive than high-yield bonds for yield-hungry institutional investors with an appetite for risky lending. First, due to their first-lien, loans are typically ranked senior to bonds in the borrowers' capital structure, which implies higher average recovery rates in case of default. Second, as their principal is partly amortizing, and loan coupons are floating, not fixed, loans have minimal duration risk. Furthermore, while bonds are securities, loans are not. As non-securities, their trading in secondary markets is not governed by securities laws or any regulatory oversight, opening the door for potentially severe temporary market price inefficiencies that, in turn, may offer attractive opportunities for a well implemented systematic strategy to exploit.[2]

Systematic investment approaches at the individual loan level are obviously subject to practical implementation pitfalls. The most important issue relates to loan availability. Typically, only a limited percentage of the individual loans desired for a factor portfolio is available for trading. More generally, for a factor approach to be viable, there needs to be some confidence that loan factor portfolios can be formed given the available liquidity underlying the market. Less liquidity at the loan level means that factor definitions must be robustly designed so that their risk and return characteristics are relatively independent of the number or types of loans used. We address these issues by building factors not at the individual loan level, but, instead, at the industry and country level. That is, we aggregate loans into indexes according to the borrower's industry sector or its country of incorporation. These indexes are designed to track the performance of the average loan in an industry or country. Hence, our factor definition is robust to some loans (or group of loans) being unavailable for trading.

To broaden the scope and practical relevance of the paper and to subject the results to various out-of-sample tests, we apply the idea of factor investing to both major loan market segments, the US dollar and the euro denominated loan universe. For the US sample, we utilize separate industry indexes for loans rated BB and those rated B. For euro loans, we use industry indexes and indexes of European countries. That way, we obtain four cross-sections: 1) industry sectors for US BB-rated loans; 2) industry sectors for US B-rated loans; 3) industry sectors for euro loans; and 4) countries for euro loans. For each loan index, we construct monthly time series of credit excess returns from average secondary market credit spreads and bid quotes of loan dealers. The US data start in January 2000 and the European series in October 2003 (industries) and November 2005 (countries), respectively.

For the four cross sections, we show how to access credit returns via relative value opportunities at the industry and country level. For these insights, we turn to well-known styles that have proven to be pervasive across asset classes: value and momentum (see Asness et al. 2013). To assess whether systematic exposures to value and (one-month) momentum are rewarded in the leveraged loan context, we construct monthly, equal weighted long-only tercile portfolios of industry and country loan indexes.

If the factors under consideration are priced in the four cross sections of loan indexes, then we would expect that more exposure to the given factor would result in a higher return. We analyze two investment horizons of factor portfolios: one-month

The strong primary market presence of institutional investors such as collateralized loan obligations (CLOs) or loan mutual funds and exchange-traded funds (ETFs) fostered the establishment of a secondary market. While outside the radar of regulators and securities laws, the secondary market in the United States grew from an annual trading volume of $145 billion in 2003 to $772 billion in 2020 at an annual compound rate of about 10%.

[2] See Section 2 in Keßler and Mählmann (2021) for a description of the institutional details of leveraged loans and the microstructure of the secondary loan market.

and six-month. As one-month holding periods seek to maximize portfolio exposure to each investment theme, the one-month results establish a necessary condition to demonstrate the potential efficacy of a systematic investment approach in the leveraged loan market. In contrast, the six-month holding period, implemented using the overlapping portfolio methodology of Jegadeesh and Titman (1993), is more realistic and prevents extreme turnover.

Risk-adjusted returns of factor portfolios over the one-month horizon are exciting. For example, Sharpe ratios of the HIGH (tercile three) value and momentum portfolios are 0.96 and 1.11 in the US BB industry cross section, 1.45 and 1.50 for US B industries, 1.02 and 1.64 for European industries, and 0.93 and 1.28 for European countries. In each case, these Sharpe ratios substantially exceed the benchmark Sharpe.[3] In contrast, Sharpe ratios of the LOW (tercile one) factor portfolios range from 0.53 to 0.86 (value), and from 0.17 to 0.81 (momentum), persistently underperforming the respective benchmark index. Similar patterns are observed for alphas and information ratios.

Because a one-month investment horizon is unrealistic to implement in the corporate loan market, for our second set of results, we analyze long-only portfolios over a six-month horizon. In line with an expected lower discriminatory power of factor themes over longer holding periods, the performance statistics often worsen for HIGH portfolios and improve for LOW portfolios, thereby reducing the HIGH-LOW performance spread. However, this effect is small (or absent) in case of the value theme, suggesting that value can predict cross-sectional return differences even at longer horizons. Importantly, HIGH value portfolios substantially outperform LOW portfolios (and a passive market allocation) over the extended holding period.

This picture is reversed for the momentum theme. All HIGH-LOW differentials in mean returns, Sharpe ratios, alphas, and information ratios decrease substantially over the longer holding period. This suggests that the predictive ability of cross-sectional momentum for credit excess returns in the loan market weakens considerably over longer periods. Hence, complementing results reported in Mählmann and Sukonnik (2022), loan momentum at the industry and country level is profitable, but primarily so in the short run. That said, although we find that momentum HIGH-LOW performance differentials shrink, they are still meaningful for European industries and countries, and slightly less so for US B-rated industries. In sum, the six-month results suggest that it may be possible to build realistic (implementable) long-only loan portfolios seeking exposure to systematic investment themes at the industry and country level.

In the last section of the paper, we perform several additional tests to rule out default risk and illiquidity as potential sources of the value and momentum premiums. In short, we show that HIGH value and momentum portfolios have lower (not higher) future realized default rates and better average future bid price returns than their LOW peers. Hence, value and momentum do not compensate for elevated credit risk. In addition, panel regressions suggest that liquidity (i.e., quoted bid-ask spreads) is not a priced characteristic in the cross section of European country loan indexes, and does not affect the return predictive content of value and momentum.

This article extends the substantial body of academic research on systematic investing to a unique credit asset class, corporate loans.[4] To the best of our knowledge,

[3] We benchmark US BB- and B-rated industries to the BB- and B-rated subsets of the broad S&P/LSTA Leveraged Loan Index (LLI). Over the sample period January 2000–December 2019, the LLI generated Sharpe ratios of 0.70 (BB-rated) and 1.05 (B-rated), respectively. European loans are benchmarked to the European Leveraged Loan Index (ELLI), which returned a Sharpe ratio of 0.75 (January 2003–December 2019).

[4] Compared to that on equities, the literature on fixed income factor investing is relatively recent but expanding fast. Value investing for corporate bonds was pioneered by Correia et al. (2012), and the seminal paper on the momentum theme for investment grade and high-yield bonds is Jostova et al. (2013).

Beyhaghi and Ehsani (2017) and Mählmann and Sukonnik (2022) are the only other papers on systematic credit investing with loans. They also find evidence that simple measures of value and (one- or three-month) momentum can explain cross-sectional variation in loan returns. Here we broaden their research in several ways. First, we mitigate practical implementation pitfalls of loan factors (e.g., loan investability or tradeability) by focusing on industry and country indexes, instead of individual loans. Hence, our results neither depend on, nor are driven by or require, the tradeability of any given loan. Furthermore, the approach in this paper can be used to guide (tactical) loan portfolio allocation decisions with respect to industry and country exposures.

Second, in contrast to most previous research that applies factor investing to just one asset class in one setting, this article explores four broad and (almost) nonoverlapping cross sections that provide and enable mutually reinforcing and complementing out-of-sample tests.[5] And finally, we study factor investing with monthly loan data over 20 years for US industries, and 17 years for European industries, significantly extending the times series used by Beyhaghi and Ehsani (2017) and Mählmann and Sukonnik (2022). This time dimension is substantial for a private asset class and facilitates powerful tests and robust inference, thereby enhancing our confidence in the article's results.

The remainder of this article proceeds as follows. Section 2 explains the different cross sections of loan indexes, how we calculate credit excess returns, and the measures of systematic investment themes for leveraged loans. Section 3 presents the empirical analyses and results, and Section 4 concludes.

DATA AND METHODOLOGY

Industry and Country Cross Sections and Credit Excess Returns

We start the sample construction with the two main subsets of the leveraged loan market: all US dollar denominated loans in the broad S&P/LSTA Leveraged Loan Index (LLI) rated either BB or B, and all euro denominated loans in the European Leveraged Loan Index (ELLI).[6] Separately for BB and B ratings, LLI loans are grouped into borrower industry sectors, and ELLI loans are sorted into borrower industries and borrower countries of incorporation. This way, we obtain four cross sections: industry sectors for US BB-rated loans, industry sectors for US B-rated loans; industry sectors for euro loans, and countries for euro loans.

For each cross-sectional unit (i.e., industry or country), S&P's Leveraged Commentary and Data (LCD) division aggregates individual loan level data on credit spreads (spread-to-maturities, or STMs) and on average dealer bid quotes. STM denotes the secondary market quoted (not traded) credit spread, reflecting any loan price (bid quote) deviations from par value, and adjusted for the remaining life of the loan.[7]

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[5] Of course, there is some overlap between index constituents of European industries and countries. However, by construction, the US BB and B cross sections are truly distinct in terms of borrower identity, and this is also (mostly) the case for US dollar versus euro loans.

[6] The S&P/LSTA Leveraged Loan Index (LLI) is the benchmark capitalization-weighted leveraged loan index that covers the US secondary loan market back to 1997. The index is published by S&P Leveraged Commentary & Data (LCD), a unit of Standard & Poor's (S&P), and is run in partnership between LCD and the Loan Syndications & Trading Association (LSTA), the US loan market's trade group. The index intends to replicate the invested institutional (nonbank) loan market. As a result, it attempts to track as many loans with institutional tranches in the market as possible. The LLI utilizes pricing data (average bid quotes) from LSTA/Refinitiv LPC. The ELLI is the European counterpart of the LLI, including primarily institutional loans denominated in euros.

[7] Because loans pay a floating interest rate (fixed margin or initial spread plus variable base rate) and future coupons are not fixed in advance, a classical yield measure as for bonds cannot be computed

Loan trading desks located at large investment banks acting as lead arrangers or transfer agents for a given loan provide indicative (not firm) bid quotes to LCD. Aggregate STM and bid quote time series are at the monthly frequency and represent equal weighted averages. The US data start in January 2000 and the European series in October 2003 (industries) and November 2005 (countries), respectively. As detailed below, we utilize the time series on average STMs and bid quotes to derive a monthly time series of credit excess returns (CERs) for each industry or country. Hence, the CER dataset contains four panels, and each panel is at the industry (or country) × month level.

As the data on STMs and bid quotes has gaps, mostly at the beginning of the sample, all panels (i.e., US BB industries, US B industries, European industries, European countries) are unbalanced. In the final sample, an average month has CERs for 11 European countries, 20 European industries, 20 US BB industries, and 22 US B industries. A list of all cross-sectional units for each panel is provided in Internet Appendix Section A.[8]

The main purpose of investing in corporate loans is to earn the default premium, which is driven by the current level and future changes in credit spreads (STMs). To separate interest rate risk from credit risk (and from other systematic determinants of loan discount rates), we calculate credit excess returns ($CER_t^{q,i}$) for each industry (or country) i in panel q and month t as follows:

$$CER_t^{q,i} = \frac{STM_{t-1}^{q,i}}{12} + \widehat{\beta_2^{q,i}} * \Delta STM_t^{q,i}, \tag{1}$$

where $STM_{t-1}^{q,i}$ denotes the average STM of industry (country) i in panel q and month $t-1$, and $\Delta STM_t^{q,i}$ is the month-to-month change of this spread. $\widehat{\beta_2^{q,i}}$ is an empirical estimate of the spread duration of industry (country) i in panel q. The first part of Equation 1 reflects the interest return and the second the price return. Note that Equation 1 is an approximation. It ignores any principal repayment return and abstracts from convexity issues in the relation between spreads and loan prices.[9] Further discussion and background on Equation 1 is provided in Internet Appendix Section B.

We estimate in-sample (i.e., constant) empirical interest rate and spread durations for each industry (country) i of panel q according to Equation 2:

$$R_t^{q,i} = \beta_0^{q,i} + \beta_1^{q,i} * \Delta LIBOR_t + \beta_2^{q,i} * \Delta STM_t^{q,i} + \epsilon_t^{q,i}, \tag{2}$$

where $R_t^{q,i}$ is the monthly percentage change of the average bid quote of industry (country) i in panel q, and $\Delta LIBOR_t$ denotes the monthly change in the three-month

for loans. LCD calculates "quasi-yields" for quoted loans with available bid quotes by holding the current value of the base rate (e.g., the three-month LIBOR) fixed over the remaining life of the loan to determine future coupons. A credit spread measure (the "spread-to-maturity" or STM) is then derived by subtracting the base rate from the quasi-yield. Importantly, the prices used by LCD to solve for quasi-yields are dealer bid quotes, not traded prices.

[8]To ensure that factor portfolios exhibit a meaningful spread over the two investment themes, we exclude months with less than eight cross-sectional units. We further require that each industry- (or country-) month have available CERs over the subsequent six months.

[9]A significant share of quoted loans in the LLI and the ELLI are institutional term loans; they typically repay 1% of par annually over their life and the remaining notional at maturity. Therefore, at a monthly frequency, the principal repayment return should be of second-order importance. Supporting this claim, Beyhaghi and Ehsani (2017) report that the 0.38% average monthly total return for their loan series consists of 0.53% interest return, 0.01% principal repayment return, and –0.16% price return.

EXHIBIT 1

Summary Statistics for Monthly Credit Excess Returns (in basis points)

	Start	End	Mean	Median	SD	Skewness	Kurtosis
Panel A: Monthly Industry or Country Returns (in bps)							
US BB Industries	2000–02	2019–12	28.67	27.89	177.82	0.09	34.37
US B Industries	2000–02	2019–12	40.51	35.67	168.30	–0.18	26.66
EU Industries	2003–11	2019–12	48.32	32.36	282.77	–0.17	17.58
EU Countries	2005–12	2018–11	46.56	38.93	244.77	–1.48	19.19
Panel B: Monthly Index Returns (in bps)							
US LLI BB	2000–02	2019–12	30.35	33.60	149.24	–2.74	37.14
US LLI B	2000–02	2019–12	42.87	37.23	141.81	–1.02	25.21
ELLI	2003–11	2019–12	41.37	40.15	187.98	–2.70	26.19
ELLI	2005–12	2018–11	44.56	47.38	209.39	–2.48	21.35

NOTES: Credit excess returns (CERs) are calculated according to Equation 1 in the text. Panel A reports summary statistics of monthly CERs for the four cross-sections. We calculate these statistics separately for each industry (or country) and report their cross-sectional average. For each cross section, we exclude months with less than eight cross-sectional units. We further require that each industry- (or country-) month has available CERs over the subsequent six months. Panel B contains summary statistics for the benchmark indexes, the S&P/LSTA Leverage Loan Index (LLI), and the European Leveraged Loan Index (ELLI).

LIBOR rate.[10] Although their floating rate coupons and the corresponding low duration should make loan prices relatively insensitive to interest rate risk, we absorb any remaining effect of interest rates on loan prices by including $\Delta LIBOR_t$ in Equation 2.[11] The OLS estimate of $\beta_1^{q,i}$ is an empirical measure of the interest rate duration and $\beta_2^{q,i}$ is the corresponding measure of the spread duration of industry (country) *i* in panel *q*. Finally, by inserting the OLS estimate of $\beta_2^{q,i}$ into Equation 1, we obtain monthly time series of CERs for each industry (or country) in the four panels.

The US industries data span 239 months from February 2000 to December 2019. The European data is shorter, from November 2003 to December 2019 (194 months) for European industries and from December 2005 to November 2018 (156 months) for European countries. With respect to the size of the four industry (or country) × month panels, we have 5,258 observations (22 average cross-sectional units times 239 months) for the US B industries panel, 4,780 observations (20 times 239) for US BB industries, 3,780 observations (20 times 189) for European industries, and 1,584 observations (11 times 144) for European countries.[12]

Panel A of Exhibit 1 shows descriptive statistics on the computed monthly CERs. We calculate these statistics separately for each industry (or country) and report their cross-sectional average. In line with meaningful variation in default risk and liquidity across the four panels, the average industry (or country) offers substantially different loan risk premiums. These premiums range from a low of 28.7 bps for the relatively save and liquid US BB loans to as high as 48.3 bps (industries) and 46.6 bps (countries) for European loans. Consistent with their distinct credit risk profile, US B loans pay on average 11.8 bps more than their BB-rated counterparts. European loans show the highest return volatilities and the lowest (most negative) skewness, making them less attractive for risk-averse investors ceteris paribus.

[10] As about three-quarters of all loans use LIBOR as their base rate, we proxy for changes in the risk-free rate by changes in the three-month LIBOR rate.

[11] In line with this prediction and in contrast to the estimated spread durations, the empirical interest rate durations are small in economic terms and almost always statistically insignificant.

[12] Due to the requirement of at least eight cross-sectional elements, we lose 5 months for the European industries panel, and 12 months for European countries.

Panel B of Exhibit 1 displays time-series statistics of monthly CERs for the benchmark indexes. We benchmark US industries with the BB-rated and B-rated subsets of the broad S&P/LSTA LLI. For European panels, we use the ELLI as a benchmark. We provide summary statistics on the ELLI over two different periods, corresponding to the European industries and countries panels. Overall, summary statistics for the index data are consistent with the industry level (country level) averages reported in Panel A. US indexes exhibit lower mean and median CERs and lower standard deviations than European indexes. US B-rated loans have higher mean and median CERs than their BB-rated peers.

Measuring Systematic Investment Themes

The two most common factors within systematic investing are value and momentum, for which an extensive collection of theoretical and empirical literature supports the existence of persistent return premiums across multiple asset classes. The aim here is to introduce intuitive measures of these two themes that are deliberately simple to enhance the transparency and replicability of the study. While this approach mitigates potential data mining concerns, the article's results on the efficacy of systematic credit investing with loans are likely conservative, leaving room for further improvement with respect to more sophisticated measures and portfolio construction choices.

Cross-sectional momentum is the tendency for an asset's recent relative performance to continue, leading to outperformance of recent winners relative to recent losers. Recent performance is typically either measured with return data from the asset itself or with returns from other related assets (e.g., using equity momentum to explain bond returns). Due to the specific microstructure of the secondary loan market, loan price quotes are likely to exhibit short-term momentum. Because quotes are provided by decentralized dealers that do not observe their competitors' individual quotes, and the market lacks pre- and post-trade transparency, new information typically takes some time to be fully incorporated into quotes. Hence, price momentum driven by slow information diffusion emerges almost naturally from the market's microstructure (see Jostova et al. 2013 for the argument that slow information diffusion causes momentum in high-yield bond returns).

In line with this reasoning, Beyhaghi and Ehsani (2017) and Mählmann and Sukonnik (2022) establish a short-term (one- and three-month) momentum effect for credit excess returns of individual loans. We follow this literature and measure short-term momentum by the industries' (or countries') past month CER. Unreported panel regressions reveal that this simple short-term momentum measure has superior performance relative to longer-term choices.

Value can be characterized as mean reversion in valuations. Relatively cheap assets outperform relatively expensive assets in risk-adjusted terms. A cheap loan provides investors excess compensation per unit of expected fundamental credit risk. Hence, to determine whether a loan is cheap or expensive, we need a credible fundamental anchor to compare against the loan's current market credit spreads. We employ a reduced-form approach to adjust industry level STMs for expected loan defaults. For US industries of BB- or B-rated loans, we regress STM (for industry *i* in panel *q*) on the industry's 12-month forward *realized* loan default rate ($f12\_month\_DR_t^{q,i}$) and use the residual ($\varepsilon_t^{q,i}$) from this regression as the industry-specific value measure:

$$STM_t^{q,i} = \alpha^{q,i} + \beta_1^{q,i} * f12\_month\_DR_t^{q,i} + \varepsilon_t^{q,i}. \tag{3}$$

This approach has the benefit that it (linearly) adjusts spreads for future realized defaults. Hence, variation in value represents industry and time variation in the excess loan premium for bearing exposure to loan credit risk beyond the compensation for expected loan defaults. This benefit comes at the cost that $\varepsilon_t^{q,i}$ is estimated in-sample; it is only available ex post and cannot be used for a contemporaneous or real-time value strategy. That is, the value results in this paper are rather descriptive, not predictive. However, they accurately simulate the efficacy potential of an actual value strategy.

Due to the smaller size of the European loan market compared to its US dollar counterpart, default events are less frequent across European loans, and European default rates at the industry or country level are noisy. Therefore, realized European default rates are an inaccurate proxy for expected default losses and we leave STMs unadjusted for defaults in the European industry and country panels. Hence, the value measure for the European panels can alternatively be viewed as carry.

FACTOR PORTFOLIO PERFORMANCE

In the next two sections, we present our main results—namely, that value and momentum factor portfolios of industry and country loan indexes earn substantial risk-adjusted returns (Sharpe ratios and alphas beyond the market's credit risk premium). We also look at information ratios vis-à-vis the loan market and highlight the importance of the investment horizon for evaluating the efficacy of factor investing in credit markets.

One-Month Investment Horizon

The analyses in this section examine the profitability of applying systematic investment themes to industry and country indexes of leveraged loans through standard tercile portfolios. At the start of each month t, we rank industries (and countries) within each panel on the two investment themes and compute returns for each portfolio over month $t + 1$. Equal weighted (industry and country) tercile portfolios are rebalanced monthly. The purpose of this analysis is to show the potential for a systematic approach (i.e., whether these characteristics are associated with future credit excess returns). We will address implementability issues in the next section.

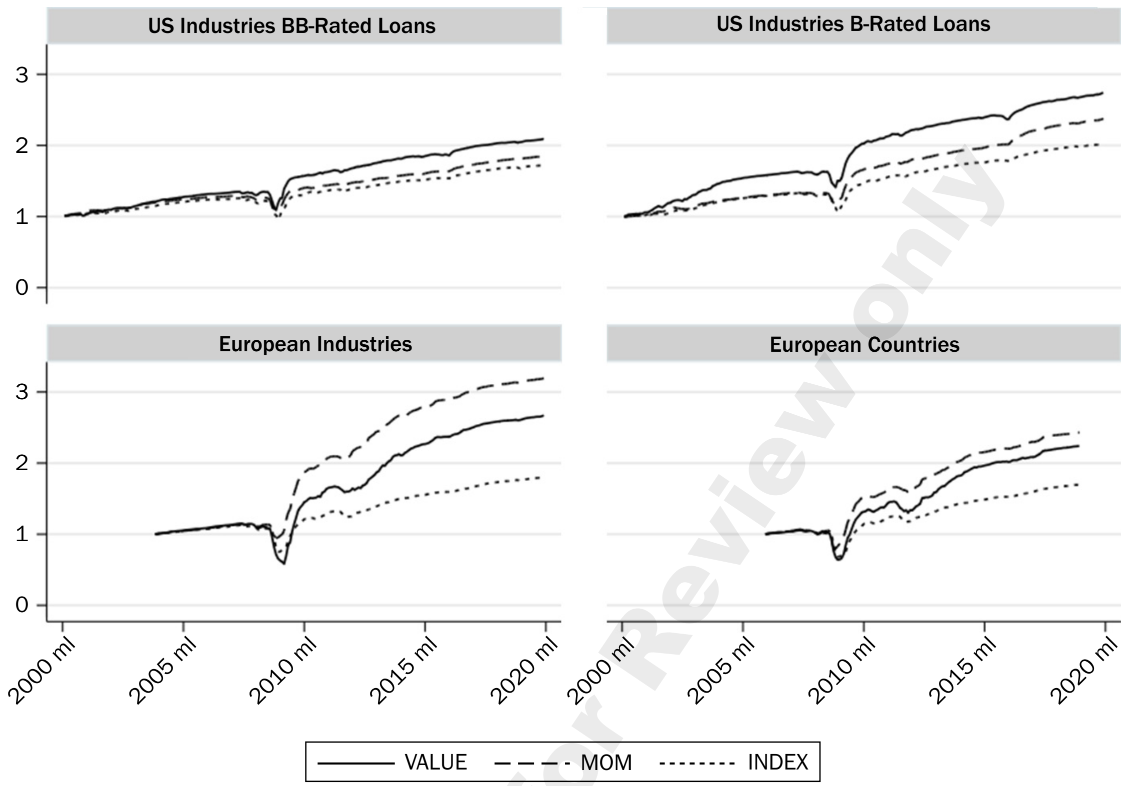
Cumulative returns. To get a first insight into the factors' potential to exploit cross-sectional investment opportunities *within* the loan market, Exhibit 2 reports the cumulative returns for the hypothetical long-only HIGH (tercile three) factor portfolios and the benchmark separately. Several results are noteworthy. For US industries, the value strategy turns out to be particularly successful: Investing $1.00 in the average loan from the top-tercile of US value industries returns $2.09 for the universe of BB-rated loans and $2.74 for B-rated loans over the period from February 2000 to December 2019. The momentum strategy is profitable too, earning $1.86 (BB-rated) and $2.38 (B-rated), respectively, for each dollar invested at the sample start. Importantly, for both investment themes, the US HIGH portfolios substantially outperform their corresponding market index. The entire subset of BB-rated (B-rated) LLI loans earns just $1.73 ($2.02) on a $1.00 investment.

In sum, these persistent outperformances of HIGH value industry factors are meaningful: Investors could have raised their terminal investment value by up to 36% (2.74/2.02–1) when investing in loans from top value US industries compared with passively (i.e., industry-neutral) investing in the loan market.

In Europe, the momentum strategy is particularly well compensated, offering final values of €3.20 (industry portfolios) and €2.43 (country portfolios), respectively, for an initial one-euro investment. The value strategy lags slightly behind with returns of

EXHIBIT 2

Cumulative Returns for Factor Portfolios and the Benchmark Indexes



NOTES: This exhibit shows the cumulative performance (credit excess returns) of hypothetical long-only HIGH (i.e., tercile three) factor portfolios and the corresponding benchmark indexes. For US industries, the benchmark is the LLI (either the BB-rated or the B-rated subset), and the ELLI for the two European panels. At the start of each month *t*, we rank industries (and countries) within each panel on the two investment themes. Equal weighted (industry and country) tercile portfolios are rebalanced monthly. We compute returns for each portfolio over month $t + 1$. The value theme is measured by an industry's aggregate secondary market credit spread (STM) adjusted for future realized 12-months default rates (for US industries) or by the unadjusted STM (for European industries and countries). Momentum denotes the month *t* CER of an industry or country.

€2.67 and €2.24 on one euro, respectively. Recall that this performance is achieved from November 2003 to December 2019 for industry portfolios and from December 2005 to November 2018 for country portfolios. During these periods, the overall cumulative return of the ELLI was just €1.80 and €1.70, respectively. Hence, the terminal value of systematically investing in the average loan of current winner industries (countries) exceeds the pay-off available from a passive (industry- or country-neutral) strategy by 78% (43%). The corresponding outperformances of the European HIGH value portfolios are 48% and 32%, respectively.

Exhibit 2 also reveals that the biggest loss for all portfolios and benchmarks occurs during the great financial crisis of 2007–2009. However, the downturn is less significant for the US panels than for the European ones. For the US series, cumulative returns of high value and momentum industries of BB loans reach a minimum of \$1.10, and \$1.40 and \$1.20, respectively, for industry value and momentum factors of B-rated loans. In the European panels, the financial crisis minima for the HIGH value and momentum factors are more meaningful, at €0.58 and €0.95 (industries), and €0.64 and €0.80 (countries), respectively. It is noteworthy that while the LLI benchmark slightly underperforms the US HIGH industries during the financial crisis, the opposite is true for the ELLI and the European HIGH value portfolios. One likely

EXHIBIT 3
Risk and Return Profiles of LOW and HIGH Value Factors

	Ranking	Start	End	Mean (bps)	SD (bps)	Sharpe Ratio	Alpha (bps)	*t*-Stat.	Info. Ratio	Skewness	Kurtosis	MDD (%)
Panel A: One-Month Holding Period												
US BB Industries	LOW	2000–02	2019–12	194	367	0.53	100	0.83	0.29	–1.59	5.22	22.53
	HIGH	2000–02	2019–12	548	568	0.96	385	2.32	0.74	0.44	2.26	25.89
US B Industries	LOW	2000–02	2019–12	301	350	0.86	139	1.02	0.44	–0.72	2.45	21.28
	HIGH	2000–02	2019–12	874	601	1.45	610	2.91	1.12	0.28	1.66	22.10
EU Industries	LOW	2003–11	2019–12	279	475	0.59	27	0.25	0.08	–1.09	2.45	32.03
	HIGH	2003–11	2019–12	1040	1017	1.02	444	2.77	0.68	0.03	1.33	50.77
EU Countries	LOW	2005–12	2018–11	304	521	0.58	78	0.52	0.19	–1.19	2.57	28.01
	HIGH	2005–12	2018–11	910	984	0.93	376	1.89	0.57	–0.33	1.23	46.05
Panel B: Six-Months Holding Period												
US BB Industries	LOW	2000–02	2019–12	224	361	0.62	147	1.21	0.43	–1.32	4.72	20.73
	HIGH	2000–02	2019–12	530	534	0.99	382	2.39	0.78	0.33	2.40	25.95
US B Industries	LOW	2000–02	2019–12	321	388	0.83	134	0.87	0.39	–0.97	3.04	23.99
	HIGH	2000–02	2019–12	806	569	1.42	542	2.87	1.06	0.26	1.69	22.21
EU Industries	LOW	2003–11	2019–12	164	544	0.30	–155	–1.52	–0.44	–1.10	2.20	44.74
	HIGH	2003–11	2019–12	1200	957	1.25	658	4.04	1.03	0.21	1.20	38.23
EU Countries	LOW	2005–12	2018–11	316	541	0.58	65	0.44	0.16	–1.12	2.46	28.09
	HIGH	2005–12	2018–11	851	957	0.89	324	1.70	0.52	–0.35	1.31	46.39

NOTES: This exhibit provides an overview of return and risk measures for HIGH and LOW value portfolios. All returns are credit excess returns. Each month, a HIGH (LOW) factor portfolio takes equal weighted long positions in 33% of the industries or countries. Panel A provides information on one-month holding periods, and Panel B on six-month. For the one-month case, the return in month $t + 1$ is calculated from portfolios constructed in month t. For the six-month investment horizon, the standard calendar-time method according to Jegadeesh and Titman (1993) is used to calculate a time series of monthly strategy returns. That is, the return in month $t + 1$ is calculated as the average of the portfolios formed from month $t - 5$ to t. Mean, standard deviation (SD), Sharpe ratio, alpha, information ratio, skewness, and kurtosis are annualized. The CAPM alpha is from a regression of portfolio returns on benchmark returns. For US industries, the benchmark is the LLI (either the BB-rated or the B-rated subset), and the ELLI for the two European panels. The value theme is measured by an industry's aggregate secondary market credit spread (STM) adjusted for future realized 12-month default rates (for US industries) or by the unadjusted STM (for European industries and countries). The *t*-statistics are calculated with Newey and West (1987) standard errors. MDD denotes the maximum drawdown.

reason for the underperformance of the European value factor during the crisis is that our European version of the value measure (STM) does not control for cross-sectional differences in expected default risk, which were substantial during the crisis.

These financial crisis-related minima in cumulative returns are responsible for the maximum drawdowns (MDDs) shown in Column 13 of Exhibit 3 (for value) and Exhibit 4 (for momentum). Maximum drawdowns are defined as the most pronounced peak-to-trough return decline for a portfolio. Exhibits 3 and 4 show substantial differences in MDDs between US and European panels. For US HIGH value industries, maximum drawdowns amount to 25.89% for BB-rated loans and to 22.10% for B-rated loans, respectively, while they double to 50.77% and 46.05% for the European industry and country panels. For HIGH momentum strategies, maximum drawdowns range from 17.10% for US industries of B-rated loans to 27.15% for European countries. The US versus European spread in MDDs is more meaningful for LOW momentum portfolios. In sum, the MDD results suggest that momentum and value sorted portfolios of European industry and country loan indexes are exposed to a higher downside risk than their US industry peers.

EXHIBIT 4

Risk and Return Profiles of LOW and HIGH Momentum Factors

	Ranking	Start	End	Mean (bps)	SD (bps)	Sharpe Ratio	Alpha (bps)	*t*-Stat.	Info. Ratio	Skewness	Kurtosis	MDD (%)
Panel A: One-Month Holding Period												
US BB Industries	LOW	2000–02	2019–12	373	493	0.76	298	1.74	0.62	0.18	2.97	24.53
	HIGH	2000–02	2019–12	429	388	1.11	295	2.87	0.87	–0.28	2.42	20.98
US B Industries	LOW	2000–02	2019–12	393	487	0.81	140	0.82	0.33	–0.81	2.36	28.99
	HIGH	2000–02	2019–12	691	461	1.50	466	3.13	1.14	0.42	1.86	17.10
EU Industries	LOW	2003–11	2019–12	128	742	0.17	–292	–2.28	–0.59	–0.73	1.61	61.25
	HIGH	2003–11	2019–12	1358	827	1.64	958	5.64	1.50	0.58	1.17	19.57
EU Countries	LOW	2005–12	2018–11	181	651	0.28	–160	–1.17	–0.35	–0.77	1.46	41.13
	HIGH	2005–12	2018–11	1093	851	1.28	708	2.78	1.06	–0.34	1.53	27.15
Panel B: Six-Months Holding Period												
US BB Industries	LOW	2000–02	2019–12	385	476	0.81	276	1.77	0.61	–0.01	2.65	24.33
	HIGH	2000–02	2019–12	379	385	0.98	268	2.22	0.76	–0.71	3.06	21.97
US B Industries	LOW	2000–02	2019–12	519	523	0.99	275	1.39	0.59	–0.05	2.18	25.99
	HIGH	2000–02	2019–12	593	410	1.45	373	2.74	1.06	–0.17	1.92	19.96
EU Industries	LOW	2003–11	2019–12	598	760	0.79	155	1.29	0.32	0.00	1.61	42.02
	HIGH	2003–11	2019–12	879	676	1.30	498	4.31	1.09	0.06	1.15	29.88
EU Countries	LOW	2005–12	2018–11	440	733	0.60	40	0.25	0.08	–0.72	1.95	39.66
	HIGH	2005–12	2018–11	744	705	1.05	387	2.19	0.76	–0.52	1.51	31.37

NOTES: This exhibit provides an overview of return and risk measures for HIGH and LOW momentum portfolios. All returns are credit excess returns. Each month, a HIGH (LOW) factor portfolio takes equal weighted long positions in 33% of the industries or countries. Panel A provides information on one-month holding periods, and Panel B on six-month. For the one-month case, the return in month $t + 1$ is calculated from portfolios constructed in month t. For the six-month investment horizon, the standard calendar-time method according to Jegadeesh and Titman (1993) is used to calculate a time series of monthly strategy returns. That is, the return in month $t + 1$ is calculated as the average of the portfolios formed from month $t – 5$ to t. Mean, standard deviation (SD), Sharpe ratio, alpha, information ratio, skewness, and kurtosis are annualized. The CAPM alpha is from a regression of portfolio returns on benchmark returns. For US industries, the benchmark is the LLI (either the BB-rated or the B-rated subset), and the ELLI for the two European panels. Momentum denotes the month t CER of an industry or country. The t-statistics are calculated with Newey and West (1987) standard errors. MDD denotes the maximum drawdown.

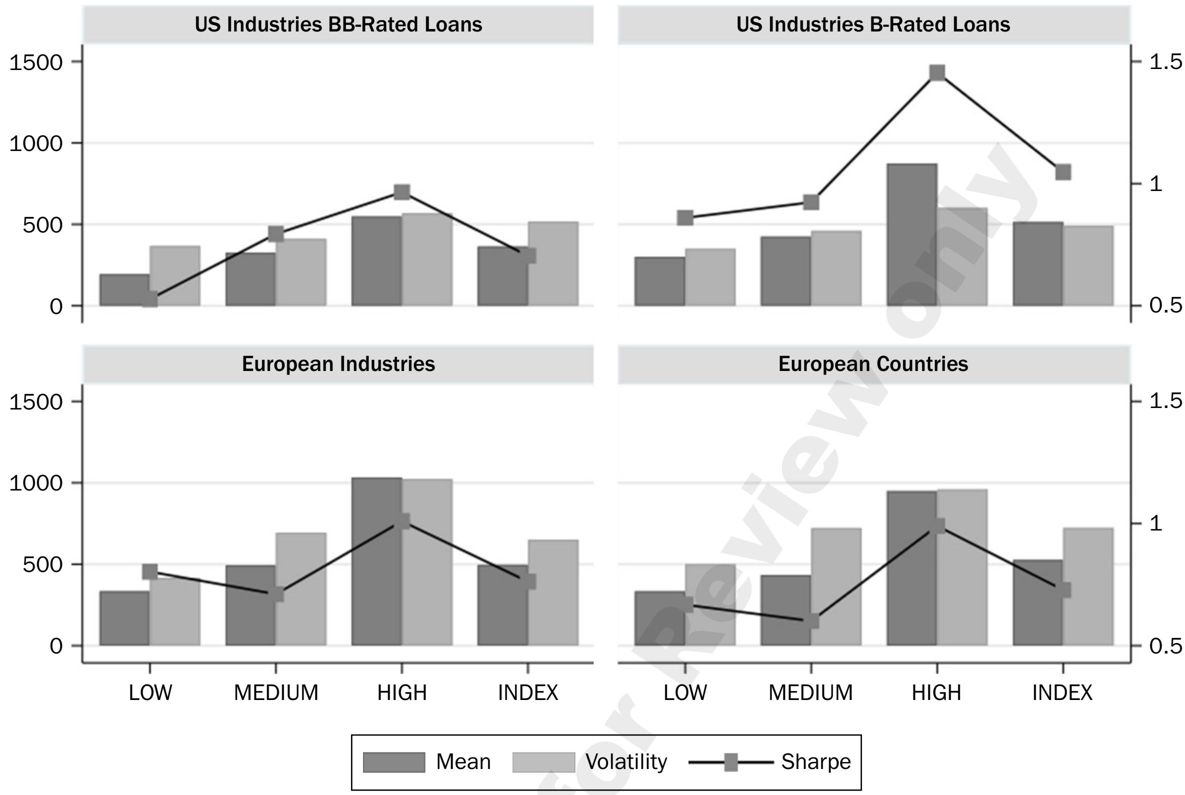
Risk-adjusted returns. While the cumulative returns in Exhibit 2 are revealing, they neglect a consideration of risk. In the following, we assess returns relative to total volatility using the Sharpe ratio statistic.

Exhibit 5 shows the annualized means and volatilities of credit excess returns for the three factor portfolios sorted according to the value theme and the performance of the corresponding benchmark. The results look promising. In line with the view that the factor under consideration rewards a (risk) premium, for all panels, mean returns of factor portfolios increase monotonically from tercile one (LOW) to tercile three (HIGH). Furthermore, the HIGH factors offer attractive loan premiums, ranging from 548 bps for US BB-rated industries to 1,040 bps for European countries.[13]

[13] We can benchmark these numbers to those reported in previous literature. Beyhaghi and Ehsani (2017), for example, study individual (quoted but not necessarily traded) US leveraged loans over the period from September 1999 to December 2009. They construct monthly rebalanced value (STM) and momentum (three-month past return) factor portfolios (quintile sorts). Their HIGH (quintile five) value factor generates an average annualized return of 621 bps, lying in between the mean HIGH returns of 548 bps and 874 bps found in this paper for BB- and B-rated industry indexes (see Exhibit 3). The HIGH minus LOW return spread is 252 bps (statistically insignificant). The profitability of the momentum theme is even more pronounced. The HIGH portfolio returns 996 bps a year on average, and the HIGH minus LOW momentum return spread amounts to a strongly significant 1,128 bps. Note that Beyhaghi and Ehsani (2017) report total returns whereas our results are based on credit excess returns. Limiting systematic

EXHIBIT 5

Industry and Country Value Factor Performance



NOTES: The exhibit shows annualized mean credit excess returns (in bps, left axis), annualized volatilities (in bps, left axis), and Sharpe ratios (right axis) for the LOW, MEDIUM, and HIGH value portfolios (tercile ranks). The portfolios are rebalanced monthly. The value theme is measured by an industry's aggregate secondary market credit spread (STM) adjusted for future realized 12-month default rates (for US industries) or by the unadjusted STM (for European industries and countries). For US industries, the benchmark is the LLI (either the BB-rated or the B-rated subset), and the ELLI for the two European panels. The sample period is February 2000 to December 2019 (US industries), November 2003 to December 2019 (European industries), and December 2005 to November 2018 (European countries).

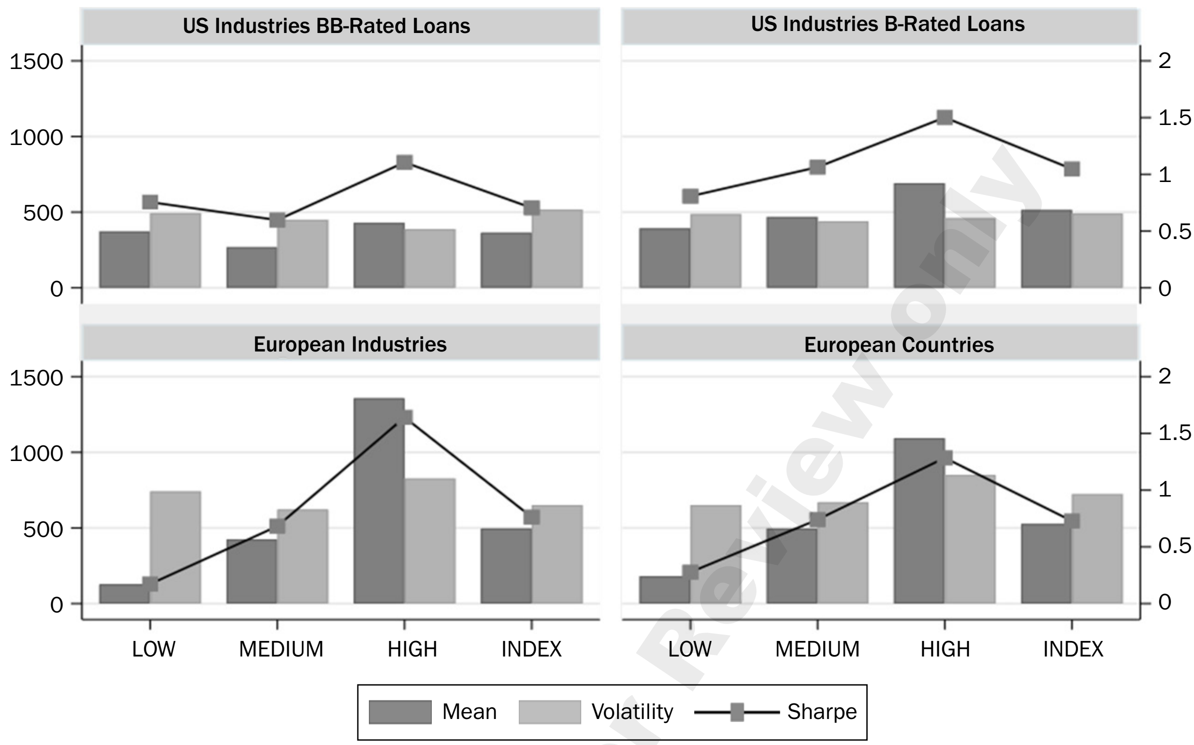
Recall from Panel B in Exhibit 1 that the BB-rated (B-rated) loan subset of the LLI returned just 364 bps (514 bps) in an average year over the sample period and that the ELLI earned 496 bps (from November 2003 to December 2019) and 534 bps (December 2005 to November 2018) a year, respectively. Hence, in economic terms, when compared to the benchmark indexes, the magnitude of the factor premiums is substantial. Even though return volatilities also increase monotonically from LOW to HIGH, Exhibit 5 reveals that HIGH value portfolios offer the largest compensation per unit of risk, substantially exceeding the market Sharpe ratio in each panel.

Exhibit 6 shows that the predictive ability of current month returns for future one-month returns is particularly strong in the cross sections of European industries and countries. Average annual returns of momentum sorted tercile portfolios increase monotonically from 128 bps to 1,358 bps for European industries and from 181 bps to 1,093 bps for European countries. As volatility stays almost flat across portfolios,

investing to the subset of liquid loans reduces factor efficacy. Mählmann and Sukonnik (2022) report annual mean credit excess returns of 483 bps and 469 bps, respectively, for HIGH value (STM adjusted for expected default risk) and HIGH one-month momentum tercile factors over the period from July 2010 to December 2015. Their factors were constructed from traded loans only.

EXHIBIT 6

Industry and Country Momentum Factor Performance



NOTES: The exhibit shows annualized mean credit excess returns (in bps, left axis), annualized volatilities (in bps, left axis), and Sharpe ratios (right axis) for the LOW, MEDIUM, and HIGH momentum portfolios (tercile ranks). The portfolios are rebalanced monthly. Momentum denotes the month *t* CER of an industry or country. For US industries, the benchmark is the LLI (either the BB-rated or the B-rated subset), and the ELLI for the two European panels. The sample period is February 2000 to December 2019 (US industries), November 2003 to December 2019 (European industries), and December 2005 to November 2018 (European countries).

Sharpe ratios climb substantially, from 0.17 to 1.64 (industries) and from 0.28 to 1.28 (countries), again beating the market Sharpe (0.75).

For US industries, short-term momentum turns out to be less predictive, especially for indexes of BB-rated loans. The HIGH minus LOW spread in average returns amounts to just 56 bps in this case. As return volatility decreases monotonically, Sharpe ratios nevertheless rise from 0.76 to 1.11, surpassing the BB market Sharpe (0.70). The momentum theme looks more profitable across US industry indexes of B-rated loans. While volatility decreases, average returns increase monotonically from 393 bps to 691 bps, yielding Sharpe ratios that almost double from 0.81 to 1.50 (B market Sharpe: 1.05).

To validate the results from Sharpe ratios, we risk-adjust returns for the beta to the respective benchmark index (LLI or ELLI). We report annualized CAPM alphas from a regression of monthly factor credit excess returns on benchmark credit excess returns in Panel A of Exhibit 3 (for value) and Exhibit 4 (for momentum). We also show Newey and West (1987) t-statistics. Looking at the value sorts first, HIGH alphas are positive, large (they range from 376 bps to 610 bps a year) and statistically significant (at least at 10%). For LOW portfolios, the alphas are much smaller (they range from 27 bps to 139 bps) and statistically insignificant. Like the pattern found for Sharpe ratios, the value theme is most attractive among industry indexes of B-rated loans.

Also, in line with previous findings, momentum investing is particularly profitable in European markets. HIGH alphas are positive (958 bps and 708 bps) and strongly significant; LOW alphas are negative (–292 bps and –160 bps) and significant (for EU industries). The corresponding return spreads of 1,250 bps and 868 bps are substantial, again highlighting the return forecasting power of short-term momentum in the cross sections of European industries and countries. While HIGH momentum factors are rewarded less in US markets, they still have significant alphas of 295 bps (BB-rated) and 466 bps (B-rated).

We conclude that factor portfolios constructed at the industry and country levels generate superior risk-adjusted returns, measuring risk either as volatility or beta to the broad loan market. The value and momentum themes are particularly attractive across US industries of B-rated loans, and momentum is also substantially profitable in European markets. The higher momentum profits in European markets are consistent with the view that one source of loan momentum are market microstructure and illiquidity issues (e.g., slow diffusion of new information into dealer quotes) that are likely more pronounced in the smaller European market compared to its bigger and more liquid US counterpart.

Information ratios and higher return moments. Next, we view risk in a relative sense and look at the volatility of active returns, i.e., the tracking error. Active returns are defined as portfolio returns minus benchmark returns. We relate mean active returns to tracking errors and report the resulting information ratios in Panel A of Exhibits 3 and 4. Across both investment themes, information ratios of the HIGH portfolios are substantial, with numbers approaching or exceeding one in most cases. In contrast, information ratios of LOW factors are small and typically below 0.5, except for the momentum portfolio of US BB industries. Significant information ratios are available from the portfolios of high value (1.12) and momentum (1.14) US B industries, and from the two European HIGH momentum factors of industries (1.50) and countries (1.06). These meaningful information ratios suggest that the corresponding long-only portfolios are particularly attractive to credit managers that are benchmarked to the B-subset of the LLI or to the ELLI market indexes.

We end this section with a brief look at higher moments of the factor return distribution reported in Panel A of Exhibits 3 and 4. Importantly, while return distributions of LOW portfolios display a negative skewness in most cases, the skewness of HIGH portfolio returns is almost always positive. Hence, from the perspective of a risk-averse investor, high-ranked portfolios are the most preferred as they are typically positively skewed with a moderate kurtosis.

Six-Month Investment Horizon

While the analysis above supports the case for systematic industry and country level investing within the secondary leveraged loan market, it is subject to various criticisms related to implementation. Could exposures to systematic investment themes generate meaningful risk-adjusted returns when faced with real world constraints like a turnover-aware, longer investment horizon? As mentioned above, loans are bilateral contracts, not securities, that cannot be traded as frictionless and efficient as high-yield bonds or even equities (Keßler and Mählmann 2021). Hence, a six-month holding period is a more realistic description of actual credit manager behavior than monthly rebalancing. We now turn to examine the potential for systematic investment themes to identify attractive industries or countries in the context of a six-month investment horizon.

Factor portfolios are built each month and held for the subsequent six months. To construct a time series of monthly strategy returns, we apply the standard calendar-time method according to Jegadeesh and Titman (1993). That is, the return in month $t + 1$ is calculated as the average of the portfolios constructed from month $t - 5$ to t. Panels B in Exhibits 3 and 4 report the results for the six-month horizon.[14]

As factor portfolios with one-month holding periods maximize the exposure to factor themes, some form of performance decay is almost inevitable for longer holding periods. In line with this expected lower discriminatory power of factor themes, the performance statistics in Panel B often worsen for HIGH portfolios and improve for LOW portfolios. However, this effect is small (or absent) in case of the value theme, suggesting that value can predict cross-sectional return differences even at longer horizons. For example, looking at BB-rated US industry portfolios, the HIGH-LOW differential in mean annual returns decreases by only 48 bps, from 354 bps to 306 bps, over the longer horizon, and by 88 bps (from 573 bps to 485 bps) for B-rated industry portfolios.[15] While the HIGH-LOW return differential drops by 71 bps from 606 bps to 535 bps for European countries, value investing becomes even more attractive over six months for European industry portfolios: the return differential increases by 275 bps (from 761 bps to 1,036 bps). In sum, HIGH value portfolios substantially outperform LOW portfolios (and a passive market allocation) also over extended holding periods.

This picture is reversed for the momentum portfolios. All HIGH-LOW differentials in mean returns, Sharpe ratios, alphas, and information ratios decrease substantially over the longer holding period. While the momentum theme earns positive HIGH-LOW return differentials of 56 bps for BB-rated US industries and 298 bps for B-rated industries in the one-month case, these premiums diminish considerably over six months. For BB-rated loans, the return differential becomes negative at −6 bps, and for B-rated loans, it is 74 bps. For European industry and country portfolios, one-month momentum HIGH-LOW differentials in mean annual credit excess returns are high at 1,230 bps and 912 bps, respectively. They shrink to 281 bps and 304 bps after six months. This suggests that the predictive ability of cross-sectional momentum for credit excess returns in the loan market weakens considerably over longer periods. Hence, complementing results reported in Mählmann and Sukonnik (2022), loan momentum at the industry and country level is profitable, but primarily so in the short run.

Potential Sources of Factor Premiums

In this section, we run several tests to investigate potential sources of the value and momentum premiums. The two usual suspects are default risk and illiquidity.

Default risk. Is the value (or momentum premium) a compensation for default risk? The previous sections presented evidence of an economically strong return predictive ability especially for the value theme, which is only slightly reduced over longer investment horizons.

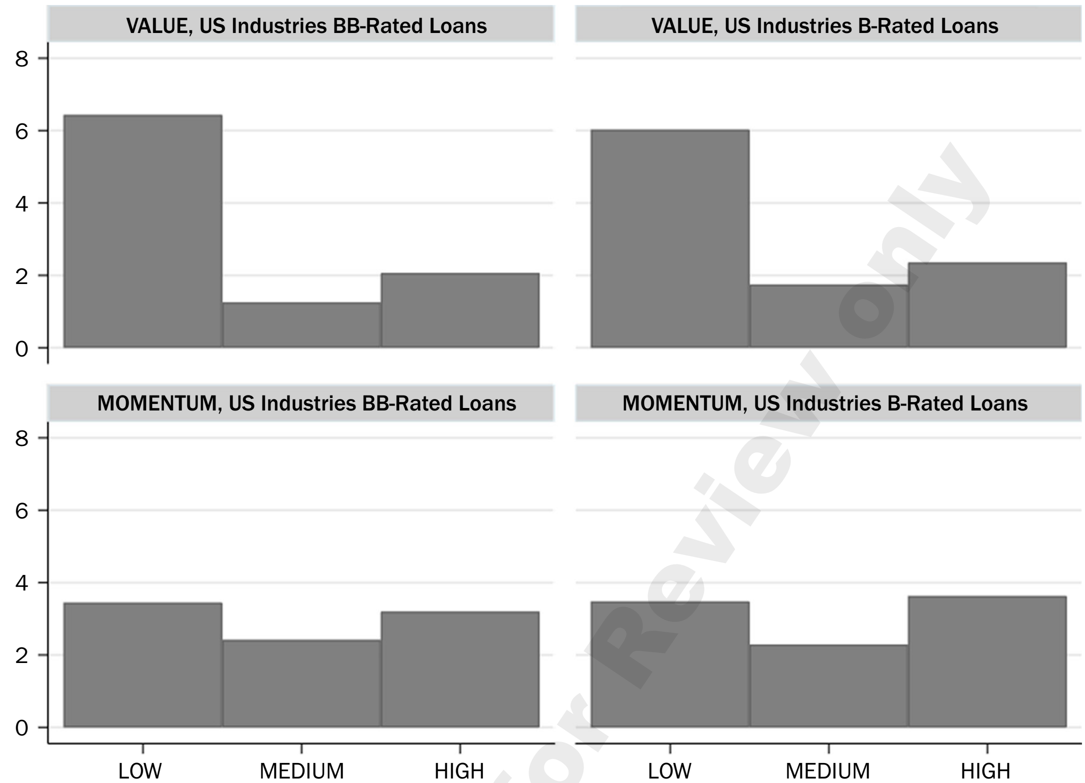
It could be argued that the identified value premium represents just a default risk premium in disguise. However, this is unlikely to be the case, for at least two reasons. First, we constructed the measure of the value theme for US industries by adjusting credit spreads (STM) for future realized default rates using an in-sample regression, and second, we exploit cross-sectional variation of industry indexes that share the same rating, BB or B. Hence, the indexes of each cross section also should

[14] Recall that our sample filter ensures that each cross-sectional unit has credit excess returns available for at least six months after the portfolio formation month. Hence, there are no portfolio drop-outs of industries or countries over the longer horizon.

[15] In this section, we assess a factors' potentially lower return predictive ability over longer horizons by looking at the change in the HIGH-LOW spread in mean credit excess returns. All described patterns are similar for corresponding portfolio spreads in Sharpe ratios, alphas, or information ratios.

EXHIBIT 7

Average 12-month Forward Default Rates (in %)



NOTES: The exhibit shows average 12-month forward default rates for US equal weighted industry value and momentum factor portfolios. Default rates are par-weighted (i.e., defaulted loan par to outstanding loan par for a given industry). The sample period is February 2000 to December 2019.

be comparable in terms of expected (or ex ante) default risk, as measured by rating agencies.

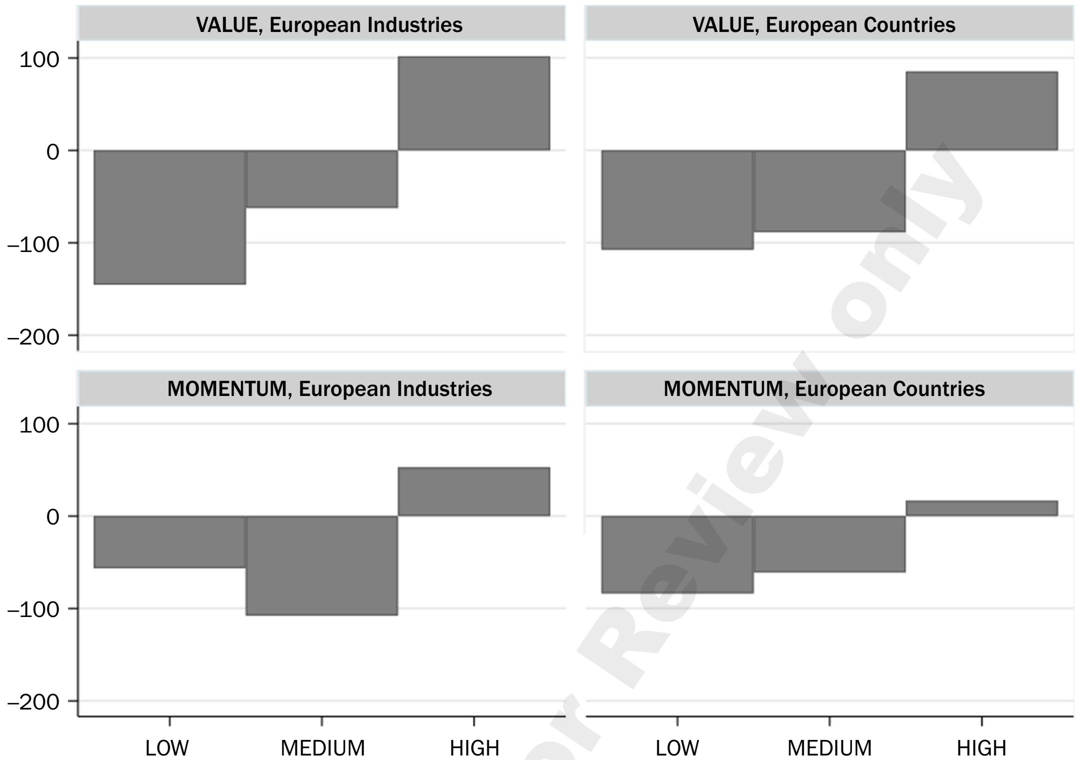
To mitigate any remaining concerns that default risk is the underlying source of the value premium, Exhibit 7 plots average 12-month forward (par-weighted) industry default rates for US BB- and B-rated cross sections. The first row of plots considers value, and the second considers momentum. For both BB- and B-rated loans, the industries in the HIGH portfolio are not the ones with more future defaults. In contrast, the average forward 12-month default rate is highest for the LOW value factor, with 6.4% for BB-rated and 6.0% for B-rated loans. For the HIGH portfolio, average future realized default rates are much lower, 2.1% and 2.4%, respectively. Hence, by construction, industries in the HIGH value portfolio that possess the largest expected returns carry a lower default risk than industries in the LOW and MEDIUM portfolios.

With respect to momentum sorts, we find that realized 12-month default rates for LOW and HIGH portfolios do not differ significantly. They amount to 3.4% and 3.2% for the BB-rated panel and to 3.5% and 3.6% for B-rated loans. MEDIUM portfolios are the ones that show the lowest forward default rates for both US cross sections.

Overall, US industries display no evidence that value or momentum profits compensate for default risk. Future default rates do not monotonously increase from the LOW to the HIGH factor, and HIGH portfolios do not exhibit higher but similar or even lower future default rates than LOW portfolios.

EXHIBIT 8

Average 12-month Forward Bid Quote Changes (in bps)



NOTES: The exhibit shows average 12-month forward changes in aggregate (i.e., industry or country level) bid quotes for European industry and country equal weighted value and momentum factor portfolios. Positive changes indicate raising bid quotes and negative changes falling quotes. The sample period is November 2003 to December 2019 (European industries), and December 2005 to November 2018 (European countries).

Since the European leveraged loan market is much smaller than its US peer, realized default rates are noisy estimates of the actual default risk experienced by European issuers.[16] Hence, instead of default rates, we use relative changes in industry average bid quotes to capture future changes in borrower creditworthiness and actual losses from loan defaults. If European HIGH industry or country portfolios are more significantly exposed to default risk, average prices of these portfolios should drop in the future, as more borrowers would suffer from defaults. Exhibit 8, however, shows exactly the opposite. For both European panels and the two investment themes, prices for the HIGH factor increase, while the prices for the MEDIUM and LOW factors decrease, indicating that also for the European cross sections, HIGH portfolio profits are not a compensation for elevated default risk.

Liquidity

The missing governance role of securities laws and regulators, their nature as bilateral contracts (non-securities), and the specific microstructure of the secondary market make loans exposed to significant liquidity concerns (see Keßler and Mählmann, 2021). Hence, it is natural to ask whether the value and momentum premiums capture cross sectional variation in industry or country level loan illiquidity.

[16] According to Bloomberg data, US leveraged loan issuance reached €919.2 billion in 2019 (€1,115.5 billion in 2018) while European issuances were €162.3 billion (€161.1 billion in 2018).

EXHIBIT 9

Panel Regressions with Country and Month Fixed Effects

	(1)	(2)	(3)	(4)	(5)
$STM_{i,t-1}$	0.1966***		0.2147***		0.2150***
	(0.0561)		(0.0406)		(0.0400)
$CER_{i,t-1}$		0.3366***	0.3514***		0.3513***
		(0.0755)	(0.0783)		(0.0780)
$BA_{i,t-1}$				–0.0322	–0.0665
				(0.2266)	(0.2321)
Const.	–79.6824*	37.1263***	–110.9527***	61.9417	–96.9113
	(40.1413)	(4.4976)	(28.3903)	(48.9768)	(59.3807)
N	1073	1066	1066	1073	1066
Adj. *R*-Squared	61.06%	63.45%	66.05%	58.83%	66.02%
Country FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes

NOTES: The exhibit shows panel regressions, estimated on a European country × month level, over the period from January 2008 to December 2016. The dependent variable (the credit excess return in month *t*: $CER_{i,t}$) is regressed on value ($STM_{i,t-1}$), momentum ($CER_{i,t-1}$), and country level average bid-ask spreads ($BA_{i,t-1}$) for country *i* in month $t-1$. Standard errors (in parentheses) are double-clustered at the country and month level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Due to missing data on actual loan trading costs, we cannot completely rule out the liquidity argument. Below, however, we present some preliminary evidence suggesting that liquidity is unlikely to be the major force behind value and momentum profitability. We construct European country level quoted bid-ask spread series at the monthly frequency by aggregating loan level daily quotes obtained from Markit IHS for the period from 2008 to 2016. Average (median) bid-ask spreads in the pooled country x month sample are 211.1 bps (197.6 bps), with a standard deviation of 91.3 bps. Hence, in line with significant trading frictions and less liquidity supply in the European loan market, these numbers are more than twice the size of quoted and effective half spreads reported in Keβler and Mählmann (2021) and Mählmann and Sukonnik (2022) for the US market.[17]

We run panel regressions at the country × month level with country and month fixed-effects to investigate whether liquidity is priced in the cross section of European countries. We regress one-month credit excess returns of each country *i* ($CER_{i,t}$) on past value ($STM_{i,t-1}$) and momentum ($CER_{i,t-1}$), controlling for bid-ask spreads ($BA_{i,t-1}$):

$$CER_{i,t} = \alpha + \beta_1 * STM_{i,t-1} + \beta_2 * CER_{i,t-1} + \beta_3 * BA_{i,t-1} + \varepsilon_{i,t}. \quad (4)$$

Results are in Exhibit 9, with standard errors double-clustered at countries and months. Columns 1, 2, and 3 show regressions of value and momentum, separately and combined. Column 4 looks at the pricing of country bid-ask spreads, and finally, Column 5 includes all three variables on the right side. Noteworthy, value and momentum turn out to be highly significant in all specifications. In Column 5, an increase of one standard deviation in $STM_{i,t-1}$ or $CER_{i,t-1}$ raises expected future credit excess returns by 81 bps and 106 bps, respectively, or by 27% and 35% of the standard deviation of one-month forward CERs. Most importantly, bid-ask spreads also do

[17] Keβler and Mählmann (2021) calculate average quoted and effective half spreads of 47.6 bps and 41.4 bps, respectively, for a large sample of quotes and actual trades of loans issued primarily by US borrowers. Limiting their sample to actively traded US dollar loans only, Mählmann and Sukonnik (2022) report average quoted half spreads of 35.0 bps (median: 19.4 bps).

not significantly predict future CERs, nor affect the predictive ability of value and momentum. Hence, liquidity is not a primary driver of factor premiums, at least not in the European countries cross section.

CONCLUSION

The development of relatively liquid secondary credit markets over the past two decades has opened up a new opportunity for active credit investors to enhance portfolio performance relative to a passive allocation to the credit risk premium by applying systematic investing techniques to credit investing. This article's goal is to show evidence of the applicability of style investing within the dollar and euro universe of leveraged loans, the liquid and tradable segment of the private debt asset class.

We find strong evidence that well-known systematic investment themes such as momentum and value, applied at the US and European industry level and the European country level, are associated with future credit excess returns of leveraged loans. A monthly rebalanced, equal weighted long-only (top-tercile) portfolio designed to maximize exposure to these systematic themes generates Sharpe ratios between 0.93 and 1.45 for value, and between 1.11 and 1.64 for momentum—substantially larger than the benchmark's Sharpe ratio in each case. In contrast, the corresponding bottom-tercile factor portfolios considerably underperform their respective benchmark. Although factor premiums typically decrease over longer portfolio holding periods, they remain meaningful in most of the settings examined. In addition, we find that these premiums do not represent a compensation for elevated default risk, and preliminary evidence suggests that illiquidity is also not a driver of style returns. Overall, our findings imply that active credit managers employing loan trading strategies that are industry and country neutral forego a viable source of additional return.

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