Dancing to the Same Tune: Commonality in Securities Lending Fees

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Preliminary and Incomplete

Current Draft: September 10, 2020 [*]

ABSTRACT

We document that there is commonality in the loan fees that short sellers pay, and the common component of loan fees explains a significant amount of their variation. The time series of the loan fee common component is highly correlated with several well-documented asset pricing and macro factors, suggesting that loan fee commonality is associated with states of the world that are consequential to investors. At the asset level, we compute sensitivities of stocks' loan fees to the loan fee common component and document that stocks with high loan fees tend to also exhibit high sensitivity to the loan fee common component. While controlling for other priced short-selling factors, we document a statistically significant negative relationship between the systematic volatility of loan fees (with respect to the loan fee common component) and stock returns, indicating that this commonality is priced in the cross-section of stock returns. In addition to this pricing implications, we present evidence that loan fee commonality is associated with lower price efficiency, suggesting that loan fee commonality is an important limit to arbitrage. Finally, we present evidence that loan demand may be the primary driver of the observed fee commonality.

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[*]The authors would like to thank seminar participants at UNC Chapel Hill and the Bank of England for helpful comments. All errors are our own. Please do not circulate.

I. Introduction

Short selling is risky. In addition to the economic exposures faced by all investors, there are risks unique to short selling. These risks come from a number of sources, including regulatory restrictions, institutional barriers and the availability of stock loans. Furthermore, Engelberg, Reed, and Ringgenberg (2018) demonstrated that the risks faced by short sellers are not static. Instead, loan fees are dynamic, and the risk of changing loan fees is a significant limit to arbitrage. In this paper, we highlight a new dimension of dynamic risks: commonality. In the empirical asset pricing literature, a central consideration is the extent to which there are common, systematic risks that influence expected returns and volatilities. We take this idea to loan fees, and we present the first evidence that there is commonality in loan fee movement, and that the common component of loan fees moves with other well-known asset pricing risk factors.

As an example, suppose there are two stocks – A and B – that are identical in every way, including the level of their loan fees and their level of loan fee volatility. However, suppose that in one scenario, loan fees move independently, and in a second scenario, loan fees move together. In the second scenario, short selling a portfolio of stocks is considerably more risky than in the first scenario. Furthermore, suppose that in this second scenario, not only do loan fees move together, but that the loan fees also move against the short seller at exactly the same times as other economic exposures move against the short seller. These two possibilities indicate that commonality in loan fees can form an important limit to arbitrage for short sellers.

Previous literature, e.g., Geczy, Musto, and Reed (2002), has suggested that loan fees are primarily idiosyncratic in nature. Our work finds the opposite. Using a principal components framework, we show that loan fees possess a very high degree of commonality. For example, we find that the first principal component explains 45.6 percent of the variation in loan fees, which indicates a significantly higher degree of commonality than is present in the corresponding equity returns, where the first principal component explains only 28.3 percent of the variation. Moreover, the first principal component of loan fees explains a much higher degree of variation in loan fees than the first principal component of liquidity (as measured by turnover), which only explains 11.6% of turnover variation.

In addition, we find that the common component of loan fees moves with other risk factors to which investors have exposure. We find that Momentum, Betting Against Beta, the Ted Spread, and VIX (e.g., Carhart (1997) and Frazzini and Pedersen (2014)) are all strongly correlated with the common component of loan fees. We find that loan fees not only move together, but that they also move with other well known asset pricing risk factors. Together these two facets of commonality represent an important new dimension of risk for short sellers.

Having established the high degree of loan fee commonality and the fact that the common component of loan fees moves with other well-known risk factors, we turn to understanding how the loan fees for individual stocks move with the common component of loan fees. We find an interesting pattern. We show that when loan fees are high, sensitivity to the common component is especially strong. For example, we show that when loan fees are in the top 25th percentile, the beta (here defined as the sensitivity of a stockâs loan fees to the common component) increases by more than 5. This, along with a number of similar findings, presents a picture that when loan fees are low, correlations to the common component are low, but when loan fees are high, loan fees move together, as if they are up and dancing to the same tune.

With these facts in hand, we then ask whether a possible systematic risk exposure (loan fee exposures to a common component) is priced in the cross-section. Decomposing total loan fee volatility into its idiosyncratic and systematic components, we begin with a simple double-sorted portfolio analysis. Recognizing the importance of the findings in Engelberg, Reed, and Ringgenberg (2018) in this setting, we sort on both total loan fee volatility and systematic volatility. Conditional on a stock having low total loan fee volatility, we find that the return on the low systematic volatility portfolio is 9.1 percent, compared with a return on the high systematic volatility portfolio of 4.5 percent. We find that an investor who buys the low systematic volatility and shorts the high systematic volatility portfolios would earn a positive and significant return. Similarly, conditional on a stock having high total loan fee volatility, we find that an investor who buys low loan fee systematic volatility stocks and shorts high loan fee systematic volatility stocks would earn positive returns. In contrast, we find no significant difference in the returns of portfolios formed on the basis of the idiosyncratic volatility.

The fact that stocks with a relatively high systematic component of loan fee volatility have unusually low future returns is consistent with the idea that these stocks are overpriced. In other words, investors are unwilling to take short positions against these stocks given the additional risk loan fee commonality poses, even after controlling for total loan fee risk.

In addition to conducting a double sorted portfolio analysis to determine whether loan fee commonality is priced in the cross-section of equity returns, we also follow the approach used by Boehmer, Jones, and Zhang (2007) in which we regress future returns on loan characteristics in a panel setting. In this setting, we decompose total loan fee risk into systematic and idiosyncratic components. We find that systematic risk dominates idiosyncratic risk, yielding a coefficient estimate of -0.183, which is highly statistically significant at the one percent level.

Controlling for stock fixed effects and other important characteristics of the short-sales market, we estimate that an increase from the 25th to the 75th percentile in systematic loan fee volatility would be associated with a 1.01% lower return in the following quarter. Alternatively, we estimate that an increase from the 10th to the 90th percentile in systematic loan fee volatility would be associated with a 3.53% lower return in the following quarter.

The fact that systematic loan fee risk has such a large negative coefficient estimate indicates that this is the driving force behind investors' unwillingness to short, and it is likely driving the overall effect found in Engelberg, Reed, and Ringgenberg (2018). In other words, fear of loan fee commonality, and its associated correlation with well-known risk factors, may dissuade investors from taking short positions in overvalued stocks.

Further corroborating the assertion that loan fee commonality is an important limit to arbitrage, we find that systematic loan fee risk is associated with decreased price efficiency. We examine two measures of stock-specific price inefficiency, from Bris, Goetzmann, and Zhu (2007) and Hou & Moskowitz (2005). We find that systematic loan fee volatility is positively correlated with both measures. This suggests that institutional investors such as hedge funds may be deterred from shorting stocks with high loan fee commonality, which results in decreased price efficiency.

In addition, we show that our key results are largely invariant to a few important experimental design characteristics. Specifically, the financial crisis could be a central driver of our results and thus a concern for our analysis. We show that the financial crisis is indeed an important driver of many of our estimates, but we also replicate many of our main tables both before and after the crisis, and we find largely similar results. We also show that that the nature of our results is unchanged when we use alternative measures of the common component of loan fees.

We investigate the origin of loan fee commonality. We hypothesize that if demand for stock loans is a greater driver of fee commonality than supply of stock loans, we should observe that portfolios of stocks which are likely to be heavily shorted should demonstrate high levels of loan demand commonality. Following a similar approach to Karolyi, Lee, and van Dijk (2012), we construct common components of loan demand (supply) for each quarter, defined as the median loan demand (supply) across all firms in that quarter. Then, for each of ten portfolios sorted according to momentum, we regress each stock's loan demand (supply) on the respective common component over the full sample. We record the resulting betas and R^2. We observe high demand betas and R^2 for the first two momentum portfolios, suggesting that loan demand commonality is highest in momentum portfolios which are likely to be heavily shorted, whereas the same phenomenon is not present regarding loan supply. This result suggests that loan fee commonality primarily originates with the demand side for stock loans.

An important parallel to our exploration of the mechanics of the shorting market is the now well-documented commonality in liquidity. To provide some context, several papers document the extent to which an asset's expected return is affected by its illiquidity or the costs associated with trading the asset (see, for example, Amihud and Mendelson (1986)). However, subsequent research documents significant co-movement, or commonality, in liquidity among individual assets (Chordia, Roll, and Subrahmanyam (2000), Hasbrouck and Seppi (2001), and Huberman and Halka (2001)). While the literature has argued about the origins of commonality in liquidity (e.g., derived from shocks to the demanders of liquidity vs. its suppliers), that commonality has been definitely linked to variables that we think are indicative of important states of the world (volatility, financial conditions, etc.) (see Hameed, Kang,and Viswanathan (2010) and Karolyi, Lee, and van Dijk (2012) among many others, for example). From an asset pricing perspective, an individual asset's exposure to systematic liquidity risk can affect asset price determination; that is, not only is an asset's liquidity time-varying, but the fact that its liquidity dries up at otherwise challenging times (high marginal utility states) for its investors affects risk compensation.

The paper proceeds as follows. In Section II, we provide an overview of our data and empirical procedure. In Section III, we discuss our results. Specifically, in Section III.A, we provide evidence of loan fee commonality. In Section III.B, we show the ways in which loan fee movements correlate with other asset pricing and macro variables that are important to investors. In Section III.C, we consider the ways in which investors might view the commonality of loan fees and show that high systematic volatility of loan fees is associated with low future returns. In Section IV, we consider the origin of loan fee commonality. Finally, in Section V, we conclude.

II. Data

In this section, we discuss our data set and empirical strategy. In Section II.A, we provide an overview of the data. In Section II.B, we discuss the measures of loan fee commonality we construct. In Section II.C, we provide a comparison of the loan fee common components. Overall, the results of this section indicate that there is commonality among short-selling loan fees. We also show that the commonality is not driven by one particular time period.

A. Data Overview

Following Engelberg, Reed, & Ringgenberg (2018), we also use a comprehensive equity lending database, which allows us to observe daily short-selling loan fees, volume, returns, and other firm characteristics for 4,675 US equities. The data span 66 months from July 2006 through December 2011.

Out of the 4,675 firms in our sample, 700 of them are in the current Russell 1000. These Russell 1000 stocks constitute 15% of our sample and 70% of the current index. The sample also contains 417 firms in the current S&P 500, which constitute 9% of our sample and 83% of the current index. These numbers indicate that our sample is representative of the market and contains most of the largest publicly traded firms.

Throughout our sample period, many stocks enter or leave the sample. For the average day, loan fee data is populated for about 3,200 stocks, and this number does not fluctuate much throughout the sample period. We restrict our analysis to stocks which have populated loan fee data for at least 252 trading days, which reduces the total number of firms in our analysis from 4,675 to 4,039.

While most loan fees in the data are positive, some loan fees are negative. Because there is little precedent in the short-selling literature for how to interpret negative loan fees, we set a -20 basis point floor for the purpose of constructing our common component. This loan fee floor allows loan fees to fluctuate around zero but limits the ability of large negative loan fees to impact our loan fee common components. We also winsorize at the 1% level on the right tail in order to limit the influence of outliers.

[Table 1]

Table 1 presents summary statistics for our sample. Panel A presents firm-level summary statistics for average loan fees and loan fee volatilities across the full sample. After the data trimming, we find that the median firm in the sample has an average loan fee of 16 basis points per annum. The firm at the 25th percentile of average loan fees across the sample has an average loan fee of 10 basis points, whereas the 75th percentile firm has an average loan fee of 73 basis points, indicating sizeable right skewness in loan fees.

B. Common Component Construction

In order to establish a common component of loan fees, we create and compare several candidate loan fee variables. Each variable is a daily time series which indicates how the aggregate of all stock loan fees in the sample moves over time.

Component 1: *Median Loan Fee*. For each day in the sample, we take the median across all loan fees to construct a time series. While a potential downside of using this as our measure of commonality is that the median is insensitive to tail movements, *Median Loan Fee* incorporates all available data and is the best measure of the average stock's loan fees for a given day. We use this as our measure of the loan fee common component in most of our analyses because of its clear economic intuition and its high correlation with the other candidate components.

Component 2: *PC1*. There is a long-standing tradition across empirical asset pricing in which researchers extract one or more relevant statistical factors from a large panel of asset returns. For example, Connor and Korajczyk (1986) employ principal components by building on the factor model theory of Chamberlain and Rothschild (1983). Many other researchers subsequently employ similar techniques. Principle component analysis also plays a role among researchers in evaluating Treasury bond returns in the term structure literature (see, for examples, Litterman and Scheinkman (1991) and Joslin, Priebsch, and Singleton (2014)).

To construct our second loan fee common component, we first standardize the data by de-meaning all loan fees and dividing by the standard deviation for each firm. In order to conduct a principal component analysis (PCA), the panel must be balanced. In our data set, there are numerous firms that enter or leave the sample at different points in time, so we can not conduct a PCA on the original data set. We remove all stocks which were missing data for at least one day, which leaves us with 1,935 stocks (about 40% of the total stocks in sample). Then we conduct a PCA on the loan fees of the remaining stocks. The first principal component, which we call *PC1*, explains a high degree of variation in loan fees (46%). However, a downside of using this measure is that there is a lack of clear economic intuition, and a large portion of our data is ignored in constructing the measure. Hence, we only consider this variable as a robustness check. The percentage of variation explained by each of the top ten principal components can be found in Table A.1.

Component 3: *Mean Loan Fee (VW)*. Using market capitalization data, we calculate a value-weighted average across all loan fees for each day. While this measure incorporates all available data, has a strong economic intuition, and has historical precedent, this measure is highly correlated with several of the largest firms' loan fees and thus is insensitive to small firms' loan fees. Hence, we only consider this variable as a robustness check.

Component 4: *Mean Loan Fee (EW)*. We calculate the equal-weighted average of all loan fees for each day. This variable is not highly correlated with the other common component candidates (see Table 2) due to the fact that small stocks with highly volatile loan fees are weighted equally with large stocks, whose loan fees tend to have a higher degree of co-movement with other stock loan fees. Because of its low correlation with the other candidates, we only consider the equal-weighted average as a robustness check.

Table 1 (Panel B) presents the time series summary statistics of the loan fee common components, in basis points per annum. On the average day, the median loan fee across firms is about 10 basis points, whereas the first principle component (PC1) is 0 due to the standardization of the data before we conducted the PCA.

C. Common Component Comparison

In this sub-section, we compare loan fee common components over time and determine whether there is co-movement in loan fees.

[Figure 1]

From Figure 1, it is evident that three measures of loan fee commonality (the median, PC1, and the value-weighted average loan fee) move together over time. Note that the levels of the median and value-weighted measures are measured on the primary vertical axis, while the level of PC1 is measured on the secondary vertical axis. The reason for this is that PC1 was calculated on standardized loan fee data, so the units do not correspond directly with those of the median and value-weighted measures. Abstracting from the level of PC1, it is clear that there is a high degree of correlation among the three.

Notably, the levels of all three components sharply rise around the onset of the financial crisis of the late 2000's. The median loan fee rose from around 15 basis points in early September 2008 to 90 basis points in October 2008, and then it subsequently fell to around zero basis points for the remainder of the crisis.

The subplots on the right side of Figure 1 illustrate that the high correlation among the three loan fee common components is not driven solely by the crisis. There is a high degree of commonality of loan fees regardless of the regime we examine. Further corroborating this finding, Table 2 shows the correlations among the components for several sub-samples. Reassuringly, the loan fee common components we consider appear to be highly correlated in each of the sub-samples we examine.

[Table 2]

III. Results

We divide our results into three distinct sections. Section III.A investigates whether or not loan fees move together or are purely idiosyncratic in their movements. We find that loan fees do indeed move together, and Section III.B investigates the ways in which loan fee movements correlate with other macro variables important to investors, and how individual loan fees move with the common component through time. Section III.C considers the ways in which investors might view this commonality of loan fees. In other words, is loan fee sensitivity to the common component priced?

A. The Commonality of Loan Fees

Previous literature, e.g., Geczy, Musto, and Reed (2002), has suggested that loan fees and loan fee variances are primarily idiosyncratic in nature. For example, Geczy, Musto, and Reed (2002) point to merger arbitrage as one of the leading drivers of high loan fees. Thus, one of the primary goals of this paper is to understand whether or not commonality exists in loan fees. Establishing loan fee commonality will serve as a foundation for our analysis.

Following long-established literature, we turn to principal components analysis to understand the degree of commonality in loan fees. We find that after standardization, loan fees possess a very high degree of commonality. We find that the first principle component, PC1, explains 45.6 percent of the sample variation. As a reference, using the same sample of stocks, we find that the first principal component of stock returns explains only 28.3 percent of the variation.* This finding counters some of the previous literature, which suggests that loan fee variation is primarily episodic in nature. For further details on the percentage of variation explained by each of the top ten principal components of loan fees and returns, see Table A.1.

B. The Factor Structure of Loan Fees

Investors' overall tolerance for risk at the portfolio level is limited, and therefore investors care about commonality in loan fees. High commonality means that the risk of short selling and borrowing stocks is higher for a portfolio, relative to a portfolio in which loan fees move randomly. In other words, commonality generates considerable risk for investors in its own right.

In addition, the risk of short selling and borrowing stock can be especially high if the common component of loan fees moves with other risk factors to which investors have exposure. To establish this scenario more firmly, we turn to the considerable literature that follows.

[Table 3]

In Table 3, we analyze the correlation of the common component in loan fees with other well-known asset pricing factors. In various models, we include market return (Mkt-Rf), small minus big (SMB), high minus low (HML), momentum

*Although we don't use principal components beyond the first factor, we do find that subsequent factors, e.g., PC2 through PC10, each individually explain more in the loan fee analysis than their corresponding factors do in the stock return analysis. Overall, we find a very high degree of commonality in loan fees, especially compared with equities. Together, PC1 through PC10 explain a relatively large 74.4 percent of the variation in loan fees, whereas PC1 through PC10 in the stock return analysis explain significantly less variation at 36.9 percent.

(MOM), betting against beta (BaB), the Pastor-Stambaugh Liquidity Factor (PS $Liq\ Factor$), the $Ted\ Spread$, VIX, and finally a dummy variable indicating the 2008-2009 financial crisis, 1_{crisis}.

The time series correlation between the common component in loan fees and other well-known factors yields some interesting insights. Although we find that the loan fee common component isn't highly correlated with the traditional one- and three-factor models, several well-known asset pricing factors seem very closely connected to the common component in loan fees. Model 1 shows very little connection between Mkt-Rf and the common component of loan fees, with a statistically insignificant coefficient estimate of -0.261.

Similarly, the other two factors in the three-factor model, SMB and HML, are generally not significant in the various models included. However, as Model 2 shows, MOM, as given in Carhart (1997), has a high correlation with the common component of loan fees; its coefficient estimate of 0.511 is statistically significant at the 5 percent level. The positive coefficient estimate indicates that loan fees are relatively high when the returns to the momentum portfolio are also high.

We can view this as a potential risk for investors who use a momentum strategy; although the returns to the underlying portfolio might be good, the short leg will incur a relatively high loan fee at times when the total return to the momentum strategy is high. This relationship is a potential demonstration of how the academic literature underestimates the difficulty of trading on well-known anomalies, e.g., Engelberg, Pontiff, and McLean (2017).

We find a strong correlation between BaB and the common component of loan fees. Model 3 shows that BaB has a coefficient estimate of -1.516, which is statistically significant at the 1 percent level. This relatively strong correlation exists fairly consistently throughout the remaining models and indicates that loan fees are relatively low when the betting against beta does well.

Model 4 shows no statistically significant correlation between the Pastor-Stambaugh Liquidity Factor ($PS\ Liq\ Factor$) developed in Pastor and Stambaugh (2001) and the common component of loan fees, although later models show statistical significance after controlling for other factors.

Model 5 introduces the *Ted Spread*, the difference between the three-month Treasury bill and the three-month LIBOR based in US dollars. We observe a very strong correlation with the median loan fee. In particular, the positive coefficient estimate of 3.69, statistically significant at the one percent level, indicates that when the *Ted Spread* is large (i.e., when financial conditions are presumed to be relatively tight), the median loan fee is also large. This correlation likely indicates that in times of relatively high perceived corporate uncertainty, loan fees are also likely to be high.

Model 6 introduces the VIX indicator, whose negative correlation with the median loan fee yields a coefficient estimate of -0.106, statistically significant at the one percent level. The fact that loan fees are low when VIX is high, in contrast to the previous result using Ted Spread, indicates that when market-wide uncertainty is high, loan fees are likely to be low.

As with momentum (MOM), BaB, the *Ted Spread*, and VIX are fairly consistent in their order of magnitude and strength of statistical significance across models. This indicates that MOM, BaB, *Ted Spread*, and VIX are fairly strongly correlated with commonality of loan fees.

Finally, Model 8 introduces a dummy variable, which captures the presence of the 2008-2009 financial crisis. As indicated in Figure 1, the financial crisis has a huge effect on loan fees; similarly, the dummy variable for the crisis is strongly significant in the Model 8 coefficient estimate. Of course, this could be a central driver of our results and thus a concern for our analysis. To better understand this relationship, we've replicated many of our main tables, both before and after the crisis, and we find largely similar results. Appendix Table A.2 indicates that the relationship between the median loan fee and the factors of Table 3 does not change during the crisis, as evidenced by insignificant coefficients on interaction terms which interact the crisis dummy and the asset pricing factors. Appendix Tables A.4 through **??** show the results of subsequent analyses broken down by subsample. The overall pattern that emerges is that although the financial crisis is absolutely critical for driving loan fees, our results hold with or without the inclusion of this time period.

Overall, our results indicate that even though a common component of loan fees is not correlated with the traditional one- and three-factor models, that common component is very highly correlated with several factors important to investors. Primarily among these, MOM, BaB, ***Ted Spread***, and the VIX are all very highly correlated with the common component of loan fees. These factors introduce risks to investors' overall performance that may be difficult to manage and that make short selling and borrowing stock riskier than may have previously been thought.

Now that we've established two key facts, (1) loan fees move together and (2) the common component of loan fees moves with other well-known risk factors, it's especially important to understand how the loan fees for individual stocks move with the overall common component of those fees. Understanding how stocks move with this common component determines whether or not investors can mitigate the risk of a portfolio of loan fees moving together.

First, Table 1 (Panel C) presents summary statistics for full-sample loan fee β's. These β's are calculated over the full sample as stocks' loan fee sensitivities to each common component. The median stock's loan fee sensitivity to the $MedianLoanFee$ common component is around 1, indicating that stock loan fees move together. Note that the magnitude of loan fee sensitivities to PC1 (β_{PC1}) is much lower. This is due to the fact that the level of the PC1 has been magnified because of the loan fee standardization we implemented prior to conducting the PCA.

[Table 4]

Second, Table 4 includes a quarterly panel regression with stock i's quarter t sensitivity to the common component as the left-hand side variable. The right-hand side shows stock i's quarter t characteristics of interest. Panel A shows the results of the OLS regression, incorporating stock fixed effects and utilizing White-Huber robust standard errors.

Model 1 asks whether the level of a stock's loan fee is correlated with that stock's sensitivity to the common component. Interestingly, in this linear specification, we find no statistically significant relationships. However, as Model 2 and later models indicate, a very strong relationship exists between the level of loan fees and their sensitivity to the common component. Specifically, Model 2 splits loan fees nonlinearly, by including an indicator variable for loan fees below the 25th percentile and another for loan fees above the 75th percentile. The model shows a strong relationship between loan fees above the 75th percentile with a coefficient estimate on the indicator of 5.187, which is statistically significant at the one percent level. In other words, when loan fees are high, specifically in the top 25 percent of loan fees, stock sensitivity to the common component is especially strong.

A similar result emerges in Model 3. However, Model 3 includes the median level of the loan fee as a control. The median level of the loan fees controls for any possible relationship between the 25th and 75th percentile. If anything, the finding of extreme loan fees being closely related to sensitivity to the common component is amplified in Model 3, with a coefficient estimate on $1_{LoanFee>75thPctile}$ of 6.094.

Model 4 clarifies the pattern further, showing that the sensitivity to the common component rises only when loan fees are in the top 40 and the top 20 percent, respectively. The title of this study, "Dancing to the Same Tune," draws its inspiration from this table. Model 4 paints a picture of a high school dance. Most loan fees are relatively low and move independently, like the students sitting on chairs along the walls at the dance doing their own thing. But as loan fees rise, especially into the top 40 or 20 percent, they move together, like the students who stand up and start dancing. Of course, they're all dancing to the same tune.

From an investor's perspective, this loan fee sensitivity pattern creates some unique issues. Loan fees are especially high when people want to borrow stocks and the quantity borrowed is high, as shown in Kolasinski, Reed, and Ringgenberg (2013). But our finding indicates that it is at these exact moments of high demand that the sensitivity to loan fee commonality is also high. Furthermore, as we've established, such commonality is not benign. Instead, the common component moves with other well-known asset pricing risk factors. Taken together, these results highlight a significant new risk for investors in any strategy that leads to the shorting of high loan fee stocks.

Models 5 through 8 replicate the above results while controlling for stock size and trading volume. The results remain robust to these controls and whether or not we incorporate stock fixed effects.

C. The Pricing of Loan Fee Sensitivities

Now that we've established that loan fees move together and that they move with well-known asset pricing risk factors, a natural question to ask is whether these effects are priced in the cross-section. In other words, do investors care enough about these risks for them to be less willing to short stocks that lead to exposure to these risks, to the extent that the pricing of equities should reflect this risk?

[Table 5]

We first ask whether portfolios formed based on systematic loan fee risk yield higher returns. In Table 5, we take a fairly simple approach and perform a double sort. Recognizing the importance of the findings in Engelberg, Reed, and Ringgenberg (2017) to these results, our first sort variable is total loan fee volatility, found in the columns of Table 5. Interestingly, when we examine the difference between total volatility portfolios, we don't see the pricing of total volatility in either Panel A or Panel B, indicating that the Engelberg, Reed, and Ringgenberg (2017) result doesn't hold in this particular econometric specification.

The second sort variable tells a different story. Panel A introduces the systematic component of loan fee volatility in the rows. We split the sample into two groups, one with systematic volatility below the median, Low $SysVol$, and systematic volatility above the median, High $SysVol$, and find that the low systematic volatility yields relatively high returns. For example, in the left column, we see a return on the low systematic volatility portfolio of 9.1 percent, compared with a return on the high systematic volatility portfolio of 4.5 percent.

More to the point, an investor who buys the high systematic volatility and shorts the low systematic volatility portfolios would earn a negative return. In other words, stocks with relatively high systematic components of loan fee volatility are shown to have unusually low future returns. This likely indicates that these stocks are overpriced and investors are unwilling to take short positions against these stocks, even though they may be able to identify them as overpriced. It is worth pointing out, again, that this is a setting in which we've controlled for the level of total loan fee risk.

A very similar result emerges in the second column of Panel A. A long/short portfolio earns a -3.6 percent return. The similar result for both high and low total volatility indicates that our finding is separate and distinct from that in Engelberg, Reed, and Ringgenberg (2017). In other words, systematic loan fee volatility is an important driver of returns, regardless of the level of total volatility.

Panel B performs a similar analysis, but this time the second sort variable is idiosyncratic volatility of the loan fees. In this case, the returns to low and high idiosyncratic volatility in loan fee portfolios are much more similar, and the long/short portfolios are not statistically different from zero. Overall, these results indicate that even while controlling for total volatility in a double-sort setting, systematic loan fee volatility seems to be a key driver of stock returns.

It's worth noting here that these double-sorted portfolio returns may be sensitive to the overall level of median loan fees. In our next set of results, we attempt to investigate these patterns in a regression setting in which we can control for the level of the loan fees. We follow a relatively standard approach used by Boehmer, Jones, and Zhang (2007) and Engelberg, Reed, and Ringgenberg (2017), in which we regress future returns on loan characteristics in a panel setting.

[Table 6]

Panel A, Model 1 of Table 6 confirms a well-documented fact, which is that stocks with high loan fees tend to earn lower future returns (see, for instance, Asquith, Pathak, and Ritter (2004)). Model 2 indicates that as found in Engelberg, Reed, and Ringgenberg (2017), loan fee volatility is indeed a significant driver of the cross-section of returns. As the median loan fee coefficient estimate indicates, this is after controlling for loan fee levels. To provide a measure of economic significance of the coefficient on loan fee volatility, we estimate that an increase from the 25th to the 75th percentile in total loan fee volatility would be associated with a 0.44% lower return in the following quarter, holding all else equal. This number is found by multiplying the coefficient on total volatility by the IQR of loan fee volatility across the sample. Alternatively, we estimate that an increase from the 10th to the 90th percentile in total loan fee volatility would be associated with a 1.76% lower return in the following quarter.

In Model 3, we decompose loan fee risk along parameters in line with our analysis, i.e., into the systematic and idiosyncratic components of loan fee risk. We find that systematic risk dominates idiosyncratic risk, yielding a coefficient estimate of -0.183, which is highly statistically significant at the one percent level. We believe this coefficient is also economically significant, as we estimate that an increase from the 25th to the 75th percentile in systematic loan fee volatility would be associated with a 1.01% lower return in the following quarter. Similarly, we estimate that an increase from the 10th to the 90th percentile in systematic loan fee volatility would be associated with a 3.53% lower return in the following quarter.

The fact that systematic loan fee risk has such a large negative coefficient estimate indicates that this is the driving force behind investors' willingness to short, and it is likely driving the overall effect found in Engelberg, Reed, and Ringgenberg (2017). In other words, fear of loan fee commonality and its associated correlation with well-known risk factors may dissuade investors from taking short positions in overvalued stocks in the first place.

Interestingly, the coefficient estimate on idiosyncratic loan fee risk is positive and statistically significant. Although the coefficient estimate is relatively small compared with systematic volatility, in the Appendix we see that this result is less robust over different time periods, making it less likely that investors have a special fondness for shorting stocks with loan fees that move idiosyncratically.

In Model 4, we include the sensitivity of loan fees to the common component as well as that component's aggregate time series volatility. We see that the sensitivity of the loan fee to the common component does appear to be priced in this particular specification, although the significance disappears when we include stock fixed effects (in Model 8). The aggregate measure of common component volatility does seem to have an effect on stocks' future returns.

Models 5, 6, 7, and 8 paint a very similar picture, although their inclusion of stock-specific fixed effects indicates that results are largely similar when we control for stock characteristics that may be driving some of the return patterns.

D. Implications on Price Efficiency

Now that we have established the pricing implications of loan fee commonality, we ask whether there are also efficiency implications. We start by constructing two measures of stock-specific price efficiency: the Bris, Goetzmann, and Zhu (2007) measure and the Hou & Moskowitz (2005) D1 price delay.

To replicate the Bris, Goetzmann, & Zhu measure, we first calculate $\rho^{cross} = corr(r_{i,t}, r_{m,t-1})$, which is the quarterly cross-autocorrelation between contemporaneous weekly stock returns and 1-week lagged market returns. We then apply the transformation $ln[(1+\rho)/(1-\rho)]$ to get our measure, which we call "BGZ ρ^{cross}" in Table 7.

To replicate the Hou & Moskowitz measure of price efficiency, we first regress weekly stock returns on stock fixed effects, contemporaneous market returns (proxied by returns on the S&P 500), and 4 weeks of lagged market returns, and we store the resulting R^2_{full}. We then regress weekly stock returns on stock fixed effects and contemporaneous market returns and store the resulting R^2_{rest}. Then the D1 measure of price delay is $D1_i = 1 - \frac{R^2_{rest}}{R^2_{full}}$. To provide alternative notation, following Hou & Moskowitz (2005), we estimate $r_{i,t} = \alpha_i + \beta_i * r_{m,t} + \Sigma_{n=1}^{4} \delta_i(-n) * r_{m,t-n} + \epsilon_{i,t}$, and then $D1_i = 1 - \frac{R^2_{\delta_i^{-n}=0,\forall n \in [1,4]}}{R^2}$.

[Table 7]

It is evident from Table 7 that loan fee commonality has negative implications on price efficiency. In columns 1 through 3, the left-hand side variable is the Bris, Goetzmann, and Zhu (2007) cross-autocorrelation measure, and the left-hand side variable in columns 4 through 6 is the Hou & Moskowitz (2005) D1 price delay. Note that an increase in either left-hand side variable indicates lower price efficiency (or higher price inefficiency).

Columns 1 and 4 confirm a finding from Engelberg, Reed, & Ringgenberg (2017), which is that high loan fee volatility is associated with price inefficiency. This suggests that high loan fee volatility is a limit to arbitrage that results in slower price reactions to new information.

Columns 2 and 5 demonstrate that stocks with high systematic volatility of loan fees exhibit lower price efficiency. This finding, in conjunction with our earlier result that systematic loan fee volatility is associated with low future returns, suggests that loan fee commonality is also an important limit to arbitrage.

To provide a practical interpretation for how loan fee commonality might affect price efficiency, consider a hedge fund which holds a portfolio of short positions. A stock which exhibits high systematic volatility of loan fees is risky for the hedge fund to short, since its loan fees are highly varying at the same time that most other stocks' loan fees are highly varying. As a result, the hedge fund is deterred from taking as large a short position in this stock, which results in decreased short selling, lower price efficiency, and overvaluation.

We also note that in column 2, idiosyncratic volatility of loan fees has a negative and significant coefficient; however, it is insignificant when the left-hand side variable is the Hou & Moskowitz D1 price delay.

In columns 3 and 6, we see a positive and significant loading on volatility of the common component. Given that this coefficient is significant and the coefficient on β^2 is insignificant, we conclude that temporal variation in loan fee common component volatility is more important in predicting stock-specific price efficiency than cross-sectional variation in loan fee sensitivities.

Overall, the results from this analysis provide further evidence to the claim that loan fee commonality is an important, previously unexplored short sale constraint which has both pricing and efficiency implications.

IV. The Origin of Loan Fee Commonality

At this point, we have established the existence of commonality among loan fees and have explored some of its implications on stock prices and efficiency. A natural next question would be to understand the origin of the commonality. In other words, is the loan fee commonality primarily driven by demand- or supply-side factors?

In order to address this question, we explore loan demand and supply as they relate to momentum, a well-documented anomaly. Our hypothesis is that if loan fee commonality is driven mostly by the demand for stock loans, we should observe higher loan demand commonality in portfolios of stocks that are likely to be heavily shorted based on a long/short momentum trading strategy.

Before discussing our empirical strategy to test this further, it may be helpful to clarify some details regarding the loan demand and supply data. We do not observe demand or supply schedules for each point in time; rather, for each stock-day, we observe the total quantity of shares on loan for that day (*loan demand*) and the total quantity of shares available to be lent (*loan supply*).

First, we calculate momentum for each stock-quarter according to Jegadeesh & Titman (2011) as the cumulative past 12 month return. We separate stocks into deciles in each quarter based on this measure of momentum. Hence, a trader who wishes to implement a long/short momentum strategy would invest long in portfolio 10 and short portfolio 1.

Next, we construct common components of loan demand and loan supply. These common components are simply the median loan demand (supply) across all stocks for each quarter. We then follow Karolyi, Lee, and van Dijk (2012) in calculating the degree of loan demand and supply commonality for each stock and quarter. For each momentum decile, we run the following two regressions:

$$LoanDemand_{i,t} = \beta_0^D + \beta_1^D * LoanDemandCC_t + \varepsilon_{i,t}^D$$
$$LoanSupply_{i,t} = \beta_0^S + \beta_1^S * LoanSupplyCC_t + \varepsilon_{i,t}^S$$

After regressing stock-specific loan demand (supply) on the common component of loan demand (supply), we record the resulting betas and R^2. Following Karolyi, Lee, and van Dijk (2012), we interpret high betas and R^2 to indicate high levels of loan demand (supply) commonality.

[Table 8]

In Table 8 Panel A, we display the betas and R^2 from the loan demand commonality regressions. Note that while loan demand commonality is quite high in momentum portfolios 1 and 2 (as evidenced by high betas and R^2), there appears to be lower loan demand commonality for portfolios of stocks with higher momentum. In the final column of this table, we see that the difference in betas between portfolios 1 and 10 is large and statistically significant. This, along with the fact that a much higher percentage of variation in loan demand is explained in portfolios 1 and 2, implies that loan demand commonality is highest in portfolios of stocks which are likely to be shorted in a long/short momentum trading strategy. We believe this result suggests that loan demand is likely a significant driver of the loan fee commonality we observe.

In Panel B, we display the betas and R^2 from the loan supply commonality regressions. Interestingly, we do not observe significantly higher betas in portfolios 1 and 2, and we also see that R^2 is low for these portfolios. Whereas we observed high loan demand commonality in stocks which are likely to be on the short side of a momentum strategy, we do not observe high loan supply commonality for these same stocks. We interpret this result to imply that loan demand may be a greater driver of loan fee commonality than loan supply.

V. Conclusion

In this paper, we highlight a new dimension of dynamic loan fee risks: commonality. We are the first to present evidence that there is commonality in loan fee movement.

Using a principal components framework, we find that the first principal component of loan fees explains 45.6% of the variation in loan fees, which indicates a much higher degree of commonality than is present in corresponding equity returns. Moreover, in constructing several different measures of the loan fee common component, we show that they move together over time, and, while important, this high correlation is not driven solely by the financial crisis.

We highlight another risk from the investor's perspective; we show that the common component of loan fees moves with other well-known asset pricing risk factors. Specifically, the commonality of loan fees is strongly correlated with Momentum, Betting Against Beta, the Ted Spread, and VIX. Not only do loan fees move together, but they move with well-known macro and asset pricing factors that investors care about.

Furthermore, we show that when loan fees are unusually high, sensitivity to the common component is especially strong. When loan fees are in the top 25th percentile, the exposure of stock-level loan fee variation to the loan fee common component increases by more than 5. This presents a picture that when loan fees are low, correlations to the common component are low, but when loan fees are high, loan fees move together, as if they are dancing to the same tune.

Moreover, we show that the degree of commonality affects asset prices. Beginning with a double-sort, we show that an investor who buys low systematic volatility stocks and shorts high systematic volatility stocks would earn a positive return. Further corroborating this finding, we regress future returns on loan characteristics in a panel setting and show that systematic volatility in loan fees is strongly and negatively associated with future returns. This finding indicates that systematic loan fee risk is the driving force behind investors' willingness to short. Fear of loan fee commonality, and its associated correlation with well-known risk factors, may dissuade investors from taking short positions in overvalued stocks in the first place.

Additionally, we show that the degree of commonality affects price efficiency. Using two measures of stock-specific price efficiency, we find that systematic volatility in loan fees is strongly associated with decreased price efficiency, providing further evidence that loan fee commonality is a significant limit to arbitrage.

Finally, we present suggestive evidence that loan demand may be the origin of the observed loan fee commonality. Examining the degree of loan demand and supply commonality among momentum portfolios reveals that stocks which are likely to be on the short side of a commonly implemented long/short trading strategy exhibit a high degree of loan demand commonality but not loan supply commonality.

As we examine whether stock lending fees are driven, in part, by common shocks, an equally important subsequent question is then whether forward-looking agents in the shorting market internalize a more nuanced source of contract uncertainty. What are the consequences for the stock lending market when the fees exhibit commonality associated with challenging states of the world?

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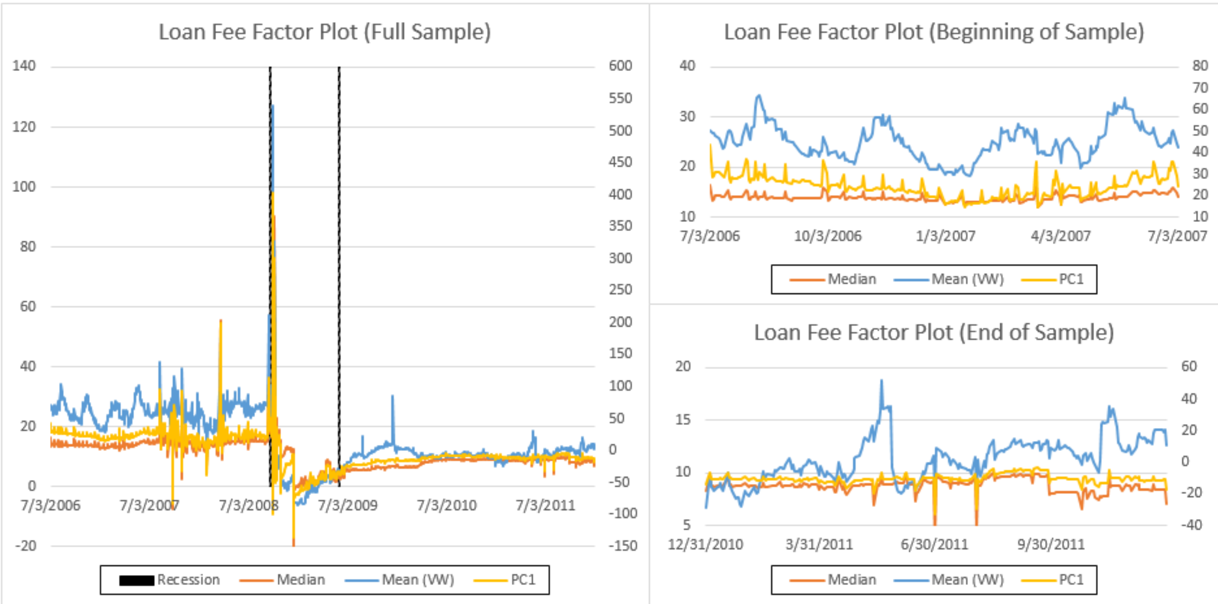

Figure 1: A plot of the common components of loan fees moving through time. Median and value-weighted (VW) mean loan fee units are on the primary vertical axis on the left, while units for PC1 are on the secondary vertical axis on the right. Beginning of sample and end of sample movements are highlighted to show that the high correlation between common components is not solely driven by the crisis.

Table 1: **Summary Statistics.**

Panel A presents firm-level summary statistics for average loan fees and loan fee volatility across the sample. The median firm has an average loan fee of 15.7 basis points across the whole sample, whereas the mean firm has an average loan fee of 97.1 basis points, indicating right skewness in loan fees. The median firm's loan fees have a standard deviation of 19.7 basis points. The median firm has about 1.43 million shares on loan ($LoanDemand$), while the median firm has about 6.20 million shares available to be lent ($LoanSupply$). Panel B presents the time series summary statistics of the loan fee common components, in basis points per annum. On the average day, the median loan fee common component is about 10 basis points, the loan demand common component is about 1-1.2 million shares, and the loan supply common component is about 7 million shares. Panel C presents summary statistics for full-sample loan fee β's. β's are calculated over the full sample as stocks' loan fee sensitivities to each common component. Note that loadings vary cross-sectionally. While 4,675 firms are represented in the unrestricted sample, many enter or leave over the sample window. On the average day, loan fee data is populated for about 3,200 stocks, and this number does not fluctuate much throughout the sample window. We restrict our analysis to stocks which have populated loan fees for at least 252 days, which reduces our sample from 4,675 to 4,039. Out of the 4,675 total represented firms, 700 of them are in the current Russell 1000, thus constituting 70% of the current index. The median market capitalization across firms is $433 million, whereas the mean is $3.233 billion.

Panel A: Firm-level loan fee summary statistics

Statistic	Mean Loan Fee (bp)	Fee Volatility (bp)	Loan Demand (x1000 shares)	Loan Supply (x1000 shares)
10th Percentile	7.6	5.8	12.8	258.1
25th Percentile	9.8	8.1	263.9	1505.9
Median	15.7	19.7	1427.9	6198.3
Mean	97.1	103.7	3785.2	17394.0
75th Percentile	70.5	87.1	4058.9	17078.8
90th Percentile	248.1	242.0	8840.5	46363.2

Panel B: Common component summary statistics

Statistic	Median	PC1	Mean (VW)	Mean (EW)	Loan Demand (x1000 shares)	Loan Supply (x1000 shares)
10th Percentile	5.5	-29.1	4.1	53.0	875.2	6614.6
25th Percentile	8.0	-14.4	10.1	59.4	917.6	6779.4
Median	9.2	-7.8	12.7	67.7	1070.8	7041.2
Mean	10.6	0.0	15.8	73.9	1243.0	7056.0
75th Percentile	14.0	22.1	24.2	80.1	1537.8	7269.0
90th Percentile	15.1	27.4	27.5	115.3	1889.2	7850.5

Panel C: Full-sample beta summary statistics

Statistic	β_{median}	β_{PC1}	β_{VW}	β_{EW}
10th Percentile	-2.9	-0.8	-2.9	-1.0
25th Percentile	0.7	0.1	0.2	0.0
Median	1.1	0.2	0.6	0.1
Mean	1.8	0.2	2.4	1.6
75th Percentile	2.5	0.5	1.4	0.4
90th Percentile	8.0	1.8	5.5	3.0

Table 2: **Correlations among common components.**

This table presents the correlations among the different loan fee common components we constructed. These correlations are calculated over several sub-samples of the data. The high correlations among the loan fee common components we consider do not appear to be driven entirely by any one sub-sample of the data.

Correlations	**Median**	**PC1**	**Mean(VW)**	**Mean (EW)**
Full Sample (7/3/2006 - 12/31/2011)				
Median	1.000	0.955	0.839	0.301
PC1		1.000	0.928	0.229
Mean (VW)			1.000	0.147
Mean (EW)				1.000
Pre-Crisis (7/3/2006 - 9/17/2008)				
Median	1.000	0.944	0.693	0.530
PC1		1.000	0.738	0.354
Mean (VW)			1.000	0.416
Mean (EW)				1.000
Crisis (9/18/2008 - 6/1/2009)				
Median	1.000	0.980	0.930	0.929
PC1		1.000	0.952	0.911
Mean (VW)			1.000	0.932
Mean (EW)				1.000
Post-Crisis (6/2/2009 - 12/31/2011)				
Median	1.000	0.955	0.115	0.569
PC1		1.000	0.982	0.495
Mean (VW)			1.000	0.242
Mean (EW)				1.000

Table 3: **Relation between loan fee common component and other asset pricing and macro variables.**

This table presents the results of time series regressions examining the relationship between the common component of loan fees (median loan fee) and other asset pricing and macro factors. The dependent variable is the median loan fee for each day across all firms in the sample, in basis points. We implement Huber-White standard errors to correct for heteroskedasticity. t-statistics are displayed in parentheses.

	Common Component (Median Loan Fee)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mkt-Rf	-0.261	-0.146	-0.470*	-0.439*	-0.170	-0.626**	-0.415	-0.272
	(-1.11)	(-0.62)	(-1.88)	(-1.75)	(-0.63)	(-2.33)	(-1.61)	(-1.09)
SMB		-0.652	-1.228	-1.215	-1.000	-1.346*	-1.098	-0.970
		(-0.85)	(-1.58)	(-1.59)	(-1.40)	(-1.71)	(-1.61)	(-1.38)
HML		0.432	0.153	0.108	0.103	-0.015	-0.476	-0.578*
		(1.08)	(0.37)	(0.27)	(0.27)	(-0.03)	(-1.44)	(-1.79)
MOM		0.511**	0.953***	0.952***	0.736***	0.925***	0.512***	0.287*
		(2.42)	(4.17)	(4.20)	(3.48)	(4.05)	(3.07)	(1.68)
BaB			-1.516***	-1.483***	-0.881***	-1.768***	-1.131***	-0.824***
			(-4.35)	(-4.40)	(-2.92)	(-5.11)	(-4.87)	(-3.60)
PS Liq Factor				-8.165			-12.528***	-12.212***
				(-1.38)			(-2.90)	(-2.83)
Ted Spread					3.690***		6.398***	6.826***
					(5.81)		(9.92)	(11.22)
VIX						-0.106***	-0.313***	-0.223***
						(-4.85)	(-21.31)	(-9.53)
1_{crisis}								-4.533***
								(-5.51)
N	1,386	1,386	1,386	1,386	1,350	1,386	1,350	1,350
Adj. R^2	0.39%	1.20%	3.88%	4.19%	18.35%	7.55%	40.44%	42.67%

Table 4: **Relationship between loan fee sensitivities and loan fee levels.**

This table presents the results of contemporaneous panel regressions examining the relationship between loan fee betas and loan fee levels. The quarterly betas are calculated for each stock by regressing each stock's time series of daily loan fees on the loan fee common component (the median loan fee). In column 4, we sort stocks into quintiles based on their loan fee levels in each quarter. The right-hand side variables in this specification are dummy variables which equal 1 if a stock's average loan fee over a given quarter falls in the indicated quintile bucket. In columns 5-8, we replicate columns 1-4 while adding controls for size (market capitalization) and trading volume. Rather than using the actual values for these controls, we sort the stocks into deciles based on size and volume and use the deciles as controls. These columns show that stocks with high loan fees tend to have high sensitivities to the common component, and this finding is robust when controlling for stock characteristics and fixed effects. Panel A incorporates stock fixed effects and White-Huber robust standard errors. Panel B utilizes standard OLS with White-Huber robust standard errors. Panel C utilizes standard OLS with no correction for heteroskedasticity or autocorrelation. t-statistics are displayed in parentheses.

Panel A: stock FE, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.004		-0.007		-0.006		-0.008	
	(-0.51)		(-0.76)		(-0.67)		(-0.88)	
$1_{LF<25thpctile}$		-0.018	-0.040			0.135	0.137	
		(-0.07)	(-0.15)			(0.51)	(0.52)	
$1_{LF>75thpctile}$		5.187***	6.094***			4.623***	5.585***	
		(3.02)	(3.55)			(2.68)	(3.15)	
$1_{20thpctile<LF\leq 40thpctile}$				-0.051				-0.069
				(-0.17)				(-0.23)
$1_{40thpctile<LF\leq 60thpctile}$				-0.095				-0.277
				(-0.28)				(-0.79)
$1_{60thpctile<LF\leq 80thpctile}$				2.315***				1.876**
				(3.01)				(2.30)
$1_{80thpctile<LF\leq 100thpctile}$				4.889**				3.953*
				(2.08)				(1.69)
Size Decile					-1.830***	-1.340**	-1.565***	-1.358**
					(-3.71)	(-2.50)	(-3.13)	(-2.55)
Volume Decile					1.590*	1.307	1.451*	1.331
					(1.88)	(1.38)	(1.68)	(1.42)
R^2	0.00%	0.01%	0.03%	0.01%	0.01%	0.02%	0.03%	0.01%
N	72,966	72,966	72,966	72,966	72,962	72,962	72,962	72,962

Panel B: OLS, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.002		-0.005		-0.003		-0.006	
	(-0.31)		(-0.85)		(-0.56)		(-0.93)	
$1_{LF<25thpctile}$		-0.060	-0.091			0.130	0.161	
		(-0.39)	(-0.57)			(0.25)	(0.32)	
$1_{LF>75thpctile}$		2.925*	4.230***			2.493*	3.819***	
		(1.90)	(3.69)			(1.90)	(3.47)	
$1_{20thpctile<LF\leq 40thpctile}$				-0.028				-0.070
				(-0.13)				(-0.20)
$1_{40thpctile<LF\leq 60thpctile}$				-0.048				-0.240
				(-0.28)				(-0.37)
$1_{60thpctile<LF\leq 80thpctile}$				1.520***				1.158
				3.67)				(1.50)
$1_{80thpctile<LF\leq 100thpctile}$				2.792				2.097
				(1.42)				(1.42)
Size Decile					-0.763***	-0.433	-0.532**	-0.449
					(-3.21)	(-1.48)	(-2.19)	(-1.55)
Volume Decile					0.548**	0.383	0.461*	0.401
					(2.35)	(1.50)	(1.93)	(1.59)
R^2	0.00%	0.01%	0.03%	0.01%	0.01%	0.02%	0.03%	0.02%
N	72,966	72,966	72,966	72,966	72,962	72,962	72,962	72,962

Panel C: OLS, non-robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.002		-0.005***		-0.003*		-0.006***	
	(-1.14)		(-2.87)		(-1.91)		(-3.12)	
$1_{LF<25thpctile}$		-0.060	-0.091			0.130	0.161	
		(-0.06)	(-0.09)			(0.12)	(0.15)	
$1_{LF>75thpctile}$		2.925***	4.230***			2.493**	3.819***	
		(2.99)	(3.92)			(2.43)	(3.44)	
$1_{20thpctile<LF\leq 40thpctile}$				-0.028				-0.070
				(-0.02)				(-0.05)
$1_{40thpctile<LF\leq 60thpctile}$				-0.048				-0.240
				(-0.04)				(-0.17)
$1_{60thpctile<LF\leq 80thpctile}$				1.52				1.158
				(1.19)				(0.81)
$1_{80thpctile<LF\leq 100thpctile}$				2.792**				2.097
				(2.19)				(1.39)
Size Decile					-0.763***	-0.433	-0.532**	-0.449*
					(-3.02)	(-1.63)	(-1.99)	(-1.66)
Volume Decile					0.548**	0.383	0.461*	0.401
					(2.21)	(1.54)	(1.85)	(1.61)
R^2	0.00%	0.01%	0.03%	0.01%	0.01%	0.02%	0.03%	0.02%
N	72,966	72,966	72,966	72,966	72,962	72,962	72,962	72,962

Table 5: **Double-sorted portfolio returns.**

In Panel A, for each quarter, stocks are sorted into one of four portfolios based on their loan fees: 1) low systematic volatility and low total volatility, 2) low systematic volatility and high total volatility, 3) high systematic volatility and low total volatility, and 4) high systematic volatility and high total volatility. In Panel B, instead of sorting on systematic volatility, we sort on idiosyncratic volatility. Systematic volatility is calculated as $\sqrt{\beta^2 * vol(LFCommonComponent)^2}$, where $LFCommonComponent$ is the median loan fee factor time series. Idiosyncratic volatility is calculated as $\sqrt{TotalVol^2 - SysVol^2}$.

Panel A

Annualized Returns		**Sort Variable: Total Vol(Loan Fee)**		**Long/Short Portfolios**
	Portfolio	Low $TotalVol$	High $TotalVol$	High - Low $TotalVol$
Sort Variable: $SysVol_{median}$	Low $SysVol$	9.1% [0.616]	7.0% [0.376]	-1.9% [-0.936]
	High $SysVol$	4.5% [0.239]	3.2% [0.121]	-1.2% [-0.737]
Long/Short Portfolios	High - Low $SysVol$	-4.3%*** [-3.001]	-3.6%* [-1.717]	

Panel B

Annualized Returns		**Sort Variable: Total Vol(Loan Fee)**		**Long/Short Portfolios**
	Portfolio	Low $TotalVol$	High $TotalVol$	High - Low $TotalVol$
Sort Variable: $IdioVol_{median}$	Low $IdioVol$	9.2% [0.627]	6.9% [0.430]	-2.2% [-1.091]
	High $IdioVol$	7.6% [0.406]	3.9% [0.169]	-3.4% [-0.965]
Long/Short Portfolios	High - Low $IdioVol$	-1.6% [-0.693]	-2.8% [-0.994]	

Table 6: **Relationship between returns and several measures of loan fee risk.**

This table presents the results of 1 quarter lagged panel regressions examining the relationship between returns and several measures of loan fee risk. Columns 5 through 8 contain stock fixed effects. The fact that the coefficients do not change much when including stock FE shows us that temporal variation of the common component is important in explaining returns. Note that volatility of the common component is calculated as quarterly volatility of the daily time series of median loan fees across all stocks, and systematic volatility is calculated as $\sqrt{\beta^2_{median} * vol(MedianLF)^2}$. White-Huber robust standard errors are employed. t-statistics are displayed in parentheses.

Panel A

	One quarter ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.029***				-0.034***		
		(-7.185)				(-7.370)		
Idio. Vol(Loan Fee)			0.029***	-0.012***			0.034***	-0.009*
			(5.264)	(-2.715)			(5.464)	(-1.780)
Sys. Vol(Loan Fee)			-0.183***				-0.215***	
			(-12.301)				(-11.475)	
β^2_{median}				-0.000				-0.000
				(-0.385)				(-0.885)
Vol(Common Comp)				-1.882***				-2.078***
				(-47.220)				(-51.565)
Median Loan Fee	-0.012***	-0.008***	-0.009***	-0.010***	-0.015***	-0.012***	-0.013***	-0.014***
	(-9.755)	(-5.707)	(-6.044)	(-7.094)	(-8.134)	(-5.611)	(-6.038)	(-6.580)
Market Cap	-0.436***	-0.534***	-0.561***	-0.623***	-18.015***	-18.182***	-18.542***	-19.783***
	(-4.575)	(-5.594)	(-5.800)	(-6.548)	(-22.535)	(-22.792)	(-22.932)	(-23.882)
Bid-Ask Spread	-0.016	-0.013	-0.012	0.011	-0.035*	-0.037*	-0.028*	0.041**
	(-1.641)	(-1.338)	(-1.293)	(1.477)	(-1.775)	(-1.858)	(-1.737)	(2.524)
Stock FE					X	X	X	X
N	68936	68936	68279	68279	68936	68936	68279	68279
Adjusted R^2	0.005	0.007	0.012	0.050	0.063	0.064	0.072	0.119

Panel B

	One month ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.010***				-0.015***		
		(-4.506)				(-5.775)		
Idio. Vol(Loan Fee)			0.028***	0.001			0.029***	0.001
			(9.338)	(0.527)			(8.000)	(0.430)
Sys. Vol(Loan Fee)			-0.117***				-0.136***	
			(-13.560)				(-12.075)	
β^2_{median}				0.000				-0.000
				(0.070)				(-0.639)
Vol(Common Comp)				-1.171***				-1.265***
				(-54.936)				(-58.391)
Median Loan Fee	-0.002***	-0.001*	-0.002**	-0.002***	-0.004***	-0.003***	-0.003***	-0.004***
	(-4.492)	(-1.876)	(-2.500)	(-4.077)	(-5.208)	(-2.988)	(-3.700)	(-4.644)
Market Cap	-0.335***	-0.369***	-0.373***	-0.411***	-8.141***	-8.212***	-8.375***	-9.121***
	(-7.303)	(-8.035)	(-8.134)	(-9.121)	(-25.347)	(-25.630)	(-25.921)	(-27.745)
Bid-Ask Spread	-0.009	-0.008	-0.007	0.007*	-0.020	-0.020	-0.013	0.029***
	(-1.482)	(-1.306)	(-1.192)	(1.670)	(-1.485)	(-1.537)	(-1.401)	(2.781)
Stock FE					X	X	X	X
N	68931	68931	68276	68928	68931	68931	68276	68928
Adjusted R^2	0.002	0.002	0.011	0.064	0.045	0.046	0.057	0.120

Table 7: **Relationship between loan fee commonality and price efficiency.**

This table presents the results of contemporaneous quarter panel regressions examining the relationship between several measures of loan fee risk and two measures of price inefficiency. The first measure we consider is from Bris, Goetzmann, and Zhu (2007). We first calculated $\rho^{cross} = corr(r_{i,t}, r_{m,t-1})$, the cross-autocorrelation between contemporaneous stock prices and 1-week lagged market returns. We then transformed this cross-autocorrelation such that our efficiency measure is $ln((1+\rho)/(1-\rho))$. The second measure of price efficiency is the Hou & Moskowitz (2005) D1 price delay measure. We regressed weekly stock returns on contemporaneous and lagged weekly S&P 500 returns and stock fixed effects, and we stored the R^2 as R^2_{full}. Then we regressed stock returns on just contemporaneous index returns and stock fixed effects, and we stored the R^2 as R^2_{rest}. The $D1$ measure of price delay is calculated as $1 - \frac{R^2_{rest}}{R^2_{full}}$. We multiplied both measures of inefficiency by 100. Note that volatility of the common component is calculated as quarterly volatility of the daily time series of median loan fees across all stocks, and systematic volatility is calculated as $\sqrt{\beta^2_{median} * vol(MedianLF)^2}$. t-statistics are displayed in parentheses.

	BGZ ρ^{cross}			HM D1 Price Delay		
	(1)	(2)	(3)	(4)	(5)	(6)
Vol(Loan Fee)	0.049***			0.024***		
	(6.694)			(9.466)		
Idio. Vol(Loan Fee)		-0.089***	-0.004		0.002	0.016***
		(-8.954)	(-0.506)		(0.777)	(6.366)
Sys. Vol(Loan Fee)		0.441***			0.075***	
		(12.823)			(9.390)	
β^2_{median}			0.000			0.000
			(0.455)			(0.856)
Vol(Common Comp)			5.543***			1.036***
			(89.761)			(38.968)
Median Loan Fee	-0.001	-0.000	0.002	0.002**	0.002**	0.002***
	(-0.652)	(-0.087)	(1.529)	(2.464)	(2.574)	(3.292)
Stock FE	X	X	X	X	X	X
R^2	0.001	0.008	0.091	0.002	0.003	0.022
N	69093	68421	68421	72861	72065	72065

Table 8: **Loan demand and supply commonality across momentum deciles.**

This table show the degree of commonality in stock loan demand and loan supply across momentum deciles. Momentum is measured for each stock-quarter according to Jegadeesh & Titman (2011) as the cumulative past 12 month return. To determine the level of commonality in loan supply and demand for each momentum decile, we construct common components of loan demand (supply) by calculating the median loan demand (supply) quantity across all firms for each quarter. We then regress each individual stock's loan demand (supply) on the common component over the full sample. These results suggest that loan demand commonality is highest in momentum portfolios which are likely to be heavily shorted (portfolios 1 and 2), whereas the same phenomenon is not present regarding loan supply. We believe this result sheds light on the origin of loan fee commonality and suggests that loan fee commonality may be driven by the demand side for stock loans, as opposed to the supply side.

	Panel A: Loan Demand										
	Momentum Portfolio										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1)-(10)
Beta	4.067***	3.355***	1.587***	2.343***	2.845***	1.921***	1.785***	2.228***	1.706***	0.322	3.745***
t-stat	(7.74)	(6.44)	(5.22)	(5.25)	(5.14)	(5.22)	(6.14)	(5.89)	(6.15)	(0.93)	(5.95)
R^2	1.33%	1.00%	0.36%	0.63%	0.65%	0.56%	0.64%	0.69%	0.35%	0.01%	

	Panel B: Loan Supply										
	Momentum Portfolio										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(1)-(10)
Beta	0.333	1.435***	3.285***	4.212***	3.535***	1.919***	1.832***	0.992*	0.759	-0.106	0.439
t-stat	(0.96)	(3.09)	(6.04)	(7.30)	(6.18)	(3.12)	(3.01)	(1.69)	(1.50)	(-0.33)	(0.93)
R^2	0.01%	0.12%	0.46%	0.70%	0.44%	0.12%	0.12%	0.04%	0.03%	0.00%	

Appendix

This section is the appendix for Andrews, Lundblad, and Reed (2019).

Table A.1: **Percentage of variation explained by each of the top principal components in loan fees, loan supply, loan demand, and stock returns.**

This table presents the percentage of variation explained by each of the top ten principal components of loan fees, loan supply, loan demand, and stock returns. Note that the first principal component of loan fees explains a high percentage of variation in loan fees (45.6%), while the first principal component of stock returns explains much less variation in returns (28.3%). The top ten principal components of loan fees explain a combined 74.4% of variation in loan fees, while the top ten principal components of returns only explain 36.9% of variation in returns. The top ten principal components of loan supply and demand explain a very high percentage of variation in supply and demand at 91% and 83%, respectively. The results of our principal component analysis indicate that there appears to be a high degree of commonality among stock loan characteristics. The sample size for this analysis is 1,935 stocks– the firms for which we are not missing any data.

	Stock Loan Characteristics						**Other Stock Characteristics**			
	Loan Fees		**Loan Supply**		**Loan Demand**		**Stock Returns**		**Liquidity (Turnover)**	
	% Variation Explained	*Cumulative*	*% Variation Explained*	*Cumulative*	*% Variation Explained*	*Cumulative*	*% Variation Explained*	*Cumulative*	*% Variation Explained*	*Cumulative*
PC1	45.6	45.6	37.6	37.6	37.2	37.2	28.3	28.3	11.6	11.6
PC2	8.5	54.1	24.0	61.6	15.3	52.5	1.9	30.3	5.3	16.9
PC3	5.8	59.9	11.2	72.8	11.0	63.5	1.2	31.5	3.5	20.4
PC4	3.3	63.2	5.8	78.6	5.6	69.1	1.2	32.6	1.8	22.1
PC5	2.8	65.9	4.5	83.1	4.0	73.0	1.0	33.6	1.4	23.5
PC6	2.5	68.4	3.0	86.1	3.1	76.2	0.8	34.4	1.2	24.7
PC7	1.7	70.2	2.3	88.4	2.9	79.0	0.7	35.1	1.1	25.8
PC8	1.7	71.8	1.3	89.7	1.8	80.9	0.7	35.7	0.9	26.8
PC9	1.4	73.2	1.0	90.7	1.7	82.6	0.6	36.3	0.9	27.7
PC10	1.2	74.4	0.8	91.5	1.3	83.8	0.6	36.9	0.8	28.5

Table A.2: **Relation between loan fee common components and other asset pricing and macro variables.**

This table presents the results of time series regressions examining the relationship between the median loan fee and other asset pricing and macro factors. The dependent variable is the median loan fee for each day across all firms in the sample, in basis points. We implement Huber-White standard errors to correct for heteroskedasticity. t-statistics are displayed in parentheses.

	Median Loan Fee (bp)				
	(1)	(2)	(3)	(4)	(5)
Mkt-Rf	-0.614***	-0.659***	-0.222	-0.914***	-0.558***
	(-3.33)	(-3.62)	(-1.60)	(-4.90)	(-3.95)
SMB	-0.307	-0.289	-0.079	-0.412	-0.201
	(-1.09)	(-1.02)	(-0.37)	(-1.51)	(-1.01)
HML	0.024	0.100	-0.134	0.019	-0.146
	(0.08)	(0.33)	(-0.59)	(0.06)	(-0.66)
MOM	0.564**	0.558**	0.091	0.676***	0.217
	(2.26)	(2.21)	(0.44)	(2.68)	(1.05)
BaB	-1.708***	-1.727***	-0.584**	-2.184***	-1.086***
	(-4.27)	(-4.26)	(-2.07)	(-5.48)	(-3.98)
PS Liq Factor		8.660**			-1.890
		(2.57)			(-0.83)
Ted Spread			5.269***		5.500***
			(17.04)		(17.89)
VIX				-0.197***	-0.228***
				(-15.29)	(-19.37)
1_{crisis}	-2.999***	-4.809***	-13.194***	-14.050***	-4.465
	(-2.90)	(-7.08)	(-7.00)	(-3.73)	(-1.04)
$Mkt * 1_{crisis}$	-0.094	-0.050	0.213	0.309	0.363
	(-0.17)	(-0.10)	(0.36)	(0.56)	(0.69)
$SMB * 1_{crisis}$	-2.510	-2.229	-1.752	-2.178	-1.908
	(-1.51)	(-1.47)	(-1.25)	(-1.25)	(-1.37)
$HML * 1_{crisis}$	-0.142	-0.869	-0.932	-0.109	-1.282
	(-0.14)	(-0.91)	(-1.06)	(-0.11)	(-1.51)
$MOM * 1_{crisis}$	0.403	-0.274	-0.179	-0.018	0.034
	(0.54)	(-0.41)	(-0.29)	(-0.02)	(0.06)
$BaB * 1_{crisis}$	-0.052	0.471	0.191	0.809	0.122
	(-0.07)	(0.72)	(0.42)	(1.01)	(0.24)
$PS * 1_{crisis}$		-90.762***			-19.178*
		(-5.66)			(-1.81)
$Ted * 1_{crisis}$			3.003*		4.161*
			(1.83)		(1.70)
$VIX * 1_{crisis}$				0.342***	-0.112
				(5.25)	(-0.77)
N	1,386	1,386	1,350	1,386	1,350
Adj. R^2	7.91%	16.75%	38.57%	12.37%	46.67%

Table A.3: **Relationship between β_{PC1} and loan fee levels.**

This table presents the results of contemporaneous panel regressions examining the relationship between loan fee betas (sensitivities to the first principal component in loan fees) and loan fee levels. The quarterly betas are calculated for each stock by regressing each stock's time series of daily loan fees on $PC1$. In column 4, we sort stocks into quintiles based on their loan fee levels in each quarter. The right-hand side variables in this specification are dummy variables which equal 1 if a stock's average loan fee over a given quarter falls in the indicated quintile bucket. In columns 5-8, we replicate columns 1-4 while adding controls for size (market capitalization) and trading volume. Rather than using the actual values for these controls, we sort the stocks into deciles based on size and volume and use the deciles as controls. These columns show that stocks with high loan fees tend to have high sensitivities to the common component, and this finding is robust when controlling for stock characteristics and fixed effects. Panel A incorporates stock fixed effects and White-Huber robust standard errors. Panel B utilizes standard OLS with White-Huber robust standard errors. Panel C utilizes standard OLS with no correction for heteroskedasticity or autocorrelation. t-statistics are displayed in parentheses.

Panel A: stock FE, robust SE

	β_{PC1}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	0.001		0.001		0.001		0.001	
	(0.50)		(0.33)		(0.37)		(0.24)	
$1_{LF<25thpctile}$		0.013	0.016			0.042	0.042	
		(0.25)	(0.30)			(0.79)	(0.79)	
$1_{LF>25thpctile}$		1.145***	1.021**			0.968***	0.888**	
		(4.09)	(2.45)			(3.38)	(2.01)	
$1_{20thpctile<LF\leq40thpctile}$				-0.032				-0.036
				(-0.53)				(-0.61)
$1_{40thpctile<LF\leq60thpctile}$				-0.030				-0.057
				(-0.41)				(-0.75)
$1_{60thpctile<LF\leq80thpctile}$				0.283*				0.186
				(1.67)				(0.98)
$1_{80thpctile<LF\leq100thpctile}$				1.354***				1.093***
				(3.25)				(-2.16)
Size Decile					-0.295***	-0.272**	-0.254**	-0.264**
					(-2.83)	(-2.12)	(-2.42)	(-2.16)
Volume Decile					0.665**	0.655**	0.643**	0.651**
					(2.52)	(2.10)	(2.36)	(2.14)
R^2	0.00%	0.01%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%
N	72,966	72,966	72,966	72,966	72,962	72,962	72,962	72,962

Panel B: OLS, robust SE

	β_{PC1}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	0.002		0.001		0.001		0.001	
	(1.03)		(0.53)		(0.86)		(0.48)	
$1_{LF<25thpctile}$		0.026	0.032			0.214	0.209	
		(0.80)	(0.93)			(1.45)	(1.48)	
$1_{LF>75thpctile}$		1.316***	1.080***			1.133***	0.938***	
		(2.81)	(4.48)			(3.03)	(4.10)	
$1_{20thpctile<LF\leq40thpctile}$				-0.047				-0.133
				(-1.01)				(-1.49)
$1_{40thpctile<LF\leq60thpctile}$				-0.055				-0.268
				(-1.52)				(-1.48)
$1_{60thpctile<LF\leq80thpctile}$				0.292**				0.012
				(2.27)				(0.06)
$1_{80thpctile<LF\leq100thpctile}$				1.430**				1.031***
				(2.40)				(2.66)
Size Decile					-0.187***	-0.156*	-0.141**	-0.153*
					(-2.86)	(-1.70)	(-2.01)	(-1.71)
Volume Decile					0.102**	0.090	0.079	0.089
					(2.01)	(1.50)	(1.55)	(1.54)
R^2	0.02%	0.02%	0.03%	0.03%	0.03%	0.04%	0.04%	0.03%
N	72,966	72,966	72,966	72,966	72,962	72,962	72,962	72,962

Panel C: OLS, non-robust SE

	β_{PC1}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	0.002***		0.001*		0.001***		0.001	
	(3.63)		(1.71)		(2.80)		(1.52)	
$1_{LF<25thpctile}$		0.026	0.032			0.214	0.209	
		(0.09)	(0.11)			(0.65)	(0.63)	
$1_{LF>75thpctile}$		1.316***	1.080***			1.133***	0.938***	
		(4.44)	(3.31)			(3.65)	(2.79)	
$1_{20thpctile<LF\leq40thpctile}$				-0.047				-0.133
				(-0.12)				(-0.34)
$1_{40thpctile<LF\leq60thpctile}$				-0.055				-0.268
				(-0.14)				(-0.64)
$1_{60thpctile<LF\leq80thpctile}$				0.292				0.012
				(0.75)				(0.03)
$1_{80thpctile<LF\leq100thpctile}$				1.430***				1.031**
				(3.71)				(2.26)
Size Decile					-0.187**	-0.156*	-0.141*	-0.153*
					(-2.45)	(-1.93)	(-1.74)	(-1.87)
Volume Decile					0.102	0.090	0.079	0.089
					(1.36)	(1.20)	(1.04)	(1.18)
R^2	0.02%	0.02%	0.03%	0.03%	0.03%	0.04%	0.04%	0.03%
N	72,966	72,966	72,966	72,966	72,962	72,962	72,962	72,962

Table A.4: **Relationship between β_{median} and loan fee levels, pre-crisis period (Q3 2006 - Q2 2008).**

This table presents the results of contemporaneous panel regressions examining the relationship between loan fee betas and loan fee levels in the pre-crisis period of our sample (Q3 2006 - Q2 2008). The quarterly betas are calculated for each stock by regressing each stock's time series of daily loan fees on the loan fee common component. Column 4 employs stock fixed effects. t-statistics are displayed in parentheses.

Panel A: stock FE, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	0.008*		0.006		0.008*		0.006	
	(1.810)		(1.405)		(1.653)		(1.311)	
$1_{LF<25thpctile}$		-0.299	-0.268			-0.259	-0.239	
		(-1.195)	(-1.060)			(-1.026)	(-0.944)	
$1_{LF>75thpctile}$		2.212**	1.628*			2.091**	1.547*	
		(2.449)	(1.946)			(2.284)	(1.860)	
$1_{20thpctile<LF\leq 40thpctile}$				0.145				0.138
				(0.664)				(0.629)
$1_{40thpctile<LF\leq 60thpctile}$				0.263				0.217
				(0.718)				(0.583)
$1_{60thpctile<LF\leq 80thpctile}$				0.735*				0.633
				(1.680)				(1.429)
$1_{80thpctile<LF\leq 100thpctile}$				3.492***				3.294***
				(2.958)				(2.709)
Market Cap Decile					-0.402	-0.410	-0.320	-0.363
					(-1.022)	(-1.177)	(-0.821)	(-1.030)
Volume Decile					0.314	0.288	0.275	0.264
					(1.387)	(1.282)	(1.221)	(1.176)
N	27333	27333	27333	27333	27333	27333	27333	27333
Adjusted R^2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Panel B: OLS, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	0.008***		0.005***		0.008***		0.005***	
	(4.373)		(2.648)		(4.199)		(2.684)	
$1_{LF<25thpctile}$		-0.250**	-0.225*			-0.496**	-0.539**	
		(-2.019)	(-1.813)			(-1.996)	(-2.185)	
$1_{LF>75thpctile}$		2.453***	1.531***			2.474***	1.558***	
		(5.171)	(3.638)			(5.010)	(3.644)	
$1_{20thpctile<LF\leq 40thpctile}$				0.052				0.284
				(0.473)				(1.447)
$1_{40thpctile<LF\leq 60thpctile}$				0.057				0.542
				(0.383)				(1.600)
$1_{60thpctile<LF\leq 80thpctile}$				0.799***				1.282***
				(3.165)				(3.568)
$1_{80thpctile<LF\leq 100thpctile}$				3.155***				3.687***
				(5.271)				(6.070)
Market Cap Decile					-0.041	0.023	0.064	0.080
					(-0.390)	(0.214)	(0.584)	(0.727)
Volume Decile					0.061	0.055	0.033	0.043
					(0.573)	(0.518)	(0.304)	(0.398)
N	27333	27333	27333	27333	27333	27333	27333	27333
Adjusted R^2	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003

Panel C: OLS, non-robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	0.008***		0.005***		0.008***		0.005***	
	(8.478)		(4.220)		(8.070)		(4.333)	
$1_{LF<25thpctile}$		-0.250	-0.225			-0.496	-0.539	
		(-0.782)	(-0.705)			(-1.347)	(-1.464)	
$1_{LF>75thpctile}$		2.453***	1.531***			2.474***	1.558***	
		(7.752)	(3.984)			(7.601)	(4.014)	
$1_{20thpctile<LF\leq 40thpctile}$				0.052				0.284
				(0.126)				(0.665)
$1_{40thpctile<LF\leq 60thpctile}$				0.057				0.542
				(0.138)				(1.149)
$1_{60thpctile<LF\leq 80thpctile}$				0.799*				1.282***
				(1.930)				(2.689)
$1_{80thpctile<LF\leq 100thpctile}$				3.155***				3.687***
				(7.666)				(7.466)
Market Cap Decile					-0.041	0.023	0.064	0.080
					(-0.477)	(0.253)	(0.719)	(0.879)
Volume Decile					0.061	0.055	0.033	0.043
					(0.731)	(0.655)	(0.396)	(0.511)
N	27333	27333	27333	27333	27333	27333	27333	27333
Adjusted R^2	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003

Table A.5: **Relationship between β_{median} and loan fee levels, post-crisis period including the crisis (Q3 2008 - Q4 2011).**

This table presents the results of contemporaneous panel regressions examining the relationship between loan fee betas and loan fee levels in the post-crisis period of our sample, including the crisis (Q3 2008 - Q4 2011). The quarterly betas are calculated for each stock by regressing each stock's time series of daily loan fees on the loan fee common component. t-statistics are displayed in parentheses.

Panel A: stock FE, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.012		-0.013		-0.013		-0.014	
	(-0.959)		(-1.063)		(-1.071)		(-1.156)	
$1_{LF<25thpctile}$		0.009	-0.048			0.151	0.117	
		(0.027)	(-0.137)			(0.420)	(0.325)	
$1_{LF>75thpctile}$		5.125*	6.541**			4.549*	5.963**	
		(1.878)	(2.463)			(1.685)	(2.214)	
$1_{20thpctile<LF\leq40thpctile}$				-0.212				-0.239
				(-0.524)				(-0.590)
$1_{40thpctile<LF\leq60thpctile}$				0.029				-0.157
				(0.072)				(-0.380)
$1_{60thpctile<LF\leq80thpctile}$				3.254**				2.829*
				(2.222)				(1.874)
$1_{80thpctile<LF\leq100thpctile}$				1.992				1.032
				(0.467)				(0.251)
Market Cap Decile					-2.526***	-1.881**	-2.272***	-2.022**
					(-3.066)	(-2.076)	(-2.772)	(-2.297)
Volume Decile					2.234	1.858	2.125	1.936
					(1.482)	(1.123)	(1.394)	(1.191)
N	45633	45633	45633	45633	45629	45629	45629	45629
Adjusted R^2	0.000	0.000	0.000	-0.000	0.000	0.000	0.001	0.000

Panel B: OLS, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.003		-0.007		-0.005		-0.008	
	(-0.490)		(-0.958)		(-0.771)		(-1.066)	
$1_{LF<25thpctile}$		0.055	0.014			0.409	0.425	
		(0.233)	(0.056)			(0.597)	(0.626)	
$1_{LF>75thpctile}$		3.207	5.024***			2.442	4.286***	
		(1.313)	(2.916)			(1.196)	(2.742)	
$1_{20thpctile<LF\leq40thpctile}$				-0.077				-0.201
				(-0.220)				(-0.413)
$1_{40thpctile<LF\leq60thpctile}$				-0.111				-0.558
				(-0.427)				(-0.666)
$1_{60thpctile<LF\leq80thpctile}$				1.953***				1.176
				(3.026)				(1.067)
$1_{80thpctile<LF\leq100thpctile}$				2.575				1.190
				(0.822)				(0.493)
Market Cap Decile					-1.091***	-0.672	-0.825**	-0.734*
					(-2.936)	(-1.548)	(-2.235)	(-1.712)
Volume Decile					0.773**	0.553	0.687*	0.589
					(2.181)	(1.444)	(1.913)	(1.553)
N	45633	45633	45633	45633	45629	45629	45629	45629
Adjusted R^2	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000

Panel C: OLS, non-robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.003		-0.007***		-0.005**		-0.008***	
	(-1.515)		(-2.692)		(-2.228)		(-2.951)	
$1_{LF<25thpctile}$		0.055	0.014			0.409	0.425	
		(0.035)	(0.009)			(0.242)	(0.252)	
$1_{LF>75thpctile}$		3.207**	5.024***			2.442	4.286**	
		(2.068)	(2.970)			(1.479)	(2.428)	
$1_{20thpctile<LF\leq40thpctile}$				-0.077				-0.201
				(-0.038)				(-0.098)
$1_{40thpctile<LF\leq60thpctile}$				-0.111				-0.558
				(-0.055)				(-0.261)
$1_{60thpctile<LF\leq80thpctile}$				1.953				1.176
				(0.961)				(0.524)
$1_{80thpctile<LF\leq100thpctile}$				2.575				1.190
				(1.274)				(0.502)
Market Cap Decile					-1.091***	-0.672	-0.825**	-0.734*
					(-2.780)	(-1.623)	(-1.976)	(-1.746)
Volume Decile					0.773**	0.553	0.687*	0.589
					(2.011)	(1.442)	(1.779)	(1.530)
N	45633	45633	45633	45633	45629	45629	45629	45629
Adjusted R^2	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000

Table A.6: **Relationship between β_{median} and loan fee levels, post-crisis period excluding the crisis (Q3 2009 - Q4 2011).**

This table presents the results of contemporaneous panel regressions examining the relationship between loan fee betas and loan fee levels in the post-crisis period of our sample, excluding the crisis (Q3 2009 - Q4 2011). The quarterly betas are calculated for each stock by regressing each stock's time series of daily loan fees on the loan fee common component. t-statistics are displayed in parentheses.

Panel A: stock FE, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.029*		-0.029*		-0.029*		-0.030*	
	(-1.826)		(-1.870)		(-1.872)		(-1.907)	
$1_{LF<25thpctile}$		-0.428	-0.551			-0.359	-0.438	
		(-0.630)	(-0.816)			(-0.512)	(-0.622)	
$1_{LF>75thpctile}$		3.096	5.360			2.893	5.005	
		(0.887)	(1.624)			(0.832)	(1.482)	
$1_{20thpctile<LF\leq 40thpctile}$				0.153				0.134
				(0.226)				(0.197)
$1_{40thpctile<LF\leq 60thpctile}$				0.766				0.654
				(0.931)				(0.755)
$1_{60thpctile<LF\leq 80thpctile}$				4.685**				4.473*
				(2.106)				(1.886)
$1_{80thpctile<LF\leq 100thpctile}$				-3.406				-3.838
				(-0.497)				(-0.587)
Market Cap Decile					-1.635	-0.444	-1.400	-0.728
					(-1.131)	(-0.282)	(-0.966)	(-0.476)
Volume Decile					1.589	1.194	1.476	1.319
					(0.627)	(0.452)	(0.577)	(0.511)
N	32275	32275	32275	32275	32271	32271	32271	32271
Adjusted R^2	0.001	-0.000	0.001	0.000	0.001	-0.000	0.001	0.000

Panel B: OLS, robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.005		-0.009		-0.007		-0.010	
	(-0.558)		(-1.047)		(-0.893)		(-1.180)	
$1_{LF<25thpctile}$		0.143	0.109			0.681	0.766	
		(0.431)	(0.326)			(0.819)	(0.953)	
$1_{LF>75thpctile}$		4.185	6.609***			2.996	5.404**	
		(1.215)	(2.689)			(1.045)	(2.478)	
$1_{20thpctile<LF\leq 40thpctile}$				-0.137				-0.304
				(-0.278)				(-0.488)
$1_{40thpctile<LF\leq 60thpctile}$				-0.224				-0.867
				(-0.611)				(-0.905)
$1_{60thpctile<LF\leq 80thpctile}$				2.530***				1.331
				(2.797)				(0.918)
$1_{80thpctile<LF\leq 100thpctile}$				3.231				1.094
				(0.731)				(0.312)
Market Cap Decile					-1.505***	-0.915	-1.156**	-1.011*
					(-2.911)	(-1.560)	(-2.307)	(-1.750)
Volume Decile					1.020**	0.708	0.904*	0.763
					(2.101)	(1.359)	(1.839)	(1.481)
N	32275	32275	32275	32275	32271	32271	32271	32271
Adjusted R^2	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	-0.000

Panel C: OLS, non-robust SE

	β_{median}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median Loan Fee	-0.005		-0.009***		-0.007**		-0.010***	
	(-1.571)		(-2.630)		(-2.324)		(-2.909)	
$1_{LF<25thpctile}$		0.143	0.109			0.681	0.766	
		(0.065)	(0.049)			(0.290)	(0.327)	
$1_{LF>75thpctile}$		4.185*	6.609***			2.996	5.404**	
		(1.913)	(2.784)			(1.269)	(2.160)	
$1_{20thpctile<LF\leq 40thpctile}$				-0.137				-0.304
				(-0.048)				(-0.106)
$1_{40thpctile<LF\leq 60thpctile}$				-0.224				-0.867
				(-0.079)				(-0.293)
$1_{60thpctile<LF\leq 80thpctile}$				2.530				1.331
				(0.884)				(0.425)
$1_{80thpctile<LF\leq 100thpctile}$				3.231				1.094
				(1.133)				(0.327)
Market Cap Decile					-1.505***	-0.915	-1.156**	-1.011*
					(-2.747)	(-1.577)	(-1.973)	(-1.715)
Volume Decile					1.020*	0.708	0.904*	0.763
					(1.909)	(1.328)	(1.682)	(1.427)
N	32275	32275	32275	32275	32271	32271	32271	32271
Adjusted R^2	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	-0.000

Table A.7: **Relationship between returns and several measures of loan fee risk, using the $PC1$ common component.**

This table presents the results of 1 quarter lagged panel regressions examining the relationship between returns and several measures of loan fee risk. Note that volatility of the common component is calculated as quarterly volatility of the daily time series of the first principle component of loan fees across all stocks, and systematic volatility is calculated as $\sqrt{\beta^2_{PC1} * vol(PC1)^2}$. t-statistics are displayed in parentheses.

Panel A								
	One quarter ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.026***				-0.023***		
		(-6.532)				(-5.291)		
$IdioVol_{PC1}$ (Loan Fee)			0.020***	-0.009**			0.025***	-0.000
			(3.773)	(-2.023)			(4.436)	(-0.016)
$SysVol_{PC1}$ (Loan Fee)			-0.123***				-0.120***	
			(-9.473)				(-9.081)	
β^2_{PC1}				-0.000				-0.000
				(-0.792)				(-0.983)
Vol (PC1 Common Comp)				-0.429***				-0.424***
				(-42.652)				(-45.799)
Median Loan Fee	-0.011***	-0.008***	-0.008***	-0.010***	-0.010***	-0.007***	-0.008***	-0.009***
	(-9.164)	(-5.291)	(-5.641)	(-6.607)	(-5.334)	(-3.560)	(-3.855)	(-4.385)
Stock FE					X	X	X	X
N	68938	68938	68314	68314	68938	68938	68314	68314
Adjusted R^2	0.005	0.006	0.008	0.044	0.002	0.003	0.005	0.041

Panel B								
	One month ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.008***				-0.010***		
		(-3.640)				(-3.854)		
$IdioVol_{PC1}$ (Loan Fee)			0.027***	0.004*			0.028***	0.006**
			(8.793)	(1.819)			(8.191)	(2.381)
$SysVol_{PC1}$ (Loan Fee)			-0.091***				-0.095***	
			(-12.576)				(-12.084)	
β^2_{PC1}				-0.000				-0.000
				(-0.966)				(-1.294)
Vol (PC1 Common Comp)				-0.262***				-0.260***
				(-48.717)				(-50.674)
Median Loan Fee	-0.002***	-0.001	-0.001*	-0.002***	-0.002**	-0.001	-0.001	-0.002**
	(-3.377)	(-1.189)	(-1.897)	(-3.472)	(-2.124)	(-0.697)	(-1.174)	(-2.170)
Stock FE					X	X	X	X
N	68932	68932	68309	68309	68932	68932	68309	68309
Adjusted R^2	0.000	0.001	0.007	0.053	0.000	0.001	0.007	0.054

Table A.8: **Relationship between returns and several measures of loan fee risk, pre-crisis period (Q3 2006 - Q2 2008).**

This table presents the results of 1 quarter lagged panel regressions examining the relationship between returns and several measures of loan fee risk during the pre-crisis period (Q3 2006 - Q2 2008).Note that volatility of the common component is calculated as quarterly volatility of the median loan fee across all stocks, and systematic volatility is calculated as $\sqrt{\beta^2_{median} * vol(MedianLF)^2}$. t-statistics are displayed in parentheses.

Panel A								
	One quarter ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.015**				-0.001		
		(-2.505)				(-0.113)		
$IdioVol_{median}$ (Loan Fee)			0.009	-0.008			0.037***	0.010
			(0.999)	(-1.149)			(3.432)	(1.197)
$SysVol_{median}$ (Loan Fee)			-0.087***				-0.118***	
			(-3.893)				(-4.780)	
β^2_{median}				0.000				-0.000
				(0.261)				(-0.600)
Vol (Median Common Comp)				-2.009***				-1.985***
				(-24.668)				(-23.535)
Median Loan Fee	-0.011***	-0.010***	-0.010***	-0.009***	-0.005	-0.005	-0.007*	-0.004
	(-7.807)	(-6.106)	(-6.116)	(-5.764)	(-1.624)	(-1.525)	(-1.859)	(-1.241)
Stock FE					X	X	X	X
N	23672	23672	23422	23422	23672	23672	23422	23422
Adjusted R^2	0.005	0.005	0.006	0.038	0.000	0.000	0.002	0.039

Panel B								
	One month ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.001				0.008**		
		(-0.173)				(2.065)		
$IdioVol_{median}$ (Loan Fee)			0.012***	0.004			0.029***	0.017***
			(2.907)	(1.066)			(5.620)	(3.801)
$SysVol_{median}$ (Loan Fee)			-0.049***				-0.070***	
			(-4.219)				(-5.392)	
β^2_{median}				-0.000*				-0.000**
				(-1.774)				(-2.531)
Vol (Median Common Comp)				-0.223***				-0.205***
				(-5.317)				(-5.116)
Median Loan Fee	-0.003***	-0.003***	-0.003***	-0.003***	0.001	0.000	0.000	-0.000
	(-3.863)	(-3.466)	(-3.424)	(-3.581)	(0.694)	(0.224)	(0.043)	(-0.126)
Stock FE					X	X	X	X
N	27066	27066	26796	26796	27066	27066	26796	26796
Adjusted R^2	0.001	0.001	0.002	0.002	0.000	0.000	0.002	0.002

Table A.9: **Relationship between returns and several measures of loan fee risk, post-crisis period including the crisis (Q3 2008 - Q4 2011).**

This table presents the results of 1 quarter lagged panel regressions examining the relationship between returns and several measures of loan fee risk during the post-crisis period including the crisis (Q3 2008 - Q4 2011). Note that volatility of the common component is calculated as quarterly volatility of the median loan fee across all stocks, and systematic volatility is calculated as $\sqrt{\beta^2_{median} * vol(MedianLF)^2}$. t-statistics are displayed in parentheses.

Panel A								
	One quarter ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.029***				-0.028***		
		(-6.388)				(-5.329)		
$IdioVol_{median}$ (Loan Fee)			0.036***	-0.009*			0.037***	-0.001
			(5.650)	(-1.733)			(5.302)	(-0.109)
$SysVol_{median}$ (Loan Fee)			-0.202***				-0.196***	
			(-12.039)				(-10.301)	
β^2_{median}				-0.000				-0.000
				(-0.667)				(-0.771)
Vol (Median Common Comp)				-1.871***				-1.833***
				(-43.173)				(-50.948)
Median Loan Fee	-0.011***	-0.007***	-0.008***	-0.010***	-0.010***	-0.007***	-0.009***	-0.010***
	(-8.123)	(-4.277)	(-4.657)	(-5.794)	(-4.863)	(-3.008)	(-3.539)	(-3.884)
Stock FE					X	X	X	X
N	45266	45266	44859	44859	45266	45266	44859	44859
Adjusted R^2	0.005	0.006	0.013	0.051	0.002	0.003	0.010	0.051

Panel B								
	One month ahead return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vol(Loan Fee)		-0.010***				-0.014***		
		(-4.109)				(-4.670)		
$IdioVol_{median}$ (Loan Fee)			0.033***	0.003			0.030***	0.004
			(9.300)	(1.260)			(6.979)	(1.182)
$SysVol_{median}$ (Loan Fee)			-0.130***				-0.132***	
			(-13.112)				(-10.596)	
β^2_{median}				-0.000				-0.000
				(-0.565)				(-0.486)
Vol (Median Common Comp)				-1.292***				-1.289***
				(-55.555)				(-58.884)
Median Loan Fee	-0.002**	-0.000	-0.001	-0.002***	-0.002**	-0.001	-0.002	-0.002**
	(-2.568)	(-0.145)	(-0.886)	(-2.588)	(-2.183)	(-0.502)	(-1.434)	(-1.989)
Stock FE					X	X	X	X
N	41866	41866	41481	41481	41866	41866	41481	41481
Adjusted R^2	0.000	0.001	0.013	0.086	0.000	0.001	0.013	0.090

Table A.10: **Double-sorted portfolio returns, in relation to the PC1 loan fee common component.**

In Panel A, for each quarter, stocks are sorted into one of four portfolios based on their loan fees: 1) low systematic volatility and low total volatility, 2) low systematic volatility and high total volatility, 3) high systematic volatility and low total volatility, and 4) high systematic volatility and high total volatility. In Panel B, instead of sorting on systematic volatility, we sort on idiosyncratic volatility. Systematic volatility is calculated as $\sqrt{\beta^2 * vol(LFCommonComponent)^2}$ and idiosyncratic volatility is calculated as $\sqrt{TotalVol^2 - SysVol^2}$, where $LFCommonComponent$ is the first principal component (PC1) time series and $TotalVol$ is the standard deviation of each stock's loan fees over the quarter.

Panel A

Annualized Returns	**Portfolio**	**Sort Variable: Total Vol(Loan Fee)** $TotalVol$ **(1)**	$TotalVol$ **(2)**	**Long/Short Portfolios** $TotalVol$ **(2) - (1)**
Sort Variable: $SysVol_{PC1}$	$SysVol$ **(1)**	9.4% [0.629]	6.0% [0.310]	-3.2% [-1.551]
	$SysVol$ **(2)**	4.1% [0.224]	3.6% [0.145]	-0.6% [-0.467]
Long/Short Portfolios	$SysVol$ **(2) - (1)**	-4.9%*** [-3.878]	-2.3% [-1.317]	

Panel B

Annualized Returns	**Portfolio**	**Sort Variable: Total Vol(Loan Fee)** $TotalVol$ **(1)**	$TotalVol$ **(2)**	**Long/Short Portfolios** $TotalVol$ **(2) - (1)**
Sort Variable: $IdioVol_{PC1}$	$IdioVol$ **(1)**	9.2% [0.623]	6.2% [0.384]	-2.8% [-1.178]
	$IdioVol$ **(2)**	7.0% [0.378]	4.1% [0.181]	-2.8% [-1.081]
Long/Short Portfolios	$IdioVol$ **(2) - (1)**	-2.1% [-0.774]	-2.0% [-0.705]	

Table A.11: **Double-sorted portfolio returns, sorting on systematic volatility and median loan fee levels.**

For each quarter, stocks are sorted into one of four portfolios based on their loan fees: 1) low systematic volatility and low median loan fee, 2) low systematic volatility and high median loan fee, 3) high systematic volatility and low median loan fee, and 4) high systematic volatility and high median loan fee. Systematic volatility is calculated as $\sqrt{\beta^2 * vol(LFCommonComponent)^2}$, where $LFCommonComponent$ is the median loan fee time series in Panel A and the PC1 time series in Panel B.

Panel A

Annualized Returns		**Sort Variable: Median Loan Fee**		**Long/Short Portfolios**
	Portfolio	LF **(1)**	LF **(2)**	LF **(2) - (1)**
Sort Variable: $SysVol_{median}$	$SysVol$ **(1)**	9.9% [0.716]	6.5% [0.335]	-3.1% [-1.067]
	$SysVol$ **(2)**	9.1% [0.624]	1.5% [-0.005]	-7.2%** [-2.069]
Long/Short Portfolios	$SysVol$ **(2) - (1)**	-0.7% [-1.198]	-4.8%** [-2.482]	

Panel B

Annualized Returns		**Sort Variable: Median Loan Fee**		**Long/Short Portfolios**
	Portfolio	LF **(1)**	LF **(2)**	LF **(2) - (1)**
Sort Variable: $SysVol_{PC1}$	$SysVol$ **(1)**	10.0% [0.714]	5.7% [0.287]	-4.0% [-1.518]
	$SysVol$ **(2)**	9.3% [0.653]	2.1% [0.037]	-6.7% [-1.564]
Long/Short Portfolios	$SysVol$ **(2) - (1)**	-0.7% [-1.588]	-3.5% [-1.563]	

Table A.12: **Single-sorted portfolio returns.**

Panel A presents single-sorted portfolio returns, sorting firms into one of two portfolios based on quarterly volatility of loan fees. The first portfolio for each quarter is composed of stocks which have loan fee volatilities below the median loan fee volatility for that quarter. The second portfolio contains the other half of stocks in the sample, those with high loan fee volatilities. Panel B sorts on systematic volatility of loan fees, and Panel C sorts on idiosyncratic volatility of loan fees. Systematic volatility is calculated as $\sqrt{\beta^2 * vol(LFCommonComponent)^2}$, where $LFCommonComponent$ is the median loan fee time series. Idiosyncratic volatility is calculated as $\sqrt{TotalVol^2 - SysVol^2}$.

Panel A

Annualized Returns	**Portfolio**	**Return**
Sort Variable: $SysVol_{median}$	Low	9.1% [0.589]
	High	3.5% [0.146]
Long/Short Portfolio	High - Low	-5.3%*** [-2.989]

Panel B

Annualized Returns	**Portfolio**	**Return**
Sort Variable: $IdioVol_{median}$	Low	9.4% [0.641]
	High	3.8% [0.163]
Long/Short Portfolio	High - Low	-5.2%* [-1.948]

Table A.13: **Single-sorted portfolio returns.**

Systematic volatility is calculated as $\sqrt{\beta^2 * vol(LFCommonComponent)^2}$, where $LFCommonComponent$ is the PC1 time series. Idiosyncratic volatility is calculated as $\sqrt{TotalVol^2 - SysVol^2}$.

Panel A

Annualized Returns	**Portfolio**	**Return**
Sort Variable: $SysVol_{PC1}$	**(1)**	8.8% [0.564]
	(2)	3.8% [0.168]
Long/Short Portfolio	**(2) - (1)**	-4.7%*** [-3.080]

Panel B

Annualized Returns	**Portfolio**	**Return**
Sort Variable: $IdioVol_{PC1}$	**(1)**	9.3% [0.631]
	(2)	4.0% [0.175]
Long/Short Portfolio	**(2) - (1)**	-4.9%* [-1.754]