



Impact assessment: Explaining the differences in funds' securities lending returns

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- The impact of securities lending on the returns of regulated funds is largely misunderstood within the investment community. Although securities lending income earned by regulated funds is recorded in a fund's annual report, no recognized source aggregates this data for the fund industry.
- As a result, practitioners often overestimate the impact of securities lending and extrapolate broad industry trends based on the performance of but a handful of funds, funds within a few asset classes, or funds during a single calendar year.
- To gain a more holistic view of the contribution of securities lending to fund returns, we collected securities lending income data from a large sample of funds across several asset classes and calendar years.
- We tested several variables to see how well they explain differences in the contribution of securities lending to fund returns, what we call "lending impact." We found significant differences according to asset class and calendar year. Of note, we also found differences according to asset manager, which we believe to be a proxy for firm-level policies and procedures.

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Securities lending is a rather opaque topic within the investment community. This is largely because of limited amounts of publicly available data on securities lending activity, as well as a lack of aggregated databases that contain lending data. Under the Investment Company Act of 1940 (1940 Act), however, *regulated funds* including mutual funds, closed ended funds, and 1940 Act exchange-traded funds (ETFs)¹ are required to disclose in their annual reports information pertaining to their lending activity. Based on this data source, we constructed an eight-year sample of data (covering the years 2007 through 2014) from the annual reports of 1,193 index mutual funds and exchange-traded funds—resulting in 6,096 fund years of data. The primary data point in this sample is what we call “lending impact”—defined as the reported securities lending income of a fund divided by the fund’s average monthly net assets over the fiscal year—and is the estimate of the contribution to a fund’s performance from securities lending. Using this aggregated data, we conducted multivariate regression to explain differences in lending impact across funds.

Literature background to this study

Recent literature has addressed different aspects of securities lending: For example, Rich and Moore’s 2002 overview of the securities lending industry included a detailed review of the market’s overall size and scope. Both Adrian et al. (2013) and D’Avolio (2002) described how the securities lending market functions, while the latter also explained how loan fees are determined. The Investment Company Institute (ICI, 2014a–d) provided a series of viewpoints on securities lending related to market size, market regulations, market participants, and involvement of regulated funds.

Our analysis, however, aligns more with research focusing on measuring and analyzing the benefit to fund performance from securities lending activities. In this vein, recent research by Dunham and Simpson (2012; 2015) measured funds’ incremental return and index-tracking enhancement as a result of securities lending. In other work, Adams, Mansi, and Nishikawa (2013) primarily tested for differences in funds’ securities lending returns based upon whether the funds used affiliated or unaffiliated lending agents; the authors also measured the overall fund-performance benefit. And Blocher and Whaley (2015) discussed a framework for estimating how much revenue funds can earn through securities lending.

Notes on risk and performance data: All investments are subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index. There may be other material differences between products that must be considered prior to investing.

Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer’s ability to make payments. Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk, which is the chance that political upheaval, financial troubles, or natural disasters will adversely affect the value of securities issued by companies in foreign countries or regions, and currency risk, which is the chance that the value of a foreign investment, measured in U.S. dollars, will decrease because of unfavorable changes in currency exchange rates. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks.

¹ For a brief discussion of ETFs operating under the 1940 Act, see Vanguard Investment Strategy Group (2015).

Our research expands upon previous findings by analyzing a broad set of fund variables that we believe help explain the cross-sectional differences in lending impact across funds. The eight variables we reviewed were: average proportion of a fund's portfolio on loan; fund size (AUM percentile); expense ratio; portfolio turnover; number of stock/bond holdings; fiscal year; asset-class category; and asset manager.²

The remaining sections of this paper describe our data sample and methodology; provide an overview of the securities lending landscape; review notable variables that we believe influence a fund's lending impact; discuss a multivariate regression analysis we conducted of all the variables; and, finally, conclude with a reiteration of our findings.

Data sample and analysis methodology

Using Morningstar Direct, we selected all U.S.-domiciled index mutual funds and ETFs considered "40 Act funds" (for the Investment Company Act of 1940) whose annual reports indicated that they had a full year of operations from fiscal year 2007 through 2014. From these annual reports, we collected securities lending income reported in the funds' statements of operations as well as the market value of securities on loan (typically reported in

the funds' statement of assets and liabilities). We did not capture this data for funds that used a master-feeder structure or otherwise reported securities on loan that could not be attributed to a single fund; however, such funds were few in number.³ As stated earlier, we recorded a total of 6,096 observations (which we refer to as our "full sample") from 1,193 unique index funds and ETFs in operation over the time period.

We captured the following data from Morningstar Direct as of the fiscal year for each observation: average assets under management, expense ratio, portfolio turnover, number of stock/bond holdings, and name of asset manager. These variables were selected because they are common variables in practitioner research and performance analysis. We used our data collected from annual reports and the Morningstar data to construct lending impact (defined earlier) and proportion on loan. Average proportion on loan is the two-year average of the market value of the securities on loan from each fund at its fiscal year-end divided by the fund's net assets (e.g., a fund's average proportion on loan for 2008 is the average of its proportion on loan in 2007 and 2008).⁴ We then used Morningstar categories to place each fund in one of seven asset classes: U.S. large-cap, U.S. mid-cap, U.S. small-cap, international equity, fixed income, sector, and "other."

² See appendix Figure A-1, for detailed definitions of these variables. Fiscal year, asset-class category, and asset-manager effects could be considered "time effects, fixed effects, and firm effects," respectively, from an econometric perspective. However, we treat them as variables and show their results because they provide valuable insight into the variability among the funds in our sample.

³ The total number of master-feeder funds excluded from the data sample was only nine.

⁴ This variable incorporates the start date and end date for the loan balance. We believe this is a reasonable representation of lending activity throughout the fiscal year. Average proportion on loan is a critical independent variable, and we believe the conceptual rationale for its inclusion is strong. The challenge lies not with the variable itself but with the frequency of its availability (i.e., annual rather than monthly).

Our analysis tested for differences among funds that engage in securities lending; it did not test for differences between funds that lend and funds that do not lend. Because of that, we excluded fund-year observations that neither showed material lending income⁵ (2,924 fund years) nor reported assets on loan in two consecutive years (121 fund years). We also excluded funds that did not possess all of the previously listed independent variables for a given year (an additional 12 observations). Finally, we excluded 57 observations from 17 funds categorized as “other.”

As a result of these adjustments, what we refer to as our “regression sample” comprised a cross-section of 2,982 fund-year observations representing 726 distinct index mutual funds and ETFs from 50 asset managers.

In addition, we collected a sample of actively managed mutual funds. Although the active mutual fund universe was (and is) too large for us to complete a full survey across multiple years, we collected securities lending data from the 2014 annual reports of the 100 largest

U.S.-domiciled active funds in each of the following five asset classes: U.S. large-cap, U.S. mid-cap, U.S. small-cap, international, and fixed income. Although these data are useful for understanding the broader securities lending landscape, they are not presented as part of our regression analysis.

Figure 1 summarizes the full sample, organized into three groups. *Nonmaterial lenders* are funds that either have no lending income or have lending income that falls below the threshold for reporting under current regulations. *Material lenders (not in regression sample)* includes funds that reported non-zero lending income but were missing at least one of the additional data points (notably, average proportion of assets on loan). *Material lenders (in regression sample)* are funds that had reported non-zero lending income and possessed all additional data points, and comprise the same group of funds as our “regression sample.” In addition, the last row in Figure 1 displays data from our 2014 active fund sample.

Figure 1. Summary of this study’s full sample and active sample

| Year | Nonmaterial lenders | | Material lenders (not in regression sample) | | Material lenders (in regression sample) | |
|---------------|---------------------|------------------|--|------------------|--|------------------|
| | Number of funds | AUM (\$millions) | Number of funds | AUM (\$millions) | Number of funds | AUM (\$millions) |
| 2007 | 169 | \$154,664 | 162 | \$752,526 | NA | NA |
| 2008 | 195 | 162,540 | 158 | 218,734 | 194 | \$773,498 |
| 2009 | 263 | 142,433 | 62 | 19,256 | 326 | 838,389 |
| 2010 | 284 | 181,839 | 40 | 52,323 | 374 | 1,125,619 |
| 2011 | 329 | 227,032 | 73 | 53,438 | 410 | 1,442,368 |
| 2012 | 348 | 470,289 | 86 | 56,237 | 490 | 1,449,953 |
| 2013 | 380 | 568,869 | 124 | 73,486 | 543 | 1,819,666 |
| 2014 | 361 | 633,363 | 80 | 56,189 | 645 | 2,399,928 |
| 2014 (active) | 327 | 3,363,191 | 173 | 1,728,281 | NA | NA |

Notes: AUM represents average assets under management over the funds’ fiscal year. For 2007 material lenders (in regression sample), there were potentially 160 funds with \$752.5 billion in assets under management that would have otherwise been included if they had 2006 data to create average proportion on loan. NA = nonapplicable.

Sources: Vanguard calculations, based on data from Morningstar, Inc.

⁵ Financial disclosure requirements in Section 210.6-07 of SEC regulation S-X (17 CFR 210.6-07) specify that registered investment companies must disclose other income, if any, to the extent such income exceeds 5% of a fund’s total income. With respect to any differences between the revenue generated by a lending transaction and the income received by the fund as a result of costs related to the transaction (referred to as the “fee split”), the ICI (2014a) noted that SEC guidelines state that a “U.S. regulated fund must receive a reasonable return on the loan, including any income from the loaned securities, such as dividends.”

Securities lending landscape

Several organizations have estimated the size of the securities lending market, with little consensus on the level of aggregate activity. For example, Standard & Poor's (S&P Indices, 2010) estimated that in 2007, assets in the global and U.S. equity lending markets were \$850 billion and \$400 billion, respectively. The Financial Stability Oversight Council, in its January 2014 annual report (FSOC, 2014), estimated the daily value of securities lending transactions to be \$1.8 trillion globally and \$900 billion in the United States. In that report, the FSOC also claimed that the share of the U.S. securities lending market attributed to regulated funds was about 35%. However, our analysis yielded a much lower estimate of the portion attributed to regulated funds.

Figure 2 helps reconcile these estimates and displays the aggregate amounts of lending income, securities on loan, and total assets under management (average and fiscal year-end), as well as the weighted-average lending impact and weighted-average portion on loan for our full sample

of index funds from 2007 through 2014. The last row in Figure 2 displays data from our 2014 active funds sample. In 2014, total index-fund assets on loan were almost \$68 billion, while for active funds the figure was about \$36 billion; this represented about 2% and less than 1% of fund assets, respectively. The combined total of \$8 trillion in assets held by the index fund and active fund sample as of 2014 accounted for 63% of U.S.-domiciled fund assets. In aggregate, these funds had about \$104 billion out on loan. This represented just 5.8% of the FSOC's \$1.8 trillion global estimate for 2014, and represented 11.6% of the FSOC's \$900 billion U.S. estimate, each much lower than the FSOC's estimated 35% market share. In a similar analysis, the ICI (2014a) estimated that in 2013 the largest 500 U.S. regulated funds had \$95.1 billion out on loan (representing 0.99% of their assets). This corresponded to a global market share of just 5.3% of the FSOC's 2014 estimate of \$1.8 trillion and a U.S. market share of 10.6% of the FSOC's estimate of \$900 billion in 2014.

Figure 2. Securities on loan and lending impact for study's full sample and active sample

| Year | Total lending income (\$millions) | Total on loan (\$millions) | Total average AUM (\$millions) | Total FYE AUM (\$millions) | Weighted-average lending impact (bps) | Weighted-average percentage on loan |
|---------------|-----------------------------------|----------------------------|--------------------------------|----------------------------|---------------------------------------|-------------------------------------|
| 2007 | \$209 | \$24,546 | \$907,190 | \$976,852 | 2.31 | 2.51% |
| 2008 | 567 | 38,832 | 1,154,773 | 1,022,699 | 4.91 | 3.80 |
| 2009 | 699 | 31,644 | 1,000,078 | 1,134,039 | 6.99 | 2.79 |
| 2010 | 376 | 35,033 | 1,359,782 | 1,552,623 | 2.77 | 2.26 |
| 2011 | 461 | 38,060 | 1,722,838 | 1,775,704 | 2.67 | 2.14 |
| 2012 | 660 | 41,987 | 1,976,479 | 2,146,861 | 3.34 | 1.96 |
| 2013 | 691 | 48,763 | 2,462,020 | 2,754,486 | 2.81 | 1.77 |
| 2014 | 834 | 67,726 | 3,089,480 | 3,445,256 | 2.70 | 1.97 |
| 2014 (active) | 503 | 36,461 | 5,091,472 | 5,255,378 | 0.99 | 0.69 |

Notes: Bps = basis points; FYE = fiscal year-end.

Sources: Vanguard calculations, based on annual data from Morningstar, Inc.

These figures offer three important takeaways. First, they could seem either surprisingly low—given the high level of attention paid to securities lending in recent years—or not surprising, given the SEC’s strict securities lending guidelines for regulated funds⁶ and the fact that securities lending actually tends to make up a relatively small portion of an asset manager’s operations. (It’s worth noting that the ICI [2014a] also recently described securities lending as a “marginal” portfolio management technique for most U.S. regulated funds.)

The second takeaway is that, with the exception of a brief spike in 2008–2009 (the global financial crisis), the amount of securities on loan and their weighted-average impact have actually been fairly consistent over time.

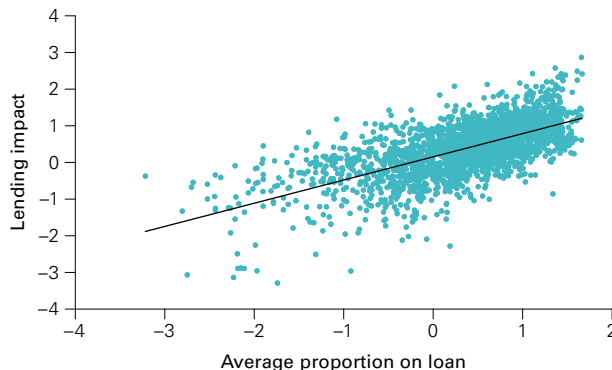
Third, the figures confirm that securities lending has a positive impact on a fund’s return. Considering that our index funds from the full sample had a weighted-average expense ratio of 23.6 basis points (bps) in 2014, the weighted-average lending impact of 2.7 bps helped offset more than 10% of the expense ratio in the same year. This is a significant benefit, because expense ratio is a critical determinant of an index fund’s return relative to its benchmark index.⁷

Review of variables affecting lending impact

We first reviewed three variables—average proportion of a fund’s portfolio on loan, fund fiscal year, and asset-class category—that we believed could play key roles in explaining cross-sectional variation in lending impact in our regression sample.

The *average proportion of a fund’s portfolio on loan* simply measures the percentage of a fund’s assets that have been lent out. **Figure 3** suggests a positive relationship between average proportion on loan and lending impact. Since a fund can only earn lending income to the extent it lends securities, it might seem obvious that a fund’s lending impact is determined in large part by how much the fund lends. However, variation from the trend line can be a result of factors such as asset class and lending strategy. With respect to our tests, average proportion on loan consistently explained a large portion of the variability in our regression analysis, discussed later.

Figure 3. The higher the fund proportion on loan, the greater the lending impact



Notes: Data based on regression sample covering fiscal years 2007–2014. See appendix Figure A-1, for definitions of *lending impact* and *average proportion on loan* (each of which is a logged variable).

Sources: Vanguard calculations, based on data from Morningstar, Inc.

Our analysis held that *fiscal year* was another important variable because, just as returns for the broad stock and bond markets display cyclicity, it is possible that returns for the broad securities lending market display cyclicity.⁸ **Figure 4** shows the interquartile range and median lending impact for fiscal years 2008 through 2014. Notably, lending impact was higher during the global financial crisis years of 2008 and 2009, an increase that can likely be attributed to two factors combined. First, the high level of market volatility during the period could have created additional demand from short sellers, increasing the proportion on loan in 2008 and 2009 relative to other years. Second, and perhaps more important, scarcity premiums may have risen (i.e., rebate rates dropped). For example, S&P Indices (2010) noted that the S&P 500 financials sector sub-index was consistently priced at a negative rebate rate for second-quarter 2009.

⁶ See ICI (2014a), for further discussion of these guidelines that include an express limit on lending, termination and recall rights, collateralization, daily market-to-market valuation, conservative investment of cash collateral, reasonable return, and board oversight.

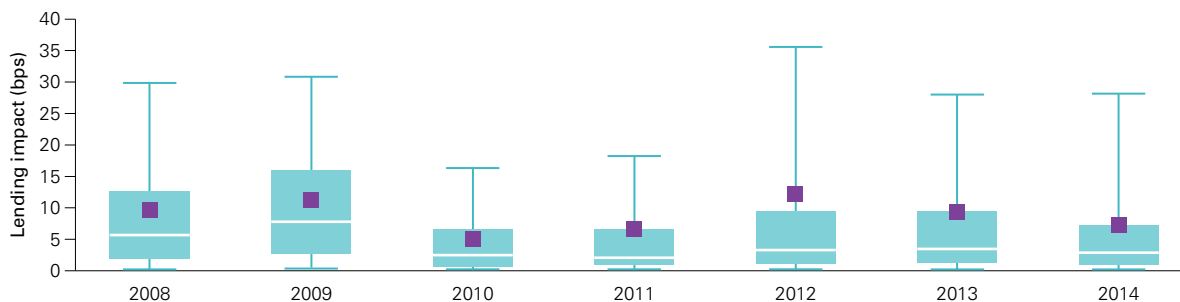
⁷ See Rowley and Kwon (2015), for a discussion of how expense ratio affects an index fund’s excess return and tracking error.

⁸ See S&P Dow Jones Indices (2009), for a discussion of the firm’s securities lending index.

Finally, we contended that a fund’s asset class—as represented by its fund category—would provide explanatory power. **Figure 5** displays the interquartile range and median lending impact by asset class during the analysis period (fiscal years 2008–2014). It suggests that U.S. smaller-cap funds (that is, both small- and mid-cap) tended to earn significantly more than their large-cap counterparts. D’Avolio (2002) showed that lending fees and the probability of a stock trading “special” decrease with size. International stock funds also tend to earn a

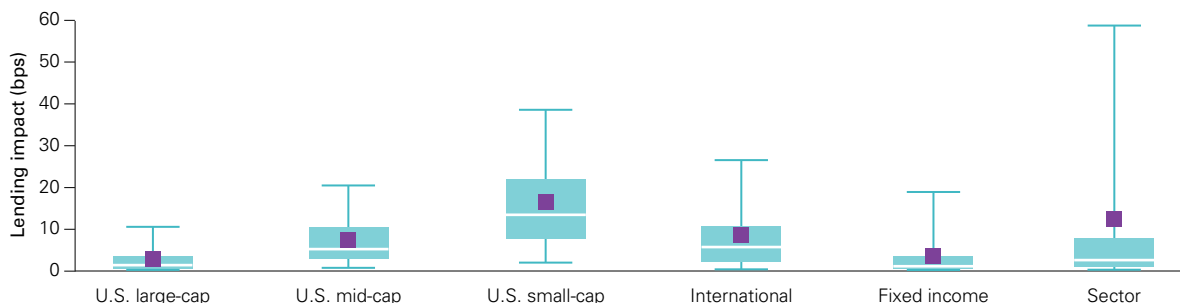
lending premium relative to U.S. large-cap funds, likely due to the benefits associated with the tax treatment of cash flows remitted to the lender that represent the dividend payment on the borrowed stock.⁹ The greatest variation in lending impact across asset class was seen with sector funds. This likely resulted from both the capitalization effects just mentioned and the opportunity for specialized funds to take advantage of lending opportunities when short interest is high in a particular industry.¹⁰

Figure 4. Lending impact fluctuates across fiscal year



Notes: Data based on regression sample covering fiscal years 2007–2014. See appendix Figure A-1, for definition of *lending impact*. For illustrative purposes, we show lending impact here in basis points, rather than the logged values used for the regression analysis. Boxes represent interquartile range. Lower whisker extends to 5th percentile, and upper whisker extends to 95th percentile. The purple boxes and white lines represent the mean and median values, respectively.
Sources: Vanguard calculations, based on data from Morningstar, Inc.

Figure 5. Lending impact differs across asset classes



Notes: Data based on regression sample covering fiscal years 2007–2014. See appendix Figure A-1, for definition of *lending impact*. For illustrative purposes, we show lending impact here in basis points, rather than the logged values used for the regression analysis. Boxes represent interquartile range. Lower whisker extends to 5th percentile, and upper whisker extends to 95th percentile. The purple boxes and white lines represent the mean and median values, respectively.
Sources: Vanguard calculations, based on data from Morningstar, Inc.

⁹ These dividend-tax arbitrage lending transactions have commonly occurred in tax jurisdictions where taxation rates for the borrower are more favorable than those for the lender.

¹⁰ For example, sector funds are often equal weighted rather than market-cap weighted or otherwise cap their exposures to their largest components to avoid concentration. Notably, funds specializing in solar and alternative energy stocks appeared to have the largest opportunities for return enhancement through securities lending in recent years.

Multivariate analysis

In addition to a fund's average proportion on loan, fund fiscal year, and asset-class category, we identified several independent variables that we believed might influence variation in securities lending impact.¹¹ To test the significance of these variables, we conducted a multivariate regression analysis—with lending impact as the dependent variable. **Figure 6** displays the results of our regression analysis.

Panel A of Figure 6 shows that the average proportion of a fund's portfolio on loan explained more than 40% of the variation in lending impact and was significant at 1%. Intuitively, this should have been the case, since, as mentioned earlier, all else equal, more securities on loan means more opportunity to earn lending income. However, we tested this variable first to show the extent of its explanatory power. In addition, by including it in the remaining panels, it enabled us to test the remaining variables, *given a fund's amount on loan*.

Panel B (Figure 6) adds four independent variables. Of these, expense ratio, turnover, and number of stocks/bonds showed a statistically significant relationship with lending impact, suggesting that higher expense ratios, higher number of stock/bond holdings, and higher portfolio turnover were associated with greater lending impact. A higher number of holdings seems intuitive, since it could mean a fund has a greater inventory of stocks or bonds from which it can choose to lend. The addition of these variables slightly increased the explanatory power of our model to 44.3%. Average proportion on loan remained significant.

Panel C (Figure 6) introduces fiscal year, which captures how macro factors influence returns in the securities lending market. Fiscal years 2009 (positive influence), 2010 (negative influence), and 2011 (negative) were statistically significant at 1%. This suggests that 2010

and 2011 were “down” years relative to 2014 (the control fiscal year), while 2009 was an “up” year. Average proportion on loan, expense ratio, and number of stocks/bonds remained significant at 1%, while AUM (negative) and portfolio turnover (positive) were significant at 5%. The adjusted R-squared increased to 46.4%.

Panel D (Figure 6) continues to build from the earlier panels and introduces asset class to the regression. All five of the asset-class categories were found to be statistically significant at 1%, and their inclusion increased the explanatory power of our model to 55.2%. Relative to large-cap funds (the control asset class), the smaller-cap, sector, and international equity funds tended to have greater securities lending impact. Fixed income funds were associated with lower levels of securities lending impact. Average proportion on loan, portfolio turnover, and number of stock/bond holdings remained significant at 1%, as did fiscal years 2009, 2010, and 2011. Fiscal year 2008 (positive influence) was significant at 5%. Expense ratio was no longer significant, suggesting that its significance in panels B and C had more to do with a fund's asset class.¹²

Since expense ratio is often the focal point for two theories related to securities lending income, we found its lack of statistical significance to be of interest. The first theory suggests that funds with higher expense ratios should have a higher lending impact to offset those higher expenses. The second theory suggests that funds with lower expense ratios should have a greater lending impact because the fund sponsor needs to make up for an “artificially low” expense ratio. Our findings suggest either that a fund's pricing strategy does not influence lending impact or that the theories just suggested offset each other in aggregate.

¹¹ Since securities lending information is reported at the portfolio level, we did not include a “dummy” variable for ETF because in the case of Vanguard, the ETF is a share class alongside conventional mutual fund share classes of the same portfolio.

¹² It may seem intuitive that mid-cap funds and small-cap funds would have higher expense ratios due to higher transaction costs and less liquidity; however, although these costs reduce a fund's return, they are not part of the fund's expense ratio.

Figure 6. Results of index-fund regression with 'lending impact' as dependent variable

| Predictor | Panel A | | Panel B | | Panel C | | Panel D | | Panel E | |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Constant | 0.21 | 18.34** | -0.31 | -5.20** | -0.28 | -4.55** | -0.50 | -6.69** | -0.35 | -4.08** |
| Average proportion on loan | 0.63 | 46.33** | 0.61 | 44.38** | 0.61 | 44.60** | 0.59 | 46.24** | 0.75 | 53.80** |
| AUM percentile | | | -0.08 | -1.84 | -0.10 | -2.33* | -0.05 | -1.34 | -0.20 | -5.46** |
| Expense ratio | | | 0.29 | 6.84** | 0.28 | 6.83** | -0.05 | -1.14 | 0.13 | 1.71 |
| Portfolio turnover | | | 0.08 | 3.23** | 0.06 | 2.46* | 0.18 | 7.35** | 0.08 | 3.28** |
| Number of stock/bond holdings | | | 0.15 | 8.57** | 0.15 | 8.58** | 0.16 | 7.90** | 0.12 | 5.79** |
| 2008 | | | | | 0.08 | 1.73 | 0.09 | 2.23* | 0.09 | 2.33* |
| 2009 | | | | | 0.24 | 6.62** | 0.24 | 7.10** | 0.27 | 8.77** |
| 2010 | | | | | -0.15 | -4.26** | -0.16 | -4.85** | -0.14 | -4.80** |
| 2011 | | | | | -0.11 | -3.33** | -0.12 | -3.87** | -0.11 | -3.88** |
| 2012 | | | | | 0.04 | 1.36 | 0.02 | 0.79 | 0.03 | 0.94 |
| 2013 | | | | | 0.05 | 1.71 | 0.04 | 1.56 | 0.05 | 1.88 |
| U.S. mid-cap | | | | | | | 0.18 | 4.69** | 0.12 | 3.25** |
| U.S. small-cap | | | | | | | 0.39 | 9.54** | 0.29 | 7.53** |
| International | | | | | | | 0.37 | 12.64** | 0.28 | 8.86** |
| Fixed income | | | | | | | -0.46 | -11.59** | -0.45 | -11.97** |
| Sector | | | | | | | 0.23 | 7.26** | 0.12 | 3.90** |
| Asset manager | No | | No | | No | | No | | Yes | |
| Standard error | 0.56 | | 0.55 | | 0.53 | | 0.49 | | 0.44 | |
| R-squared | 41.9% | | 44.4% | | 46.6% | | 55.4% | | 64.8% | |
| Adjusted R-squared | 41.9% | | 44.3% | | 46.4% | | 55.2% | | 64.0% | |

**Significant at 1%; *Significant at 5%.

Sources: Vanguard calculations, based on data from Morningstar, Inc., and FactSet.

Finally, we address asset manager in panel E (Figure 6). (The full list of firms, coefficients, and t -statistics is shown in Figure 7).¹³ We believe that the asset-manager variable serves as a proxy for firm-level policies and procedures including, but not limited to, the lending-fee split, lending strategy, and collateral reinvestment strategy. Proportion on loan remained significant at 1%, and its coefficient stayed similar to the size shown in previous panels. Portfolio turnover and the number of stock/bond holdings

remained significant at 1%. AUM was negatively significant at 1%, though with a slightly negative and near-zero coefficient, even large changes in AUM percentile have a relatively slight effect on the model's output. Fiscal years 2008 (5%) and 2009 (1%) stayed positively significant, while fiscal years 2010 and 2011 were negatively significant at 1%. All asset classes stayed significant at 1%. The inclusion of the asset-manager variable bumped the adjusted R-squared to 64.0%.

Figure 7. Results for asset-manager variable from Figure 6, Panel E

| Asset manager | Coefficient | t -statistic | Number of observations |
|-----------------------|-------------|----------------|------------------------|
| American Century | 0.30 | 0.68 | 1 |
| Bridgeway | -0.27 | -0.85 | 2 |
| Columbia Threadneedle | 0.12 | 0.98 | 16 |
| Deutsche X-trackers | 0.07 | 0.65 | 18 |
| Dreyfus | -0.16 | -1.84 | 35 |
| Federated | -0.19 | -1.32 | 10 |
| Fidelity | 0.01 | 0.18 | 63 |
| Fifth Third | -0.23 | -1.02 | 4 |
| First Trust | 0.34 | 4.81** | 56 |
| Global X Management | 0.48 | 4.93** | 25 |
| Great-West | -0.01 | -0.15 | 33 |
| Guggenheim | 0.20 | 3.99** | 166 |
| GuideStone | -0.12 | -0.26 | 1 |
| IndexIQ | -0.18 | -1.41 | 13 |
| Invesco | 0.17 | 0.37 | 1 |
| iShares | 0.00 | -0.08 | 997 |
| John Hancock | 0.07 | 0.63 | 18 |
| JPMorgan | 0.31 | 1.53 | 5 |
| MainStay Management | 0.23 | 0.90 | 3 |
| MassMutual | -0.20 | -0.46 | 1 |
| MMA Praxis | -0.83 | -1.83 | 1 |
| Nationwide | 0.11 | 1.00 | 22 |
| Northern | -0.26 | -2.25* | 17 |
| Nuveen | -0.37 | -2.93** | 15 |
| PIMCO | 0.71 | 2.23* | 2 |

| Asset manager | Coefficient | t -statistic | Number of observations |
|-----------------------|--------------------|----------------|------------------------|
| PNC | -0.37 | -2.18 | 7 |
| PowerShares | 0.26 | 4.09** | 79 |
| Precidian Investments | -1.17 | -2.63** | 1 |
| Principal | 0.34 | 0.77 | 1 |
| Prudential | -0.30 | -1.76 | 7 |
| RevenueShares | -0.96 | -8.49** | 17 |
| RidgeWorth | 0.30 | 1.75 | 7 |
| Rydex | -0.29 | -1.88 | 28 |
| Schwab (ETFs) | 0.37 | 3.85** | 26 |
| Schwab (Funds) | 0.64 | 9.62** | 67 |
| SEI | -0.35 | -2.42* | 10 |
| State Street | -0.11 | -2.50* | 466 |
| T. Rowe Price | 0.06 | 0.66 | 28 |
| TIAA | -0.14 | -1.66 | 39 |
| USAA | 0.61 | 1.92 | 2 |
| VALIC | -0.01 | -0.06 | 35 |
| Van Eck | 0.25 | 4.41** | 107 |
| Vanguard | 0.72 | 13.51** | 258 |
| Vantagepoint | 0.01 | 0.07 | 35 |
| Victory | -0.34 | -1.29 | 3 |
| Virtus | -1.38 | -3.06** | 1 |
| Voya | 0.22 | 2.87** | 54 |
| Wells Fargo | -0.17 | -0.91 | 6 |
| Wilshire | -0.10 | -0.42 | 4 |
| WisdomTree | (Control variable) | | 169 |

**Significant at 1%; *Significant at 5%.

Sources: Vanguard calculations, based on data from Morningstar, Inc., and FactSet.

¹³ Swensen (2009) and Baklanova, Copeland, and McCaughrin (2015) stated that the standard industry practice is a 70%/30% split for securities lending revenue between a fund and its lending agent. We chose WisdomTree as our control variable since, according to data provided by FactSet and ETF.com, WisdomTree was the only firm to consistently use a 70%/30% revenue-sharing split for all of its ETFs.

Lending-fee split is an integral component because it takes into account the amount of a fund's lending revenue that is divided between the fund and its lending agent (affiliated or unaffiliated). The amount of lending revenue that the fund keeps (its portion of the split) translates into its lending *income*.¹⁴ Lending strategy can be characterized in two primary ways. Funds that seek to earn a higher relative rate of return per amount of securities on loan through a scarcity premium (i.e., low-to-negative rebate rates) on hard-to-borrow securities are said to be conducting *value-style lending*. The alternative, commonly known as *volume-style lending*, is when the lender's strategy aims to earn a higher absolute rate of return by lending a large share of securities in the portfolio. In most cases, collateral is invested in diversified pools of high-credit-quality, highly liquid money market instruments. It is possible that lenders could decide to enhance returns by investing the collateral in instruments with additional risks associated with credit quality, duration, or liquidity.¹⁵

Conclusion

Using a cross-sectional sample of index funds and ETFs, we analyzed the effect of several variables on a fund's lending impact—the performance benefit due to securities lending. We found that cross-sectional differences in lending impact could be largely explained by the average proportion of a fund's assets out on loan, the number of a fund's portfolio securities, its fiscal year, its asset-class category, and its asset manager. Also, of note, we found no relationship between expense ratio and lending impact.

¹⁴ Rich and Moore (2002) described the transfer of securities and cash flows in this relationship.

¹⁵ Adrian et al. (2013) highlighted the importance of information related to cash reinvestment strategies when assessing risk in securities lending transactions.

References

- Adams, John C., Sattar A. Mansi, and Takeshi Nishikawa, 2013. Affiliated Agents, Boards of Directors, and Mutual Fund Securities Lending Returns. *Journal of Financial Research* 37: 1–53.
- Adrian, Tobias, Brian Begalle, Adam Copeland, and Antoine Martin, 2013. *Repo and Securities Lending*. Federal Reserve Bank of New York Staff Reports No. 529. New York: Federal Reserve Bank of New York, 1–19.
- Baklanova, Viktoria, Adam Copeland, and Rebecca McCaughrin, 2015. *Reference Guide to U.S. Repo and Securities Lending Markets*. Office of Financial Research Working Paper: 31; available at http://financialresearch.gov/working-papers/files/OFRwp-2015-17_Reference-Guide-to-U.S.-Repo-and-Securities-Lending-Markets.pdf.
- Blocher, Jesse, and Robert E. Whaley, 2015. *Passive Investing: The Role of Securities Lending*. Vanderbilt Owen Graduate School of Management Research Paper. Nashville, Tenn.: Vanderbilt University, 1–40.
- D'Avolio, Gene, 2002. The Market for Borrowing Stock. *Journal of Financial Economics* 66: 1–46.
- Dunham, Lee M., and Thuy H. Simpson, 2012. The Impact of Securities Lending on Index Fund Performance. *Journal of Investing* 42: 9–15.
- Dunham, Lee M., and Thuy H. Simpson, 2015. An Analysis of the Impact of Securities Lending on the Performance of ETFs. *Journal of Wealth Management* 17: 75–84.
- Financial Stability Oversight Council, 2014. *2014 Annual Report*; available at <http://www.treasury.gov/initiatives/fsoc/Documents/FSOC%202014%20Annual%20Report.pdf>.
- FSOC. See Financial Stability Oversight Council.
- ICI. See Investment Company Institute.
- Investment Company Institute, 2014a. *Securities Lending by Mutual Funds, ETFs, and Closed-End Funds: The Basics* (September 15); available at https://www.ici.org/viewpoints/view_14_sec_lending_01.
- Investment Company Institute, 2014b. *Securities Lending by Mutual Funds, ETFs, and Closed-End Funds: The Market* (September 16); available at https://www.ici.org/viewpoints/view_14_sec_lending_02.
- Investment Company Institute, 2014c. *Securities Lending by Mutual Funds, ETFs, and Closed-End Funds: Regulators' Concerns* (September 17); available at https://www.ici.org/viewpoints/view_14_sec_lending_03.
- Investment Company Institute, 2014d. *Securities Lending by Mutual Funds, ETFs, and Closed-End Funds: Are the Risks Systemic?* (September 18); available at https://www.ici.org/viewpoints/view_14_sec_lending_04.
- Rich, Don, and Jason A. Moore, 2002. Scope and Dynamics of the Securities Lending Industry. *Journal of Portfolio Management* 29(1): 61–75.
- Rowley, James J., Jr., and David Kwon, 2015. The Ins and Outs of Index Tracking. *Journal of Portfolio Management* 41(3): 35–45.
- S&P Dow Jones Indices, 2009. *S&P Securities Lending Index Series Methodology* (September): 1–13; available at <http://us.spindices.com/documents/methodologies/methodology-sp-securities-lending.pdf>.
- S&P Indices, 2010. *Transparency in the Securities Lending Market* (January); available at http://www.spindices.com/documents/research/Transparency_in_the_Securities_Lending_Market_IntroFinal_Jan2010.pdf.
- Swensen, David F., 2009. *Pioneering Portfolio Management: An Unconventional Approach to Institutional Investment*. New York: Free Press.
- U.S. Investment Company Act of 1940. U.S. Public Law 76-768, 76th Cong., August 22, 1940, 15 U.S.C. §210.6–07-1; available at http://www.ecfr.gov/cgi-bin/text-idx?SID=8e0ed509ccc65e983f9eca72ceb26753&node=17:3.0.1.1.8&rgn=div5#se17.3.210_16_607.
- Vanguard Investment Strategy Group, 2015. *Exchange-Traded Funds: Clarity Amid the Clutter*. Valley Forge, Pa.: The Vanguard Group.

Appendix. Definitions of variables; regression sample summary statistics

Figure A-1. Definitions of variables

Dependent variable

| | |
|----------------|---|
| Lending impact | Log (base 10) of the basis points of lending impact, defined as the reported securities lending income for the fiscal year divided by the average monthly net assets over the fund's fiscal year. |
|----------------|---|

Independent variables

| | |
|-------------------------------|---|
| Average proportion on loan | Log (base 10) of the average of the fund proportion on loan for the fiscal year and the fund proportion on loan for the prior fiscal year. |
| AUM percentile | Percentile ranking of the assets under management, defined as the average net assets across all share classes over the fund's fiscal year. Ranking is relative to all observations in a given fiscal year. |
| Expense ratio | Expense ratio reported in the fund's annual report for a given fiscal year. |
| Portfolio turnover | Log (base 10) of the portfolio turnover reported in the fund's annual report for a given fiscal year. |
| Number of stock/bond holdings | Log (base 10) of the average number of stocks/bonds held by a fund over the fiscal year. |
| 2008 | A binary variable indicating whether the observation occurred in fiscal year 2008. |
| 2009 | A binary variable indicating whether the observation occurred in fiscal year 2009. |
| 2010 | A binary variable indicating whether the observation occurred in fiscal year 2010. |
| 2011 | A binary variable indicating whether the observation occurred in fiscal year 2011. |
| 2012 | A binary variable indicating whether the observation occurred in fiscal year 2012. |
| 2013 | A binary variable indicating whether the observation occurred in fiscal year 2013. |
| U.S. mid-cap | A binary variable indicating whether or not a fund is classified as a U.S. mid-cap equity fund. |
| U.S. small-cap | A binary variable indicating whether or not a fund is classified as a U.S. small-cap equity fund. |
| International | A binary variable indicating whether or not a fund is classified as an international equity fund. |
| Fixed income | A binary variable indicating whether or not a fund is classified as a fixed-income fund. |
| Sector | A binary variable indicating whether or not a fund is classified as a sector fund. |
| Asset manager | A binary variable indicating whether or not a fund is sponsored by a given asset manager. In our cross-sectional index fund regression, 50 distinct firms were tested against a control variable of WisdomTree. |

Note: Logged models were used to linearize the relationship among variables.

Source: Vanguard.

Figure A-2. Regression sample summary statistics

| | Regression sample | | |
|-------------------------------|-------------------|------|--------------------|
| | <i>n</i> | Mean | Standard deviation |
| Average proportion on loan | 2982 | 0.38 | 0.76 |
| AUM percentile | 2982 | 0.60 | 0.27 |
| Expense ratio | 2982 | 0.43 | 0.26 |
| Portfolio turnover | 2982 | 1.25 | 0.45 |
| Number of stock/bond holdings | 2982 | 2.30 | 0.60 |
| 2008 | 194 | | |
| 2009 | 326 | | |
| 2010 | 374 | | |
| 2011 | 410 | | |
| 2012 | 490 | | |
| 2013 | 543 | | |
| 2014 | 645 | | |
| U.S. large-cap | 579 | | |
| U.S. mid-cap | 246 | | |
| U.S. small-cap | 242 | | |
| International | 762 | | |
| Fixed income | 267 | | |
| Sector | 886 | | |
| Lending impact | 2982 | 0.45 | 0.74 |

Source: Vanguard.

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