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The effect of stock market indexing on the asymmetric timeliness of loss recognition

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Abstract

This study examines the effect of stock market indexing on the asymmetric timeliness of loss recognition (ATLR) in accounting earnings. I use the annual reconstitution of the Russell 1000 and 2000 Indices as a source of exogenous variation in passive indexing demand. Index assignment is based on a threshold rule; hence, around the threshold, assignment is plausibly random. However, each index is separately value weighted such that firms at the bottom (top) of the Russell 1000 (2000) receive small (large) index weights, thereby causing variation in indexing demand. Using a regression discontinuity design, I show that around the threshold, firms added to the Russell 2000 from the Russell 1000 have lower ATLR than firms that stayed in the Russell 1000. The result contributes to our understanding of how investors affect properties of accounting earnings.

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1 Introduction

Various equity market indexes cover over 90 percent of the U.S. market,[1] and in 2014, stock funds that passively tracked major market indices surpassed $1 trillion in assets under management [Solomon, 2014]. Thus, index funds represent an economically meaningful portion of the equity market. Whether firms respond to indexing by changing their financial reporting is of interest to financial economics and accounting researchers. In this paper, I study how indexing affects one aspect of financial reporting, the asymmetric timeliness of loss recognition.

Empirically, accounting income is more sensitive to decreases in firm value than increases; this is referred to as "asymmetric timeliness of loss recognition" (hereafter ATLR) [Ball and Shivakumar, 2006]. The accounting literature argues that equity investors may demand ATLR for several reasons. For example, ATLR can reduce managers' incentives to overinvest by promoting timely abandonment of losing projects and discouraging negative net present value projects. It can also allow shareholders to *ex ante* guard against the possibility that management increases its current period compensation by withholding bad news [Kothari et al., 2010].

Since passive indexing funds that follow major market indices change their holdings as the underlying index's holdings change, the funds' portfolios are constructed without regard for the level of ATLR in firms. As a result, these funds may not care about ATLR such that passive indexing demand does not affect ATLR. On the other hand, as ATLR can be costly [Watts, 2003], it is also possible that firms may decrease ATLR in response to an exogenous shock to indexing demand precisely because passive indexers may not care about or value its potential benefits. Hence, it is an empirical question as to whether and how stock market indexing affects ATLR.

I use institutional features of the Russell 1000 and 2000 indices in a regression discontinuity design to identify the effect of stock market indexing on ATLR. On the last trading day in May, FTSE Russell ranks firms by their market capitalization. Index assignment is determined by whether a firm's market capitalization ranking exceeds an arbitrary cutoff; the 1000 largest firms are assigned to the Russell 1000, and the *next* 2000 firms are assigned to the Russell 2000. Thus, around the threshold, index assignment is plausibly random. However, as the Russell 1000 and Russell 2000 indices are separately value weighted on the last Friday in June, firms just to the right of the Russell 1000 / 2000 cutoff have much higher index weights and assets benchmarked than firms just to the left of the cutoff [Chang et al., 2015]. Hence, Russell 1000 and 2000 Index reconstitution provides exogenous variation in passive indexing demand. To the extent that firms "just above" the cutoff are similar to firms "just below" the cutoff, causal inferences can be made on the effect of stock market indexing [Lee and Lemieux, 2010].

To conduct my empirical tests, I use the Russell 1000 and 2000 index constituents from 1996 to 2012. I first verify that a plot of May market capitalization is continuous at the Russell 1000 / 2000 cutoff. Thus, around the cutoff, index assignment is as good as randomly

[1] http://www.ftserussell.com/index-series/index-spotlights/us-equity-indexes

assigned, and it is plausible that outcomes for firms "just outside" the Russell 2000 (i.e. at the bottom of the Russell 1000) are good counterfactuals of outcomes for firms "just inside" the Russell 2000. Using C-Score to measure ATLR [Khan and Watts, 2009], I show that around the Russell 1000 / 2000 cutoff, firms that move to the Russell 2000 from the Russell 1000 have lower C-Scores relative to firms that stay in the Russell 1000. The result is robust to both linear and quadratic specifications and suggests that passive indexing demand decreases ATLR.

In additional analyses, I conduct a falsification test with lagged C-Score and find no evidence that Russell 1000 and Russell 2000 firms close to the cutoff had significant pre-existing differences in the level of C-Score. To provide further support for the validity of the research design, I also confirm that on average, firms "close to" the cutoff had no significant differences in prior year firm return-on-assets, book-to-market ratio, length of operating cycle, and leverage. Thus, I find no evidence that firms around the cutoff were systematically different in these variables prior to index assignment.

My study contributes to the financial economics and accounting literatures. A large body of research predicts and finds characteristics that are positively associated with ATLR [Kothari et al., 2010]. More recent research has begun to investigate settings in which ATLR decreases (e.g. Erkens et al. [2014]). My study joins these papers by providing evidence that passive indexing demand decreases ATLR.

2 Empirical Framework

2.1 Data

The sample period covers the Russell 1000 and 2000 Index reconstitutions from 1996 to 2012. I obtained a list of the Russell 1000 and 2000 index constituents from Inessa Liskovich.[2] Data to compute the variables comes from Compustat and CRSP.

2.2 Measuring Stock Market Indexing

On the last trading day of each May, FTSE Russell ranks firms by their market capitalization. Prior to 2006, the 1000 largest firms were assigned to the Russell 1000, and the next 2000 firms were assigned to the Russell 2000.[3] Membership lasts for one year, and Russell assigns weights separately within each index on the last Friday of June (the annual reconstitution date).

As a result of this methodology, firms "close to" the cutoff have similar May market capitalizations by construction; it seems plausible that firms on the left of the cutoff could have

[2] `https://sites.google.com/site/inessal/research`

[3] Russell implemented a banding policy after 2006 to reduce turnover between the indices: for a firm in the Russell 2000, it has to move to the left of the 1000th rank "enough" to switch to the Russell 1000; and for a firm in the Russell 1000, it has to move to the right of the 1000th rank "enough" to switch to the Russell 2000.

been on the right and vice versa. However, small changes in market capitalization at the end of May result in large differences in index weights in June: firms "just inside" the Russell 2000 on the right of the cutoff have significantly larger index weights than for firms "just outside" the Russell 2000 on the left. Moreover, in terms of assets benchmarked, more assets were benchmarked to the Russell 2000 than the Russell 1000 for every year between 2002 and 2008. For example, in 2002, \$198.2 billion was benchmarked to the Russell 2000 compared to \$47.6 billion to the Russell 1000. Combined with the index weight discontinuity at the cutoff, this meant that in 2002, stocks just inside the Russell 1000 had around \$5 million tracking them, while stocks just inside the Russell 2000 had around \$200 million [Chang et al., 2015].

Figure 1 demonstrates the continuity in market capitalization and the discontinuity in index weights at the cutoff. Consistent with these features of the Russell Indices generating variation in indexing demand, Chang et al. [2015] document that around the cutoff, firms added to the Russell 2000 from the Russell 1000 experience a 5% higher raw stock return as well as significantly higher trading volume in the month of June compared to firms that stayed in the Russell 1000 (but who were close enough to the cutoff that they could have switched).

2.3 Measuring ATLR

I follow Khan and Watts [2009] to construct a firm-year measure of ATLR.[4] I delete firm years with missing data for any of the variables used in estimation, negative total assets or book value of equity, and price per share less than \$1. I truncate observations in the top and bottom 1% for earnings, returns, size, market-to-book, leverage, and depreciation each year. Annual returns are obtained by cumulating monthly returns starting from the fourth month after the firm's previous fiscal year end.

After performing the screens, I estimate the following regression for each year:

$$
\begin{aligned}
X_i = {} & \beta_1 + \beta_2 D_i + \delta_1 \text{Size}_i + \delta_2 \text{MTB}_i + \delta_3 \text{Lev}_i + \delta_4 D_i \times \text{Size}_i + \delta_5 D_i \times \text{MTB}_i + \delta_6 D_i \times \text{Lev}_i \\
& + \mu_1 R_i + \mu_2 R_i \times \text{Size}_i + \mu_3 R_i \times \text{MTB}_i + \mu_4 R_i \times \text{Lev}_i + \lambda_1 D_i \times R_i + \lambda_2 D_i \times R_i \times \text{Size}_i \\
& + \lambda_3 D_i \times R_i \times \text{MTB}_i + \lambda_4 D_i \times R_i \times \text{Lev}_i + \varepsilon_i \qquad (1)
\end{aligned}
$$

where (COMPUSTAT variable names in parantheses)

- X_i is net income before extraordinary items (IB) scaled by lagged market value of equity (PRCC_F × CSHO);
- R_i are contemporaneous annual returns;
- D_i is an indicator variable equal to one if $R_i < 0$ and zero otherwise;
- Size_i is the natural logarithm of market value of equity;

[4] An example of ATLR in practice is impairment accounting for long-lived tangible assets whereby firms write down the book value of the assets in a timely fashion upon receiving sufficiently bad news, but they do not write up the book value of the assets as quickly (or at all) upon receiving correspondingly good news [Ryan, 2006]. While Accounting Standards Codification 360-10 provides guidance on impairment of long-lived assets, guidance implies a range of managerial discretion.

- MTB_i is the ratio of market value of equity (PRCC_F × CSHO) to the book value of equity (CEQ); and

- Lev_i is leverage, defined as long-term debt (DLTT) plus short term debt (DLC) scaled by market value of equity.

From the annual regressions, I save the coefficient estimates to compute C-Score, defined as

$$\text{C-Score}_{i,t} = \widehat{\lambda}_{1,t} + \widehat{\lambda}_{2,t}\text{Size}_{i,t} + \widehat{\lambda}_{3,t}\text{MTB}_{i,t} + \widehat{\lambda}_{4,t}\text{Lev}_{i,t}$$

Higher values of C-Score indicate higher levels of ATLR.

2.4 Empirical Specification

To test the effect of stock market indexing on ATLR, I use a fuzzy regression discontinuity design (RDD) following Chang et al. [2015]. A sharp RDD is inappropriate because FTSE Russell does not make available to researchers the measure of market capitalization it uses to rank firms in May, and researcher-constructed rankings based on end-of-May CRSP market capitalization cannot perfectly predict membership in the Russell 1000 and 2000 indices. Russell 2000 membership (i.e. treatment) is thus endogenous because it is partly determined by whether the ranking crosses the cutoff and partly by measurement error. However, as long as there is a discontinuity in the probability of Russell 2000 membership near the cutoff, the setting is appropriate for a fuzzy RDD [Lee and Lemieux, 2010]. Two-stage least squares (2SLS) can then be used to estimate the effect of an increase in passive indexing demand for firms moving from the Russell 1000 to the Russell 2000 around the cutoff:

$$\begin{aligned} \text{R2000}_{i,t} &= \alpha_{0l} + \alpha_{0r}\tau_{i,t} + \sum_{n=1}^{k}\alpha_{nl}\text{Rank}_{i,t}^{n} + \sum_{n=1}^{2}\alpha_{nr}\tau_{i,t} \times \text{Rank}_{i,t}^{n} + \nu_t + \xi_{i,t} \\ Y_{i,t} &= \beta_{0l} + \beta_{0r}\widehat{\text{R2000}}_{i,t} + \sum_{n=1}^{k}\beta_{nl}\text{Rank}_{i,t}^{n} + \sum_{n=1}^{2}\beta_{nr}\text{R2000}_{i,t} \times \text{Rank}_{i,t}^{n} \\ &\quad + \eta_t + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where

- the indicator variable $\text{R2000}_{i,t}$ is equal to 1 if firm i in year t is a member of the Russell 2000 and 0 if firm i is a member of the Russell 1000;

- the instrument is an indicator variable, $\tau_{i,t}$, for whether firm i of researcher-constructed rank $\text{Rank}_{i,t}$ exceeds the cutoff c for Russell 2000 membership;

- ν_t (η_t) are year fixed effects;

- $Y_{i,t}$ is the outcome; and

- k is equal to 1 (local linear regression) or 2 (local quadratic regression).

The bandwidth is 100 following Chang et al. [2015]. Standard errors are clustered at the firm level.

Given the fuzzy RDD, β_{0r} can be interpreted as a local average treatment effect (LATE): in the limit at the cutoff, it is the average effect of Russell 2000 Index membership on ATLR for the Russell 2000 Index members who comply with the instrument [Angrist and Pischke, 2009, Lee and Lemieux, 2010].[5]. Thus, it is the average difference in C-Score between Russell 1000 and 2000 firms at the cutoff divided by the average difference in the probability of Russell 2000 Index membership at the cutoff:

$$\beta_{0r} = \frac{\mathbb{E}[\text{C-Score}_{i,t} \mid \tau_{i,t} = 1] - \mathbb{E}[\text{C-Score}_{i,t} \mid \tau_{i,t} = 0]}{\mathbb{E}[\text{R2000}_{i,t} \mid \tau_{i,t} = 1] - \mathbb{E}[\text{R2000}_{i,t} \mid \tau_{i,t} = 0]}$$

2.5 Validating the Design

I test for covariate balance with the following variables that prior literature has documented to vary with ATLR [Khan and Watts, 2009]:

- Return on Assets (ROA) - Income Before Extraordinary Items ($\text{IB}_{i,t-1}$) / Total Assets ($\text{AT}_{i,t-2}$), from Compustat;
- Book-to-Market Ratio (BTM) - Shareholders' Common Equity ($\text{CEQ}_{i,t-1}$) / Market Value of Equity ($\text{PRCC\_F}_{i,t-1} \times \text{CSHO}_{i,t-1}$), from Compustat;
- Natural logarithm of the operating cycle (OPC) - $\log\left[365 \times \left(\frac{\text{RECT}_{i,t-1}}{\text{SALE}_{i,t-1}} + \frac{\text{INVT}_{i,t-1}}{\text{COGS}_{i,t-1}}\right)\right]$, from Compustat.
- Leverage (LEV) - [Long-term Debt ($\text{DLTT}_{i,t-1}$) + Long-term Debt in Current Liabilities ($\text{DLC}_{i,t-1}$)] / Total Assets ($\text{AT}_{i,t-1}$), from Compustat.

3 Results

3.1 First-Stage Regressions

In table 1, I show the first-stage regressions of the fuzzy RDD. Columns 1 and 2 (3 and 4) present the first-stage regressions for the addition (deletion) effect, where only firms that were in the Russell 1000 (Russell 2000) in May are included. The coefficients on the instrument, $\tau_{i,t}$, are positive and significant at the 1% level, and the adjusted R^2s all exceed 81%.[6] While the instrument does not perfectly predict membership, a firm is between 54% and 78% more likely to be added to the Russell 2000 when the cutoff is crossed. Thus, there is a significant

[5]Compliers refer to firm-year observations that are in the Russell 2000 when their researcher-constructed May market capitalization rankings cross the cutoff for index membership and who are in the Russell 1000 when their rankings do not cross the cutoff.

[6]In untabulated results, I compute F-statistics to test the null of joint insignificance in the instruments (including $\text{Rank}_{i,t} \times \tau_{i,t}$ and $\text{Rank}^2_{i,t} \times \tau_{i,t}$). In the linear (quadratic) specifications, the F-statistics all far exceed 11.59 (12.83), which is the suggested critical value for two (three) instruments [Stock and Yogo, 2005].

discontinuity in the probability of being assigned to the Russell 2000 Index around the cutoff, and there is no evidence that the instrument is weak.

3.2 Main Result

I present the main results using both graphs and regression analysis. In figure 2, I plot C-Score against end-of-May market capitalization rankings, centered at the cutoff for being added to or deleted from the Russell 2000 on the top and bottom, respectively. The figure suggests that firms added to the Russell 2000 from the bottom of the Russell 1000 have smaller C-Scores than firms that stay at the bottom of the Russell 1000, while there appears to be no significant difference in C-Scores between firms that stay at the top of the Russell 2000 compared to firms that move from the top of the Russell 2000 to the bottom of the Russell 1000.

Table 2 presents the regression results. Panel A (Panel B) displays the addition (deletion) effect, where only firms that were in the Russell 1000 (Russell 2000) in May are included. Consistent with the graphs, the coefficients on $\text{R2000}_{i,t}$ in columns 1 and 2 of panel A are negative and significantly different from zero at the 5% level. This indicates that around the cutoff, firms added to the Russell 2000 from the Russell 1000 have lower C-Scores compared to firms that stay in the Russell 1000. The result is consistent with the hypothesis that firms decrease their level of ATLR in response to an exogenous increase in demand from passive index funds who may not care about ATLR.

The coefficients on $\text{R2000}_{i,t}$ in columns 1 and 2 of panel B are statistically insignificant from zero at conventional levels. Moreover, the estimates are an order of magnitude lower; that is, they are also economically insignificant. While care must be taken when interpreting null results, this suggests that an exogenous decrease in demand from passive index funds does not significantly increase ATLR such that changes in ATLR from indexing may not be easily reversed.

3.3 Falsification test

Columns 3 and 4 of table 2 (both panels) repeat the main analysis using lagged C-Score as the dependent variable. The coefficient on $\text{R2000}_{i,t}$ is economically insignificant and statistically insignificant from zero at conventional levels. Thus, there is no evidence that the main result reflects a significant pre-existing difference in the level of C-Score between firms around the Russell 2000 cutoff. This further supports the assumption that around the threshold, firms were similar before index assignment.

3.4 Covariate balance

The critical assumption of any valid regression discontinuity design is local continuity: "all other factors" that determine a given outcome are "continuous" with respect to the assignment variable [Lee and Lemieux, 2010]. Table 3 shows that there are no differences in prior year return-on-assets, book-to-market ratio, length of operating cycle, or leverage between firms that moved to the Russell 2000 and those that stayed in the Russell 1000 in panel A. For firms that stayed in the Russell 2000 and those that moved to the Russell 1000 in panel B, there is a pre-existing discontinuity in the lagged book-to-market ratio.

Since some discontinuities in covariates will be significant by chance, I test the joint hypothesis that there are no discontinuities across the covariates by estimating a system of equations with 3SLS [Lee and Lemieux, 2010].[7] The χ^2 statistic is 5.79 with $p = 0.22$. Hence, I fail to reject the null hypothesis of no joint discontinuities. Overall, I find no evidence that around the cutoff, Russell 1000 and 2000 firms were systematically different prior to index assignment, suggesting that the main result can be attributed to differences in passive indexing demand that arise from FTSE Russell's index construction methodology.

4 Conclusion

This paper provides empirical evidence that stock market indexing has a causal effect on the asymmetric timeliness of loss recognition (ATLR) in accounting earnings. To measure exogenous variation in passive indexing demand, I use institutional features of the Russell 1000 and Russell 2000 indices in a regression discontinuity design. Russell ranks firms on their market capitalization at the end of May; index assignment is then determined by whether a firm's ranking exceeds an arbitrary cutoff. Near the Russell 1000/2000 cutoff, firms are similar in size and other characteristics, but firms at the top of the Russell 2000 receive much higher index weights than firms at the bottom of the Russell 1000 [Chang et al., 2015]. Thus, the setting generates exogenous variation in indexing demand.

I find that an increase in indexing demand by being added to the Russell 2000 causes a decrease in ATLR relative to firms that stayed in the Russell 1000 but who were close to the Russell 2000 cutoff. I also verify that firms around the Russell 1000/2000 cutoff had no pre-existing differences in conditional conservatism, return-on-assets, the book-to-market ratio, the length of the operating cycle, and leverage, which supports the assumption of random index assignment near the cutoff. I contribute to the financial economics and accounting literature by demonstrating that passive indexing demand affects one property of accounting earnings, ATLR. Future research can investigate how stock market indexing affects other aspects of financial reporting.

[7] Intuitively, 3SLS can be thought of as Seemingly Unrelated Regression (SUR) where each equation is estimated with 2SLS.

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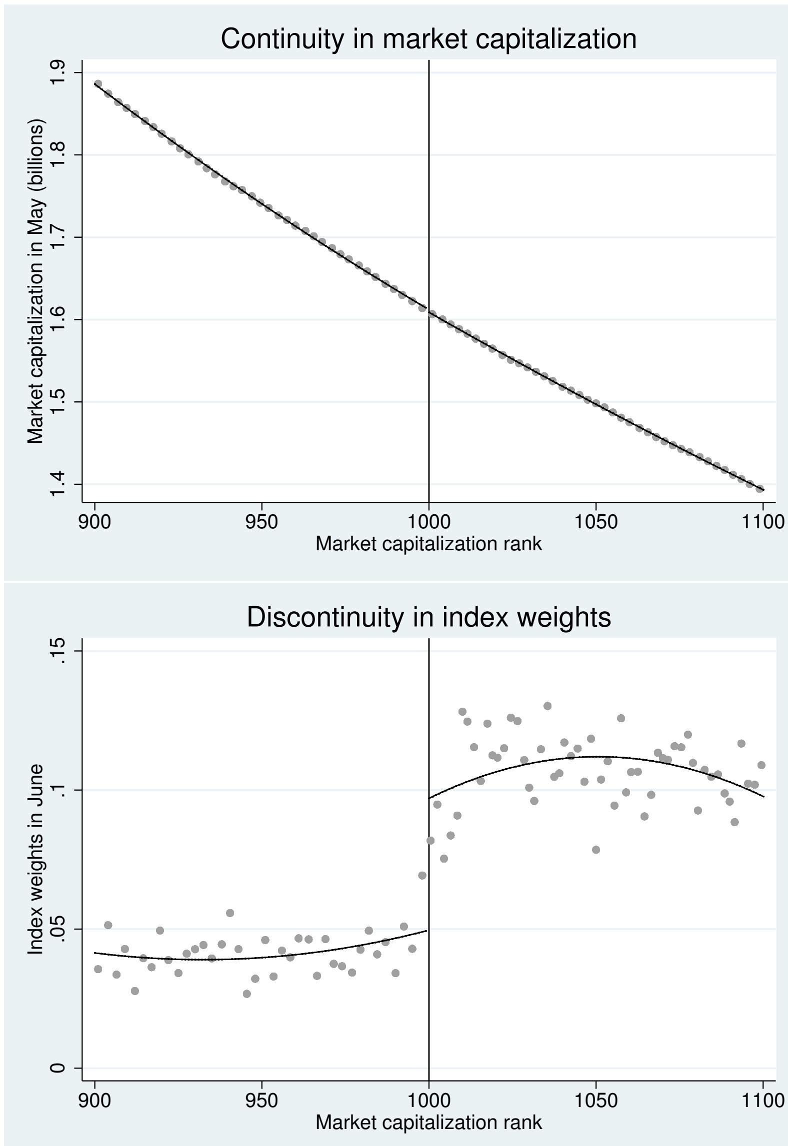

Figure 1: The top (bottom) plots market capitalization at the end of May from CRSP (index weights in June) against rankings based on end-of-May CRSP market capitalization. The bandwidth is 100. Firms on the left (right) side of the vertical line will be in the Russell 1000 (Russell 2000) in June. Local quadratic regression is used to fit the data. The bins are chosen using the evenly spaced mimicking variance approach of Calonico et al. [2015]. The sample period is 1996–2012.

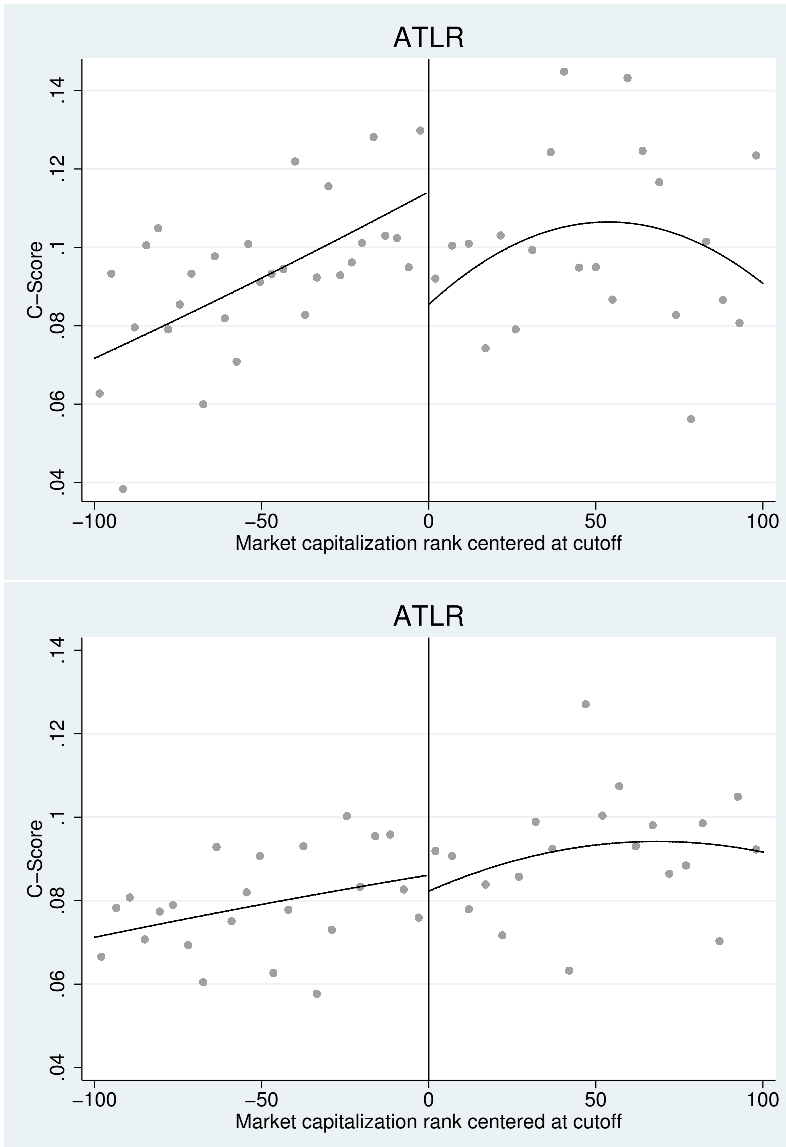

Figure 2: The top (bottom) plots C-Score against rankings based on end-of-May CRSP market capitalization centered at the cutoff for being added to (deleted from) the Russell 2000. Only firms that were in the Russell 1000 (Russell 2000) in May are included in the top (bottom). The bandwidth is 100. Firms on the left (right) side of the vertical line are predicted to be in the Russell 1000 (Russell 2000) in June. Local quadratic regression is used to fit the data. The bins are chosen using the evenly spaced mimicking variance approach of Calonico et al. [2015]. The sample period is 1996–2012.

Table 1: First stage regression: The effect of crossing the cutoff on Russell 2000 Index membership

	(1)	(2)	(3)	(4)
	$R2000_{i,t}$	$R2000_{i,t}$	$R2000_{i,t}$	$R2000_{i,t}$
$\tau_{i,t}$	0.780***	0.564***	0.745***	0.540***
	(0.038)	(0.070)	(0.035)	(0.058)
$\text{Rank}_{i,t} \times \tau_{i,t}$	0.000	0.002		
	(0.001)	(0.003)		
$\text{Rank}_{i,t}$	0.001***	0.007***		
	(0.000)	(0.002)		
$\text{Rank (Del)}_{i,t} \times \tau_{i,t}$			-0.001**	-0.002
			(0.001)	(0.002)
$\text{Rank (Del)}_{i,t}$			0.002***	0.009***
			(0.000)	(0.002)
Constant	0.077***	0.176***	0.152***	0.252***
	(0.028)	(0.049)	(0.031)	(0.046)
Year Fixed Effects	Yes	Yes	Yes	Yes
Quadratic	No	Yes	No	Yes
Observations	1057	1057	1546	1546
Adjusted R^2	0.859	0.867	0.816	0.825

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

This table reports the results of the estimating the following with OLS for $k \in \{1, 2\}$. The dependent variable is an indicator for Russell 2000 Index membership. The instrument is an indicator variable, $\tau_{i,t}$, for whether firm i of rank $\text{Rank}_{i,t}$ exceeds the cutoff for Russell 2000 membership. $\text{Rank}_{i,t}$ is the end-of-May market capitalization ranking of firm i in year t relative to the addition or deletion cutoff. Only firms that were in the Russell 1000 (Russell 2000) in May are included in columns 1 and 2 (3 and 4). The bandwidth is 100. Standard errors are clustered by firm. The sample period is 1996–2012.

$$\text{R2000}_{i,t} = \alpha_{0l} + \alpha_{0r}\tau_{i,t} + \sum_{n=1}^{k} \alpha_{nl}\text{Rank}^n_{i,t} + \sum_{n=1}^{k} \alpha_{nr}\tau_{i,t} \times \text{Rank}^n_{i,t} + \nu_t + \xi_{i,t}$$

Table 2: The effect of stock market indexing on ATLR

Panel A: Addition

	(1)	(2)	(3)	(4)
	C-Score$_{i,t}$	C-Score$_{i,t}$	C-Score$_{i,t-1}$	C-Score$_{i,t-1}$
R2000$_{i,t}$	-0.027**	-0.051**	-0.008	-0.029
	(0.011)	(0.022)	(0.011)	(0.022)
Rank$_{i,t}$ × R2000$_{i,t}$	-0.000	0.001	-0.000*	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)
Rank$_{i,t}$	0.001**	-0.000	0.001**	0.001
	(0.000)	(0.001)	(0.000)	(0.001)
Constant	0.110***	0.114***	0.036**	0.049**
	(0.009)	(0.013)	(0.015)	(0.020)
Year Fixed Effects	Yes	Yes	Yes	Yes
Quadratic	No	Yes	No	Yes
Observations	950	950	868	868

Panel B: Deletion

	(1)	(2)	(3)	(4)
	C-Score$_{i,t}$	C-Score$_{i,t}$	C-Score$_{i,t-1}$	C-Score$_{i,t-1}$
R2000$_{i,t}$	0.006	0.001	0.001	0.005
	(0.009)	(0.012)	(0.012)	(0.015)
Rank (Del)$_{i,t}$ × R2000$_{i,t}$	-0.000	0.000	-0.001	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Rank (Del)$_{i,t}$	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.061***	0.061***	-0.055*	-0.066***
	(0.008)	(0.008)	(0.028)	(0.024)
Year Fixed Effects	Yes	Yes	Yes	Yes
Quadratic	No	Yes	No	Yes
Observations	1401	1401	1356	1356

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

This table reports the results of the estimating the following with 2SLS. The dependent variable is C-Score. The instrument is an indicator variable, $\tau_{i,t}$, for whether firm i of rank Rank$_{i,t}$ exceeds the cutoff for Russell 2000 membership. Rank$_{i,t}$ is the end-of-May market capitalization ranking of firm i in year t relative to the addition or deletion cutoff. Only firms that were in the Russell 1000 (Russell 2000) in May are included in panel A (B). The bandwidth is 100. Standard errors are clustered by firm. The sample period is 1996–2012.

$$\text{R2000}_{i,t} = \alpha_{0l} + \alpha_{0r}\tau_{i,t} + \sum_{n=1}^{2} \alpha_{nl}\text{Rank}_{i,t}^{n} + \sum_{n=1}^{2} \alpha_{nr}\tau_{i,t} \times \text{Rank}_{i,t}^{n} + \nu_t + \xi_{i,t}$$

$$Y_{i,t} = \beta_{0l} + \beta_{0r}\widehat{\text{R2000}}_{i,t} + \sum_{n=1}^{2} \beta_{nl}\text{Rank}_{i,t}^{n} + \sum_{n=1}^{2} \beta_{nr}\text{R2000}_{i,t} \times \text{Rank}_{i,t}^{n} + \eta_t + \varepsilon_{i,t}$$

Table 3: Covariate balance

Panel A: Addition

	(1) $ROA_{i,t-1}$	(2) $BTM_{i,t-1}$	(3) Op. $Cycle_{i,t-1}$	(4) $Lev._{i,t-1}$
$R2000_{i,t}$	0.120	-0.095	-0.334	0.009
	(0.089)	(0.141)	(0.440)	(0.071)
$Rank_{i,t} \times R2000_{i,t}$	-0.001	-0.001	-0.008	0.003*
	(0.002)	(0.003)	(0.011)	(0.002)
$Rank_{i,t}$	-0.001	0.002	0.013	-0.004
	(0.003)	(0.006)	(0.016)	(0.003)
Constant	-0.018	0.530***	4.977***	0.260***
	(0.069)	(0.084)	(0.223)	(0.040)
Year Fixed Effects	Yes	Yes	Yes	Yes
Quadratic	Yes	Yes	Yes	Yes
Observations	922	1045	1005	1040

Panel B: Deletion

	(1) $ROA_{i,t-1}$	(2) $BTM_{i,t-1}$	(3) Op. $Cycle_{i,t-1}$	(4) $Lev._{i,t-1}$
$R2000_{i,t}$	-0.006	-0.154**	0.418	-0.053
	(0.041)	(0.076)	(0.364)	(0.061)
$\text{Rank (Del)}_{i,t} \times R2000_{i,t}$	0.001	0.003	-0.009	0.002
	(0.001)	(0.002)	(0.010)	(0.002)
$\text{Rank (Del)}_{i,t}$	-0.000	0.001	-0.004	-0.000
	(0.001)	(0.002)	(0.009)	(0.001)
Constant	0.049	0.392***	4.843***	0.204***
	(0.038)	(0.056)	(0.242)	(0.040)
Year Fixed Effects	Yes	Yes	Yes	Yes
Quadratic	Yes	Yes	Yes	Yes
Observations	1441	1543	1491	1532

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

This table reports the results of the estimating the following with 2SLS. The dependent variables are lagged return-on-assets, book-to-market ratio, length of operating cycle, and leverage. The instrument is an indicator variable, $\tau_{i,t}$, for whether firm i of rank $Rank_{i,t}$ exceeds the cutoff for Russell 2000 membership. $Rank_{i,t}$ is the end-of-May market capitalization ranking of firm i in year t relative to the addition or deletion cutoff. Only firms that were in the Russell 1000 (Russell 2000) in May are included in panel A (B). The bandwidth is 100. Standard errors are clustered by firm. The sample period is 1996–2012.

$$R2000_{i,t} = \alpha_{0l} + \alpha_{0r}\tau_{i,t} + \sum_{n=1}^{2} \alpha_{nl} \text{Rank}_{i,t}^{n} + \sum_{n=1}^{2} \alpha_{nr}\tau_{i,t} \times \text{Rank}_{i,t}^{n} + \nu_t + \xi_{i,t}$$

$$Y_{i,t-1} = \beta_{0l} + \beta_{0r}\widehat{R2000}_{i,t} + \sum_{n=1}^{2} \beta_{nl} \text{Rank}_{i,t}^{n} + \sum_{n=1}^{2} \beta_{nr} R2000_{i,t} \times \text{Rank}_{i,t}^{n} + \eta_t + \varepsilon_{i,t}$$