

Is Stock Index Membership for Sale? Online Appendix

Kun Li, Xin Liu, and Shang-Jin Wei

November 2021

Appendix Table 1: Leading S&P500 Funds During 1980-2019

| Name | Investment type | NAV(in bn) | Rank | Rank year |
|---|-----------------|------------|------|-----------|
| Vanguard 500 Index Investor | Open-End Fund | 0.10 | 1 | 1980 |
| Vanguard 500 Index Investor | Open-End Fund | 2.17 | 1 | 1990 |
| Fidelity® 500 Index Investor | Open-End Fund | 0.57 | 2 | 1990 |
| Vanguard Institutional Index I | Open-End Fund | 0.47 | 3 | 1990 |
| SEI S&P 500 Index E (SIMT) | Open-End Fund | 0.21 | 4 | 1990 |
| Fidelity Spartan 500 Index Investor | Open-End Fund | 0.06 | 5 | 1990 |
| Federated Hermes Max-Cap Index IS | Open-End Fund | 0.05 | 6 | 1990 |
| BNY Mellon S&P 500 Index | Open-End Fund | 0.04 | 7 | 1990 |
| DFA US Large Company I | Open-End Fund | 0.01 | 8 | 1990 |
| Wells Fargo Index Admin | Open-End Fund | 0.01 | 9 | 1990 |
| T. Rowe Price Equity Index 500 | Open-End Fund | 0.01 | 10 | 1990 |
| Vanguard 500 Index Investor | Open-End Fund | 88.24 | 1 | 2000 |
| Vanguard Institutional Index I | Open-End Fund | 26.41 | 2 | 2000 |
| SPDR® S&P 500 ETF Trust | ETF | 25.48 | 3 | 2000 |
| Fidelity® 500 Index Investor | Open-End Fund | 17.84 | 4 | 2000 |
| Vanguard Institutional Index Instl Pl | Open-End Fund | 10.77 | 5 | 2000 |
| Fidelity Spartan 500 Index Investor | Open-End Fund | 9.57 | 6 | 2000 |
| Vanguard 500 Index Admiral | Open-End Fund | 8.24 | 7 | 2000 |
| Schwab® S&P 500 Index | Open-End Fund | 4.06 | 8 | 2000 |
| T. Rowe Price Equity Index 500 | Open-End Fund | 4.04 | 9 | 2000 |
| Schwab S&P 500 Index Inv | Open-End Fund | 3.38 | 10 | 2000 |
| SPDR® S&P 500 ETF Trust | ETF | 89.88 | 1 | 2010 |
| Vanguard Institutional Index I | Open-End Fund | 54.69 | 2 | 2010 |
| Vanguard 500 Index Admiral | Open-End Fund | 51.44 | 3 | 2010 |
| Vanguard Institutional Index Instl Pl | Open-End Fund | 33.64 | 4 | 2010 |
| Vanguard 500 Index Investor | Open-End Fund | 31.90 | 5 | 2010 |
| Fidelity® 500 Index Investor | Open-End Fund | 26.41 | 6 | 2010 |
| iShares Core S&P 500 ETF | ETF | 25.76 | 7 | 2010 |
| Vanguard 500 Index Signal | Open-End Fund | 18.98 | 8 | 2010 |
| Fidelity® 500 Index Premium | Open-End Fund | 14.50 | 9 | 2010 |
| T. Rowe Price Equity Index 500 | Open-End Fund | 13.20 | 10 | 2010 |
| Vanguard 500 Index Admiral | Open-End Fund | 319.62 | 1 | 2019 |
| SPDR® S&P 500 ETF Trust | ETF | 307.39 | 2 | 2019 |
| Fidelity® 500 Index | Open-End Fund | 233.48 | 3 | 2019 |
| iShares Core S&P 500 ETF | ETF | 201.41 | 4 | 2019 |
| Vanguard S&P 500 ETF | ETF | 130.59 | 5 | 2019 |
| Vanguard Institutional Index Instl Pl | Open-End Fund | 125.36 | 6 | 2019 |
| Vanguard Institutional Index I | Open-End Fund | 116.81 | 7 | 2019 |
| Vanguard 500 Index Institutional Select | Open-End Fund | 81.23 | 8 | 2019 |
| Schwab® S&P 500 Index | Open-End Fund | 43.45 | 9 | 2019 |
| T. Rowe Price Equity Index 500 | Open-End Fund | 25.51 | 10 | 2019 |

Appendix Table 2: Historical Market Capitalization Guidelines

| Effective Date | S&P500 Market Capitalization Guidelines (USD) |
|----------------|---|
| 02/20/2019 | At least \$8.2 billion |
| 03/10/2017 | At least \$6.1 billion |
| 07/16/2014 | At least \$5.3 billion |
| 06/19/2013 | At least \$4.6 billion |
| 02/16/2011 | At least \$4.0 billion |
| 12/09/2009 | At least \$3.5 billion |
| 12/18/2008 | At least \$3.0 billion |
| 09/25/2008 | At least \$4.0 billion |
| 07/18/2007 | At least \$5.0 billion |

Appendix Table 3: Top non-addition firms between 2015 to 2018

| Rank | 2015 | 2016 | 2017 | 2018 |
|------|------------------------------|---------------------------|------------------------------|---------------------------|
| 1 | United Airlines Holdings Inc | Las Vegas Sands Corp | Sirius Xm Holdings Inc | Sirius Xm Holdings Inc |
| 2 | Illumina Inc | Hilton Worldwide Holdings | Las Vegas Sands Corp | Las Vegas Sands Corp |
| 3 | Hilton Worldwide Holdings | Sirius Xm Holdings Inc | Iqvia Holdings Inc | Arista Networks Inc |
| 4 | Sirius Xm Holdings Inc | Incyte Corp | Mgm Resorts International | Fleetcor Technologies Inc |
| 5 | Las Vegas Sands Corp | Mgm Resorts International | First Republic Bank | Maxim Integrated Products |
| 6 | Incyte Corp | Fleetcor Technologies Inc | Fleetcor Technologies Inc | First Republic Bank |
| 7 | Activision Blizzard Inc | Markel Corp | Celanese Corp | Celanese Corp |
| 8 | Citizens Financial Group Inc | Transdigm Group Inc | Maxim Integrated Products | Costar Group Inc |
| 9 | Fleetcor Technologies Inc | Ultra Beauty Inc | Annaly Capital Management | Westlake Chemical Corp |
| 10 | Concho Resources Inc | Maxim Integrated Products | Fidelity Natl Finl Fnf Group | Annaly Capital Management |

Appendix Table 4: Predicting S&P 500 Membership

| Variables | S&P500_member=1, Otherwise=0 | | | | |
|---|------------------------------|---------------------|---------------------|----------------------|----------------------|
| | Probit | OLS | | | |
| | | 1980 - 2018 | | 2015 - 2018 | |
| | (1) | (2) | (3) | (4) | (5) |
| Size rank[1,100] | 3.928*** (0.102) | 0.909*** (0.015) | 0.844*** (0.015) | 0.771*** (0.015) | 0.785*** (0.034) |
| Size rank[101,300] | 3.455*** (0.057) | 0.807*** (0.012) | 0.750*** (0.013) | 0.693*** (0.012) | 0.686*** (0.029) |
| Size rank[301,500] | 2.674*** (0.047) | 0.537*** (0.013) | 0.486*** (0.014) | 0.454*** (0.013) | 0.580*** (0.027) |
| Size rank[501,700] | 1.902*** (0.045) | 0.248*** (0.011) | 0.208*** (0.012) | 0.204*** (0.011) | 0.181*** (0.021) |
| Size rank[701,1000] | 1.268*** (0.039) | 0.092*** (0.006) | 0.075*** (0.006) | 0.079*** (0.006) | 0.054*** (0.009) |
| Log(MktCap) | | | 0.007*** (0.000) | 0.012*** (0.001) | -0.001 (0.002) |
| MktCap_OK | | | 0.090*** (0.013) | 0.064*** (0.012) | 0.082*** (0.018) |
| Turnover | | | | -0.003*** (0.001) | -0.001 (0.001) |
| Turnover \geq 1 | | | | 0.009*** (0.003) | 0.041*** (0.007) |
| Log(average monthly volume) | | | | 0.015*** (0.001) | 0.015*** (0.003) |
| Monthly volume \geq 250,000 shares | | | | -0.007* (0.004) | -0.044*** (0.006) |
| Earnings_last1Q | | | | -0.000** (0.000) | -0.000** (0.000) |
| Earnings_last1Q > 0 | | | | 0.008*** (0.002) | 0.019*** (0.004) |
| Earnings_last4Q | | | | -0.000 (0.000) | 0.000 (0.000) |
| Earnings_last4Q > 0 | | | | 0.004** (0.002) | 0.022*** (0.005) |
| IWF_OK | | | | 0.031*** (0.004) | 0.029*** (0.006) |
| Deletion_Gap_OK | | | | 0.026 (0.018) | 0.024 (0.015) |
| SP500 sectorial representation | | | | -0.209*** (0.037) | -0.237*** (0.063) |
| Difference between SP500 and CRSP representation | | | | -1.226*** (0.126) | -0.461* (0.270) |
| US headquarter | | | | 0.059*** (0.019) | 0.046*** (0.016) |
| US incorporation | | | | 0.091*** (0.020) | 0.063*** (0.015) |
| SP400/600 | | | | -0.151*** (0.006) | -0.100*** (0.007) |
| SP500_Acquiror | | | | -0.077 (0.055) | -0.076 (0.149) |
| SP400/600 \times Earnings_last4Q > 0 \times Post 2017Q3 | | | | -0.032*** (0.006) | -0.042*** (0.007) |

Table 4 – continued from previous page

| Variables | S&P500_member=1, Otherwise=0 | | | | |
|--|------------------------------|-------------|---------|----------------------|----------------------|
| | Probit | OLS | | | |
| | | 1980 - 2018 | | 2015 - 2018 | |
| | (1) | (2) | (3) | (4) | (5) |
| SP400/600 × Earnings_last1Q > 0 × Post 2017Q3 | | | | -0.016*** (0.004) | -0.024*** (0.005) |
| SP400/600 × Turnover _{≥ 1} × Post 2017Q3 | | | | -0.039*** (0.010) | -0.064*** (0.010) |
| SP400/600 × Monthly volume _{≥ 250,000 shares} × Post 2017Q3 | | | | 0.143*** (0.014) | 0.144*** (0.016) |
| SP400/600 × IWF _{≥ threshold} × Post 2017Q3 | | | | -0.042*** (0.008) | -0.034*** (0.008) |
| Quarter FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observation | 603,097 | 603,097 | 598,650 | 549,007 | 60,142 |
| R^2 | 0.6 | 0.59 | 0.59 | 0.63 | 0.71 |

Appendix Table 5: Predicting Additions to S&P 500

| Variables | S&P500_addition=1, Otherwise=0 | | | | | |
|---|--------------------------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| | Probit | OLS | | | | |
| | | 1980 - 2018 | | | 2015 - 2018 | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Size rank[1,100] | 2.165*** (0.134) | 0.020*** (0.005) | 0.016*** (0.005) | 0.026*** (0.005) | 0.034** (0.017) | 0.535*** (0.164) |
| Size rank[101,300] | 2.506*** (0.097) | 0.040*** (0.003) | 0.037*** (0.003) | 0.041*** (0.003) | 0.027*** (0.008) | 0.128*** (0.025) |
| Size rank[301,500] | 2.306*** (0.091) | 0.026*** (0.001) | 0.024*** (0.001) | 0.026*** (0.001) | 0.070*** (0.009) | 0.023*** (0.004) |
| Size rank[501,700] | 1.534*** (0.095) | 0.004*** (0.000) | 0.002*** (0.000) | 0.002*** (0.001) | 0.005*** (0.001) | -0.003*** (0.001) |
| Size rank[701,1000] | 1.005*** (0.102) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.000 (0.000) | -0.003*** (0.000) |
| Log(MktCap) | | | 0.000*** (0.000) | -0.000*** (0.000) | -0.001*** (0.000) | 0.000 (0.000) |
| MktCap_OK | | | 0.008*** (0.002) | 0.010*** (0.002) | 0.004*** (0.001) | -0.001 (0.001) |
| Turnover | | | | 0.000* (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Turnover \geq 1 | | | | 0.001*** (0.000) | 0.001** (0.000) | -0.000 (0.000) |
| Log(average monthly volume) | | | | 0.000** (0.000) | -0.000 (0.000) | 0.000 (0.000) |
| Monthly volume \geq 250,000 shares | | | | -0.001*** (0.000) | -0.000 (0.000) | -0.002*** (0.001) |
| Earnings_last1Q | | | | -0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Earnings_last1Q > 0 | | | | 0.000** (0.000) | 0.000 (0.001) | 0.000 (0.001) |
| Earnings_last4Q | | | | -0.000*** (0.000) | -0.000 (0.000) | 0.000 (0.000) |
| Earnings_last4Q > 0 | | | | 0.001*** (0.000) | 0.001** (0.001) | 0.001 (0.001) |
| IWF_OK | | | | 0.001*** (0.000) | 0.000 (0.000) | -0.001** (0.000) |
| Deletion_Gap_OK | | | | 0.002 (0.001) | 0.001 (0.001) | 0.003*** (0.001) |
| SP500 sectorial representation | | | | 0.006*** (0.002) | -0.003 (0.005) | -0.005 (0.006) |
| Difference between SP500 and CRSP representation | | | | -0.026*** (0.005) | -0.057*** (0.021) | -0.052** (0.024) |
| US headquarter | | | | 0.002*** (0.001) | 0.003*** (0.001) | -0.001 (0.001) |
| US incorporation | | | | 0.003*** (0.001) | 0.001 (0.001) | 0.002* (0.001) |
| SP400/600 | | | | 0.002*** (0.000) | 0.004*** (0.001) | 0.004*** (0.001) |
| SP500_Acquiror | | | | 0.068* (0.038) | -0.019*** (0.006) | -0.003* (0.002) |
| SP400/600 \times Earnings_last4Q > 0 \times Post 2017Q3 | | | | 0.000 (0.001) | -0.000 (0.002) | -0.000 (0.001) |

Table 5 – continued from previous page

| Variables | S&P500_addition=1, Otherwise=0 | | | | | |
|--|--------------------------------|-------------|---------|---------------------|---------------------|----------------------|
| | Probit | OLS | | | | |
| | | 1980 - 2018 | | | 2015 - 2018 | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| SP400/600 × Earnings_last1Q > 0 × Post 2017Q3 | | | | 0.003** (0.001) | 0.003** (0.001) | 0.003** (0.001) |
| SP400/600 × Turnover _{≥ 1} × Post 2017Q3 | | | | 0.003*** (0.001) | 0.004*** (0.001) | 0.005*** (0.002) |
| SP400/600 × Monthly volume _{≥ 250,000 shares} × Post 2017Q3 | | | | -0.005* (0.003) | -0.006** (0.003) | -0.009*** (0.003) |
| SP400/600 × IWF _{≥ threshold} × Post 2017Q3 | | | | 0.002 (0.002) | 0.002 (0.002) | 0.004** (0.002) |
| Control | | | | ✓ | ✓ | ✓ |
| Event FE | | | | | | ✓ |
| Quarter FE | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Observation | 516,860 | 532,744 | 528,342 | 479,203 | 52,444 | 230,039 |
| R ² | 0.37 | 0.03 | 0.03 | 0.03 | 0.05 | 0.07 |

Appendix Table 6: Rating Purchase and S&P 500 Addition

| Variables | Probit | | OLS | |
|--|-------------------------|----------------------|----------------------|----------------------|
| | SP_Add=100, Otherwise=0 | | | |
| | (1) | (2) | (3) | (4) |
| Purchase_Any | 0.029 (0.075) | -0.091 (0.063) | -0.019 (0.068) | -0.039* (0.020) |
| Purchase_SP | 0.128* (0.075) | 0.160** (0.074) | 0.134* (0.077) | 0.016 (0.022) |
| Purchase_Any × Size rank[701,1000] | | | | -0.072* (0.042) |
| Purchase_SP × Size rank[701,1000] | | | | 0.056 (0.048) |
| Purchase_Any × Size rank[501,700] | | | | 0.170 (0.268) |
| Purchase_SP × Size rank[501,700] | | | | -0.214 (0.274) |
| Purchase_Any × Size rank[301,500] | | | | -0.757 (0.535) |
| Purchase_SP × Size rank[301,500] | | | | 1.408** (0.631) |
| Purchase_Any × Size rank[101,300] | | | | 2.405* (1.406) |
| Purchase_SP × Size rank[101,300] | | | | 0.441 (1.476) |
| Purchase_Any × Size rank[1,100] | | | | 1.071 (2.239) |
| Purchase_SP × Size rank[1,100] | | | | -1.679 (1.952) |
| Log(MktCap) | 0.497*** (0.082) | -0.028*** (0.005) | 0.002 (0.008) | 0.005 (0.009) |
| MktCap_OK | 0.786*** (0.131) | 0.739*** (0.243) | 1.244*** (0.293) | 1.222*** (0.294) |
| Turnover | 0.030** (0.012) | 0.025*** (0.008) | 0.001 (0.007) | 0.003 (0.007) |
| Turnover _{≥1} | 0.258*** (0.052) | 0.080*** (0.020) | 0.050** (0.022) | 0.052** (0.022) |
| Log(average monthly volume) | 0.033 (0.025) | 0.008 (0.006) | 0.001 (0.008) | -0.000 (0.008) |
| Monthly volume _{≥ 250,000 shares} | -0.084 (0.096) | -0.089*** (0.021) | -0.077*** (0.026) | -0.076*** (0.026) |
| Earnings_last1Q | 0.001 (0.001) | 0.001 (0.001) | 0.002** (0.001) | 0.002** (0.001) |
| Earnings_last1Q>0 | 0.111 (0.098) | 0.002 (0.013) | -0.050*** (0.014) | -0.048*** (0.014) |
| Earnings_last4Q | 0.001** (0.000) | 0.001** (0.000) | 0.002*** (0.000) | 0.002*** (0.000) |
| Earnings_last4Q>0 | 0.362*** (0.114) | 0.005 (0.015) | -0.075*** (0.016) | -0.075*** (0.016) |
| IWF _{≥ threshold} | 0.101 (0.062) | 0.054*** (0.018) | 0.146*** (0.036) | 0.152*** (0.036) |
| Deletion_Gap_OK | 0.000 (.) | 0.289** (0.111) | 2.229** (0.999) | 2.299** (0.999) |
| SP500 sectorial representation | 0.582 | 0.520*** | 0.216 | 0.200 |

Table 6 – continued from previous page

| Variables | Probit | | OLS | |
|--|-------------------------|----------|----------|----------|
| | SP_Add=100, Otherwise=0 | | | |
| | (1) | (2) | (3) | (4) |
| | (0.354) | (0.188) | (0.387) | (0.386) |
| Difference between SP500 and CRSP representation | 9.378*** | 2.801*** | 8.555*** | 8.556*** |
| | (1.197) | (0.631) | (1.544) | (1.536) |
| US headquarter | 0.334** | 0.185*** | 0.000 | 0.000 |
| | (0.165) | (0.058) | (0.000) | (0.000) |
| US incorporation | 0.339** | 0.276*** | 0.000 | 0.000 |
| | (0.156) | (0.064) | (0.000) | (0.000) |
| SP400/600 | 0.298*** | 0.147*** | 0.143*** | 0.144*** |
| | (0.045) | (0.032) | (0.036) | (0.037) |
| SP500_Acquiror | 0.791*** | 6.855 | 6.880 | 6.683 |
| | (0.226) | (4.286) | (4.191) | (4.159) |
| SP400/600 × Earnings.last4Q > 0 × Post 2017Q3 | -0.994*** | -0.103 | -0.334* | -0.330* |
| | (0.326) | (0.154) | (0.191) | (0.193) |
| SP400/600 × Earnings.last1Q > 0 × Post 2017Q3 | 0.156 | 0.180* | 0.156 | 0.158 |
| | (0.279) | (0.093) | (0.110) | (0.111) |
| SP400/600 × Turnover _{≥ 1} × Post 2017Q3 | 3.269*** | 0.288* | 0.295* | 0.297* |
| | (0.204) | (0.148) | (0.162) | (0.160) |
| SP400/600 × Monthly volume _{≥ 250,000 shares} × Post 2017Q3 | -2.039*** | -0.289 | -0.241 | -0.251 |
| | (0.580) | (0.241) | (0.278) | (0.274) |
| SP400/600 × IWF _{≥ threshold} × Post 2017Q3 | 0.130 | 0.141 | 0.273 | 0.274 |
| | (0.388) | (0.162) | (0.200) | (0.201) |
| Size rank[701,1000] | 0.408** | 0.030 | 0.019 | 0.028 |
| | (0.159) | (0.022) | (0.029) | (0.031) |
| Size rank[501,700] | 0.455** | 0.181*** | 0.168* | 0.180* |
| | (0.181) | (0.068) | (0.091) | (0.099) |
| Size rank[301,500] | 1.088*** | 2.489*** | 2.974*** | 2.878*** |
| | (0.199) | (0.206) | (0.241) | (0.247) |
| Size rank[101,300] | 1.254*** | 3.835*** | 6.113*** | 5.184*** |
| | (0.231) | (0.401) | (0.551) | (0.538) |
| Size rank[1,100] | 1.043*** | 1.636*** | 5.274*** | 5.880*** |
| | (0.260) | (0.504) | (0.872) | (1.018) |
| Firm FE | | | ✓ | ✓ |
| Quarter FE | ✓ | ✓ | ✓ | ✓ |
| Observation | 465,572 | 479,203 | 478,983 | 478,983 |
| R^2 | 0.43 | 0.03 | 0.05 | 0.05 |

Appendix Table 7: M&As between S&P 500 Members and Firm Rating Purchase

| Variables | Full Sample | | | | Restricted Sample | | | |
|---------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | SP | Moody | SP | Moody | SP | Moody | SP | Moody |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| SPmerger \times Size rank[1,1000] | 0.009*** (0.002) | 0.004*** (0.001) | | | 0.028*** (0.004) | 0.017*** (0.003) | | |
| SPmerger \times Size rank[1,100] | | | 0.026 (0.024) | 0.011 (0.019) | | | 0.073 (0.053) | -0.000 (0.039) |
| SPmerger \times Size rank[101,300] | | | 0.010 (0.008) | 0.006 (0.007) | | | 0.035* (0.019) | 0.028* (0.015) |
| SPmerger \times Size rank[301,500] | | | 0.016*** (0.005) | 0.003 (0.003) | | | 0.043*** (0.011) | 0.024*** (0.008) |
| SPmerger \times Size rank[501,700] | | | 0.015*** (0.005) | 0.006** (0.003) | | | 0.040*** (0.008) | 0.021*** (0.005) |
| SPmerger \times Size rank[701,1000] | | | 0.003 (0.003) | 0.003* (0.002) | | | 0.016*** (0.005) | 0.012*** (0.003) |
| Size rank[1,1000] | 0.000 (0.002) | -0.003 (0.002) | | | 0.001 (0.003) | -0.006 (0.002) | | |
| Size rank[1,100] | | | -0.011 (0.025) | 0.006 (0.020) | | | 0.009 (0.033) | 0.028 (0.021) |
| Size rank[101,300] | | | 0.003 (0.010) | 0.000 (0.007) | | | 0.011 (0.016) | -0.001 (0.011) |
| Size rank[301,500] | | | -0.000 (0.005) | -0.002 (0.004) | | | -0.001 (0.007) | -0.010 (0.006) |
| Size rank[501,700] | | | -0.001 (0.005) | -0.004 (0.003) | | | -0.003 (0.006) | -0.006 (0.004) |
| Size rank[701,1000] | | | 0.004 (0.003) | -0.002 (0.002) | | | 0.005 (0.003) | -0.005 (0.003) |
| SPmerger | 0.001 (0.000) | 0.002*** (0.000) | 0.001 (0.000) | 0.002*** (0.000) | 0.002* (0.001) | 0.003*** (0.001) | 0.002** (0.001) | 0.004*** (0.001) |
| Log(MktCap) | 0.006*** (0.000) | 0.003*** (0.000) | 0.006*** (0.000) | 0.003*** (0.000) | 0.009*** (0.001) | 0.006*** (0.001) | 0.009*** (0.001) | 0.005*** (0.000) |
| M/B | -0.001 (0.000) | -0.001 (0.000) | -0.001 (0.000) | -0.001 (0.000) | -0.002 (0.000) | -0.001 (0.000) | -0.002 (0.000) | -0.002 (0.000) |
| Leverage | 0.017*** (0.002) | 0.004*** (0.001) | 0.017*** (0.002) | 0.004*** (0.001) | 0.018*** (0.004) | 0.016*** (0.003) | 0.018*** (0.004) | 0.016*** (0.003) |
| Profitability | -0.015 (0.005) | -0.008 (0.004) | -0.015 (0.005) | -0.008 (0.004) | -0.024 (0.009) | -0.020 (0.007) | -0.023 (0.009) | -0.019 (0.007) |
| $\sigma(\text{ret})$ | 0.103*** (0.017) | 0.053*** (0.011) | 0.101*** (0.017) | 0.052*** (0.011) | 0.051* (0.028) | 0.097*** (0.020) | 0.043 (0.027) | 0.093*** (0.020) |
| Bond | 0.466*** (0.011) | 0.647*** (0.013) | 0.466*** (0.011) | 0.647*** (0.013) | 0.090* (0.054) | 0.180*** (0.067) | 0.087 (0.054) | 0.179*** (0.067) |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 421907 | 421907 | 421907 | 421907 | 141113 | 141113 | 141113 | 141113 |
| R^2 | 0.11 | 0.29 | 0.11 | 0.29 | 0.01 | 0.01 | 0.01 | 0.01 |

Appendix Table 8: Heterogeneous Time Effects on Rating Purchase

| Variables | SP | Moody | SP | Moody |
|---|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| SPmerger_HighCAR \times Size rank[1,1000] | 0.034*** (0.005) | 0.013*** (0.003) | | |
| SPmerger_LowCAR \times Size rank[1,1000] | 0.017*** (0.005) | 0.025*** (0.004) | | |
| SPmerger_HighCAR \times Size rank[1,100] | | | 0.067 (0.043) | -0.005 (0.040) |
| SPmerger_LowCAR \times Size rank[1,100] | | | 0.087 (0.109) | 0.004 (0.063) |
| SPmerger_HighCAR \times Size rank[101,300] | | | 0.039* (0.021) | 0.020 (0.018) |
| SPmerger_LowCAR \times Size rank[101,300] | | | 0.029 (0.025) | 0.044* (0.026) |
| SPmerger_HighCAR \times Size rank[301,500] | | | 0.049*** (0.013) | 0.012 (0.008) |
| SPmerger_LowCAR \times Size rank[301,500] | | | 0.033** (0.014) | 0.049*** (0.012) |
| SPmerger_HighCAR \times Size rank[501,700] | | | 0.050*** (0.009) | 0.019*** (0.006) |
| SPmerger_LowCAR \times Size rank[501,700] | | | 0.021** (0.010) | 0.023*** (0.008) |
| SPmerger_HighCAR \times Size rank[701,1000] | | | 0.021*** (0.005) | 0.009** (0.004) |
| SPmerger_LowCAR \times Size rank[701,1000] | | | 0.007 (0.007) | 0.017*** (0.006) |
| Size rank[1,1000] | 0.001 (0.003) | -0.006 (0.002) | | |
| Size rank[1,100] | | | 0.010 (0.032) | 0.029 (0.021) |
| Size rank[101,300] | | | 0.011 (0.016) | 0.001 (0.011) |
| Size rank[301,500] | | | -0.002 (0.007) | -0.009 (0.006) |
| Size rank[501,700] | | | -0.003 (0.006) | -0.006 (0.004) |
| Size rank[701,1000] | | | 0.005 (0.003) | -0.004 (0.003) |
| SPmerger_HighCAR | 0.002** (0.001) | 0.004*** (0.001) | 0.002*** (0.001) | 0.004*** (0.001) |
| SPmerger_LowCAR | 0.001 (0.001) | 0.002** (0.001) | 0.001 (0.001) | 0.002** (0.001) |
| Log(MktCap) | 0.009*** (0.001) | 0.006*** (0.001) | 0.008*** (0.001) | 0.005*** (0.000) |
| M/B | -0.002 (0.000) | -0.001 (0.000) | -0.002 (0.000) | -0.001 (0.000) |
| Leverage | 0.018*** (0.004) | 0.016*** (0.003) | 0.018*** (0.004) | 0.016*** (0.003) |
| Profitability | -0.023 (0.009) | -0.020 (0.007) | -0.023 (0.009) | -0.020 (0.007) |
| $\sigma(\text{ret})$ | 0.035 (0.028) | 0.100*** (0.021) | 0.027 (0.027) | 0.097*** (0.020) |

Table 8 – continued from previous page

| Variables | SP | Moody | SP | Moody |
|--------------|------------------|---------------------|------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Bond | 0.089 (0.054) | 0.180*** (0.067) | 0.086 (0.054) | 0.180*** (0.067) |
| Firm FE | ✓ | ✓ | ✓ | ✓ |
| Observations | 141113 | 141113 | 141113 | 141113 |
| R^2 | 0.01 | 0.01 | 0.01 | 0.01 |

Appendix Table 9: The 2002 Rule Change and Rating Purchases

| Variables | SP | Moody | SP | Moody | SP | Moody | SP | Moody | SP | Moody |
|---|----------------------|-------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Post \times Foreign | -0.059*** (0.018) | -0.011 (0.014) | -0.035*** (0.006) | 0.005 (0.017) | | | | | | |
| Post \times Large Foreign | | | | | -0.072*** (0.018) | 0.063 (0.037) | | | | |
| Post \times Small Foreign | | | | | -0.017 (0.010) | -0.022** (0.010) | | | | |
| Post \times European/Canadian | | | | | | | -0.057*** (0.012) | 0.015 (0.020) | -0.031** (0.012) | 0.003 (0.016) |
| Post \times Non-European/Canadian Foreign | | | | | | | 0.102 (0.063) | -0.054 (0.035) | -0.039*** (0.013) | 0.008 (0.024) |
| Post Quarter 1 and 2 \times Foreign | | | | | | | | | 0.009 (0.006) | -0.008 (0.006) |
| Post Quarter 3 and 4 \times Foreign | | | | | | | | | -0.026 (0.056) | -0.079*** (0.025) |
| Size | | | 0.009 (0.006) | -0.008 (0.006) | 0.008 (0.006) | -0.008 (0.006) | 0.010 (0.006) | -0.008 (0.006) | 0.001 (0.001) | 0.004 (0.004) |
| Leverage | | | -0.025 (0.056) | -0.079*** (0.025) | -0.025 (0.056) | -0.081*** (0.026) | -0.025 (0.056) | -0.079*** (0.025) | | |
| Market-to-Book | | | 0.001 (0.002) | 0.004 (0.003) | 0.001 (0.003) | 0.004 (0.003) | 0.001 (0.003) | 0.004 (0.003) | 0.001 (0.002) | 0.004 (0.003) |
| Profitability | | | 0.189 (0.129) | 0.108 (0.079) | 0.197 (0.134) | 0.099 (0.080) | 0.193 (0.128) | 0.106 (0.079) | 0.189 (0.129) | 0.108 (0.079) |
| σ (ret) | | | -0.042 (0.349) | -0.317 (0.268) | -0.063 (0.337) | -0.323 (0.271) | 0.007 (0.342) | -0.339 (0.269) | -0.043 (0.349) | -0.317 (0.268) |
| bond | | | 0.598*** (0.031) | 0.682*** (0.027) | 0.598*** (0.031) | 0.682*** (0.028) | 0.598*** (0.031) | 0.682*** (0.027) | 0.598*** (0.031) | 0.682*** (0.027) |
| Firm FE | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Quarter FE | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| R^2 | 0.12 | | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 |
| Observation | 23230 | | 18826 | 18396 | 18396 | 18826 | 18826 | 18826 | 18826 | 18826 |

Appendix Table 10: Sample Summary Statistics

| Variables | Obs | Mean | SD | P25 | Median | P75 |
|---|---------|-------|-------|--------|--------|-------|
| Panel A: M&A sample | | | | | | |
| Purchase_SP | 421907 | 0.020 | 0.138 | 0.000 | 0.000 | 0.000 |
| Purchase_Moody | 421907 | 0.013 | 0.114 | 0.000 | 0.000 | 0.000 |
| SPmerger | 421907 | 0.873 | 0.333 | 1.000 | 1.000 | 1.000 |
| Log(MktCap) | 421906 | 5.288 | 1.723 | 4.019 | 5.272 | 6.566 |
| M/B | 421907 | 1.876 | 1.484 | 1.032 | 1.315 | 2.065 |
| Leverage | 421907 | 0.206 | 0.202 | 0.025 | 0.156 | 0.328 |
| Profitability | 421907 | 0.017 | 0.050 | 0.005 | 0.023 | 0.042 |
| $\sigma(\text{ret})$ | 421907 | 0.033 | 0.018 | 0.020 | 0.029 | 0.041 |
| Bond | 421907 | 0.009 | 0.097 | 0.000 | 0.000 | 0.000 |
| Panel B: 2002 announcement sample | | | | | | |
| Purchase_SP | 9273 | 0.076 | 0.265 | 0.000 | 0.000 | 0.000 |
| Purchase_Moody | 9273 | 0.044 | 0.206 | 0.000 | 0.000 | 0.000 |
| Post \times Foreign | 9273 | 0.032 | 0.176 | 0.000 | 0.000 | 0.000 |
| Post Quarter 1 and 2 \times Foreign | 9071 | 0.008 | 0.088 | 0.000 | 0.000 | 0.000 |
| Post Quarter 3 and 4 \times Foreign | 9273 | 0.022 | 0.146 | 0.000 | 0.000 | 0.000 |
| Post \times Large Foreign | 9273 | 0.016 | 0.124 | 0.000 | 0.000 | 0.000 |
| Post \times Small Foreign | 9273 | 0.016 | 0.127 | 0.000 | 0.000 | 0.000 |
| Post \times European/Canadian | 9273 | 0.026 | 0.159 | 0.000 | 0.000 | 0.000 |
| Post \times Non-European/Canadian Foreign | 9273 | 0.006 | 0.077 | 0.000 | 0.000 | 0.000 |
| Log(Mve) | 9171 | 6.234 | 1.455 | 5.415 | 6.413 | 7.272 |
| M/B | 9164 | 1.584 | 1.034 | 1.035 | 1.251 | 1.697 |
| Leverage | 8680 | 0.305 | 0.222 | 0.126 | 0.297 | 0.441 |
| Profitability | 8692 | 0.028 | 0.032 | 0.016 | 0.029 | 0.043 |
| $\sigma(\text{ret})$ | 9273 | 0.037 | 0.019 | 0.024 | 0.032 | 0.044 |
| Bond | 9273 | 0.032 | 0.176 | 0.000 | 0.000 | 0.000 |
| Panel C: Discretionary-in v.s. Discretionary-out sample | | | | | | |
| Post \times Treat | 6860 | 0.212 | 0.409 | 0.000 | 0.000 | 0.000 |
| Log(asset) | 6624 | 7.824 | 1.508 | 6.821 | 7.873 | 8.849 |
| M/B | 6620 | 2.513 | 2.874 | 1.177 | 1.697 | 2.795 |
| Leverage | 6595 | 0.260 | 0.242 | 0.084 | 0.223 | 0.381 |
| Ret_lag1yr | 6606 | 0.022 | 0.044 | 0.001 | 0.019 | 0.040 |
| Profitability | 6558 | 0.148 | 0.107 | 0.082 | 0.137 | 0.205 |
| ROA | 6860 | 0.052 | 0.137 | 0.016 | 0.052 | 0.098 |
| Investments | 6278 | 0.081 | 0.133 | 0.021 | 0.050 | 0.100 |
| Panel D: Entropy balancing sample | | | | | | |
| Post \times Treat | 1448212 | 0.223 | 0.416 | 0.000 | 0.000 | 0.000 |
| Post \times Treat \times Discretionary-in | 1448212 | 0.149 | 0.356 | 0.000 | 0.000 | 0.000 |
| Log(at) | 1448212 | 7.701 | 1.803 | 6.530 | 7.725 | 8.852 |
| M/B | 1448212 | 2.230 | 3.847 | 1.092 | 1.494 | 2.373 |
| Leverage | 1448212 | 0.223 | 0.210 | 0.073 | 0.188 | 0.317 |
| Ret_lag1yr | 1448212 | 0.020 | 0.046 | -0.001 | 0.017 | 0.037 |
| Profitability | 1448212 | 0.128 | 0.240 | 0.069 | 0.130 | 0.192 |
| ROA | 1448200 | 0.037 | 0.278 | 0.013 | 0.048 | 0.092 |

Appendix Table 11: Summary Statistics for Entropy Balanced Sample

This table presents distributional differences between treatment (S&P 500 addition) sample and control sample with and without balancing weights. ***, **, and * indicate statistically significant at the 1%, 5%, and 10% level, respectively.

| Variables | Non-Balanced Sample | | | Balanced Sample | |
|------------|---------------------|----------------|-----------------------------|-----------------|-----------------------------|
| | Treat (1) | Control (2) | Difference (3) = (1)-(2) | Control (4) | Difference (5) = (1)-(4) |
| Log(at) | 7.468 | 5.279 | 2.189*** | 7.467 | 0.001 |
| M/B | 2.533 | 2.123 | 0.410*** | 2.533 | 0.000 |
| Leverage | 0.222 | 0.204 | 0.018** | 0.222 | -0.000 |
| Ret_lag1yr | 0.029 | 0.017 | 0.011*** | 0.029 | 0.000 |

Appendix Table 12: Variable Definitions

| Variable | Definition |
|---|---|
| Panel A: S&P 500 Membership and Addition Prediction | |
| Size rank [1, 100] | Rank from 1 to 100 among all the candidate universe based on market capitalization at quarter t-1 |
| Size rank [101, 300] | Rank from 101 to 300 among all the candidate universe based on market capitalization at quarter t-1 |
| Size rank [301, 500] | Rank from 301 to 500 among all the candidate universe based on market capitalization at quarter t-1 |
| Size rank [501, 700] | Rank from 501 to 700 among all the candidate universe based on market capitalization at quarter t-1 |
| Size rank [701, 1000] | Rank from 701 to 1000 among all the candidate universe based on market capitalization at quarter t-1 |
| Log(MktCap) | Logarithm of market capitalization at quarter t-1 |
| MktCap_OK | A dummy variable equals one if a firm's market capitalization meets the S&P 500 published market capitalization threshold, and zero otherwise. We can trace the historical market capitalization threshold for S&P 500 back to 7/18/2007. For firms prior to 7/18/2007, we denote this variable as 1. |
| Turnover | Ratio of annual dollar value traded (defined as average closing price over the period multiplied by historical volume) to market capitalization. |
| Turnover \geq 1 | A dummy variable that equals one if the ratio of annual dollar value traded (defined as average closing price over the period multiplied by historical volume) to market capitalization is equal to or greater than one, and otherwise is zero. |
| Log(average monthly volume) | Logarithm value of the average monthly volume of shares traded in the window of [-6, -1] months leading up to the evaluation date. |
| Monthly volume \geq 250,000 shares | A dummy variable that equals one if the stock trades a minimum of 250,000 shares in all the months of the six months leading up to the evaluation date. |
| Earnings_last1Q | Most recent quarter's earnings (net income excluding discontinued operations) |
| Earnings_last4Q | Sum of the most recent four consecutive quarters' earnings (net income excluding discontinued operations) |
| Earnings_last1Q>0 | A dummy that equals one if the most recent quarter's earnings (net income excluding discontinued operations) are positive |
| Earnings_last4Q>0 | A dummy that equals one if the sum of the most recent four consecutive quarters' earnings (net income excluding discontinued operations) is positive |
| IWF_OK | A dummy that equals one if a firm's Investable Weight Factor (IWF) is greater than or equal to 0.5. IWF is calculated as available float shares over total shares outstanding. Available float shares are calculated from holding information from CapitalIQ. For quarters before 2004, it is defined as one. |
| Deletion gap_OK | A dummy variable that equals one if the length since last deletion from S&P 500 is greater than the required threshold for periods after July 31, 2017. For periods before July 31, 2017, the deletion gap_OK is set to one. |
| SP400or600 | A dummy variable equals one if a firm is an existing S&P 400 (mid cap) or S&P 600 (small cap), and zero otherwise. |
| SP500_acquiror | A dummy variable equals one if a firm acquired any S&P 500 member firms in the window of [-2, 0] quarters leading up to the evaluation date, and zero otherwise. |
| SP500 sector representation | Sum of the market capitalization in GICS sector i over the total market capitalization for all firms in S&P 500 index. |
| Difference in sector representation | (Sector weight in S&P Total Market Index – sector weight in S&P 500 Index). |
| US Headquarters | A dummy that equals one if a firm's headquarters are in the US, and zero otherwise. |
| US Incorporation | A dummy that equals one if foreign incorporation code is US, and zero otherwise. |
| Panel B: Baseline regression | |
| SP_Add | A dummy equals 100 if a firm is added to S&P 500 in quarter t, and otherwise is zero. |

Table 12 – continued from previous page

| Variable | Definition |
|--|--|
| Purchase_SP | A dummy variable equals one if firm <i>i</i> purchases any rating from S&P over quarter [t-4, t] based on the rating date reported by S&P, and is zero otherwise. |
| Purchase_Any | A dummy variable equals one if a firm purchases any rating either from S&P or Moody's over quarter [t-4, t], and otherwise is zero. |
| Panel C: Between S&P 500 M&As | |
| Purchase_SP | A dummy variable equals one if firm <i>i</i> purchases any rating from S&P in quarter <i>t</i> based on the rating date reported by S&P, and is zero otherwise. |
| Purchase_Moody | A dummy variable equals one if firm <i>i</i> purchases any rating from Moody's in quarter <i>t</i> based on the rating date reported by Moody's, and is zero otherwise. |
| SPmerger | Baseline sample: A dummy that equals one if there is any announcement of M&As between existing S&P 500 members with 100% share sought in quarter [t-2, t]. Restricted sample: A dummy that equals one if each quarter of [t-2, t], there is any announcement of between S&P 500 members M&As, and equals zero if there is no announcement of between S&P 500 M&As in each of the quarter [t-2, t] |
| SPmerger_HighCAR | A dummy variable that equals one if SPmerger=1 is in a quarter in which the average S&P 500 addition CAR over the past two years from the current evaluation date is in the top 25% of the entire sample period. Otherwise, the value takes zero. S&P addition CAR is calculated via WRDS Eventus under a market model with an estimation window [-120, -30] days and event window [-14, 5] days around addition date. |
| SPmerger_LowCAR | A dummy variable that equals one if SPmerger=1 is in a quarter in which the average S&P 500 addition CAR over the past two years from the current evaluation date is below the top 25% of the entire sample period. Otherwise, the value takes zero. |
| Log(MktCap) | Logarithm of market capitalization in quarter t-1 |
| M/B | Market to book value of asset in quarter t-1 |
| Leverage | Sum of long-term debt and short-term debt scaled by total assets in quarter t-1 |
| Profitability | EBITDA/Assets at quarter t-1 |
| $\sigma(\text{ret})$ | Standard deviation of daily stock return within quarter t-1 |
| Bond | A dummy variable that equals one if there is any bond issuance in quarter <i>t</i> |
| Panel D: 2002 shock regressions | |
| Post | A dummy variable equals one if quarter <i>t</i> is after Q3 2002, and zero otherwise. |
| Foreign | A dummy variable equals one if the firm is classified as a non-US firm, and zero otherwise. |
| Panel E: Consequences of discretionary additions | |
| Post | A dummy variable equals one if quarter <i>t</i> is after S&P 500 addition quarter, and zero otherwise. |
| Treat | A dummy variable equals one if the firm is classified as an S&P 500 entrant, and zero otherwise. |
| Discretionary in | A dummy variable equals one if the firm is classified as a discretionary in, and zero otherwise. |
| Log(asset) | Logarithm of total assets in year t-1 |
| M/B | Market to book value of assets in year t-1 |
| Leverage | Sum of long-term debt and short-term debt scaled by total assets in year t-1 |
| Ret_lag1yr | Stock return in year t-1 |
| Profitability | EBITDA/Assets at year <i>t</i> |
| ROA | Net Income/Assets at year <i>t</i> |
| Investment | Capex/Assets at year <i>t</i> |