

Is Stock Index Membership for Sale?

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Benefits associated with index membership

- Index membership boosts stock prices
 - Shleifer (1986): S&P500 addition raised equity price by 2.8%
 - Chang, Hong and Liskovich (2014) : Similar for Russell.
- Benchmarking to S&P500 can arise endogenously:
 - Kashyap, Kovrijnykh, Li, and Pavlova (2021): raising the equity prices of index members by more than the increased demand from index ETFs and funds
- Strong incentives to compete for index membership
 - Price premium with index membership implies a lower cost of capital.
 - Agency consideration



Rules versus discretion in index membership decision

- Publicly announced rules do not always predict actual membership
 - **S&P** 500 60-80%
 - Russell nearly 100%
- Rising concerns over the power of stock market indices.
 - Discretion: AIG and Tesla
 - Multi-segment business: Potential conflict of interest

Operating Profit (S&P): USD (million)

Year	2020	2019	2018	2017
Total	3936	3438	3021	2778
Rating	2223	1763	1530	1517
Indices	666	630	563	478

Research question

- Are major index membership decisions afflicted with conflict of interest? Do they have efficiency consequences?
- **Specifically:** S&P 500 index as a laboratory.
 - Discretions vs rules in S&P 500 index membership decision?
 - Does S&P give more favourable considerations to clients with more rating purchases?
 - Any causal evidence?
 - What are the consequences of discretionary additions?

Preview of the findings

• Evidence of discretion in the membership decision of S&P 500.

- Using published S&P rules, we are able to explain about 60-80% of the <u>index membership</u> status and about 20% of the <u>addition decisions</u> over the period of 1980 to 2018.
- Compare: nearly 100% of Russell 1000 membership status and nearly 100% addition decisions
- S&P gives more favourable considerations to those firms that buy relatively more rating services from S&P.
- Identification.
 - M&A between S&P500 members
 - Sudden change of the eligibility requirement in 2002.
- Evidence that discretionary additions to S&P 500 tend to perform worse in subsequent periods.

Literature Review

- Add to the literature on index addition by exploring discretions in membership decisions and their consequences
 - Index addition on stock price: e.g. Shleifer (1986), Kaul, Mehrotra and Morck (2000); Chang, Hong and Liskovich (2014); Hau, Massa and Peress (2009).
 - Real effects from index addition: e.g. Denis et al (2003), Bennett, Stulz and Wang (2020).
- Examining whether issuers of rating agencies have advantage in the rating agencies' other business.
 - Conflict of interest in financial market.
 - Conflict of interest in the credit rating agencies document evidence of inflated rating as a result of conflict of interest
 - ▶ He, Qian and Strahan (2012), Efing and Hau (2015) and Baghai and Becher (2018)

Data

- Sample:
 - Time period: 1980-2018
 - Contains newly added S&P 500 firms and non-S&P 500 public firms.
 - Data source:
 - >Index membership: Siblis Research, CRSP, and Compustat
 - Rating information: S&P credit rating, Moody's historical rating delivery services
 - New purchase of ratings (about 1/4 of firms in our sample purchased new ratings from 1980-2018)
 - Security ratings (90,058 rating purchases)
 - Issuer ratings (6,968 rating purchases)

Rating fees large enough to justify the impact

- Rating fees: initiation fee + renewal fee
- Rating payment can range from **\$1,500 to \$2,400,000**
 - "The fee for any particular rating is based on a variety of factors, such as the type of rating being assigned, the complexity of the analysis being performed, and the principal amount of the issuance. Depending on such factors, fees for MIS's rating services may range from \$1,500 to \$2,400,000. A small number of the ratings assigned and updated by MIS are not paid for by issuers."
- Choice of rating agency also plays a role

Research Question 1:

Does S&P exercise discretions on index membership decision?

• Evidence of **discretions** in S&P 500 additions

	1980s	1990s	2000s	2010s	1980 - 2018	2015 - 2018			
Panel A: # of Additions									
	201	175	237	160	773	92			
Panel B: Percentage of stocks meeting	a given crite	erion							
Meet all criteria	22.39	41.71	72.15	73.75	52.65	78.26			
US headquarter	97.51	95.43	97.89	86.88	94.95	94.57			
US incorporation	97.01	94.86	97.05	84.38	93.92	93.48			
MktCap \geq S&P 500 threshold	100.00	100.00	98.31	97.50	98.97	97.83			
Turnover ≥ 1	24.88	49.71	85.65	98.13	64.29	97.83			
Monthly volume 250,000 shares	82.09	97.71	97.89	99.38	94.05	100.00			
Earnings $last1Q > 0$	98.51	94.86	91.56	93.13	94.44	90.22			
Earnings last $4Q > 0$	97.01	90.86	90.72	95.00	93.27	93.48			
IWF \geq required threshold	100.00	100.00	99.58	98.75	99.61	97.83			
Time since last deletion from S&P 500	100.00	100.00	100.00	100.00	100.00	100.00			
> required threshold									
Panel C: # of (unique) firms that satisfied all addition criteria but not added to the index									
	997	3004	2874	444	4996	297			

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Research Question 2a:

Do S&P's decisions on index additions take into account firms' (S&P) rating purchases?

• Specification

 $SP_add_{i,t} = \frac{\beta_1}{Purchase_sp_{i,t-4,t}} + \beta_2 Purchase_any_{i,t-4,t} + C_{i,t} + F_i + X_t + \varepsilon_{i,t}$

- Main findings: recent purchases **S&P** ratings help the firm to be added to the index beyond the published rules on additions.
- Robustness:
 - First report accounting numbers
 - Lag 2 quarter value
 - Event-based regression
 - Control for M&A
 - Fama-Macbeth
 - Non-parametric method, i.e. random forest

S&P500_addition=100, otherwise=0							
	(1)	(2)	(3)	(4)	(5)		
VARIABLES	Probit	Relogit	OLS	OLS	OLS		
Purchase_any ratings	0.103	0.272	-0.038	0.040	0.051		
	(0.069)	(0.173)	(0.061)	(0.062)	(0.062)		
Purchase_S&P ratings	0.130*	0.294*	0.188**	0.161**	-0.047		
	(0.071)	(0.176)	(0.075)	(0.076)	(0.062)		
Purchase_sp×Size rank[1,100]					-0.140		
					(0.981)		
Purchase_sp×Size rank[101,300]					2.155***		
					(0.675)		
Purchase_sp×Size rank[301,500]					1.027***		
					(0.343)		
Purchase sp×Size rank[501,700]					0.298**		
					(0.127)		
Purchase sp×Size rank[701,1000]					0.012		
					(0.039)		
Other controls	Yes	Yes	Yes	Yes	Yes		
Observations	465,688	465,688	479,321	479,101	479,101		
Firm FE	No	No	No	Yes	Yes		
Quarter FE	Yes	Yes	Yes	Yes	Yes		
R2	0.43	0.35	0.03	0.05	0.05		

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Research Question 2b:

Do firms purchase more ratings when the chance of getting into the S&P 500 is higher?

• Shocks to vacancies on the S&P 500 index

- Announcements of M&A events between S&P 500 members are likely to result in vacancies in the index
- Findings:
 - Upon merger announcement, large firms outside the index tend to increase their purchases of S&P ratings (more than they do of Moody's ratings).
 - Firms buy more S&P ratings after an opening in the index when there is a higher stock price reaction to addition events.
- A shock to the eligibility for index membership
 - The 2002 rule change on domicile of companies: 7 European and Canadian firms suddenly removed from the index
 - Findings:
 - Find a significant reduction in S&P rating purchases by foreign firms after the event (relative to US firms). See no comparable changes in foreign firms' purchase of Moody's ratings

 $Purchase_sp_{i,t} = \beta_1 SPmerger_t \times (size \ group) + \gamma_1 Bond_{i,t} + C_{i,t-1} + F_i + \varepsilon_{i,t}$ $Purchase_moody_{i,t} = \beta_1 SPmerger_t \times (size \ group) + \gamma_1 Bond_{i,t} + C_{i,t-1} + F_i + \varepsilon_{i,t}$

		Full sample					Restricted sample				
		SP	Moody	SP	Moody	SP	Moody	SP	Moody		
Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
SPmerger × Size r	ank[1,1000]	0.009***	0.004***			0.028***	0.016***				
		(0.002)	(0.001)			(0.004)	(0.003)				
SPmerger × Size rank[[1,100]		× /	0.039*	0.012	· · · ·	× ,	0.096**	0.001		
				(0.021)	(0.017)			(0.041)	(0.034)		
SPmerger × Size rank[[101,300]			0.005	0.005			0.028	0.023		
				(0.009)	(0.007)			(0.019)	(0.014)		
SPmerger × Size ra	ank[301,500]			0.017***	0.003			0.045***	0.028***		
				(0.005)	(0.003)			(0.010)	(0.008)		
SPmerger × Size ra	ank[501,700]			0.013***	0.006**			0.038***	0.020***		
				(0.005)	(0.003)			(0.008)	(0.005)		
SPmerger × Size rank[701,1000]			0.004	0.003			0.016***	0.011***		
				(0.003)	(0.002)			(0.005)	(0.003)		
SPmerger		0.001	0.002***	0.001	0.002***	0.002**	0.004***	0.002**	0.004^{***}		
		(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)		
		0.466***	0.647***	0.466***	0.647***	0.090*	0.180***	0.088	0.179***		
Bond		(0.011)	(0.013)	(0.011)	(0.013)	(0.054)	(0.067)	(0.054)	(0.066)		
	SPmerger ×Size rank	[1,1000] = S]	Pmerger ×S	ize rank[1.10	0001	4.251***	7.70	1***			
	SPmerger × Size rank	[301.500] = 8	Pmerger × S	Size rank[30]	1.5001	4.796***	2.40)3			
	SPmerger × Size rank	[501,700] = S	SPmerger \times S	Size rank[50]	1,700]	1.539	5.25	51***			
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Effects are dominated in the periods with high addition benefit and among firms closer to the S&P 500 threshold

	SP	Moody	SP	Moody
Variables	(1)	(2)	(3)	(4)
SPmerger_HighCAR \times Size rank[1,1000]	0.034***	0.012***		
	(0.005)	(0.003)		
$SPmerger_LowCAR \times Size rank[1,1000]$	0.015^{***}	0.025^{***}		
	(0.005)	(0.004)		
$SPmerger_HighCAR \times Size rank[1,100]$			0.070**	-0.020
			(0.035)	(0.035)
$SPmerger_LowCAR \times Size rank[1,100]$			0.152^{*}	0.041
			(0.082)	(0.058)
$SPmerger_HighCAR \times Size rank[101,300]$			0.038*	0.019
			(0.021)	(0.018)
$SPmerger_LowCAR \times Size rank[101,300]$			0.008	0.026
			(0.025)	(0.023)
$SPmerger_HighCAR \times Size rank[301,500]$			0.050***	0.016*
			(0.012)	(0.008)
SPmerger_LowCAR \times Size rank[301,500]			0.035***	0.054***
			(0.014)	(0.012)
$SPmerger_HighCAR \times Size rank[501,700]$			0.048***	0.019***
			(0.009)	(0.006)
SPmerger_LowCAR \times Size rank[501,700]			0.018*	0.021***
			(0.010)	(0.008)
$SPmerger_HighCAR \times Size rank[701,1000]$			0.022^{***}	0.008**
			(0.005)	(0.004)
SPmerger_LowCAR \times Size rank[701,1000]			0.005	0.016^{***}
	0.000	0 1 0 0 4 4 4	(0.006)	(0.006)
Bond	0.089	0.180^{***}	0.086	0.180^{***}
	(0.054)	(0.067)	(0.054)	(0.067)

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Research Question 2b:

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Effects of the rule change announcement on rating purchase

_	SP	Moody	SP	Moody	SP	Moody	SP	Moody	SP	Moody
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Post \times Foreign$	-0.058^{***} (0.019)	-0.011 (0.014)	-0.030^{***} (0.007)	$0.006 \\ (0.018)$						
Post \times Large Foreign					-0.072^{***} (0.018)	$0.064 \\ (0.038)$				
Post \times Small Foreign					-0.010 (0.013)	-0.021^{*} (0.010)				
Post \times European/Canadian							-0.052^{***} (0.013)	0.016 (0.020)		
Post \times Non-European/Canadian Foreign							(0.102) (0.063)	-0.054 (0.035)	0.006*	0.004
Post Quarter 1 and 2 \times For eign									-0.026^{*} (0.013) 0.025**	(0.004) (0.016) 0.000
Post Quarter 3 and 4 \times For eign			0 605***	0 68/***	0 605***	0 68/***	0 605***	0 68/***	(0.014)	(0.009) (0.025) 0.684***
Bond			(0.003)	(0.027)	(0.003)	(0.028)	(0.003)	(0.027)	(0.031)	(0.027)
Controls				\checkmark		\checkmark		\checkmark		\checkmark
Firm-rating Agency FE		\checkmark		\checkmark		\checkmark		\checkmark		\checkmark
Quarter-rating Agency FE B^2	0	√ 19		√ 0.21		√ 0.21		√ 0.21		√ 0.21
Observation	23	.12 8218	1	.8830	1	8400]	18830		18830

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Research Question 3:

Do "discretionary-ins" have worse financial performance?

- Examine the consequence on firm performance over -4 to +4 years relative to addition events
- Define discretionary entrants
 - Use the estimated probability from S&P 500 membership regression, we define an addition as a low entry probability addition if its estimated entry probability is smaller than the median of the addition sample.
 - Among the low entry probability additions, we define discretionary additions to be S&P 500 additions of firms with low entry probability and S&P rating purchase within one year before the additions.
- Main findings:
 - "Discretionary-ins" have worse subsequent performance than "rule-based ins" or "discretionary-outs" in terms of profitability, ROA and stock price.

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"Discretionary ins" has worse performance compared to "discretionary outs"

 $Performance_{i,t} = \beta_1 Post_t \times Discretionary In_i + C_{i,t-1} + F_i + X_t + \varepsilon_{i,t}$.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	[-4,+1]	[-4,+2]	[-4,+4]	[-4,+1]	[-4,+2]	[-4,+4]
		Profitability			ROA	
Post × Discretionary In	-0.008	-0.010*	-0.008*	-0.019**	-0.017**	-0.012*
	(0.006)	(0.005)	(0.005)	(0.009)	(0.008)	(0.006)
Observation	4,176	4,886	6,078	4,698	5,500	6,836
<u>R</u> ²	0.88	0.86	0.85	0.76	0.73	0.71
Controls	Y	Y	Y	Y	Y	Y
Match-Specific Firm FE	Y	Y	Y	Y	Y	Y
Match-Specific Year FE	Y	Y	Y	Y	Y	Y

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"Discretionary ins" has worse performance compared to "Rulebased entrants"

 $Performance_{i,t} = \beta_1 Post_t \times Treat_i + \beta_2 Post_t \times Treat_i \times G_i + C_{i,t-1} + F_i + X_t + \varepsilon_{i,t}.$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	[-4,	,+1]	[-4,	[-4,+2]		+3]	[-4,+4]	
Variables				Profit	ability			
Post × Treat	-0.004	0.004	-0.006***	0.002	-0.006***	0.001	-0.007***	-0.000
	(0.003)	(0.005)	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)
Post × Treat × Discretionary In		-0.010*		-0.011**		-0.010**		-0.009*
		(0.006)		(0.005)		(0.005)		(0.004)
Observation	1,017,571	1,017,571	1,177,015	1,177,015	1,319,392	1,319,392	1,448,212	1,448,212
<u>R²</u>	0.88	0.88	0.87	0.87	0.86	0.86	0.86	0.85
				R	DA			
Post × Treat	-0.001	0.006	-0.004	0.004	-0.002	0.006	-0.002	-0.006
	(0.004)	(0.006)	(0.004)	(0.007)	(0.003)	(0.006)	(0.003)	(0.005)
Post × Treat × Discretionary In		-0.010		-0.011		-0.012*		-0.011*
		(0.009)		(0.008)		(0.007)		(0.006)
Observation	1,021,971	1,021,971	1,182,741	1,182,741	1,326,505	1,456,625	1,456,625	1,456,625
<u>R²</u>	0.77	0.77	0.75	0.75	0.74	0.74	0.73	0.73
controls	Y	Y	Y	Y	Y	Y	Y	Y
Match-Specific Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Match-Specific Year FE	Y	Y	Y	Y	Y	Y	Y	Y

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"Discretionary-ins" have worse stock performance compared to "discretionary-outs" and "rule-based entrants"

- Who bear the cost of such discretionary addition?
 - Investors suffer from S&P's discretionary addition
 - Passively managed index fund vs actively managed S&P 500
 - Policy implication

Month	Discretionary Entrants	Rules-Based Entrants	Discretionary Outs	Difference			
	(1)	(2)	(3)	(4) = (1) - (2)	(5) = (1) - (3)		
36	0.032***	0.101***	0.063***	-0.069***	-0.031**		
	(0.011)	(0.014)	(0.010)	(0.018)	(0.015)		
48	0.043***	0.107***	0.062***	-0.064***	-0.020		
	(0.009)	(0.013)	(0.008)	(0.015)	(0.012)		
60	0.042***	0.103***	0.060***	-0.061***	-0.018*		
	(0.008)	(0.011)	(0.007)	(0.014)	(0.011)		

Conclusion

- The decisions on S&P 500 membership appear to have discretions.
- Evidence on conflict of interest through a two-part investigation:
 - S&P gives more favourable considerations to firms buying more S&P ratings.
 - Non-S&P 500 firms buy more S&P ratings when there are openings in the S&P membership (but not more Moody ratings)
- "Discretionary-ins" have worse subsequent performance than "rule-based ins" or "discretionary-outs" in terms of profitability, ROA and stock price.

Looking forwards to your comments!