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ESG Strategy

Why Do Investors Buy ESG Funds? Our ESG Model Turns Three, ESG and ETFs

Allocating to ESG: Altruism or Self-Interest?

- An important practical question for the ESG industry has to do with *why* investors choose to allocate to ESG funds. Does their decision hinge exclusively on financial considerations, or is it done out a sense of altruism and a desire to make the world a better place? The size of the addressable market hinges on the answer: if potential ESG investors are motivated mostly by expectations of financial outperformance then winning assets will be harder because so far there's limited statistical evidence that ESG strategies consistently outperform. But if investors' interest in ESG is motivated by a wider set of goals, some of which are non-financial, then there's a better chance to grow market share even without clear-cut outperformance.
- We came across a fascinating academic study that tries to answer the question in a novel way, using a database of individual investors who bought mutual funds from a large European provider. The platform offered both SRI and conventional funds, so the researchers could identify individual investors who allocated to SRI funds, conventional funds, or both. Then, they conducted a detailed survey to see if they could tease out any commonalities among the investors who picked SRI funds versus those who didn't.
- The striking conclusion was that financial considerations aren't a major swing factor for SRI investors. Three pieces of evidence supported that conclusion. First, the return and risk expectations that SRI investors had for SRI funds weren't significantly different from the views of the investors who bought conventional funds. In other words, SRI investors didn't pick their funds based on a belief SRI in general outperforms. Second, the realized returns of the SRI funds held by SRI investors were poor over the period studied, much worse than the conventional funds. So past performance was unlikely to explain why the SRI investors stuck with their SRI allocations.
- Third, and most telling, SRI investors who showed strong altruism in a game designed to measure that abstract quality were almost twice as likely to allocate to SRI funds. Across the whole sample about 16% of the investors made an SRI allocation, but for those who showed strong altruism the likelihood of owning an SRI fund went up to over 30%. Interestingly investors who said they liked to talk to others about their investments were also more likely to allocate to SRI funds, suggesting that social signaling also plays a role. Overall, the academics' findings are heartening for the ESG industry because investors' intrinsic beliefs about fairness and altruism do seem to matter. That suggests there's an opportunity for ESG products to grow by meeting a need that's not purely financial.

Our ESG Model Turns Three

- Our ESG model celebrates its third birthday this month and so far it's delivered some alpha in live performance. Stocks in the best quintile of our ESG Directional Score have outperformed by about a percentage point per annum on average and those in the worst quintile have lagged by about twice that. The ESG Disclosure Score has also added alpha, but some of that comes from the underperformance of the low-disclosure extractive industries in the aftermath of the oil bust. Appendix 1 on page 9 screens for stocks with good all-around ESG credentials that have solid financials, as judged by our Core stock selection model. J.P. Morgan, Shell, Visa, Citigroup, and IBM rate well.
- On the other side of the return distribution, stocks with high arbitrage risk and poor disclosure have continued to underperform. Arbitrage risk is a metric we use to assess controversy and stocks with weak ESG disclosure seem to disproportionately attract it. Appendix 2 on page 10 presents the current naughty list, led by Ulta and Coty.

ESG and ETFs

- The assets in ESG-focused ETFs have grown exponentially, but they're still negligible overall, amounting to about $4 billion. That's less than 20 basis points of total ETF assets. They're also a mere fraction of the assets allocated to ESG-focused *mutual* funds, which themselves are less than 1% of the actively-managed mutual fund industry.

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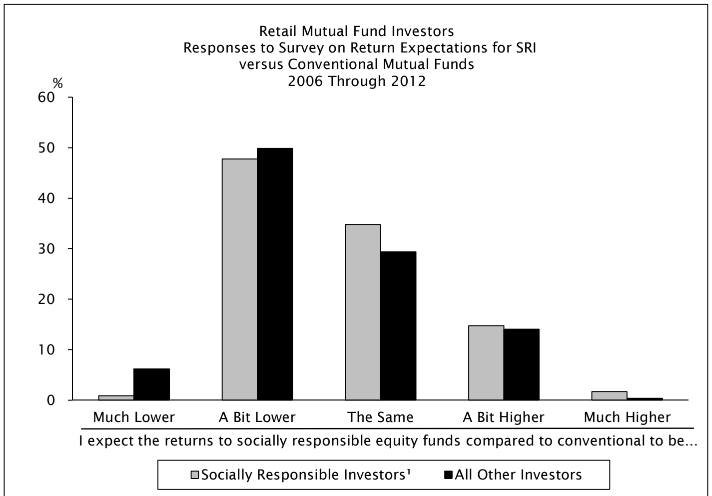
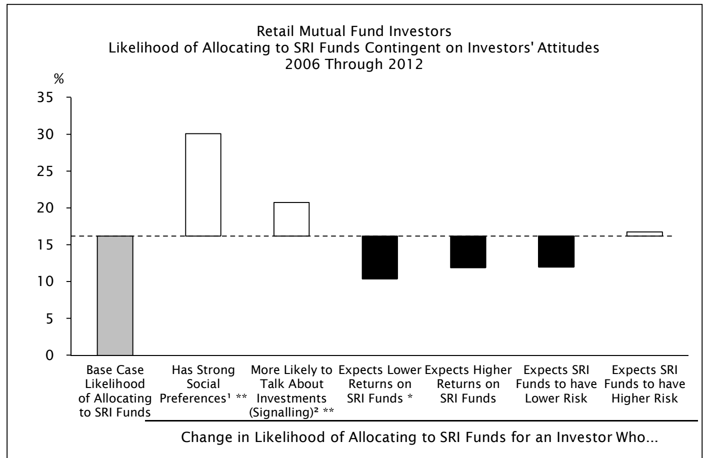
Conclusions in Brief

- SRI investors don't necessarily expect SRI funds to outperform…



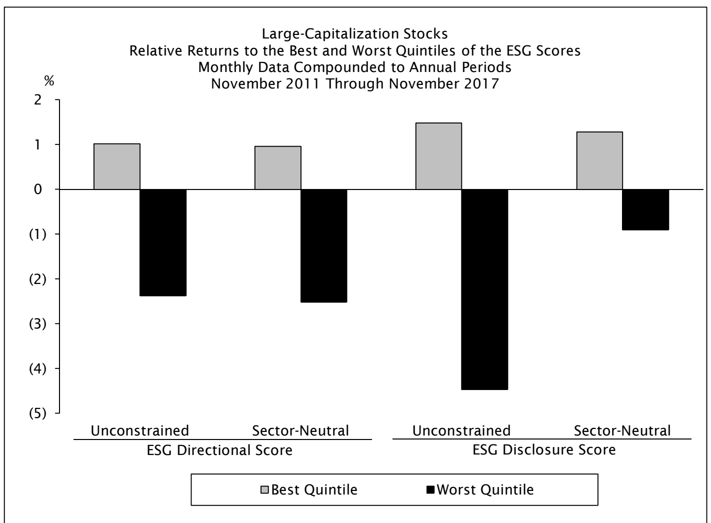
Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.
[1] Socially Responsible Investors are those that had an allocation to an SRI fund at the time of the survey.

- …And their motivation for allocating to SRI isn't purely financial:



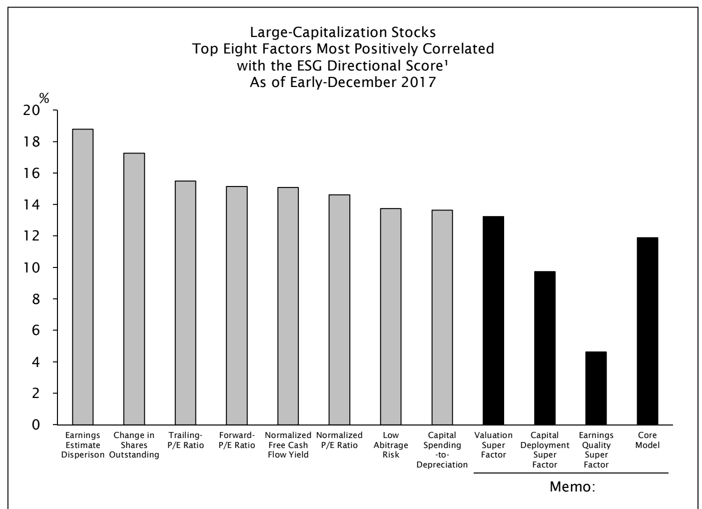
Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" Journal of Finance, Forthcoming.
[1] Investors with strong social preferences are those who gave back at least half their windfall in the trust game.
[2] Based on a two-point increase on a scale from 1 to 7, where 1=fully disagree with the statement "I often talk about investment with others" and 7=fully agree.
** Statistically significant at the 5% level; * Statistically significant at the 10% level.

- Our ESG model turned three this month and has added some alpha…



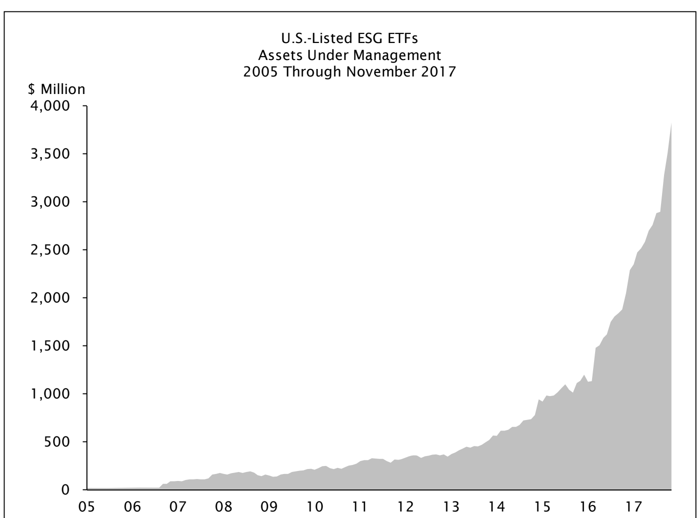
Source: Empirical Research Partners Analysis.

- …Although this year its value bias weighed on returns:



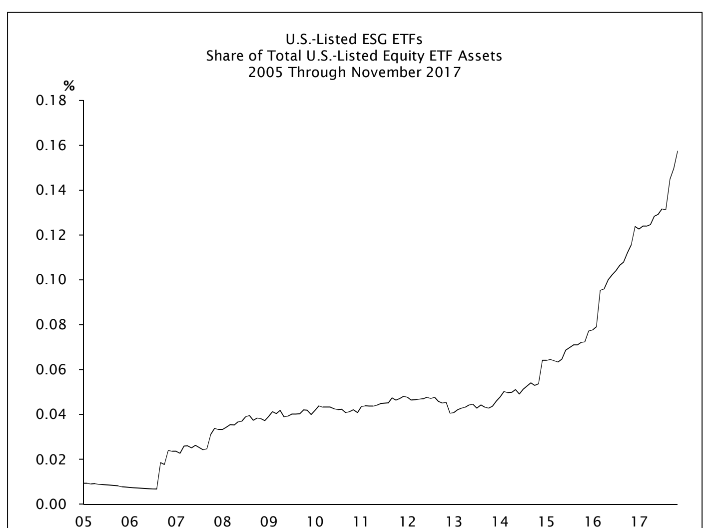
Source: Empirical Research Partners Analysis.
[1] Correlation based on cross-sectional correlation between quintiled ESG score and factor score.

- Assets in ESG-focused ETFs have grown exponentially…



Source: Empirical Research Partners Analysis.
[1] Includes U.S.-listed ETFs over non-U.S. stocks, e.g., the iShares MSCI ACWI Low Carbon Target ETF (CRBN).

- …But they're still a negligible share of the ETF pie:



Source: Empirical Research Partners Analysis.

Why Do Investors Buy ESG Funds? Our ESG Model Turns Three, ESG and ETFs

Allocating to ESG: Altruism or Self-Interest?

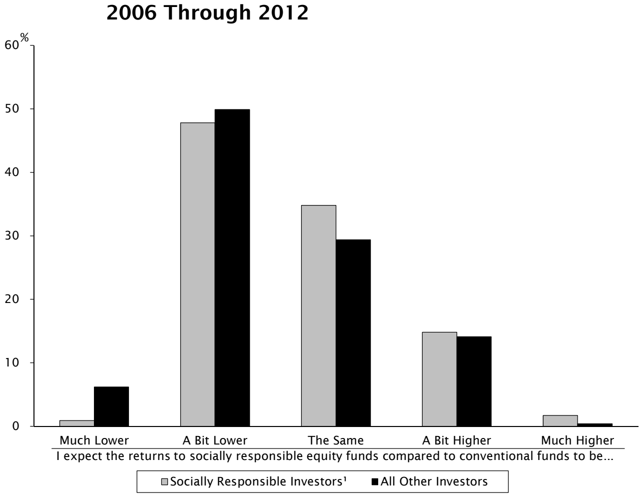
This time of year Santa Claus likes to keep things simple: you've either been naughty or nice, there's really no in-between. In fairness, you'd keep things black and white too if you had to shimmy down 5,000 chimneys per second and pilot a sleigh traveling at five million miles per hour.

However, when it comes to the motivations of ESG investors things have always been a little murkier: do investors allocate to ESG out of a sense of altruism or do they do so because they think it will ultimately lead to higher *financial* returns? That's a question of practical importance for the burgeoning ESG industry because it has a big bearing on the size of the addressable market. If investors are mainly looking for financial outperformance then so far the numbers are a tough sell; the majority of academic work suggests ESG-focused funds don't outperform their non-ESG counterparts.[1] But if investors' interest in ESG is motivated by a wider set of goals, some of which are non-financial, then there's a chance to claim market share even without definitive outperformance.

We came across a fascinating academic paper, forthcoming in the *Journal of Finance*, that tries to identify why investors allocate to ESG (or SRI as they call it) funds using a novel two-part methodology.[2] First, the academics procured access to a database of individual investor data from one of the largest mutual fund providers in the Netherlands. The platform offers a wide range of mutual funds, both conventional and SRI, and many investors were invested in funds from both buckets. The second part of the study was to survey the investors who allocated some of their portfolio to SRI mutual funds, as well as a subset of similar investors who stuck with conventional funds.

The first interesting finding was that the return expectations of the two sets of investors weren't all that different, in fact they were mostly statistically-indistinguishable from each other (see Exhibit 1). In other words, investors who actually allocated some of their portfolio to SRI funds didn't necessarily do so because they believed those funds would outperform. The same was true on the risk side too, where SRI investors were only marginally more likely believe that SRI funds would deliver lower risk than conventional funds (see Exhibit 2).

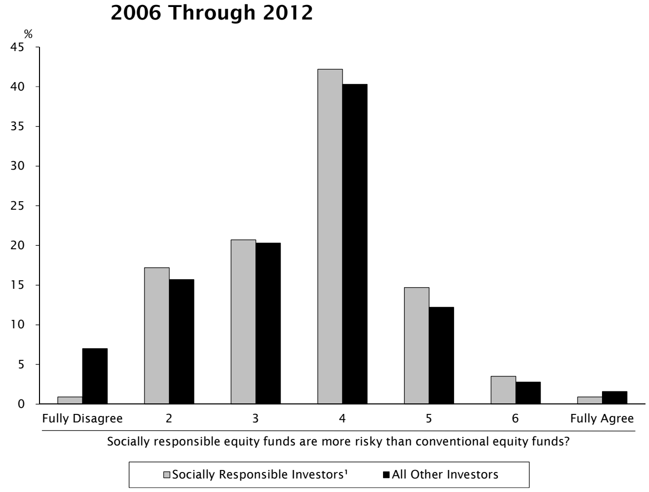
Exhibit 1: Retail Mutual Fund Investors
Responses to Survey on Return Expectations for SRI versus Conventional Mutual Funds
2006 Through 2012



Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.

[1] Socially Responsible Investors are those that had an allocation to an SRI fund at the time of the survey.

Exhibit 2: Retail Mutual Fund Investors
Responses to Survey on Risk Expectations for SRI versus Conventional Mutual Funds
2006 Through 2012



Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.

[1] Socially Responsible Investors are those that had an allocation to an SRI fund at the time of the survey.

Even more noteworthy was the fact that SRI investors on average experienced worse performance in their SRI funds compared to their conventional funds in the years *prior* to the survey (see Exhibit 3). The grey bars in the chart show the average one-, three-, and five-year returns that SRI investors realized in the actual SRI funds they picked,

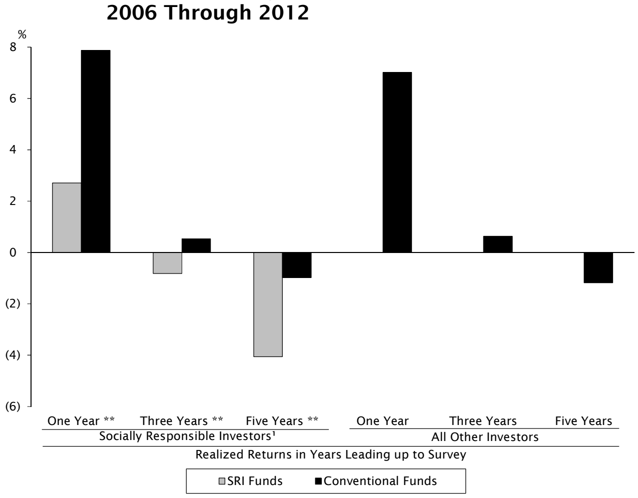
[1] *Investment Ideas from the Ivory Tower* May 2014. "Perspectives on Socially Responsible Investing."

[2] Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, forthcoming.

whereas the black bars are the returns of their conventional funds, which were significantly better. That's a confronting result: despite all the empirical evidence that retail investors are performance-chasers, the SRI investors continued to believe in their SRI funds notwithstanding the fact they gave up performance by doing so.[3]

To make things even more vexing, not only was there an *implicit* performance drag in holding the SRI funds, there was also a higher *explicit* cost because the SRI funds on average had higher fees (see Exhibit 4). Putting all that together, the academics concluded that the investors' motivation for buying SRI funds must be at least partly *non*-financial. After all, the investors didn't appear to believe the SRI funds would perform much better than conventional funds, they were quite tolerant of realized underperformance, and they were willing to pay higher management fees for the privilege!

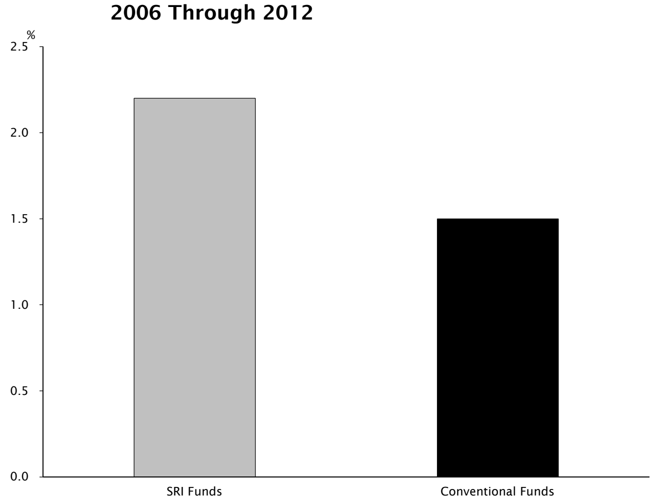
Exhibit 3: Retail Mutual Fund Investors
Nominal Returns from SRI and Conventional Funds in Years Leading up to the Survey
2006 Through 2012



Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.

[1] Socially Responsible Investors are those that had an allocation to an SRI fund at the time of the survey.
** Statistically significant difference in returns at the 5% level.

Exhibit 4: Retail Mutual Fund Investors
Average Annual Expense Ratios Incurred in SRI and Conventional Funds
2006 Through 2012



Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.

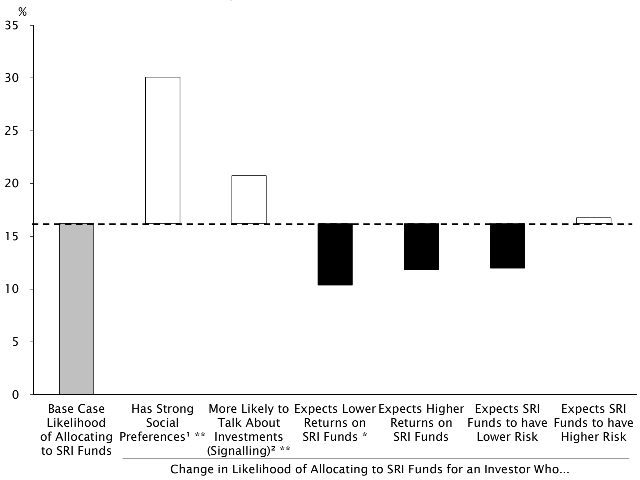
At this point the study got really interesting. As part of the survey the academics had the investors play a so-called trust game, designed to tease out their social preference. That's just academic-y speak for altruism or reciprocity. The game itself is simple and involves two players. The first player is given some money, say $50, by the experimenter and then asked to give some portion of that money to the second player, let's say $20. As the money is passed to the second player the experimenter triples the amount, so in this case the second player receives a $60 windfall. The second player is than asked if he or she wants to return some of the money back to the first player. Since $40 of the $60 is "free money" (i.e., provided directly from the experimenter rather than the first player) the second player might choose to give some of it back to the first player, as a gesture of goodwill. After all, the second players would have got nothing if the first player hadn't agreed to pass on some of their own windfall. In the psychology research the portion of funds that the second player gives back to the first player is seen as a reasonable proxy for the second player's social preference. The lower the ratio of funds returned-to-funds received the more the player cares about maximizing their own P&L. In this case the SRI investors, and the control group of conventional investors, were treated as the second player in the game via an online simulation delivered during the survey.

The first white bar in Exhibit 5 shows how the likelihood of investing in SRI funds changes for investors who have strong social preferences, meaning they returned at least half their windfall in the trust game. Over the whole sample about 16% of investors held at least one SRI fund, but for investors with strong social preferences the likelihood of holding an SRI fund almost doubled, to over 30%. In fact, that was a much bigger swing factor than expectations about how the funds might perform, which were mostly statistically-insignificant.

[3] Note that this is not to say that SRI funds underperform in general, rather in the sample of funds on this particular mutual fund platform over the period the academics studied it just so happens that the SRI funds lagged the conventional funds available on the same platform. The point is that retail investors, usually acutely sensitive to past performance, seem less sensitive to past performance when it comes to SRI funds.

The second white bar in the chart is also interesting; it turns out that investors who said they like to talk about their investments with others are also more likely to own SRI funds. So the picture that emerges is that the decision to invest in SRI funds is in part a function of an investor's own belief system, with perhaps a bit of social signaling thrown in for good measure. Call it the Instagram effect: SRI investors may be altruistic on the inside, but they also want the world to know about it. That conclusion is reinforced by the fact that social preference and investment signaling don't matter (i.e., aren't statistically significant) in determining the *share* of the portfolio that's allocated to SRI, only in the initial binary decision to invest at least something in SRI (see Exhibit 6). You get a lot more likes for your initial #gogreenorgohome than you do for your #raisingmySRIallocationbytwopoints follow-up.

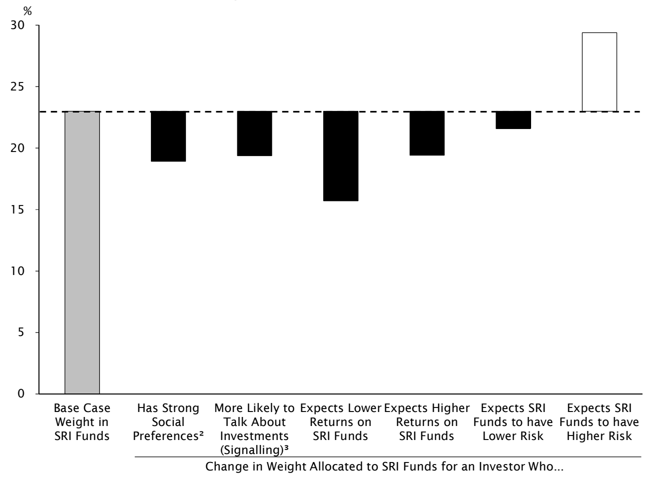
Exhibit 5: Retail Mutual Fund Investors
Likelihood of Allocating to SRI Funds
Contingent on Investors' Attitudes
2006 Through 2012



Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.

[1] Investors with strong social preferences are those who gave back at least half their windfall in the trust game.
[2] Based on a two-point increase on a scale from 1 to 7, where 1=fully disagree with the statement "I often talk about investment with others" and 7=fully agree.
** Statistically significant at the 5% level; * Statistically significant at the 10% level.

Exhibit 6: Socially Responsible Retail Mutual Fund Investors[1]
Weight Allocated to SRI Funds Contingent on Investors' Attitudes
2006 Through 2012



Source: Riedl, A., and Paul Smeets, 2017. "Why Do Investors Hold Socially Responsible Mutual Funds?" *Journal of Finance*, Forthcoming.

[1] Socially Responsible Investors are those that had an allocation to an SRI fund at the time of the survey.
[2] Investors with strong social preferences are those who gave back at least half their windfall in the trust game.
[3] Based on a two-point increase on a scale from 1 to 7, where 1=fully disagree with the statement "I often talk about investment with others" and 7=fully agree.
** Statistically significant at the 5% level; * Statistically significant at the 10% level.

Overall we see this analysis as heartening for the ESG industry. Investors' intrinsic beliefs about fairness and altruism do seem to matter so there's an opportunity for ESG products to meet a need that's not purely financial. That's a good thing because the empirical evidence that good ESG companies or funds outperform is mixed at best, so building an entire industry on that premise alone will always prove to be a shaky foundation. Ultimately it's a lot like the organic food movement; it's just about impossible to scientifically prove that a conventional apple is worse for you than an organic one, and yet that hasn't stopped the explosive growth in the latter.

Our ESG Model Turns Three

On the subject of whether good ESG stocks outperform, we've thought the best way to assess that is to track their performance live and out-of-sample. But that's easier said than done because one first has to pin down what makes a good ESG company. Three years ago we attempted to do that, building an ESG model that assesses a firm along two dimensions: an ESG Directional Score, that measures how good or bad a company looks relative to its industry peers across a range of about 40 industry-specific metrics, and an ESG Disclosure Score, that assesses how transparent a company is in providing ESG-relevant data to the public.[4]

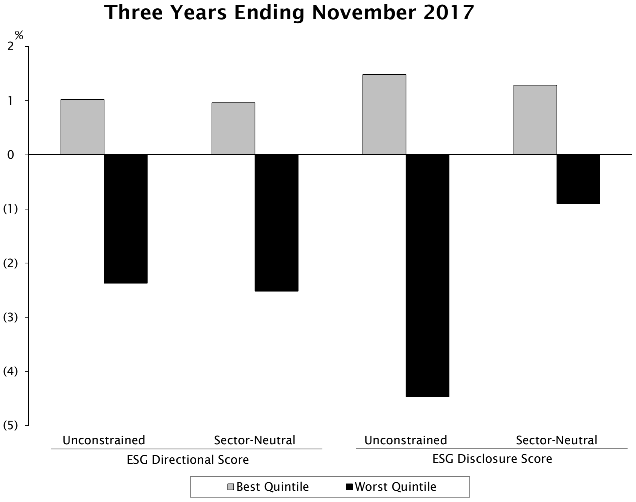
In the past three years the model has delivered some alpha, with stocks in the best quintile of the ESG Directional Score outperforming by about a point per annum, and those in the worst quintile lagging by about twice that (see Exhibit 7). That's been true on a sector-neutral basis too. The Disclosure Score has also delivered alpha, particularly

[4] *Stock Selection: Research and Results* October 2014. "A Toolbox for the Responsible Investor."

when sectors are left unconstrained. That's because the extractive industries have scant ESG disclosure so the collapse in the oil price has been a headwind for low-disclosure stocks over the last three years. The sector-neutral outcome is probably more indicative of what we might expect going forward.

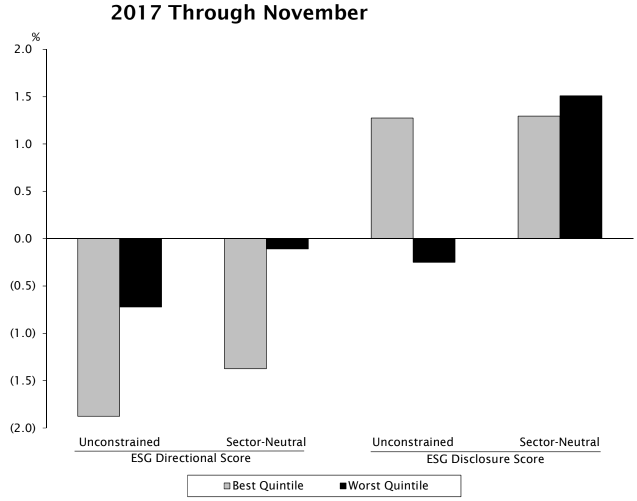
Despite reasonable performance since inception, this year has proved challenging for the model (see Exhibit 8). A lot of the drag on performance came from the model's bias towards lower valuations and its tilt away from growth and momentum stocks, something that we've discussed in past research (see Exhibits 9 and 10). The tale of this year has been the recovery in the Big Growers, propelled by the nirvana-like setting of weak inflation and improving wages at the lower end of the income distribution. We'd expect our ESG model to face less of a headwind now that our regime indicator has shifted back to a neutral setting, away from a growth-tilted reading.

Exhibit 7: Large-Capitalization Stocks
Relative Returns to the Best and Worst Quintiles of the ESG Scores
Monthly Data Compounded to Annual Periods
Three Years Ending November 2017



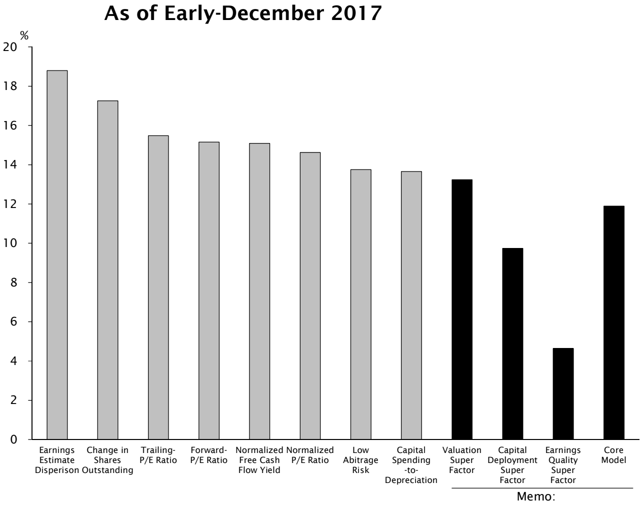
Source: Empirical Research Partners Analysis.

Exhibit 8: Large-Capitalization Stocks
Relative Returns to the Best and Worst Quintiles of the ESG Scores
Monthly Data Compounded
2017 Through November



Source: Empirical Research Partners Analysis.

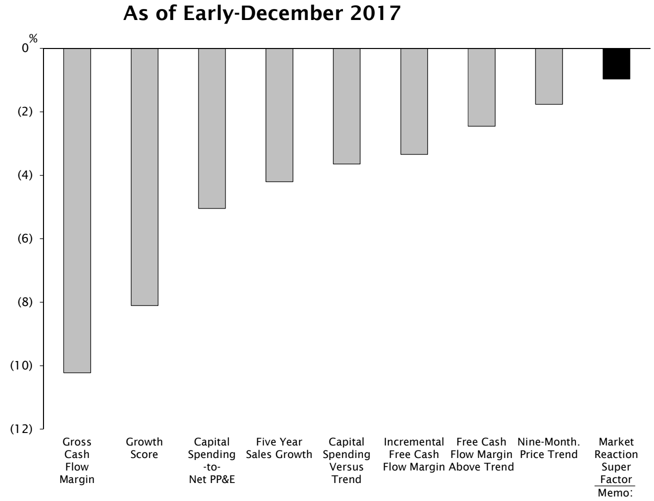
Exhibit 9: Large-Capitalization Stocks
Top Eight Factors Most Positively Correlated with the ESG Directional Score[1]
As of Early-December 2017



Source: Empirical Research Partners Analysis.

[1] Correlation based on cross-sectional correlation between quintled ESG score and factor score.

Exhibit 10: Large-Capitalization Stocks
Top Eight Factors Most Negatively Correlated with the ESG Directional Score[1]
As of Early-December 2017



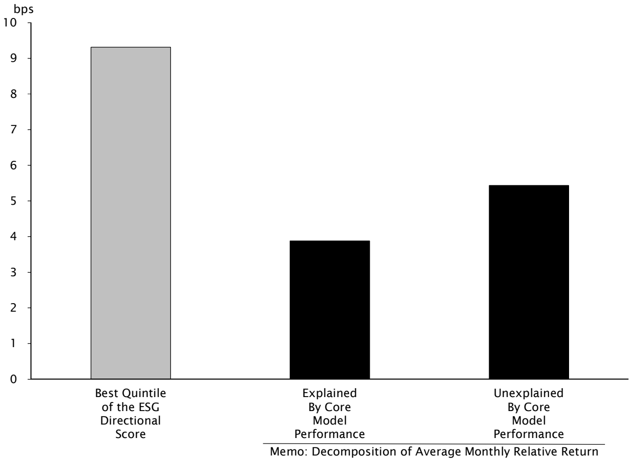
Source: Empirical Research Partners Analysis.

[1] Correlation based on cross-sectional correlation between quintled ESG score and factor score.

Appendix 1 on page **9** sorts stocks by their combined ESG Directional and ESG Disclosure scores. We've restricted the list to stocks that also screen in the top two quintiles of our Core model, so these are issues that have solid financials to go along with the warm fuzzies. It's worth noting that since we launched our ESG model only about 40% of its alpha can be explained by the performance of the Core model, so there does appear to be some incremental alpha in ESG above and beyond what's captured in our Core model (see Exhibit 11).

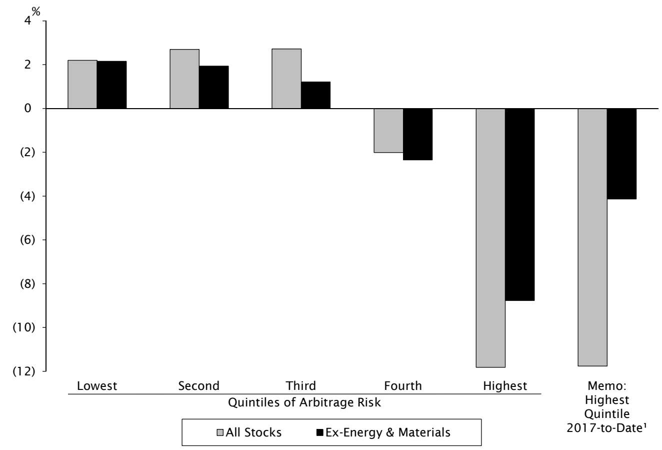
At the other end of the return distribution, we've found that stocks with weak ESG disclosure that also have high arbitrage risk are particularly prone to underperformance and that's been true again this year (see Exhibit 12).[5] In our work arbitrage risk is a proxy for the amount of controversy embroiling a stock and perhaps unsurprisingly stocks with poor ESG disclosure are disproportionately likely to attract it. Appendix 2 on page 10 presents the current crop of high arbitrage risk-poor disclosure issues. Many are also Failure candidates.

**Exhibit 11: Large-Capitalization Stocks
Average Monthly Relative Return to the Best Quintile
of the ESG Directional Score
Three Years Ending November 2017**



Source: Empirical Research Partners Analysis.

**Exhibit 12: Large-Capitalization Stocks
in the Worst Quintile of the ESG Disclosure Score
Relative Returns by Quintile of Arbitrage Risk
Measured Over One-Year Holding Periods
Three Years Ending November 2017**



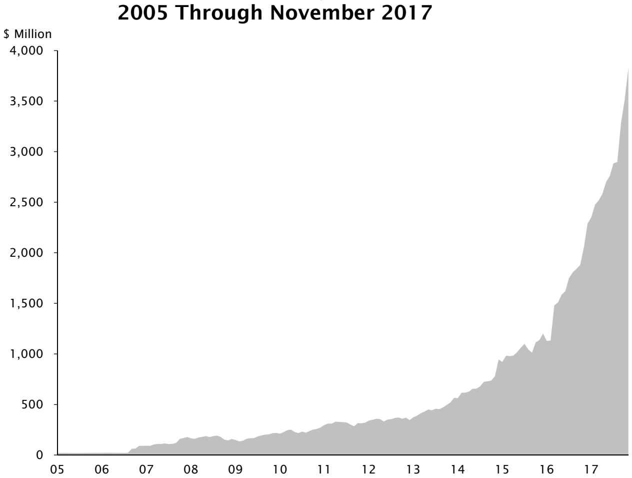
Source: Empirical Research Partners Analysis.

[1] 2017-to-date based on monthly data compounded and unannualized.

ESG and ETFs

One of the questions clients ask us most frequently is about the size of the ESG market. In past research we've looked at ESG mutual funds and institutional products, so here we'll focus on ETFs which are obviously one of the fastest-growing parts of the broader professionally-managed equity market.[6] Is that true for ESG ETFs too? Certainly assets in ESG-focused ETFs have been growing exponentially, but the actual numbers are tiny (see Exhibit 13). Collectively U.S.-listed ESG ETFs have just under $4 billion in assets, and the four largest funds have the bulk of that (see Exhibit 14).

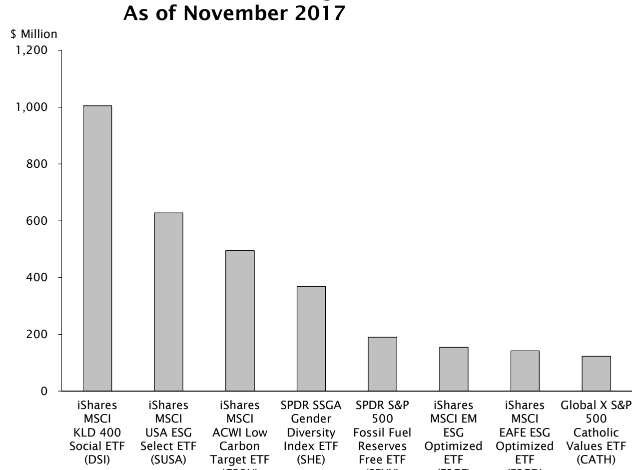
**Exhibit 13: U.S.-Listed ESG ETFs
Assets Under Management
2005 Through November 2017**



Source: Empirical Research Partners Analysis.

[1] Includes U.S.-listed ETFs over non-U.S. stocks, e.g., the iShares MSCI ACWI Low Carbon Target ETF (CRBN).

**Exhibit 14: Major U.S.-Listed ESG ETFs[1]
Assets Under Management
As of November 2017**



Source: Empirical Research Partners Analysis.

[1] Includes all U.S.-listed equity ESG ETFs with assets under management greater than $100 million.

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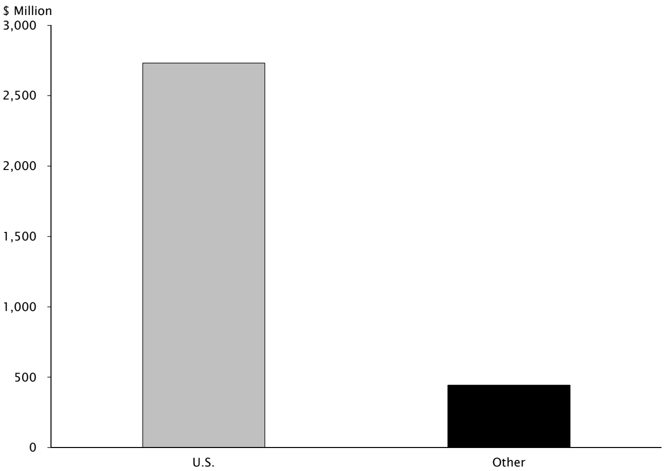
[5] *ESG Strategy* June 2017. "The Dirty Downside: Poor ESG Disclosure and Failure Risk."

[6] *ESG Strategy* July 2015. "Who Says Nice Stocks Finish Last?"

Here we're including any U.S.-listed ETF, so for example we include the iShares MSCI All-Country World Index Low Carbon Target ETF (CRBN) even though a lot of the underlying constituents are ex-U.S. However, most of the U.S.-listed ESG ETFs do tend to target only U.S. stocks (see Exhibit 15).

As a share of the total U.S.-listed ETF pie the ESG slice is negligible, currently less than 20 basis points of the total (see Exhibit 16). To put that in perspective, ESG-focused *mutual* funds have garnered around $55 billion in assets, still tiny relative to the overall actively-managed mutual fund universe (less than 1% of assets) but much larger in dollar terms than ESG assets invested via ETFs (see Exhibit 17).

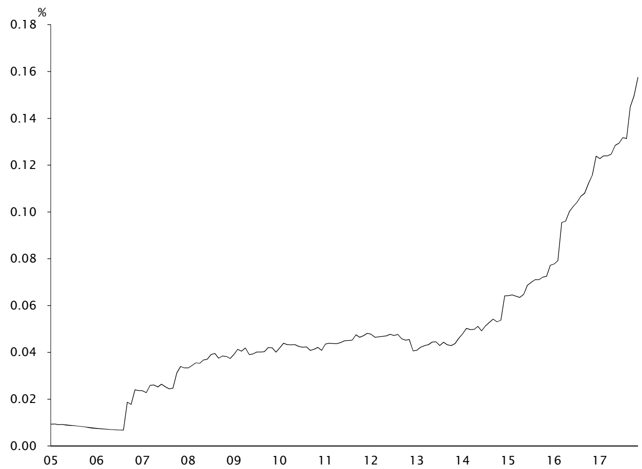
Exhibit 15: U.S.-Listed ESG ETFs
Assets Under Management by Geography of Underlying Stocks[1]
As of November 2017



Source: Empirical Research Partners Analysis.

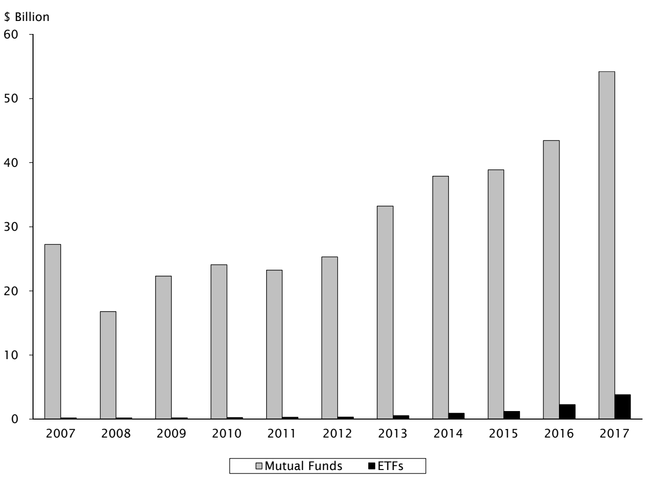
[1] U.S. ETFs are those with U.S.-listed constituent stocks; other ETFs are those holding global stocks (often including U.S. stocks as part of a global portfolio).

Exhibit 16: U.S.-Listed ESG ETFs
Share of Total U.S.-Listed Equity ETF Assets
2005 Through November 2017



Source: Empirical Research Partners Analysis.

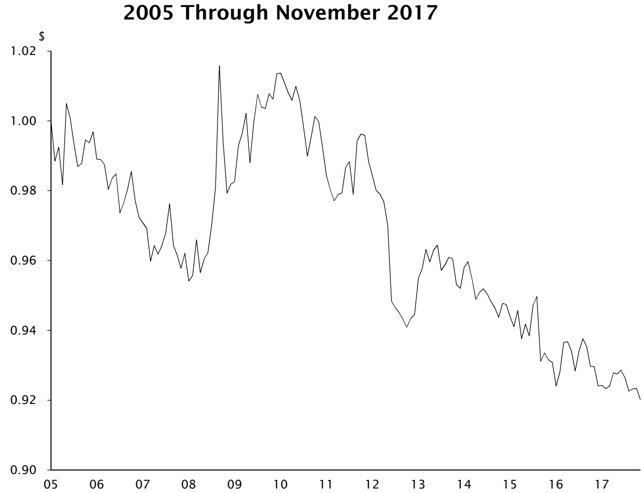
Exhibit 17: ESG-Focused Equity Mutual Funds and ETFs[1]
Assets Under Management
2007 Through November 2017



Source: Strategic Insight Simfund, Empirical Research Partners Analysis.

[1] ETFs include U.S.-listed ESG equity ETFs over non-U.S. stocks and mutual funds include U.S.-domiciled assets invested in U.S. and non-U.S. ESG-focused mutual funds.

Exhibit 18: U.S. ESG ETFs
Growth of a Dollar Invested
Relative to the S&P 500 ETF (SPY)[1]
2005 Through November 2017

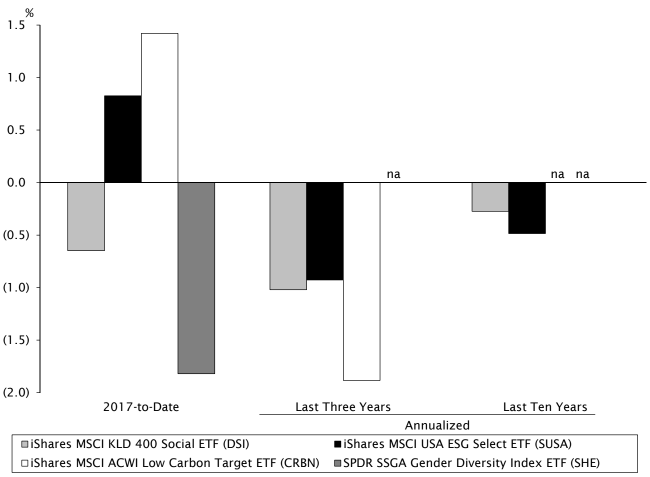


Source: Empirical Research Partners Analysis.

[1] Based on asset-weighted total returns for all U.S. equity ESG ETFs relative to the total return of the S&P 500 ETF (SPY).

Part of the issue is probably the relatively weak performance of the few ESG ETFs that have any kind of track record (see Exhibit 18). On an asset-weighted basis the universe of ESG ETFs has fairly consistently lagged the S&P 500 in the post-Crisis era, and the four largest have been big contributors to that underperformance (see Exhibit 19). Notwithstanding the prior academic study that suggested financial performance matters less for ESG products, there are so many ETFs to choose from that if you're not putting up the numbers it's tough slog. For what it's worth, net new money flows over the past few years have been positive, but again the numbers are miniscule with about $120 million added in the past year (see Exhibit 20). To put that in perspective, all U.S.-listed ETFs have collectively added something like $17 billion over the last year.

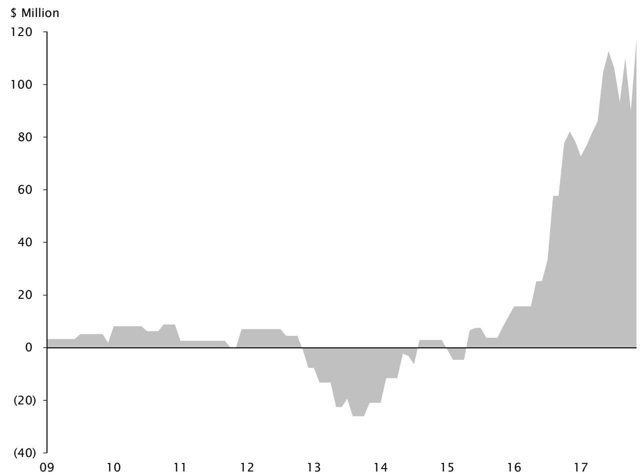
Exhibit 19: Major U.S. ESG ETFs[1]
Relative Returns Versus the S&P 500 ETF (SPY)[2]
Ten Years Ending November 2017



Source: Empirical Research Partners Analysis.

[1] Top four by current assets under management.
[2] Based on total returns; 2017-to-date is unannualized. CRBN does not yet have a ten-year track record and SHE does not yet have a three-year track record.

Exhibit 20: U.S.-Listed ESG ETFs
Trailing 12-Month Net New Money Flows
2009 Through November 2017



Source: Empirical Research Partners Analysis.

Appendix 1: Large-Capitalization Stocks in the Best Two Quintiles of the Core Model
Sorted by Combined ESG Score and Capitalization
As of Mid-December 2017

			Quintile Ranks (1=Best; 5=Worst)									
			ESG Metrics			Super Factors						
Symbol	Company	Price	Directional Score	Disclosure Score	**Average Of The Two**	Valuation	Capital Deployment	Earnings Quality and Trend	Market Reaction	Core Model Rank	YTD Returns	Market Capitalization ($ Billion)
JPM	JPMORGAN CHASE & CO	$105.93	1	1	**1.0**	2	2	na	2	2	25.5 %	$367.5
RDS.A	ROYAL DUTCH SHELL PLC	63.46	1	1	**1.0**	2	1	2	1	1	23.4	262.8
V	VISA INC	112.60	1	1	**1.0**	4	2	1	2	2	45.3	256.1
C	CITIGROUP INC	75.71	1	1	**1.0**	1	1	na	2	1	29.3	200.2
IBM	INTERNATIONAL BUSINESS MACHINES CORP	154.81	1	1	**1.0**	1	2	5	5	2	(3.1)	143.3
BHP	BHP BILLITON GROUP (AUS)	41.06	1	1	**1.0**	1	1	1	3	1	19.6	109.3
GS	GOLDMAN SACHS GROUP INC	250.35	1	1	**1.0**	1	1	na	4	1	5.9	98.6
QCOM	QUALCOMM INC	64.24	1	1	**1.0**	2	1	3	5	1	2.4	94.7
ADBE	ADOBE SYSTEMS INC	173.57	1	1	**1.0**	5	2	2	2	2	68.6	85.6
CELG	CELGENE CORP	106.09	1	1	**1.0**	2	3	1	5	1	(8.3)	83.5
BIIB	BIOGEN INC	325.77	1	1	**1.0**	2	5	2	4	2	24.7	68.9
BK	BANK OF NEW YORK COMPANY INC	54.67	1	1	**1.0**	1	1	na	3	1	17.4	56.0
CI	CIGNA CORP	209.97	1	1	**1.0**	2	2	4	1	1	57.5	52.0
PRU	PRUDENTIAL FINANCIAL INC	117.15	1	1	**1.0**	1	3	na	3	2	15.8	49.8
COF	CAPITAL ONE FINANCIAL CORP	95.79	1	1	**1.0**	1	3	na	4	1	11.9	46.4
SHPG	SHIRE PHARMACEUTICALS GROUP -ADR	148.00	1	1	**1.0**	1	4	3	5	2	(12.7)	44.8
EXC	EXELON CORP	41.05	1	1	**1.0**	1	3	3	2	2	19.8	39.4
LUV	SOUTHWEST AIRLINES	63.33	1	1	**1.0**	2	1	4	3	2	28.1	37.6
HUM	HUMANA INC	256.49	1	1	**1.0**	1	1	2	4	1	26.6	36.6
HPQ	HP INC	21.07	1	1	**1.0**	1	1	2	2	1	45.1	35.2
TGT	TARGET CORP	61.37	1	1	**1.0**	1	2	3	4	2	(11.5)	33.4
GIS	GENERAL MILLS INC	55.84	1	1	**1.0**	2	2	2	4	2	(6.4)	31.7
PCG	PG&E CORP	53.46	1	1	**1.0**	1	4	2	5	2	(10.0)	27.5
RCI	ROGERS COMMUNICATIONS -CL B	50.42	1	1	**1.0**	3	3	2	2	2	34.8	26.0
WPP	WPP PLC	89.63	1	1	**1.0**	1	1	2	5	2	(15.8)	22.8
BBY	BEST BUY CO INC	63.79	1	1	**1.0**	1	1	2	2	1	53.2	18.9
CCE	COCA-COLA EUROPEAN PARTNERS	38.77	1	1	**1.0**	2	2	2	4	2	26.5	18.8
LNC	LINCOLN NATIONAL CORP	78.54	1	1	**1.0**	1	1	na	1	1	20.5	17.2
CBG	CBRE GROUP INC	43.62	1	1	**1.0**	1	4	2	1	1	38.5	14.8
ADS	ALLIANCE DATA SYSTEMS CORP	233.05	1	1	**1.0**	1	1	1	5	1	2.9	12.9
IRM	IRON MOUNTAIN INC	40.12	1	1	**1.0**	3	3	3	2	2	29.3	10.7
PVH	PVH CORP	135.40	1	1	**1.0**	2	4	5	1	2	50.3	10.4
LDOS	LEIDOS HOLDINGS INC	64.13	1	1	**1.0**	1	4	2	2	2	27.6	9.7
MAN	MANPOWERGROUP	127.96	1	1	**1.0**	1	2	2	1	1	46.4	8.5
KSS	KOHL'S CORP	49.78	1	1	**1.0**	1	1	1	1	1	6.3	8.4
JHG	JANUS HENDERSON GROUP PLC	36.13	1	1	**1.0**	1	2	na	3	2	na	7.2

Source: Empirical Research Partners Analysis.

Appendix 1(Cont.): Large-Capitalization Stocks in the Best Two Quintiles of the Core Model
Sorted by Combined ESG Score and Capitalization
As of Mid-December 2017

			Quintile Ranks (1=Best; 5=Worst)									
			ESG Metrics			Super Factors						
Symbol	Company	Price	Directional Score	Disclosure Score	**Average Of The Two**	Valuation	Capital Deployment	Earnings Quality and Trend	Market Reaction	Core Model Rank	YTD Returns	Market Capitalization ($ Billion)
AAPL	APPLE INC	$169.37	1	2	**1.5**	3	3	3	3	2	48.6 %	$869.6
BAC	BANK OF AMERICA CORP	29.05	2	1	**1.5**	1	3	na	2	2	33.5	303.8
T	AT&T INC	36.73	2	1	**1.5**	1	1	3	5	1	(9.3)	225.5
UNH	UNITEDHEALTH GROUP INC	223.91	1	2	**1.5**	3	3	3	2	2	42.0	217.0
HD	HOME DEPOT INC	183.41	1	2	**1.5**	4	1	1	2	1	39.9	214.2
ORCL	ORACLE CORP	49.60	1	2	**1.5**	2	2	3	4	2	31.1	207.0
BA	BOEING CO	285.90	1	2	**1.5**	3	1	3	1	1	88.8	170.8
PEP	PEPSICO INC	116.57	2	1	**1.5**	3	2	2	3	2	14.5	165.9
MA	MASTERCARD INC	149.89	1	2	**1.5**	5	2	1	1	2	46.2	158.9
TOT	TOTAL SA	55.68	1	2	**1.5**	1	1	2	2	1	13.0	139.6
AMGN	AMGEN INC	175.41	2	1	**1.5**	1	1	1	4	1	23.3	127.5
CVS	CVS HEALTH CORP	73.09	1	2	**1.5**	1	1	3	5	1	(5.0)	74.0
STO	STATOIL ASA	20.13	1	2	**1.5**	2	1	2	1	1	14.2	66.3
FDX	FEDEX CORP	240.73	1	2	**1.5**	3	3	1	2	2	30.4	64.6
COP	CONOCOPHILLIPS	51.57	2	1	**1.5**	3	1	2	2	1	5.2	61.7
AET	AETNA INC	182.73	1	2	**1.5**	3	1	5	2	2	49.2	59.6
SNE	SONY CORP	45.79	1	2	**1.5**	1	1	1	2	1	64.2	57.8
SU	SUNCOR ENERGY INC	34.42	2	1	**1.5**	2	1	1	2	1	8.6	57.1
AMAT	APPLIED MATERIALS INC	51.43	2	1	**1.5**	3	3	2	1	1	60.8	54.8
CTSH	COGNIZANT TECH SOLUTIONS	71.82	2	1	**1.5**	2	1	2	3	1	29.0	42.4
MFC	MANULIFE FINANCIAL CORP	20.89	2	1	**1.5**	1	4	na	2	1	21.1	41.3
EBAY	EBAY INC	37.65	2	1	**1.5**	2	1	2	3	1	26.8	39.5
STT	STATE STREET CORP	97.67	2	1	**1.5**	1	1	na	3	1	27.4	36.2
PLD	PROLOGIS INC	66.16	1	2	**1.5**	4	3	1	1	2	28.3	35.2
AFL	AFLAC INC	88.16	1	2	**1.5**	1	2	na	2	2	29.6	34.7
SYY	SYSCO CORP	62.64	1	2	**1.5**	3	2	2	2	1	16.0	32.7
MPC	MARATHON PETROLEUM CORP	64.75	1	2	**1.5**	1	1	2	1	1	32.2	32.2
SLF	SUN LIFE FINANCIAL INC	40.74	2	1	**1.5**	1	3	na	3	2	10.0	24.9
BEN	FRANKLIN RESOURCES INC	44.67	1	2	**1.5**	1	2	na	4	2	14.4	24.8
ABC	AMERISOURCEBERGEN CORP	86.70	1	2	**1.5**	1	2	5	4	2	12.9	18.9
CAH	CARDINAL HEALTH INC	58.89	1	2	**1.5**	1	1	5	5	2	(16.7)	18.6
XLNX	XILINX INC	68.54	1	2	**1.5**	4	2	2	3	2	16.0	17.2
HST	HOST HOTELS & RESORTS INC	19.84	1	2	**1.5**	2	4	4	3	2	8.8	14.7
HES	HESS CORP	45.49	2	1	**1.5**	3	1	2	5	2	(25.7)	14.5
URI	UNITED RENTALS INC	164.00	2	1	**1.5**	1	5	4	1	2	55.3	13.9
MRO	MARATHON OIL CORP	15.15	1	2	**1.5**	2	1	3	4	1	(11.2)	12.9
HOG	HARLEY-DAVIDSON INC	51.19	1	2	**1.5**	1	1	2	5	2	(10.4)	8.6
M	MACY'S INC	25.80	1	2	**1.5**	1	2	2	5	2	(24.6)	7.9
XRX	XEROX CORP	29.59	2	1	**1.5**	1	2	3	5	1	31.8	7.5
JLL	JONES LANG LASALLE INC	150.09	1	2	**1.5**	1	2	4	1	1	49.4	6.8
ARRS	ARRIS INTERNATIONAL PLC	29.31	1	2	**1.5**	1	2	5	3	1	(2.7)	5.5

Source: Empirical Research Partners Analysis.

Appendix 2: Large-Capitalization Stocks in the Worst Quintiles of the ESG Disclosure Score and Arbitrage Risk
Sorted by Core Model Rank and Capitalization
As of Mid-December 2017

			Quintle Ranks (1=Best; 5=Worst)									
					Super Factors							
Symbol	Company	Price	**ESG Disclosure Score (5=Worst)**	**Arbitrage Risk (5=Highest)**	Valuation	Capital Deployment	Earnings Quality and Trend	Market Reaction	Core Model Rank	Failure Candidate	YTD Return	Market Capitalization ($ Billion)
ULTA	ULTA BEAUTY INC	$224.54	**5**	**5**	4	5	3	5	5	Y	(11.9) %	$13.7
COTY	COTY INC	17.78	**5**	**5**	3	5	5	5	5	Y	(0.1)	13.3
CGNX	COGNEX CORP	64.38	**5**	**5**	5	5	5	1	5		103.1	11.1
TRGP	TARGA RESOURCES CORP	45.36	**5**	**5**	2	5	5	5	5	Y	(13.0)	9.8
PE	PARSLEY ENERGY INC	26.10	**5**	**5**	3	5	5	5	5	Y	(25.9)	8.3
LILA	LIBERTY GLOBAL PLC LILAC GRP	21.16	**5**	**5**	2	3	3	5	4		(3.6)	28.5
SHOP	SHOPIFY INC	100.77	**5**	**5**	5	4	5	1	4		135.1	10.0
QRVO	QORVO INC	67.88	**5**	**5**	3	5	3	5	4		28.7	8.6
BLUE	BLUEBIRD BIO INC	171.15	**5**	**5**	5	5	5	1	4		177.4	7.8
COHR	COHERENT INC	292.95	**5**	**5**	5	5	4	1	4		113.2	7.3
SPB	SPECTRUM BRANDS HOLDINGS INC	114.47	**5**	**5**	2	2	5	5	4		(5.1)	6.6
EEP	ENBRIDGE ENERGY PARTNERS -LP	14.19	**5**	**5**	2	4	4	5	4		(38.7)	6.2
ARNC	ARCONIC INC	24.47	**5**	**5**	4	2	1	5	3	Y	33.2	11.8
IPGP	IPG PHOTONICS CORP	205.26	**5**	**5**	5	5	2	1	3		107.9	11.0
TEAM	ATLASSIAN CORP PLC	46.46	**5**	**5**	5	3	5	1	3		92.9	10.8
YNDX	YANDEX N.V.	32.89	**5**	**5**	4	3	5	1	3		63.4	10.7
OLED	UNIVERSAL DISPLAY CORP	172.70	**5**	**5**	5	4	1	1	3		207.0	8.1
BIO	BIO-RAD LABORATORIES INC	255.08	**5**	**5**	5	3	4	1	3		39.9	7.6
CHKP	CHECK POINT SOFTWARE TECHNOLOGIES INC	104.78	**5**	**5**	2	3	1	4	2		24.1	17.4
ANET	ARISTA NETWORKS INC	222.79	**5**	**5**	5	4	1	1	2		130.2	16.3
CC	CHEMOURS CO	47.64	**5**	**5**	3	2	4	1	2		116.3	8.8
VST	VISTRA ENERGY CORP	17.75	**5**	**5**	2	2	2	4	2		14.5	7.6
SWN	SOUTHWESTERN ENERGY CO	5.49	**5**	**5**	1	2	5	5	2		(49.3)	2.8
ESV	ENSCO PLC	5.62	**5**	**5**	1	1	3	5	2	Y	(41.8)	2.5
BIDU	BAIDU INC	234.59	**5**	**5**	3	1	2	1	1		42.7	81.5
KLAC	KLA-TENCOR CORP	103.98	**5**	**5**	2	1	2	3	1		35.3	16.3
NTAP	NETAPP INC	58.26	**5**	**5**	3	1	1	1	1		68.4	15.6
SINA	SINA CORP	97.02	**5**	**5**	2	1	4	1	1		73.0	6.9
SCG	SCANA CORP	45.78	**5**	**5**	1	1	1	5	1		(35.7)	6.5
X	UNITED STATES STEEL CORP	33.23	**5**	**5**	2	1	1	5	1		1.4	5.8
AR	ANTERO RESOURCES CORP	18.23	**5**	**5**	1	5	4	5	1		(22.9)	5.8
RIG	TRANSOCEAN LTD	9.91	**5**	**5**	1	1	2	5	1		(32.8)	3.9
RAD	RITE AID CORP	1.90	**5**	**5**	1	1	1	5	1		(76.9)	2.0

Source: Empirical Research Partners Analysis.