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This Chartbook is for the readers of The GRYNING Times and serves to provide detailed quantitative analysis to accompany the recent posts regarding the bullish thesis for Bonds. Within this Chartbook you will find;

- Top 10 ETFs ranked according to our AI with Fundamental, Technical, Sentiment & Low Risk Scores.
- Bottom 10 ETFs ranked according to our AI with Fundamental, Technical, Sentiment & Low Risk Scores.
- Three (3) Bullish Trade Idea's with Alpha Signal Breakdowns.
- Three (3) Bearish Trade Idea's with Alpha Signal Breakdowns.

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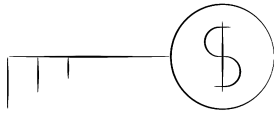
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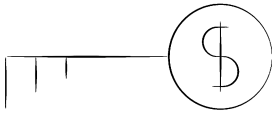
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BOND ETF RANKING

The table below shows the AI scores and ranking for the top 10 and bottom 10 etf's from the 185 tickers analysed by our AI within the Bond(s) asset class.

Rank	Name	Ticker	Fundamental	Technical	Sentiment	Low Risk	AI Score
1	Vanguard Ext Dur T;ETF	EDV	4	10	4	9	10
2	PIMCO ETF:25+ Yr US Tres	ZROZ	4	10	2	8	10
3	iShares:20+ Trs Bd ETF	TLT	4	10	2	10	10
4	Vanguard LT Corp Bd;ETF	VCLT	4	10	3	10	10
5	iShares:10+ IG Corp Bd	IGLB	4	10	2	10	10
6	Schwab Str:LT US Trsry	SCHQ	4	10	2	10	9
7	iShares:10-20 Trs Bd ETF	TLH	4	10	3	10	9
8	PIMCO ETF:15+ Yr US TIPS	LTPZ	4	10	3	10	9
9	Vanguard Lg-Tm Bd;ETF	BLV	4	10	3	10	9
10	Vanguard LT Trs;ETF	VGLT	4	10	3	10	9
<hr/>							
185	iShares:0-5 IG Corp Bd	SLQD	4	2	2	10	2
184	iShares:0-5 TIPS Bd ETF	STIP	4	2	2	10	2
183	iShares:Sh Trs Bd ETF	SHV	4	3	2	10	2
182	iShares:0-3 Month Trs Bd	SGOV	4	3	2	10	2
181	iShares:iBd Dec2026T Crp	IBDR	4	2	3	10	2
180	iShares:iBd Dec2025T Crp	IBDQ	4	2	2	10	2
179	iShares:Core Intl Agg Bd	IAGG	4	2	3	10	2
178	iShares:Core 1-5Y USD Bd	ISTB	4	2	2	10	2
177	iShares:ST Nat Muni Bond	SUB	4	2	2	10	2
176	SPDR Blackstone Sr Loan	SRLN	4	3	3	10	2

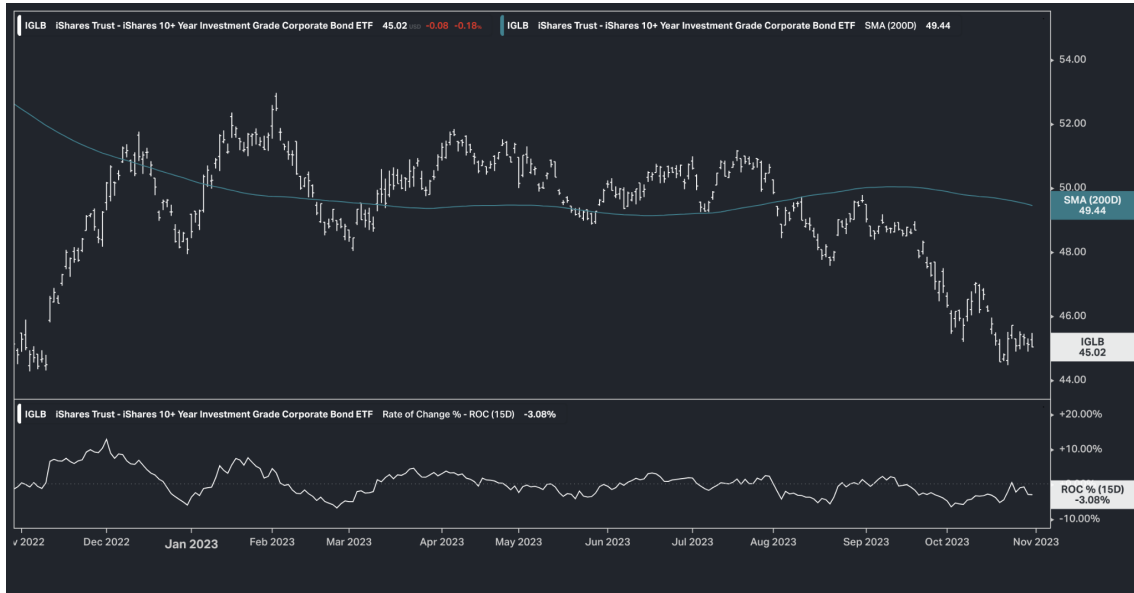


Trade Idea | IGLB - iShares 10+ Year Investment Grade Corporate Bond ETF

Fundamental 4 | Technical 10 | Sentiment 3 | Low Risk 10

AI Score 10 | Strong Buy

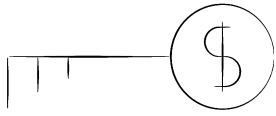
#357 of 2031 in ETFs, #9 of 230 in Investment Grade



iShares 10+ Year Investment Grade Corporate Bond ETF (IGLB) has an AI Score of 10/10 (Strong Buy) because its overall probability of beating the market (S&P 500) in the next 3 months (48.52%) is **+10.39%** vs. the average probability (38.13%) of US stocks analyzed by our Artificial Intelligence.

The AI-powered overall analysis of iShares 10+ Year Investment Grade Corporate Bond ETF (IGLB) is based on the 22 fundamental, technical, and sentiment features that are among the ones that had the greatest impact on the performance of ETFs during the last 12 months (alpha signals):

Type	Alpha Signal	Current Value	Odds to Beat Market	Signal Relevance
Technical	Chart pattern 120d	n/a	60.75%	98/100
Technical	Chart pattern 90d	n/a	59.51%	98/100
Sentiment	Niche	Long-Term	22.70%	96/100
Sentiment	Weighting Scheme	Market Value	24.92%	94/100
Sentiment	Focus	Investment Grade	24.96%	94/100
Sentiment	Asset Class	Bond	25.09%	94/100
Technical	MINUS DI 300d	34.27	49.60%	91/100
Technical	KAMA 200d	7.69%	49.30%	91/100
Technical	RSI 100	44.15	49.10%	90/100
Technical	MOM 90d	-5.16	48.04%	87/100

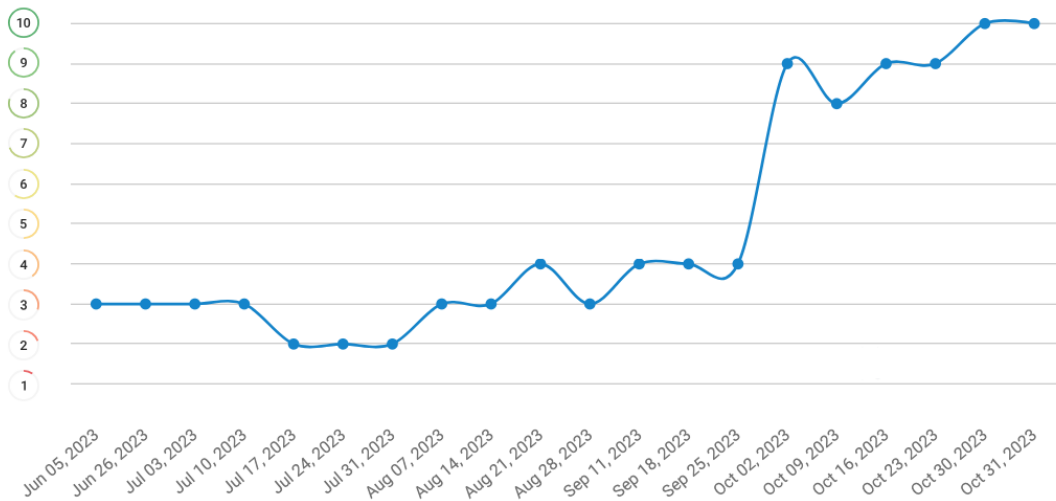


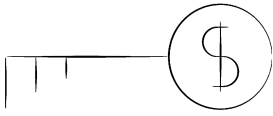
Average Past Performance & Win Rate

Three months after its 1083 Buy signals since January, 2017, IGLB had an average performance of **+1.56%** and a **59.43%** Win rate (positive performance).

1083 Past IGLB Buy Signals	1 Month Later	3 Months Later	6 Months Later	1 Year Later
Average Performance	0.47%	1.56%	2.47%	4.80%
Average Alpha	-2.00%	-3.10%	-5.38%	-21.01%
Win Rate (% Positive Perf.)	61.14%	59.43%	61.71%	68.67%
% Positive Alpha	31.43%	18.86%	26.86%	5.33%

AI Score Evolution





Trade Idea | LTPZ - PIMCO 15+ Year U.S. TIPS Index ETF

Fundamental 4 | Technical 10 | Sentiment 3 | Low Risk 10

AI Score 9 | Buy

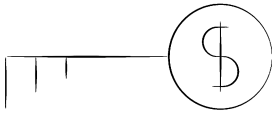
#444 of 2031 in ETFs, #13 of 230 in Investment Grade



PIMCO 15+ Year U.S. TIPS Index ETF (LTPZ) has an AI Score of 9/10 (Buy) because its overall probability of beating the market (S&P 500) in the next 3 months (47.41%) is **+9.28%** vs. the average probability (38.13%) of US stocks analyzed by our Artificial Intelligence.

The AI-powered overall analysis of PIMCO 15+ Year U.S. TIPS Index ETF (LTPZ) is based on the 22 fundamental, technical, and sentiment features that are among the ones that had the greatest impact on the performance of ETFs during the last 12 months (alpha signals):

Type	Alpha Signal	Current Value	Odds to Beat Market	Signal Relevance
Sentiment	Niche	Long-Term	22.70%	96/100
Sentiment	Issuer	Allianz Investment Management LLC	23.96%	95/100
Sentiment	Brand	PIMCO	23.96%	95/100
Sentiment	Weighting Scheme	Market Value	24.92%	94/100
Sentiment	Focus	Investment Grade	24.96%	94/100
Fundamental	Propectus Objective	Government Bond	24.97%	94/100
Sentiment	Asset Class	Bond	25.09%	94/100
Technical	TRIX 30d	-0.2	49.83%	92/100
Technical	TRIX 18d	-0.25	49.50%	91/100
Technical	KAMA 200d	11.07%	49.30%	91/100

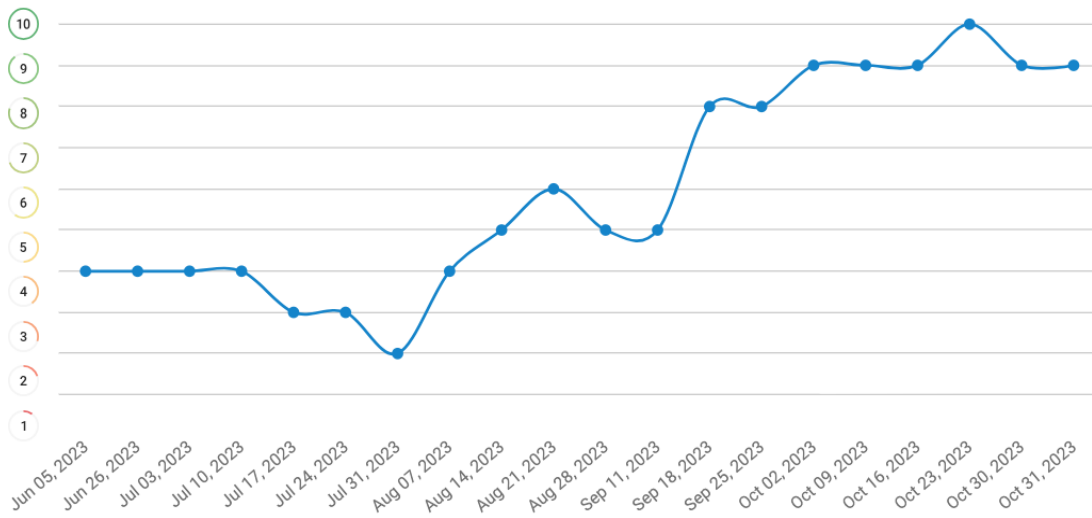


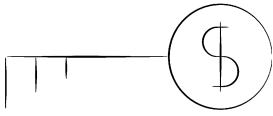
Average Past Performance & Win Rate

Three months after its 826 Buy signals since January, 2017, LTPZ had an average performance of **+0.94%** and a **68.39%** Win rate (positive performance).

826 Past LTPZ Buy Signals	1 Month Later	3 Months Later	6 Months Later	1 Year Later
Average Performance	1.02%	0.94%	2.17%	0.93%
Average Alpha	-1.81%	-7.49%	-11.62%	-30.20%
Win Rate (% Positive Perf.)	57.22%	68.39%	69.54%	61.64%
% Positive Alpha	31.55%	13.79%	8.62%	7.55%

AI Score Evolution



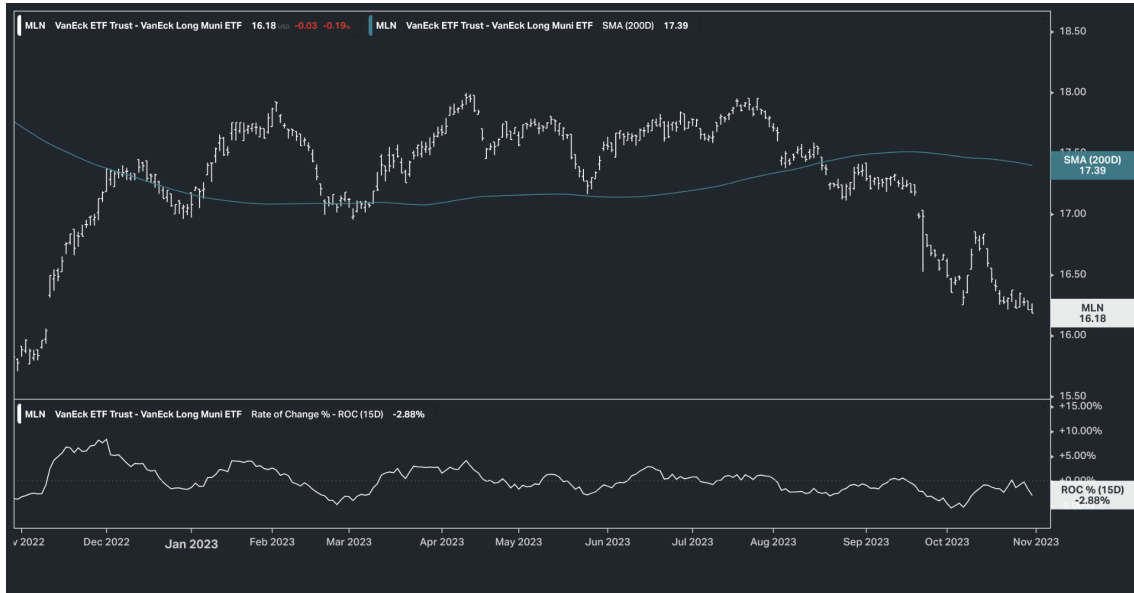


Trade Idea | MLN - VanEck Long Muni ETF

Fundamental 4 | Technical 9 | Sentiment 3 | Low Risk 10

AI Score 9 | Buy

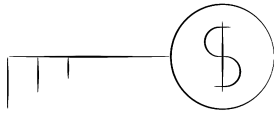
#743 of 2031 in ETFs, #21 of 230 in Investment Grade



VanEck Long Muni ETF (MLN) has an AI Score of 9/10 (Buy) because its overall probability of beating the market (S&P 500) in the next 3 months (44.55%) is **+6.42%** vs. the average probability (38.13%) of US stocks analyzed by our Artificial Intelligence.

The AI-powered overall analysis of VanEck Long Muni ETF (MLN) is based on the 23 fundamental, technical, and sentiment features that are among the ones that had the greatest impact on the performance of ETFs during the last 12 months (alpha signals):

Type	Alpha Signal	Current Value	Odds to Beat Market	Signal Relevance
Technical	Chart pattern 90d	n/a	59.51%	98/100
Sentiment	Niche	Long-Term	22.70%	96/100
Fundamental	Propectus Objective	Municipal Bond	23.60%	96/100
Sentiment	Weighting Scheme	Market Value	24.92%	94/100
Sentiment	Focus	Investment Grade	24.96%	94/100
Sentiment	Asset Class	Bond	25.09%	94/100
Technical	MINUS DI 300d	37.18	49.60%	91/100
Technical	RSI 100	42.38	49.10%	90/100
Technical	MIFI 180d	45.61	48.43%	88/100
Technical	Chart pattern 180d	n/a	28.37%	87/100

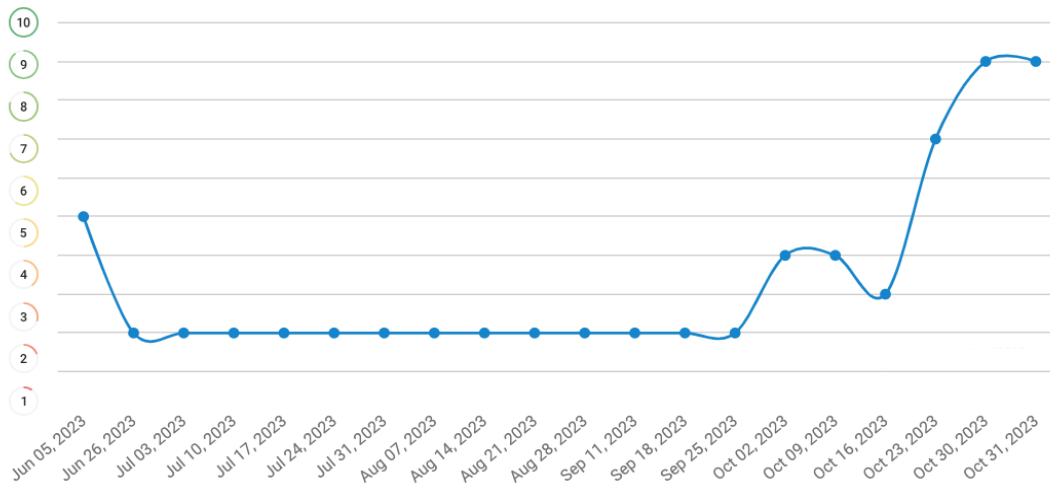


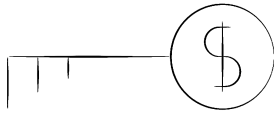
Average Past Performance & Win Rate

Three months after its 1136 Buy signals since January, 2017, MLN had an average performance of **+1.32%** and a **69.48%** Win rate (positive performance).

1136 Past MLN Buy Signals	1 Month Later	3 Months Later	6 Months Later	1 Year Later
Average Performance	0.05%	1.32%	1.86%	4.85%
Average Alpha	-2.12%	-3.97%	-2.33%	-14.70%
Win Rate (% Positive Perf.)	51.64%	69.48%	55.40%	83.89%
% Positive Alpha	32.39%	22.54%	45.54%	16.11%

AI Score Evolution



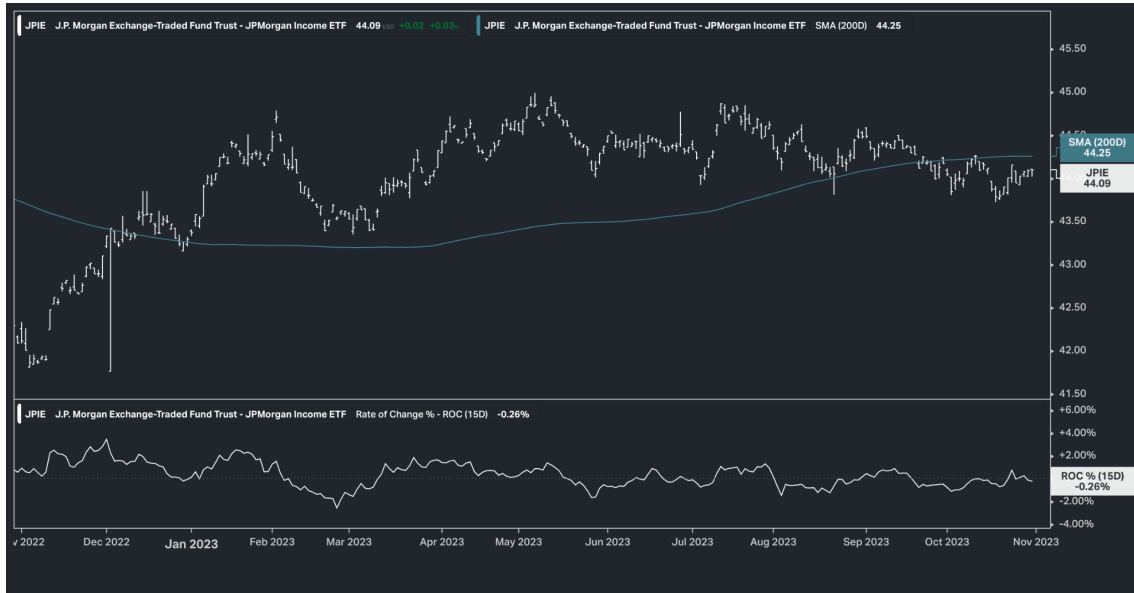


Trade Idea | JPIE - JPMorgan Income ETF

Fundamental 4 | Technical 2 | Sentiment 3 | Low Risk 10

AI Score 3 | Sell

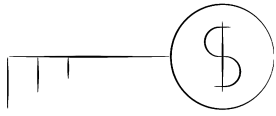
#1721 of 2031 in ETFs, #53 of 83 in Broad Credit



JPMorgan Income ETF (JPIE) has an AI Score of 3/10 (Sell) because its overall probability of beating the market (S&P 500) in the next 3 months (32.02%) is **-6.04%** vs. the average probability (38.06%) of US stocks analyzed by our Artificial Intelligence.

The AI-powered overall analysis of JPMorgan Income ETF (JPIE) is based on the 24 fundamental, technical, and sentiment features that are among the ones that had the greatest impact on the performance of ETFs during the last 12 months (alpha signals):

Type	Alpha Signal	Current Value	Odds to Beat Market	Signal Relevance
Technical	MINUS DI 90d	29.71	53.25%	96/100
Fundamental	Propectus Objctive	Multisector Bon	23.79%	95/100
Sentiment	Niche	Broad Maturities	24.18%	95/100
Sentiment	Focus	Broad Credit	24.93%	94/100
Sentiment	Asset Class	Bond	25.16%	94/100
Technical	Chart pattern 120d	n/a	26.23%	92/100
Technical	PLUS DI 180	15.4	47.44%	86/100
Fundamental	ETF Dividend Yield	5.16%	28.81%	85/100
Technical	RSI 100	45.49	47.28%	85/100
Technical	RSI SLOPE 90d	-0.05	46.94%	83/100

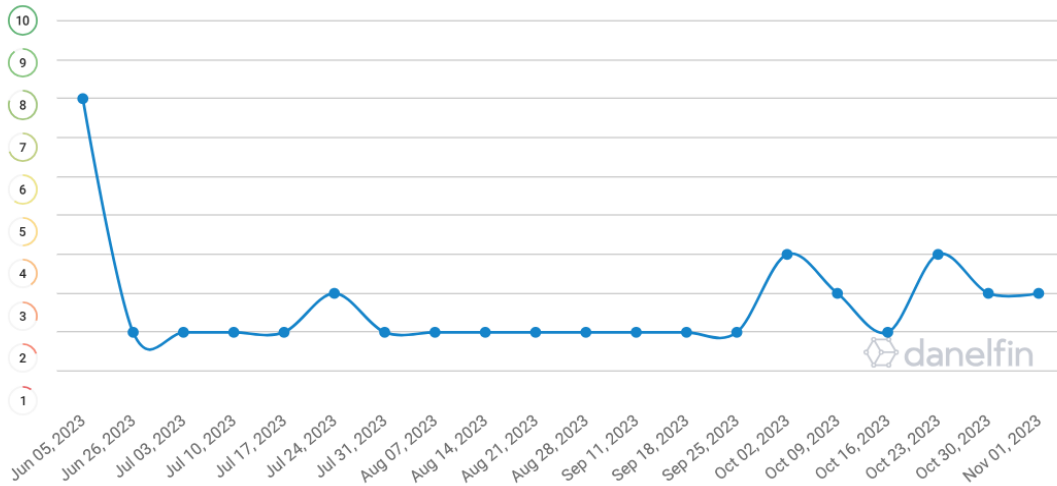


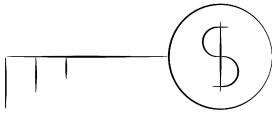
Average Past Performance & Win Rate

Three months after its 182 Sell signals since November, 2021, JPIE had an average performance of **-2.66%** and a **100.00%** Loss rate (negative performance).

182 Past JPIE sell Signals	1 Month Later	3 Months Later	6 Months Later	1 Year Later
Average Performance	-0.76%	-2.67%	-5.04%	-6.32%
Average Alpha	0.31%	2.85%	6.86%	4.88%
Loss Rate (% Negative Perf.)	80.00%	100.00%	100.00%	100.00%
% Negative Alpha	41.76%	19.53%	8.42%	8.42%

AI Score Evolution



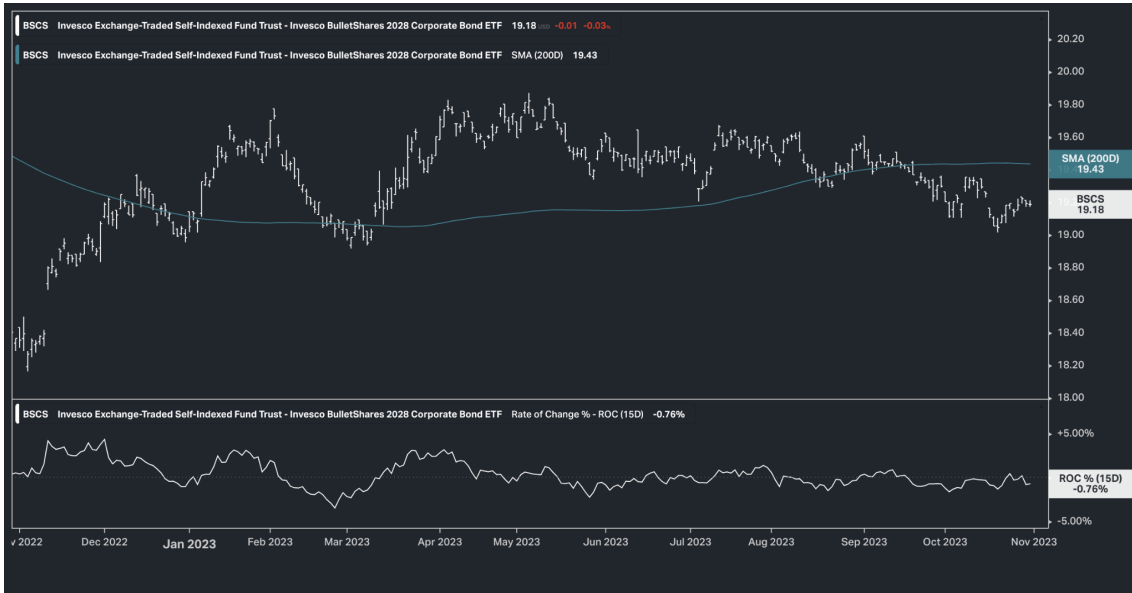


Trade Idea | BSCS - Invesco BulletShares 2028 Corporate Bond ETF

Fundamental 4 | Technical 2 | Sentiment 3 | Low Risk 10

AI Score 3 | Sell

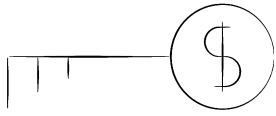
#1427 of 2156 in ETFs, #47 of 237 in Investment Grade



Invesco BulletShares 2028 Corporate Bond ETF (BSCS) has an AI Score of 3/10 (Sell) because its overall probability of beating the market (S&P 500) in the next 3 months (32.52%) is **-5.54%** vs. the average probability (38.06%) of US stocks analyzed by our Artificial Intelligence.

The AI-powered overall analysis of Invesco BulletShares 2028 Corporate Bond ETF (BSCS) is based on the 24 fundamental, technical, and sentiment features that are among the ones that had the greatest impact on the performance of ETFs during the last 12 months (alpha signals):

Type	Alpha Signal	Current Value	Odds to Beat Market	Signal Relevance
Sentiment	Weighting Scheme	Market Value	24.97%	94/100
Sentiment	Focus	Investment Grade	25.03%	94/100
Sentiment	Asset Class	Bond	25.16%	94/100
Fundamental	Propectus Objective	Corporate Bond	25.41%	94/100
Technical	Chart pattern 120d	n/a	25.61%	93/100
Sentiment	Niche	Intermediate	25.83%	93/100
Sentiment	Strategy	Bullet Maturity	26.45%	92/100
Technical	Chart pattern 180d	n/a	30.49%	75/100
Technical	Chart pattern 90d	n/a	31.41%	68/100
Technical	DC Phase	-228.13%	44.38%	64/100

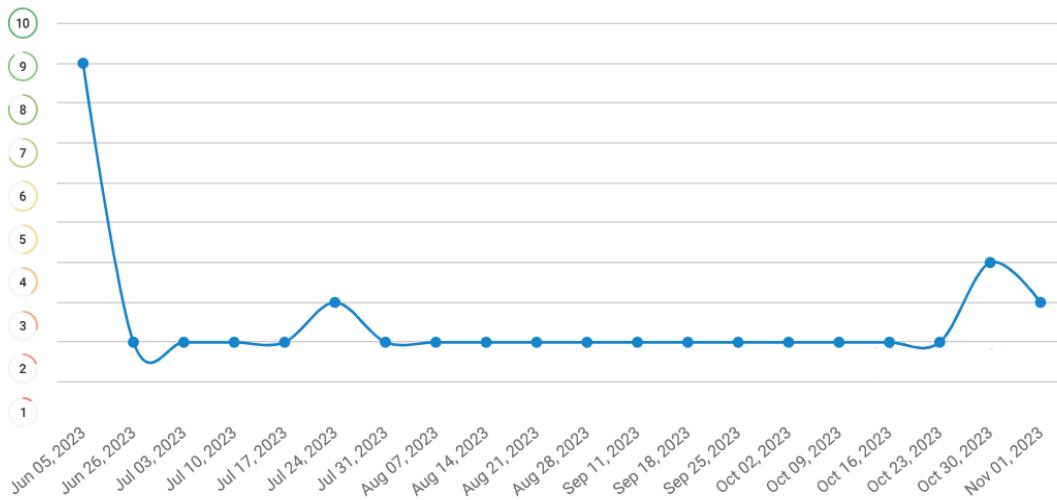


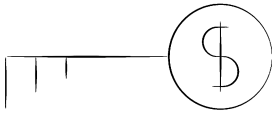
Average Past Performance & Win Rate

Three months after its 583 Sell signals since August, 2018, BSCS had an average performance of **-0.74%** and a **60.54%** Loss rate (negative performance).

583 Past BSCS sell Signals	1 Month Later	3 Months Later	6 Months Later	1 Year Later
Average Performance	-0.26%	-0.74%	-1.09%	-2.05%
Average Alpha	0.55%	-1.07%	-4.02%	-4.61%
Loss Rate (% Negative Perf.)	55.50%	60.54%	48.05%	63.45%
% Negative Alpha	57.80%	59.39%	63.24%	53.18%

AI Score Evolution





Trade Idea | IVOL - Quadratic Interest Rate Volatility & Inflation Hedge ETF

Fundamental 5 | Technical 3 | Sentiment 2 | Low Risk 10

AI Score 3 | Sell

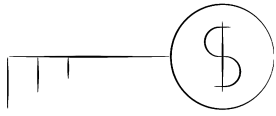
#1505 of 2156 in ETFs, #59 of 237 in Investment Grade



Quadratic Interest Rate Volatility and Inflation Hedge ETF New (IVOL) has an AI Score of 3/10 (Sell) because its overall probability of beating the market (S&P 500) in the next 3 months (31.93%) is **-6.13%** vs. the average probability (38.06%) of US stocks analyzed by our Artificial Intelligence.

The AI-powered overall analysis of Quadratic Interest Rate Volatility and Inflation Hedge ETF New (IVOL) is based on the 24 fundamental, technical, and sentiment features that are among the ones that had the greatest impact on the performance of ETFs during the last 12 months (alpha signals):

Type	Alpha Signal	Current Value	Odds to Beat Market	Signal Relevance
Sentiment	Issuer	CICC	20.20%	97/100
Sentiment	Niche	Broad Maturities	24.18%	95/100
Sentiment	Focus	Investment Grade	25.03%	94/100
Sentiment	Asset Class	Bond	25.16%	94/100
Technical	DC Period	2192.45%	44.27%	63/100
Technical	DX	2%	44.37%	64/100
Technical	SLOWD	68.66	44.37%	64/100
Technical	Upside based on 90-day Price Forecast (lower bound)	-10.96%	44.41%	65/100
Technical	PLUS DI 180	22.92	44.43%	65/100
Technical	DC Phase	4082.27%	44.43%	65/100

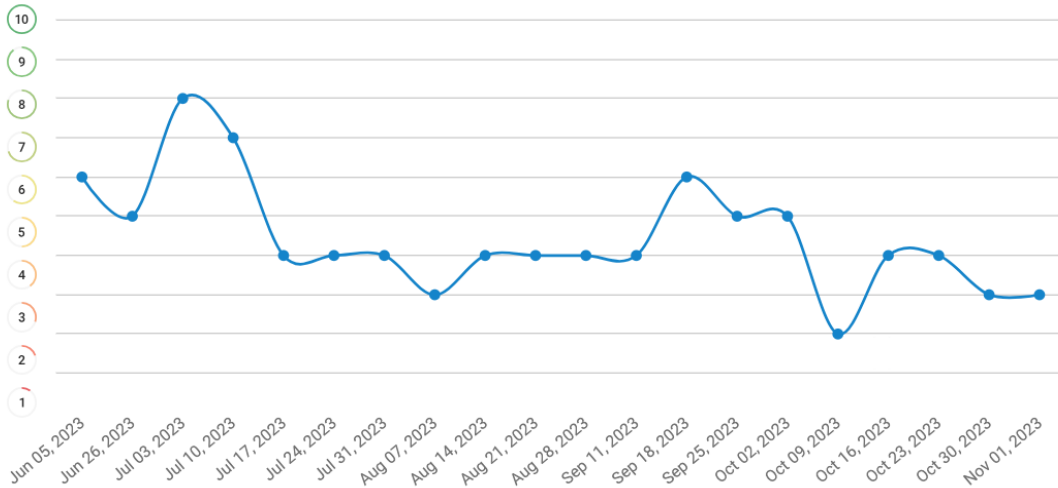


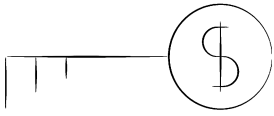
Average Past Performance & Win Rate

Three months after its 368 Sell signals since May, 2019, IVOL had an average performance of **-0.67%** and a **63.11%** Loss rate (negative performance).

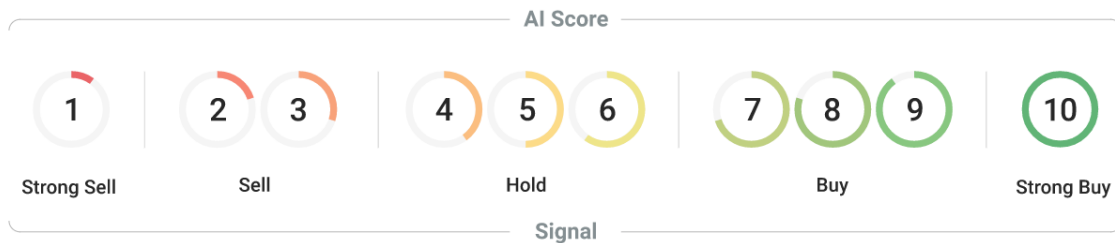
368 Past IVOL sell Signals	1 Month Later	3 Months Later	6 Months Later	1 Year Later
Average Performance	-0.11%	-0.67%	-2.00%	-7.67%
Average Alpha	-1.34%	-3.43%	-5.78%	-8.61%
Loss Rate (% Negative Perf.)	51.98%	63.11%	80.12%	86.46%
% Negative Alpha	69.77%	75.22%	74.64%	74.64%

AI Score Evolution





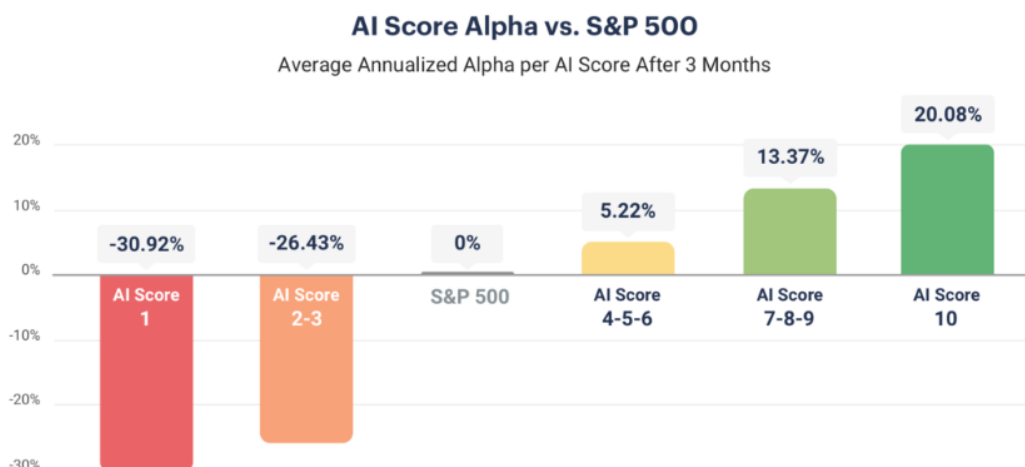
GRYNING | CAPITAL is a stock analytics research firm powered by Explainable Artificial Intelligence. It rates stocks and ETFs with an easy-to-understand global AI Score, ranging from 1 to 10; the higher the score, the higher the probability of beating the market in the next 3 months.

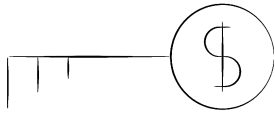


Our AI transforms hundreds of complex stock/ETFs indicators and thousands of stock/ETFs features to rate stocks and ETFs with an easy-to-understand score: the AI Score. The AI Score rates stocks and ETFs according to the probability of beating the market in the next 3 months. For U.S. Listed Single Stocks and ETF's, the benchmark is the S&P 500 TR index, and for European Stocks, it is the STOXX Europe 600 index. Stocks and ETFs with the highest AI Scores (7 to 10) have a higher probability of outperforming the market, while stocks and ETFs with the lowest AI Scores (1 to 3) have a lower probability.

Our Artificial Intelligence calculates probabilities, not certainties. The AI Scores and the ratings/signals should be used as useful but not infallible information to complement your own investment decision process.

We continuously measure how successful is our Artificial Intelligence at ordering stocks and ETFs according to their potential of overperforming the market (generating alpha). Tickers with the highest AI Score (10/10) outperformed the market (S&P 500) by +20.08% on average after 3 months (annualized alpha) in the last 5 years, while stocks with the lowest AI Score (1/10) underperformed the market by -30.92% on average (annualized alpha).





Fundamental, Technical, Sentiment, and Low Risk Subscores

While the AI Score has a holistic approach, considering all the different types of information available for a stock or ETF, the Fundamental, Technical, and Sentiment subscores rate the probability of beating the market based only on those specific types of indicators.

These specific subscores can be helpful to enrich your investment strategy. For example, if you favor fundamental analysis when picking a stock or ETF, you could select the one with the highest Fundamental subscore between two with the same global AI Score. The same would apply to investors that usually favor technical or sentiment analysis in their stock/ETF picking process.

The Low Risk subscore rates the negative price fluctuations (semi-deviation) of the latest 500 days. The higher the Low Risk subscore, the lower the downside risk.

The AI Score is not the average of the subscores. The AI Score is calculated by analyzing all the data types available for a stock or ETF, independently of the specific subscores.

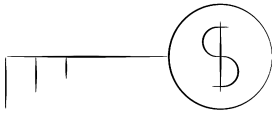
Understanding the Alpha Signals Behind our AI Scores

The alpha signals are the stock and ETF features that are more relevant to calculate the probability of beating the market. These alpha signals are ordered according to their alpha relevance. In the Scores Explanation table, alpha signals are represented as percentages; above 50% means a higher than average alpha odds, below 50% means a lower than average alpha odds.

AI Score Summary Sheet Example

AI Scores | Summary | 31 Oct 2023

Rank	I	II	III	IV	V	VI	VII	VIII	IX	X	XII
Sector	XLY	XLI	XLU	XLB	XLK	XLRE	XLP	XLC	XLF	XLV	XLE
Fundamental	7	7	6	7	6	6	6	6	6	5	7
Technical	7	7	7	7	7	7	6	6	7	6	6
Sentiment	7	7	7	7	7	7	6	6	7	5	7
AI Score	7	7	7	7	7	7	7	7	6	6	6
Leaders (stock)	BURL	UAL	BIPC	NGVT	SQ	CIGI	EL	ZD	AMG	RMD	CHRD
	AAP	ALK	BKH	FMC	DOCU	MAA	DAR	NXST	KMPR	ILMN	EE
Laggers (stock)	EJH	OP	CDZIP	FMST	IDAI	STRS	PETZ	TSAT	CLST	BNOX	GBR
	CNXA	ATXG	TVE	IPX	ASTI	GYRO	PAVS	BAOS	FRAF	SXTC	HUSA
Rank	I	II	III	IV	V	VI	VII	VIII	IX	X	
U.S. Leaders	Ticker	SQ	RMD	BURL	ILMN	UAL	ULTA	JD	DOCU	EL	ETSY
	AI Score	10	10	10	10	10	10	10	10	10	10
U.S. Lagers	Ticker	WPM	HLN	FNV	SAN	GSK	PCOR	PPL	PNW	WMB	OHI
	AI Score	5	5	5	5	5	5	5	5	5	5
ETF Leaders	Ticker	ALTL	IHI	ECH	LIT	DRIV	MORT	EDV	REM	BOTZ	IJS
	AI Score	10	10	10	10	10	10	10	10	10	10
ETF Lagers	Ticker	VTC	ULST	IBDP	NYF	MEAR	LVHI	BND	USIG	FTSM	QLTA
	AI Score	2	2	2	2	2	2	2	2	2	2
Euro Leaders	Ticker	BAMI	CBKG	BNPP	SAN	RBIV	RENA	CABK	ISP	BARC	BBVA
	AI Score	9	9	9	9	9	9	9	9	9	9
Euro Lagers	Ticker	BIOX	ETL	SIM	TELIA	ALLN	PUMG	UHR	PHNX	TEMN	HUHV
	AI Score	4	4	4	4	4	4	4	4	4	4
Movers	Ticker	SNY	GNTX	AMH	SWAV	NVS	RIVN	NET	ONON	DG	FOX
	AI Score	9	9	8	9	9	5	7	7	7	7
	Change (1Wk)	3	3	3	2	2	-3	-2	-2	-2	-2
Europe	Ticker	CRH	PKO	RR	EQR	SGOB	CNHI	CDR	OMU	HEIN	SES
	AI Score	8	9	9	9	9	4	5	5	4	5
	Change (1Wk)	4	4	4	4	4	-4	-4	-4	-3	-3



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