

Value Trap Indicator v7.0

– Backtesting Results –

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Executive Summary

Ever since the first version of the Value Trap Indicator was released in April 2015, the tool has consistently proved its ability to identify companies likely to go bankrupt, through simple inputs from financial statements.

After 6 iterative versions of the Value Trap Indicator, mostly to improve user experience and interface, the formula has finally evolved to a v7.0. This latest update maintains the same bankruptcy predictive power of previous versions, but makes fundamental changes to the underlying formula—with the help of powerful computing and broad swathes of data sets.

VTI v7.0 Backtest: 2003-2018

Expanding the scope past previous bankruptcies and into a large dataset of stocks and their key financials, the new formula (v7.0) shows a **predicative** power in avoiding the Value Trap type stocks that are more likely, on average, to underperform a universe of stocks (4,000+) both in frequency and by average total return.

- The 1y, 2y, 3y, and 5y CAGR is calculated after each VTI signal.
- An average of total median performance per year compared to the universe returns a difference of -0.7% CAGR over this examined time period.

The Evolution from v6.0 to v7.0

Not only have the formulas to calculate the VTI score changed, but the application of the score has transformed from a strictly **static** Strong Buy / Strong Sell signal, to an indicator **monitoring adverse developments** in the business (as a “No Buy” / Strong Sell).

- A lack of a dividend payment no longer disqualifies a company automatically.
- More of an emphasis on changes in financials rather than absolute values.
- An average of 18%-25% of companies as a Strong Sell vs 43%-57% in v6.0.
- Much improved signaling of low return stocks with the VTI v7.0 Strong Sell vs v6.0.

The 30 Biggest Bankruptcies – VTI v7.0

Company Name	Date Failed	VTI Signals
THQ	2012	2011
Borders Group	2011	2007
AMR Corp	2011	2008
MF Global	2011	2010
Hollywood Video (Movie Gallery)	2010	2005
Blockbuster	2010	2009, 2008
Spansion	2009	2008
Spectrum Brands	2009	2006
Silicon Graphics	2009	2008
Nortel	2009	2007, 2005
Monaco Coach Corp	2009	2005
Hartmarx Corp	2009	2007
Gottschalks	2009	2008
CIT Group Inc	2009	none
Resolute Forest	2009	n/a
Washington Mutual	2008	2007
Tribune Company	2008	2006
Pilgrim's Corp	2009	2007, 2006
Lehman Brothers	2008	2007
Countrywide Financial	2008	2007
Circuit City	2008	2004
Acclaim Entertainment	2004	2003, 1999
Loral Space & Comm.	2003	2002, 2000
The 3DO Company	2003	2002, 2001
Worldcom	2002	none
WCOM Tracking Stock	2002	2001
Global Crossing	2002	2000
Adelphia Comm.	2002	2000
HomeBase	2001	2001
Enron	2001	2000

Summary: Biggest Bankruptcies

For Value Trap Indicator v1.0 – v6.0, the formula was successful in avoiding 29 out of 30 (97%) of the biggest bankruptcies of the 21st century. In other words, in only 1 stock out of 30 would the investor have been guided to a Strong Buy in a stock that quickly went bankrupt.

With the latest conversion to v7.0, the Value Trap Indicator would've maintained a similar track record. Of the 30 stocks, 27 of 29 (93%) would've flashed a VTI Strong Sell within one of the previous 5 years prior to bankruptcy.

One of the stocks, Resolute Forest, would not qualify in this test due to only 1 year of publicly available stock price data in the company's 10-k. With the new VTI v7.0, at least 2 years of financials are required to be inputted, since the new indicator now looks at the change in VTI values rather than an absolute value independent of context.

Backtest Results – VTI v7.0 vs All Stocks

This first table shows the **median** in 1y and 2y CAGR return on a stock with a VTI v7.0 Strong Sell vs all of the stocks in the universe (4,000+) over the same time period. The final row in the 1y and 2y NET column shows the average of this set of **median** values per year.

The -0.6% average for 1y_NET medians and -0.8% average for 2y_NET medians shows that a VTI v7.0 Strong Sell was most likely to underperform all stocks over the selected time period. Good signal.

MEDIAN	1y_ALL	1y_VTI	1y_NET	2y_ALL	2y_VTI	2y_NET
2003	22.8%	23.9%	1.1%	16.4%	19.0%	2.6%
2004	9.3%	9.4%	0.1%	12.4%	12.9%	0.5%
2005	14.6%	14.8%	0.2%	8.5%	8.3%	-0.2%
2006	2.6%	-5.9%	-8.5%	-15.2%	-25.0%	-9.8%
2007	-32.8%	-44.8%	-12.0%	-12.2%	-11.7%	0.5%
2008	16.6%	35.4%	18.8%	19.0%	27.0%	8.0%
2009	22.7%	18.9%	-3.8%	12.2%	6.9%	-5.3%
2010	0.3%	0.2%	-0.1%	4.9%	5.2%	0.3%
2011	9.9%	9.0%	-0.9%	19.8%	20.5%	0.7%
2012	30.9%	33.3%	2.4%	19.7%	18.9%	-0.8%
2013	7.3%	4.7%	-2.6%	3.0%	-0.8%	-3.8%
2014	-2.4%	-2.7%	-0.3%	3.7%	2.8%	-0.9%
2015	11.3%	10.5%	-0.8%	14.0%	13.8%	-0.2%
2016	15.5%	15.6%	0.1%	3.7%	2.8%	-0.9%
2017	15.4%	11.4%	-4.0%	3.7%	1.6%	-2.1%
2018	15.4%	16.5%	1.1%			
AVG	10.0%	9.4%	-0.6%	7.6%	6.8%	-0.8%

This second table shows the **median** in 3y and 5y CAGR return on a stock with a VTI v7.0 Strong Sell vs all of the stocks in the universe (4,000+) over the same time period. The final row in the 3y and 5y NET column shows the average of this set of **median** values per year.

The -1.4% average for 3y_NET medians and -0.1% average for 5y_NET medians shows that a VTI v7.0 Strong Sell was most likely to underperform all stocks over the selected time period. Good signal.

MEDIAN	3y ALL	3y VTI	3y NET	5y ALL	5y VTI	5y NET
2003	16.2%	18.0%	1.8%	4.7%	5.3%	0.6%
2004	8.6%	8.7%	0.1%	2.4%	3.4%	1.0%
2005	-6.5%	-12.0%	-5.5%	2.6%	3.3%	0.7%
2006	-3.9%	-11.9%	-8.0%	-0.7%	-2.7%	-2.0%
2007	-1.7%	-0.5%	1.2%	0.8%	1.3%	0.5%
2008	12.2%	14.8%	2.6%	15.2%	18.4%	3.2%
2009	11.5%	9.2%	-2.3%	14.6%	14.4%	-0.2%
2010	12.9%	13.0%	0.1%	8.9%	8.3%	-0.6%
2011	16.2%	15.7%	-0.5%	11.6%	11.4%	-0.2%
2012	11.7%	9.9%	-1.8%	4.5%	1.8%	-2.7%
2013	5.6%	1.9%	-3.7%	4.3%	2.4%	-1.9%
2014	7.0%	5.9%	-1.1%			
2015	6.8%	6.2%	-0.6%			
2016	5.5%	3.6%	-1.9%			
2017						
2018						
AVG	7.3%	5.9%	-1.4%	6.3%	6.1%	-0.1%

Backtest – The 4,000+ Stocks Universe

This backtest took a list of all of the stocks in the NYSE and all of the stocks in the NASDAQ, and calculated VTI v7.0 scores and 1y, 2y, 3y, and 5y CAGR returns for each year examined.

For example, a 1y CAGR return calculation for 2010 took the market capitalization of the stock in 2011 and 2010 and calculated a 1y CAGR return, as well as recorded the VTI v7.0 score for 2010. The 2y CAGR calculation was also recorded by taking the market capitalization of the stock in 2012 and 2010 and calculating that return, with the same approach for 3y and 5y CAGR returns.

Only stocks with enough data for a VTI v7.0 calculation were included, and market capitalization data for each 1y, 2y, 3y, and 5y CAGR return was needed to record that stock for that data point.

In the case that this data was not relatively available from the dataset examined, the stock was excluded from the backtest for the year affected. This resulted in a range of 2,873 - 4,173 stocks as part of the ALL stocks universe in any given year.

The list of stocks examined, which may or may not have qualified for backtest results in any or all of the years based on data availability, included the following tickers for the **NYSE**:

A AA AAN AAP AAT AB ABB ABBV ABC ABEV ABG ABM ABR ABT AC ACA ACB ACC ACH ACM ACN ACP ACRE ACV ADC ADM ADNT ADS ADSW ADT ADX AEB AEE AEG AEL AEM AEO AEP AER AES AFB AFC AFG AFGC AFI AFL AFT AG AGCO AGD AGI AGM AGM.A AGN AGO AGR AGRO AGS AGX AHC AHH AHT AI AIF AIG AIN AIO AIR AIT AIV AIZ AJG AJRD AJX AKO.B AKR AKS AL ALB ALC ALE ALEX ALG ALK ALL ALLE ALLY ALSN ALV ALX AM AMBC AMC AMCR AME AMG AMH AMK AMN AMOV AMP AMPY AMRC AMXR AMT AMX ANET ANF ANH ANTM AOD AON AOS AP APA PMAP APD APH APHA APLP APO APRN APTV APY AQN AQUA AR ARA ARC ARCH ARCO ARD ARDC ARE ARES ARGO ARI ARL AROL ARMK ARNC AROC ARR ARW ASA ASB ASC ASGN ASH ASIX ASPN ASR ASX AT ATEN ATGE ATH ATHM ATI ATKR ATO ATR ATTO ATUS ATV AU AUY AVA AVAL AVB AVD AVH AVK AVL R AVNS AVTR AVX AVY AVYA AWF AWI AWK AWP AWR AX AXE AXL AXP AXR AXS AXTA AYI AYR AYX AZN AZO AZRE AZUL AZZ B BA BABA BAC BAF BAH BAM BANC BAP BAX BB BBAR BBD BBDO BBF BBK BBL BBN BBVA BBW BBX BBY BC BCC BCE BCEI BCH BCO BCRH BCS BCSF BCX BDC BDJ BDN BDX BE BEDU BEN BEP BERY BEST BF.A BF.B BFAM BFK BFO BFS BFY BFZ BG BGB BGG BGH BGIO BGR BGS BGSF BGT BGX BGY BH BH.A BHC BHE BHK BHBL BH PBP BHR BHV BHVN BIF BIG BILL BIO BIO.B BIP BIT BITA BJ BK BKD BKE BKH BKI BKN BKR BKT BKT BKL BLD BLL BLW BLX BMA BME BMI BMO BMY BNED BNS BNY BOE BOH BOOT BORR BOX BP BPMP BPT BQH BR BRBR BRC BRFS.B BRK.B BRO BRT BRX BSA BSAC BSBR BSD BSE BSIG BSL BSM BSMX BST BSX BTA BTE BTI BTO BTT BTU BUD BUI BURL BV BNW BWG BWXT BX BXC BXG BXMT BXMX BXP BXS BY BYD BYM BZH BZM C CAAP CABO CACI CADE CAE CAF CAG CAH CAI CAJ CAL CALX CANG CAPL CARS CAT CATO CB CBB CBD CBH CBL CBRE CBT CBU CBZ CC CCC CCEP CCH CCI CCJ CCK CCL CCM CCO CCR CCS CCU CCX CCZ CDAY CDE CDR CE CEA CEE CEIX CEL CELP CEM CEN CEO CEPU CEQP CF CFG CFR CFX FXA CGA CGC CHA CHAP CHCT CHD CHE CHGG CHH CHK CHL CHMI CHN CHRA CHS CHT CHU CHWY CI CIA CIB CIEN CIF CIG CIG.C CII CIM CINR CIO CIR CIT CKH CL CLB CLDR CLDT CLF CLGX CLH CLI CLNC CLNY CLPR CLR CLS CLW CLX CM CMA CMC CMM CMMG CMI CMO CMP CMRE CMS CMU CNA CNC CNF CNHI CNI CNK CNMD CNNE CNO CNP CNQ CNR CNS CNX CNXM CO CODI COE COF COG COLD COO COP COR CORR COTY CP CPA CPAC CPB CPE CPF CPQ CPK CPLG CPRI CPS CPT CR CRC CRD.A CRD.B CRH CRI CRK CRL CRM CRS CRT CRY CS CSL CSLT CSPR CSTM CSU CSV CTB CTK CTLT CTR CTRA CTS CTST CTT CTVA CTY CTZ CUB CUBE CUK CULP CURO CUZ CVE CVEO CVI CVIA CVNA CVS CW CWEN CWH CWK CWT CX CXE CXH CXO CXP CXW CYD CYH CZZ D DAC DAL DAN DAR DATA DB DBD DBI DBL DCF DCI DCO DCP DCUE DD DDD DDF DDS DDT DE DEA DECK DEI DELL DEO DESP DEX DFN DFP DFS DG DGX DHF DHI DHR DHT DHX DIAX DIN DIS DK DKL DKS DL DLB DLNG DLPH DLR DLX DMB DMO DNI DNK DNOW DNP DNR DO DOC DOOR DOV DOW DPG DPZ DQ DRD DRE DRH DRI DRQ DS DSE DSL DSM DSSI DSU DSX DT DTE DTF DTY DUC DUK DVA DVD DVN DX DXB DXC DY E EAF EAI EARN EAT EB EBF EBR EBR.B EBS EC ECC ECL ECOM ECT ED EDD EDF EDI EDN EDU EE EEA EEX EFC EFF EFL EFR EFT EFX EGF EGHT EGF EGO EGP EGY EHC EHI EHT EIG EIX EL ELAN ECL ELP ELS ELVT ELY EMD EME EMF EMN EMO EMP EMR ENB ENBL ENIA ENIC ENLC ENR ENS ENV ENVA ENZ EOD EOG EOI EOS EOT EPAM EPC EPD EPR EPRT EQC EQH EQM EQN R EQR EQS EQT ERA ERF ERJ EROS ES ESE ES1 ESNT ESRT ESS ESTC ESTE ET ETB ETG ETH ETJ ETM ETN ETO ETR ETRN ETW ETX ETY EURN EV EVA EVC EVF EVN EVR EVRG EVRI EFT EVTC EW EXD EXG EXK EXP EXR EXTN F FAF FAM FBHS FBFM FBPP FC FCAU FCF FCN FCPT FCT FCX FDEU FDPD FDS FDX FE FE FU FEI FENG FEO FET FF FFA FFC FFG FG FGB FHN FI FICO FIF FINV FIS FIT FIV FIX FL FLC FLO FLOW FLR FLS FLT FLY FMC FMN FMS FMX FMY FN FNB FND FNF FNV FOE FOR FPAC FPF FPH FPI FPL FR FRA FRC FRO FRT FSB FSD FSK FSLY FSM FSS FT FTAI FTCH FTI FTK FTS FTSI FTV FUL FUN FVRR G GAB GAM GATX GBAB GBL GBX GCAP GCI GCO GCP GCV GD GDDY GDL GDO GDOT GDV GE GEF GEF.B GEL GEN GEO GER GES GF GFF GFI GFL GFY GGB GGG GGM GGT GGZ GHC GHG GHL GHM GHY GIB GIL GIM GIS GJT GKOS GL GLOB GLOG GLOP GLP GLT GLW GM GME GMED GMRE GMS GMZ GNC GNE GNK GNL GNRC GNT GNW GOF GOL GOLD GOLF GOOS GPC GPI GPK GPM GPN GPRK GPS GPX GRA GRAF GRAM GRC GRP.U GRUB GRX GS GSBD GSH GSL GSX GTES GTN.GA GTSA GTT GTX GTY GUT GVA GWB GWRE GWW H HAE HAL HASI HBB HBI HBM HCA HCC HCFT HCHC HCI HCR HD HDB HE HEI HEI.A HEP HEQ HES HESM HEXO HFC HFRO HGH HGV HHC HHS HI HIE HIG HII HIL HIO HIX HKIB HL HLF HLI HLT HLC HMC HMI HMLP HMN HMY HNHR HNI HNP HOG HOME HON HOV HP HPE HPF HPI HPQ HPR HPS HQH HQL HR HRB HRC HRI HRL HRTG HSBC HSC HST HSY HT HTA HTD HTGC HTH HTY HTZ HUBB HUBS HUD HUM HUN HUYA HVT HVT.A HXL HY HYB HYI HYT HZN HZO I IAA IAE IAG IBA IBM IBN IBP ICD ICE ICL IDA IDE IDT IEX IFF IFFT IFN IFS IGA IGD IGI IGR IGT IHC IHD IHG IHTH IID IIF IIM IIPR IMAX INF INFO INFY ING INGR INN INSI INSP INST INSW INT INVH INXN IO IP IPG IPHI IPI IQI IQV IR IRET IRL IRM IRR IRS IRT ISD IT ITCB ITGR ITT ITUB ITW IVC IVH IVR IVZ IX J JAX JBGS JBL JBR JBT JCAP JCE JCI JCP JDD JE JEF JELD JEQ JFR JGH JHB JHG JHI JHS JHX JHY JILL JKS JLL JLS JMEI JMF JMIA JMLP JMM JMP JNJ PR JPC JPI JPM JPS JPT JQC JRI JRO JRS JSD JT JTA JTD JW.A JW.B JWV K KAI KAMN KAR KB KBH KBR KDMN KDP KEM KEN KEP KEX KEY KEYS KF KFS KFY KGC KIM KIO KKR KL KMB KMF KMI KMPK KMT KMX KN KNL KNOP KNX KO KODK KOF KOP KOS KR KRA KRC KRF KRG KRO KRP KSM KSS KSU KT KTB KTF KTN KW KWR KYN L LAC LAD LADR LAIX LAZ LB LBRT LC LCI LCL LDL LDOS LDP LEA LEAF LEE LEG LEJU LEN LEN.B LEO LEVI LFC LGC LGC.U LGF.B LGI L LGI LHC LHC.U LH X LI LIN LINX LITB LL LLY LM LMT LN LNC LND LNN LOMA LOW LPG LPI LPL LPX LRN LSI LTC LTHM LTM LUB LUV LVS LW LXFR LXU LYB LYG LYV LZB M MA MAA MAC MAIN MAN MANU MAS MATX MAV MAXR MBI MBT MC MCA MCB MCC MCD MCI MCK MCN MCO MCR MCS MCX MCY MD MDC MDLA MDLY MDP MDT MDU MEC MED MEI MEN MET MFA MFAC MFC MFD MFG MFGP MFL MFM MFT MFV MG MGA MGF MGM MPG MGR MGU MGY MHD MHE MHF MHI MHK MHN MHO MIC MIE MIN MITT MIXT MIY MKC MKC.V MKL MLI MLM MLP MLR MMC MMD MM1 MMM MMP MMS MMT MMU MN MNE MNK MNP MNR MNRL MO MOD MODN MOG.A MOG.B MOGU MOH MOS MOV MPA MPC MPLX MPV MPW MPW MQT MQY MR MRC MRK MRO MS MSA MSB MSC MSCI MSD MSGN MSI MSM MT MTD MTDR MTG MTH MTL MTN MTR MTRN MTT MTW MTX MTZ MUA MUC MUE MUFG MUH MUI MUJ MUR MUS MUSA MUX MVC MVF MVO MVT MWA MX MXE MXF MXL MYC MYD MYE MYF MYI MYJ MYN MYOY MZA NAC NAD NAN NAT NAZ NBB NBHC NBR NC NCA NCB NCLH NCR NCV NCZ NPD NE NEA NEE NEM NEP NET NEU NEV NEWR NEX NEXA NFG NFJ NGG NGL NGS NGVC NGVT NHA NHF NHI NI NID NIE NIM NINE NIO NIQ NJR NJV NKE NKG NKX NL NLS NLSN NLY NM NMFC NMI NMM NMR NMS NMT NMY NMZ NNA NNI NNY NOA NOAH NOC NOK NOM NOMD NOV NOVA NOW NP NPK NPN NPO NPTN NPV NQP NR NRG NRK NRP NRT NRZ NS NSA NSC NSCO NSL NSP NTB NTG NTP NTR NTZ NUE NUM NUO NUS NUV NUW NVG NVGS NVO NVR NVRO NVS NVT NVT NVA NWE NWIHM NWI NXI NXC NXJ NXN NXQ NXR NXRT NYCB NYT NYV NZF O OBE OC OCN ODC OEC OFC OFG OGE OGS OHI OI OIA OII OIS OKE OLN OLP OMC OMF OM1 OMN ONDK ONE ONTO OOMA OPP OPY OR ORA ORAN ORC ORCC ORCL ORI ORN OSB OSG OSK OUT OXM OXY PAA PAC PACD PACK PAG PAGS PAGS PAI PAM PANW PAR PARR PAYC PB PBA PBF PBFX PBH PBI PBR PBR.A PBT PBY PCF PCG PCI PCK PCM PCN PCQ PD PDI PDM PDS PDT PE PEAK PEB PEG PEI PEN PEO PER PFD PFE PGFC PFL PFN PFO PFSI PG PGP PGR PGRE PGTI PGZ PH PHD PHG PHI PHK PHM PHR PHT PHX PIC PII PIN PING PINS PJT PK PKE PKG PKI PKO PKX PLAN PLD PLNT PLW PLT PLWY PM PMF PML PMT PMX PNC PNF PNI PNM PNR PNW POL POR POST PPG PPL PPR PPT PPX PQG PRA PRG PRH PRI PRLB PRMW PRO PROS PRS PRSP PRT PRTY PRU PSA PSB PSF PSN PSO PSTG PSTL PSV PSX PSXP PTR PTY PUK PUMP PVG PVH PVL PWR PXD PYN PYS PYT PYX PZC PZN QD QEP QES QGEN QHC QSR QTS QTWO QUAD QUOT R RA RACE RAD RAMP RBA RBC RBS RC RCI RCL RCP RCS RCUS RDN RDS.A RDS.B RDY RE RELX RENN RES RESI REV REVG REX REXR REZI RF RF1 RFL RFP RGA RGR RGS RGT RH RHI RHP RIG RIO RIV RJF RL RLGY RLH RLI RLJ RM RMAX RMD RMED RMG RMI RMM RMT RNG RNGR RNP RNR ROG ROK ROL ROP ROYT RP1 RPM RPT RQ1 RRC RRD RRTS RS RSG RST RTN RTW RUBI RVI RVL RVT RWT RXN RY RYAM RYB RYI RYN S SA SAFE SAH SAIC SAIL SALT SAM SAN SAND SAP SAR SAVE SB SBH SBI SBW SBR SBS SC SCA SCCC SCD SCHW SCI SCL SCM SCPE SCS SCU SCX SD DRDL SE SEAS SEE SEM SERV SF SFE SFL SFUN SGU SHAK SHG SHI SHLL SHLX SHO SHOP SHW SI SID SIG SITC SITE SIX SJI SJII SJM SJR SJT SJW SKM SKT SKX SKY SLB SLCA SLF SLG SM SMAR SMFG SMG SMHI SMLPL SMM SMP SNA SNAP SNDR SNE SNN SNP SNR SNV SNX SO SOGO SOI SOL SOLN SON SOR SPAQ SPB SPCE SPE SPG SPGI SPH SPLP SPN SPOT SPR SPX SPXX SQ SQM SQNS SR SRC SRE SRF SRG SRI SRL SRLP SRT SRV SSD SSI SSL SSTK ST STAG STAR STE STG STK STL STM STN STNG STON STOR STT STWD STZ STZ.B SU SUI SUM SUN SUP SUPV SUZ SWCH SWI SWK SWM SWN SWP SWX SXC SXI SXT SYF SYK SYX SYY SZC T TAC TAK TAL TALO TAP TAP.A TARO TBI TCI TCO TCP TCS TD TDC TDF TDO TDS TDW TDY TECK TEF TEI TEL TEN TE0 TEVA TEX TFII TXF TG TGE TGH TGI TGNA TGP TGS TGT THC THG THO THQ THR THS THW TIF TISI TJX TK TKC TKR TLI TLK TLRA TLRD TLYS TM TME TMHC TMO TMST TNC TNET TNK TNP TOL TOT TPB TPC TPL TPR TPVG TPX TPZ TR TRC TREX TRGP TRI TRN TRNE TRNO TROX TRP TRQ TRTN TRX TRU TRV TRWH TS TSE TSI TSLF TSLX TSM TSQ TSU TT TTC TTI TTM TTP TU TUFN TUP TV TVC TVE TWI TWN TWO TWTR TX TXT TY TYG TYL UA UAA UAN UBA UBER UBP UBS UDR UE UFI UFS UGI UGP UHS UHT UI UIS UL UMC UMH UN UNF UNFI UNH UNM UNP UNT UNVR UPS URI USA USAC USB USDP USFD USM USNA USPH USX UTP UTI UTL UTX UVE UVV V VAC VAL VALE VAM VAPO VAR VBF VCR A VCV VEC VEDL VEE VEL VER VET VFC VGI VGM VGR VHI VICI VIPS VIST VIV VJET VKQ VLO VLRS VLT VMC VMI VMO VMW VNCE VNE VNO VNTR VOC VOYA VPG VPV VRS VRT VRTV VSH VSLR VST VTO VTA VTN VTR VVI VVR VVV VZ W WAAS WAL WAT WBAI WBC WBK WBS WBT WCC WCN WD WDR WEA WEC WEI WELL WES WEX WF WFC WGO WH WHD WHG WHR WIA WIT WIW WK WLK WLKP WLL WM WMB WMC WMK WMS WMT WNC WNS WOR WORK WOW WPC WPG WPM WPP WPX WRB WRE WRI WRK WSM WSO.B WSR WST WTI WTM WTRU WTS WTTR WU WUBA WWW WY WYND X XAN XEC XFLT XHR XIN XOM XPO XRF XRX XYF XYL Y YELP YETI YEXT YPF YRD YUM YUMC ZAYO ZBH ZEN ZNH ZTO ZTR ZTS ZUO ZYME

The list of stocks examined, which may or may not have qualified for backtest results in any or all of the years based on data availability, included the following tickers for the **NASDAQ**:

AAL AAME AAOI AAON AAPL AAWW AAXN ABCB ABEO ABMD ABT ABUS ACAD ACBI ACER ACGL ACHC ACHV ACIA ACIU ACIW ACLS ACMR ACNB ACOR ACRS ACRX ACST ACTG ADAP ADBE ADES ADI ADMA ADMP ADPS ADPT ADRO ADSK ADTN ADUS ADVM ADXS AEGN AEHR AEIS AEMD AERI AESE AEY AEYE AEZS AFH AFIN AFMD AFYA AGEN AGFS AGIO AGLE AGMH AGNC AGTC AGYS AHPI AIA AIHS AIMC AINV AIQ AIRG AIRT AKAM AKBA AKCA AKER AKRX AKTS ALBO ALCO ALEC ALGN ALGT ALIM ALJJ ALKS ALLT ALNY ALOT ALPN ALRM ALRS ALSK ALT ALTM ALTR ALXN ALYA AMAG AMAL AMAT AMBA AMCX AMD AMED AMEH AMGN AMKR AMNB AMOT AMPH AMRB AMRH AMRK AMRN AMRS AMSF AMSWA AMTB AMTBB AMTD AMTX AMWD AMZN ANAB ANAT ANDE ANGI ANGO ANIK ANIP ANIX ANSS ANTE ANY AOBC AOSL APDN APIA APEN APEX APOG APPF APPN APPS APTO APTX APVO APWC APYX AQB AQMS AQST ARAV ARAY ARCB ARCC ARCE ARCT ARDS ARDX AREC ARGX ARKR ARLP ARNA AROW ARPO ARTNA ARTW ARVN ARWR ASFI ASLN ASMB ASML ASNA ASND ASPS ASPU ASRT ASRV ASTC ASTE ASUR ASYS ATAX ATEC ATEX ATHE ATHX ATIF ATLC ATLO ATNI ATNX ATOM ATOS ATRC ATRI ATRO ATRS ATSG ATVI AUB AUBN AUDC AUPH AUTL AUTO AVAV AVCO AVDL AVEO AVG0 AVGR AVID AVNW AVT AWRE AXAS AXDX AXGN AXNX AXTI AY AYTU AZPN BAND BANF BANX BASI BATRA BATRK BBBY BBCP BBGI BBI BBIO BBSI BCBP BCDA BCML BCOM BCOR BCOW BCOP BCPC BCRX BCTF BCYC BDGE BDSI BEAT BECN BELFA BELFB BFC BFNF BFRA BFST BGCP BGFW BGNE BHF BHTG BIDU BIIB BILI BIMI BIOC BIOL BIS BJRI BKCC BKEP BKNG BKSC BKYI BL BLBD BLCM BLDP BLDR BLFS BLIN BLKB BLMN BLNK BLU BLUE BMCH BMRA BMRC BMRN BMTC BND BNFT BNGO BNSO BNTC BNTX BOCH BOKF BOMN BOOM BOSC BOTJ BOXL BPFFH BPMC BPOP BPRN BPTH BPY BREW BRID BRKL BRKR BRKS BRQS BRY BSET BSQR BSRR BSTC BSVN BUG BURG BUSE BVSN BWY BWB BWEN BWFG BYFC BYND BZUN CAAS CAC CACC CAKE CALA CALB CALM CAMP CAMT CAN CAPR CAR CARE CARG CARO CARV CASA CASH CASI CASS CASY CATB CATM CATS CATY CBAN CBAT CBAY CBVF CBIO CBLI CBMGB CBMG CBNK CBRL CBSH CBTX CCBG CCCL CCPM CCNE CCOI CCRC CCRN CCXI CDEV CDK CDLX CDMO CDNA CDNS CDXT CDW CDXC CDXS CDZI CECE CELH CEMI CENT CENTA CENX CERC CERN CERS CETV CETX CEVA CEY CFB CFB1 CFBK CFFI CFFN CFMS CFO CG CGBD CGEN CGIX CGNX CHCI CHDO CHDN CHEF CHFS CHKP CHMG CHNR CHRIS CHRW CHTR CHUY CIDM CIFS CIGI CINF CIVB CIZN CJJD CKPT CLAR CLBK CLBS CLCT CLDB CLDX CLFD CLGN CLIR CLLS CLMT CLNE CLPS CLRB CLRO CLSD CLSK CLSN CLUB CLVS CLWT CLXT CMBM CMCO CMCSA CMCT CME CMLS CMPPR CMRX CMTL CNAT CNBKA CNCE CNDT CNET CNFR CNNB CNOB CNSL CNTY CNXN COCP CODA CODX COFS COHR COHU COKE COLB COLL COLM COMM CONE CONN COOP CORE CORT CORV COUP COWN CPAH CPHC CPIX CPLP CPRT CPRX CPSH CPSI CPSS CPST CPTA CRAI CRBP CREE CREG CRESY CREX CRIS CRM7 CRNT CRNX CRON CROX CRSP CROTO CRUS CRVL CRWD CRWS CSBR CSCO CSF CSFL CSGP CSGS CSII CSIQ CSOD CSP1 CSSE CSTE CSTR CSTR CSWC CSWI CSX CTAS CTBI CTG CTHR CTIB CTIC CTMX CTRC CTRE CTRN CTSH CTXS CUE CUI CURT CVBF CVCO CVCY CVET CVGI CVGW CVLT CVLY CVTI CVV CWBC CWK CWST CXDC CY CYAD CYAN CYBE CYC CYCC CYCN CYOU CYRN CYRX CYTK CZNC CZR CZWI DAIO DAKT DARE DBVT DBX DCAR DCIX DCOM DCPH DDOG DENN DFFN DGICA DGICB DGII DGLY DHC DHIL DIOD DISCA DISCB DISCK DISH DJCO DLHC DLPN DLTH DLTR DMAC DMRC DMTK DNJR DNKN DNLI DOCU DOGZ DOMO DOOO DORM DOX DOYU DRAD DRIA DRNA DRRX DSGX DSKE DSPG DSWL DTEA DTIL DTSS DUOT DVAX DWSN DXCM DXLG DXPE DXYN DYAI DYNT DZSI EA EAST EBAY EBIX EBM7 EBSB EBTC ECHO ECOL ECOR ECPG EDAP EDIT EDNT EDRY EDUC EEF7 EFOI EFSC EGAN EGBN EGLE EGVO EGRX EHHT EIDX EIGI EKSO ELGX ELOX ELSE ELTK EMB EMCF EMKR EML EMMS ENDP ENG ENOB ENPH ENSG ENT ENTA ENTG ENTX EOLS EPAY EPSN EPZM EQBK EQIX ERI ERIC ERII ERYP ESBK ESCA ESEA ESGR ESLT ESPR ESQ ESSA ESTA ESXB ETFC ETON ETSY ETTX EVBG EVER EVFM EVGN EVK EVOL EVOP EVSI EWBC EXAS EXC EXEL EXFO EXLS EXPD EXPE EXPI EXPO EXTR EYE EYEG EYES EYPT EZPW FAB FAMI FANG FARM FARO FAST FAT FATE FB FBIO FBIZ FBMS FBNC FBSS FCA FCAP FCBC FCCO FCCY FCCL FCFS FCNA FDDBC FDEF FDUS FEIM FELE FEYE FFBC FFHW FFHL FFIC FFIV FFNV FFWM FGFI FGEM FHB FIBK FID FISI FISV FITB FIVE FIVN FIXX FIZZ FLDMM FLEX FLGT FLIC FLIR FLL FLMN FLN FLNT FLWS FLXN FLXS FMAO FMBH FMBI FMNB FNMC FNHC FNJN FNKO FNLC FNWB FOCS FOLD FOMX FONR FORD FORK FORM FORR FORTY FOSL FOX FOXA FOXF FPAY FPRX FRAF FRAN FRBA FRBK FREQ FRGI FRHC FRME FRPH FRPT FRTA FSBC FSBW FSCT FSEA FSFG FSLR FSTR FSV FSZ FTC FTDR FTEK FTFT FTNT FTR FTSV FUTL FUNC FUSB FUTU FUV FVCF FWE FWONA FWONK FWRD FXNC GABC GAIA GAIN GARS GASS GBCI GBDC GBLI GBT GCBC GDEN GDS GEC GECC GENC GEEN GEOS GERN GEVO GFED GFN GGAL GH GHSI GIFI GIGM GIII GILD GILT GLAD GLBS GLBZ GLDD GLG GLIBA GLMD GLNG GLPG GLPI GLRE GLUU GLYC GMAB GMLP GNCA GNFT GNLN GNMK GNTX GNTY GNUS GO GOGL GOGO GOOD GOOG GOOGLE GPPR GPRO GRBK GRFS GRIF GRIN GRMN GRNQ GROW GRPN GRTS GRVY GRWG GSBC GSHD GSIT GSKY GSM GSUM GT GTEC GTHX GTIM GTLS GTYH GURE GVP GWGH GWPH GWRS HA HABT HAFC HAIN HALL HALO HARP HAS HAYN HBAN HBCP HBIO HBMD HBNC HBP HCAP HCAT HCCI HCKT HCM HCSG HDS HDSN HEAR HEBT HELES HELE HFBL HFFG HFWA HGSH HHR HHT HIBB HIFS HIHO HIQ HIMX HJLI HLG HLIO HLIT HLNE HMHC HMNF HMST HMSY HMTV HNNN HNRG HOFT HOLI HOLX HOMB HONE HOOK HOPE HQY HROW HRTX HRZN HSDT HSIC HSII HSKA HSON HSTM HTBI HTBK HTBX HTGM HTHT HTLD HTLF HUBG HUGE HURC HURN HVBC HWBK HWC HWCC HWKN HX HYRE HZNP IAC IART IBCP IBKC IBKR IBOC IBTX ICAD ICBK ICC7 ICCH ICFI ICLR ICMB ICON ICPT ICUI IDCC IDEX IDN IDRA IDXG IDXX IEA IEC IEI IEP IESC IFMK IHRT III IIIN IIIV IIN IIKN ILMN ILPT IMAC IMBI IMGN IMKTA IMM7 IMMR IMMU IMRN IMTE IMV INAP INBK INCY INDB INF1 INFN INMD INNT INOV INPX INSE INSG INSM INTG INTL INTU INVA INWE INWK IONS IOSP IOTS IPAP IPWP IQ IRBT IRCP IRDM IRX IRMD IROQ IRTC IRWD ISBC ISEE ISIG ISNS ISRG ISTR ITCI ITI ITIC ITRM ITRN ITRN IVAC IZEA JACK JAGX JAKK JAN JAZZ JBHT JBLL JBSS JCOM JCS JCTCF JD JG JJSF JKHY JNCE JOBS JOUT JRJC JRSH JRVJ JVA JYNT KALA KALU KALV KBAL KBFS KE KELYA KELYB KEQU KERN KFFB KFRC KGJI KHC KIDS KIN KINS KIRK KLAC KLIC KMDA KMPH KNDI KNSL KOPN KOSS KPTI KRNT KRNV KTCC KTOS KTOV KVHI KZIA LAKE LAMR LANC LAND LARK LASR LAUR LAWS LAZY LBAI LBC LBRDA LBRYA LBTYA LCNB LCNT LE LECO LEDS LEGH LEVL LFUS LFVN LGIH LGND LHCG LIFE LILA LILAK LINC LIND LIOT LITE LIVE LIVN LIVX LJPC LKFN LKQ LLIT LLNW LMAT LMB LMFA LMNR LMNX LMRK LMST LNDC LNT LNTN LOAN LOB LOCO LOGI LOGM LONE LOPE LRLR LOVE LPCN LPLA LPSPN LPTH LDQT LRCC LSBK LSCC LSTR LSXMA LSXMB LSXMK LTBR LTRPA LTRX LULU LUNA LVGO LWAY LX LXRX LYFT LYLY LYTT MASK MAGS MANH MANT MAR MARA MARK MARPS MAS1 MAT MATW MAYS MBCN MBII MBIN MBUU MBWM MCBC MCBS MCEP MCFT MCHP MCXH MCRB MCR1 MDB MDCA MDGL MDGS MDJH MDLZ MDRR MDWD MEDP MEET MEIP MELI MEOH MERC MESA MESO METC MF1N MFNC MF5F MGEE MG1 MGIC MGLN MGNX MGPI MGRC MGTX MGYR MHLD MICT MIDD MINI MIME MIND MINI MITK MITO MJCO MKGI MKSI MKTX MLAB MLCO MLHR MLND MLNX MLVF MMAC MMLP MMSI MMYT MNDO MNLO MNOV MNRO MNSB MNST MNTA MNTX MOBL MOFG MOGO MOMO MOR MORF MORN MOSY MOTS MOXC MPAA MPB MPWR MRAM MRBK MRCC MRCY MRIN MRKR MRLN MRNA MRNS MRSN MRTN MRTX MRUS MRVL MSBF MSBI MSEX MSFT MSON MSTR MSVB MTBC MTCH MTEM MTEX MTLS MTP MTRX MTSC MTSI MTSI MU MVBF MVIS MXIM MYFW MYGN MYL MYOK MYOS MYRS MYTZ NAI NAKD NAOV NATH NATI NATR NAVI NBEV NBIX NBL NBLX NBN NBRV NBTB NCBS NCMI NCSM NCTY NDAQ NDLS NDRA NDSN NEO NEOG NEON NEOS NEPH NEPT NETE NEWA NEWT NFBK NFE NFLX NGHC NGHM NH NHLD NHTC NICE NICK NIU NK NKSH NKTR NLNK NLTX NMII NMRK NNBR NNDM NODK NOVN NRC NRIM NSEC NSIT NSSC NSTG NSYS NTAP NTCT NTES NTGR NTIC NTLA NTRA NTRS NTUS NTWK NUAN NURO NUVA NVAX NVCN NVCV NVDA NVEE NVFY NVFY NWFI NWFL NWGI NWL NWL NWPX NWSA NXGN NXPI NXST NXTC NXTD NYMT NYMX OAS OBAS OBCI OBLN OBKN OBSV OCC OCFC OCSI OCSL OCUL ODFL ODP OESX OFED OFIX OFLX OFS OG1 OIIM OKTA OLED OLLI OMAB OMCL OMER OMEX OMP ON ONB ONCT ONTX ONVO OPB OPBK OPGN OPHC OPI OPK OPNT OPOF OPRT OPRX OPTN OPTT ORBC ORG ORGO ORGS ORLY ORMP ORRF ORTX OSBC OSIS OSMT OSN OSPN OSS OSTK OSUR OSW OTEL OTEX OTIC OTLK OTTR OTTW OVBC OVLY OXBR OXFD OXLC OXSQ OZK PAAS PACB PACW PAHC PANL PATI PATK PAYS PAYX PBBI PBCT PBIP PBPP PBYI PCAR PCB PCH PCOM PCRX PCSB PCTI PCTY PCYG PCYO PDCE PDCO PDD PDEX PDFS PDLE PDLI PEBK PEBO PECK PEGA PEGI PEIX PENN PEP PERI PESI PETQ PETS PETZ PEY PFBC PFBI PFG PFI PFN PFIS PFLT PFM PFMT PFPT PFSW PGC PGNX PGNY PHAS PHCF PHIO PHO PHUN PI PICO PIH PINC PIO PIRS PIXY PKBK PKOH PLAB PLAY PLBC PLC PLLC PLLP PLUG PLUS PLXP PLXS PLYA PMBC PMD PME PNBK PNFP PNNT PNRG PNTG POAI POOD POLA POOL POPE POWI POWL PPBI PPC PPH PPIH PPSI PRAA PRAH PRCP PRFT PRGS PRGX PRIM PRN PRNB PROV PRPH PRPL PRPO PRQR PRSC PRTA PRTB PRTK PRTS PS PSC PSEC PSL PSMT PSNL PSTI PSTV PT PTC PTCT PTE PTEN PTF PTGX PTI PTLA PTMN PTNR PTSI PTVCA PTVCB PUB PULM PUYI PVAC PVBC PWOD PXI PXLW PXS PYPL PZZA QADA QADB QAT QBAK QCOM QCRH QDEL QFIN QIWI QLYS QMCO QNST QRHC QRTEA QRVO QTNT QTRX QTT QUIK QUMU QURE RADA RAIL RAND RARE RARX RAVE RAVN RBB RBBN RBCAA RBCN RBKB RBNC RBZ RCII RKCY RCM RCTN RDCM RDFN RDHL RDI RDIB RDNT RDUS RDVT RDWR REAL RECN REDU REED REFR REG REGI REGN REKR RELL RELV REPH RESN RETA RETO REVN RFIL RGCO RGEM RGLD RGNS RIBT RICK RIGL RILY RIOT RIVE RKDA RMBI RMBL RMBS RMCF RMNI RMR RMTI RNDB RNET RNST RNWK ROAD ROCK ROIC ROKU ROLL ROSE ROSE ROST RP RPAY RPD RRBI RRGS RRR RSSS RTIX RTLR RTRX RUN RUSA RUSHB RUTH RVNC RVSB RWLK RYAA SABR SAEX SAFT SAGE SAIA SAL SALM SAMG SANM SANW SASR SATS SAVA SBAC SBPP SBX SBFC SBFG SBGI SBLK SBNY SBPH SBRA SBSI SBT SBUX SCHL SCHN SCKT SCON SCOR SCPL SCSC SCVL SCWX SCYX SCZ SDC SDG SEAC SECO SEDG SEED SEEL SEIC SELB SELF SENE A SENE SES SESN SFBC SFBS SFET SFIX SFM SFNC SFST SG SGA SGBX SGC SGEN SGH SGLB SGMA SGMS SGOC SGPR SGY SHBI SHEN SHIP SHLO SHOO SHSP SHV SBN SIC SIEB SIEV SIFY SIGA SIGI

SILC SILK SIMO SINA SINO SINT SIRI SITM SIVB SKYS SKYW SLAB SLCT SLGG SLGL SLGN SLM SLNO SLP SLRC SLRX SMBK SMBK SMCI SMED SMIT SMMF SMMT SMPL SMRT SMSI SMTC SMTX SNBR SNCR SND SNLD SNDX SNES SNFCA SNGX SNOA SNPS SNSS SNY SOHO SOHU SOLO SONA SONM SONO SORL SP SPAR SPCB SPEX SPFN SPHS SPI SPKE SPLK SPNE SPNS SPOK SPPI SPRO SPRT SPSC SPT SPTN SPWH SPWR SQBG SRAX SRCE SRCL SRDX SREV SRNE SRPT SRRK SRTS SSB SSBI SSKN SSNC SSNT SSP SSRM SSSS SSTI SSYS STAA STAF STAY STBA STCN STFC STIM STKL STLD STML STMP STND STNE STRA STRL STRM STRO STRS STRT STX STXB SUMR SUNS SUNW SUPN SURF SVBI SVC SVMK SVRA SVVC SWAV SWKH SWKS SXTC SY SYBT SYBX SYKE SYNA SYNC SYNH SYNL SYPR SYRS TA TACO TACT TAIT TANH TAOP TAST TATT TAYD TBKK TBIO TBK TBLT TBNK TBPH TC TCBK TCCO TCF TCFC TCMD TCOM TCON TCPC TCRD TCX TEAM TECD TECH TEDU TELA TELL TENB TENX TER TERP TESS TEAM TFSL TGA TGEN TGLS TGTX THFF THMO THRM TIGO TIGR TILE TIPT TITN TIVO TLC TLF TLGT TLND TLRY TLSA TLT TMDX TMSR TMUS TNAV TNDM TOCA TOPS TOUR TOWN TPCO TPIC TRCH TREE TRHC TRIB TRIL TRIP TRMB TRMD TRMK TRMT TRNS TRXN TROV TROW TRS TRST TRUE TRUP TRVG TRVN TSBK TSC TSCAP TSCO TSEM TSG TSLA TSRI TTD TTCE TTGTT TTMI TTNP TTTOU TTTPH TTWO TUES TURN TUSK TVTY TW TWIN TWMC TWNK TWOU TWST TXG TXMD TXN TXRH TYHT TZOO UAL UBCP UBFO UBOH UBSI UBX UCB1 UCTT UEIC UEPS UFCS UFPI UFPT UG UHAL UIHC ULBI ULH ULTA UMBF UMPQ UMRX UNAM UNB UNIT UNTY UONE UONEK UPLD UPWK URBN URGN USAK USAP USAU USCR USEG USIO USLM USWS UTHR UTMD UTSI UVSP UXIN VALU VBFC VBIV VBLT VBTX VC VCEL VCNX VCTR VCYT VECO VEON VERB VERI VERU VFFF VG VIAV VICR VIE VIOT VIR VIRC VIRT VISL VIVE VIVO VLGEA VLY VMD VNDA VNET VNOM VOD VOXX VRA VRAY VREX VRML VRNS VRNT VRRM VRSK VRSN VRTS VRTU VRTX VSAT VSEC VSTM VTC VTGN VTNR VTSI VTVT VUZI VVPR VVUS VXRT VYGR WABC WAFD WASH WATT WB WBA WDAY WDC WDFC WEBK WEN WERN WETF WEYS WHF WHLM WHLR WIFI WILC WINA WING WINS WIRE WISA WIX WKHS WLDN WLFC WLWT WMGI WNEB WORX WPRT WRLD WRTC WSBC WSFB WSC WSFS WSTG WSTL WTBA WTER WTFC WTRH WVE WVFC WWVI WW WWD WWR WYNN XAIR XBIO XCUR XEL XELA XELB XENE XENT XERS XFOR XGN XLNX XLRN XNCR XNET XOG XOMA XONE XPEL XPER XRAY XSPA XTLB YGYI YI YIN YJ YNDX YORW YRCW YTEN YTRA YVR YY Z ZAGG ZBRA ZEAL ZEUS ZG ZGNX ZION ZIOP ZIXI ZKIN ZLAB ZM ZNGA ZS ZSAN ZUMZ ZVO ZYNE ZYXI

VTI v7.0 – Backtest Limitations

As data availability inside the examined dataset affected the results of the backtest, so too does other factors commonly known to affect backtest results, such as survivorship bias. Survivorship bias describes the situation where a list of stocks doesn't fully represent historical reality, as the stocks that eventually went bankrupt or were acquired are usually excluded from such lists.

In the case of this dataset with the universe of 4,000+ stocks, no reasonable method of including formerly bankrupt or acquired stocks was able to be absorbed into the universe that was analyzed.

The distortive effects of survivorship bias was mostly mitigated by including a list of as many publicly traded U.S. stocks as possible, regardless of financial size or any other requirements.

Additionally, a portfolio was not built and compared to a benchmark as a result of the backtest. Rather, the backtest attempted to measure the likely movements of a stock price following a VTI v7.0 Strong Sell signal—nothing more, nothing less.

Important Distinction Between Average and Median Return

The tables presented in this report contain 1y, 2y, 3y, and 5y CAGR returns with both **averages** and **medians** of various data points. The final conclusion from the results is explained with each, and depends on what conclusion is attempted to be measured.

In general, an average is better at displaying the extent of a portfolio's gains, while a median is better at displaying the probability of a return percentage.

However, there's a **major flaw** with using averages instead of medians, and that is the skewing effect of a large number to the overall average. For example, just one return average at 200% could skew an average of a group of stocks with 10% gains by factors of 2x-6x, misrepresenting the rest of the group.

The inherent strengths and weaknesses of both averages and medians was considered with each final conclusion on the results presented, and thus influenced the final figures highlighted in each table.

Backtest Results – VTI v6.0 vs All Stocks

This first table shows the **median** in 1y and 2y CAGR return on a stock with a VTI v6.0 Strong Sell vs all of the stocks in the universe (4,000+) over the same time period. The final row in the 1y and 2y NET column shows the average of this set of **median** values per year.

The 0.3% average for 1y_NET medians and 0.0% average for 2y_NET medians shows that a VTI v6.0 Strong Sell was actually most likely to outperform all stocks over the selected time period. Not ideal.

MEDIAN	1y_ALL	1y_VTI	1y_NET	2y_ALL	2y_VTI	2y_NET
2010	1.7%	-0.8%	-2.5%	5.2%	5.7%	0.5%
2011	8.6%	9.1%	0.5%	18.4%	19.7%	1.3%
2012	29.5%	34.5%	5.0%	19.5%	22.0%	2.5%
2013	8.9%	9.0%	0.1%	4.3%	5.4%	1.1%
2014	-1.4%	-0.3%	1.1%	3.4%	1.7%	-1.7%
2015	9.5%	8.8%	-0.7%	13.2%	8.9%	-4.3%
2016	15.4%	17.2%	1.8%	4.7%	5.8%	1.1%
2017	-6.0%	-5.6%	0.4%	0.8%	0.3%	-0.5%
2018	9.0%	6.4%	-2.6%			
AVG	8.4%	8.7%	0.3%	8.7%	8.7%	0.0%

This second table shows the **median** in 3y and 5y CAGR return on a stock with a VTI v6.0 Strong Sell vs all of the stocks in the universe (4,000+) over the same time period. The final row in the 3y and 5y NET column shows the average of this set of **median** values per year.

The 0.5% average for 3y_NET medians and 0.8% average for 5y_NET medians shows that a VTI v6.0 Strong Sell was actually most likely to outperform all stocks over the selected time period. Not ideal.

MEDIAN	3y_ALL	3y_VTI	3y_NET	5y_ALL	5y_VTI	5y_NET
2010	12.8%	13.8%	1.0%	9.4%	11.8%	2.4%
2011	15.7%	17.1%	1.4%	11.1%	12.2%	1.1%
2012	12.0%	14.9%	2.9%	12.2%	13.1%	0.9%
2013	5.8%	5.4%	-0.4%	4.8%	4.7%	-0.1%
2014	6.9%	5.1%	-1.8%	3.4%	3.3%	-0.1%
2015	6.5%	6.1%	-0.4%			
2016	5.5%	6.0%	0.5%			
2017						
2018						
AVG	9.3%	9.8%	0.5%	8.2%	9.0%	0.8%

An average of the 4 values for CAGR returns (1y, 2y, 3y, 5y) calculates to 0.4%, suggesting that a stock with a VTI v6.0 Strong Sell had a greater probability of a positive gain relative to ALL stocks.

Note: The universe of ALL stocks for the VTI v6.0 Strong Sell backtest varied slightly from the VTI v7.0 Strong Sell backtest due to the greater number of financial data inputs required, disqualifying some stocks from inclusion in the ALL stocks universe in certain years.

Additionally, there was a 2 month gap between these backtests, slightly influencing return figures for the ALL stock universe, though the 1y, 2y, 3y, and 5y Net CAGR returns are all compared “apples to apples” (VTI vs ALL).

Investor Takeaway – VTI v6.0 to v7.0

The significant **outperformance** of the average of median returns per year of VTI v6.0 Strong Sell stocks compared to the ALL stock universe, combined with the significant **underperformance** of the average of median returns per year of VTI v7.0 Strong Sell stocks, suggests that the VTI v7.0 formula is **much** better at signaling stocks likely to decrease in stock price.

VTI v6.0, rather, seems to solely signal troubled stocks about to go bankrupt while at the same time disqualifying a group of stocks that are on average likely to perform better than the ALL stock universe.

The increased universe of stocks available for purchase in the VTI v7.0 formula leading to better overall price appreciation opportunities vs the VTI v6.0 could be due to any of the following factors:

- Growth stocks with negative earnings
 - Might not signal financial trouble unless liabilities greatly increase
- Stocks with negative shareholder's equity (SE)
 - Might be a feature of the business rather than a sign of distress
 - Healthy stocks with negative SE might have low SE due to intangible assets
- Stocks that don't pay a dividend
 - Not paying a dividend isn't necessarily indicative of distress
- Stocks with high price-based valuations
 - Sometimes many of these stocks contribute greatly to market returns
 - Automatic disqualification based on any one of these metrics priced highly could exclude a lot of fantastic businesses with great growth and financial strength

Investors need to remember the following **key** points when using the VTI v7.0 formula:

- This tool works best as a signal to avoid value traps, not as a signal to buy stocks.
- There is no magical metric to do the work of stock picking for you. Including the VTI.
- Consider this tool as another part of your toolkit—to feel confident that you are protecting your downside risk as best as you can, while still understanding it won't completely eliminate risk.
- Review the datasets and results and observe the fluctuation of returns from year to year. This is a feature, not a bug, of investing. It's also the reality when applying any strategy to stocks.
- Invest with a margin of safety, **emphasis** on the safety!