Equity Characteristics Calculation Documentation

US Equity Characteristics Data

June 24, 2026

Abstract

This document records the working formula definitions for U.S. equity characteristics in the EquityChars project. The table keeps the formulas that match the current CIZ implementation and includes portfolio signal directions used in long-short portfolio construction.

1 Notation

Firm is indexed by i, calendar month or fiscal period by t, and daily observations by d. Unless stated otherwise, $\Delta X_{i,t} = X_{i,t} - X_{i,t-1}$. ME denotes market equity, BE denotes book equity, and industry-adjusted variables subtract the cross-sectional industry mean at time t.

Table 1: Audited Equity Characteristics Formula Table

Characteristic	Calculation	Direction
abr	$\mathrm{ABR}_{i,t} = \sum_{d=-2}^{1} \left(\mathrm{RET}_{i,t+d} - \mathrm{RET}_{t+d}^{\mathrm{SP500}}\right)$	+1
acc	$\mathrm{ACC}_{i,t} = \begin{cases} \dfrac{(\Delta\mathrm{ACT}_{i,t} - \Delta\mathrm{CHE}_{i,t}) - \Delta\mathrm{LCT}_{i,t} + \Delta\mathrm{DLC}_{i,t} + \Delta\mathrm{TXP}_{i,t} - \mathrm{DP}_{i,t}}{\frac{1}{2}(\mathrm{AT}_{i,t} + \mathrm{AT}_{i,t-1})}, & \mathrm{OANCF}_{i,t} \text{ missing}, \\ \dfrac{\mathrm{NI}_{i,t} - \mathrm{OANCF}_{i,t}}{\frac{1}{2}(\mathrm{AT}_{i,t} + \mathrm{AT}_{i,t-1})}, & \text{otherwise.} \end{cases}$	−1
absacc	$\mathrm{ABSACC}_{i,t} = \lvert\mathrm{ACC}_{i,t}\rvert$	−1
adm	$\mathrm{ADM}_{i,t} = \dfrac{\mathrm{XAD}_{i,t}}{\mathrm{ME}_{i,t}}.$	+1
age	$\mathrm{AGE}_{i,t} = \mathrm{count}_{i,t}$, the Compustat history counter used in the CIZ pipeline.	−1
agr	$\mathrm{AGR}_{i,t} = \dfrac{\Delta\mathrm{AT}_{i,t}}{\mathrm{AT}_{i,t-1}}$	−1
alm	$\mathrm{ALM}_{i,t} = \dfrac{\mathrm{ALA}_{i,t}}{\mathrm{AT}_{i,t} + \mathrm{PRCC\_F}_{i,t}\mathrm{CSHO}_{i,t} - \mathrm{CEQ}_{i,t}},$ $\mathrm{ALA}_{i,t} = \mathrm{CHE}_{i,t} + 0.75(\mathrm{ACT}_{i,t} - \mathrm{CHE}_{i,t}) - 0.5(\mathrm{AT}_{i,t} - \mathrm{ACT}_{i,t} - \mathrm{GDWL}_{i,t} - \mathrm{INTAN}_{i,t}).$	−1
ato	$\mathrm{ATO}_{i,t}^{A} = \dfrac{\mathrm{SALE}_{i,t}}{\mathrm{NOA}_{i,t-1}^{raw}}, \quad \mathrm{ATO}_{i,t}^{Q} = \dfrac{\mathrm{SALEQ}_{i,t}}{\mathrm{NOA}_{i,t-4}^{raw}}$	+1
baspread	$\mathrm{BASpread}_{i,t} = \dfrac{1}{\lvert W_{i,t}\rvert} \sum_{s \in W_{i,t}} \dfrac{\mathrm{AskHi}_{i,s} - \mathrm{BidLo}_{i,s}}{(\mathrm{AskHi}_{i,s} + \mathrm{BidLo}_{i,s})/2}$	+1
beta	$\mathrm{BETA}_{i,t} = \dfrac{\sum_{s \in W_{i,t}} (\mathrm{MKTRF}_s - \overline{\mathrm{MKTRF}})(\mathrm{EXRET}_{i,s} - \overline{\mathrm{EXRET}}_i)}{\sum_{s \in W_{i,t}} (\mathrm{MKTRF}_s - \overline{\mathrm{MKTRF}})^2}$	+1
bm	$\mathrm{ME}_{i,t} = \mathrm{PRC}_{i,t}\mathrm{SHROUT}_{i,t}, \quad \mathrm{BE}_{i,t} = \mathrm{SEQ}_{i,t} + \mathrm{TXDITC}_{i,t} - \mathrm{PSTK}_{i,t}, \quad \mathrm{BM}_{i,t} = \dfrac{\mathrm{BE}_{i,t}}{\mathrm{ME}_{i,t}}.$	+1
bm_ia	$\mathrm{BM\_IA}_{i,t} = \mathrm{BM}_{i,t} - \dfrac{1}{N_{\mathrm{ind},t}} \sum_{j \in \mathrm{ind}(i)} \mathrm{BM}_{j,t}$	+1
cash	$\mathrm{CASH}_{i,t} = \dfrac{\mathrm{CHE}_{i,t}}{\mathrm{AT}_{i,t}}$	+1
cashdebt	$\mathrm{CASHDEBT}_{i,t} = \dfrac{\mathrm{IB}_{i,t} + \mathrm{DP}_{i,t}}{\frac{1}{2}(\mathrm{LT}_{i,t} + \mathrm{LT}_{i,t-1})}$	+1
cashpr	$\mathrm{CASHPR}_{i,t} = \dfrac{\mathrm{ME}_{i,t} + \mathrm{DLTT}_{i,t} - \mathrm{AT}_{i,t}}{\mathrm{CHE}_{i,t}}$	−1

Characteristic	Calculation	Direction
cfp	$\mathrm{CFP}_{i,t} = \begin{cases} \mathrm{IB}_{i,t}/\mathrm{ME}_{i,t}, & \mathrm{DP}_{i,t} \text{ missing}, \\ \mathrm{NaN}, & \mathrm{IB}_{i,t} \text{ missing}, \\ (\mathrm{IB}_{i,t} + \mathrm{DP}_{i,t})/\mathrm{ME}_{i,t}, & \text{otherwise}. \end{cases}$	+1
cfp_ia	$\mathrm{CFP\_IA}_{i,t} = \mathrm{CFP}_{i,t} - \overline{\mathrm{CFP}}_{\mathrm{industry},t}.$	+1
chatoia	$\mathrm{NOA}^{raw}_{i,t} = (\mathrm{AT}_{i,t} - \mathrm{CHE}_{i,t} - \mathrm{IVAO}_{i,t}) - (\mathrm{AT}_{i,t} - \mathrm{DLC}_{i,t} - \mathrm{DLTT}_{i,t} - \mathrm{MIB}_{i,t} - \mathrm{PSTK}_{i,t} - \mathrm{CEQ}_{i,t}),$ $\mathrm{CHATO}_{i,t} = \frac{\mathrm{SALE}_{i,t}}{\frac{1}{2}(\mathrm{NOA}^{raw}_{i,t} + \mathrm{NOA}^{raw}_{i,t-1})} - \frac{\mathrm{SALE}_{i,t-1}}{\frac{1}{2}(\mathrm{NOA}^{raw}_{i,t-1} + \mathrm{NOA}^{raw}_{i,t-2})},$ $\mathrm{CHATOIA}_{i,t} = \mathrm{CHATO}_{i,t} - \overline{\mathrm{CHATO}}_{\mathrm{industry},t}.$	+1
chcsho	$\mathrm{CHCSHO}_{i,t} = \frac{\mathrm{CSHO}_{i,t}}{\mathrm{CSHO}_{i,t-1}} - 1$	−1
chempia	$\mathrm{HIRE}_{i,t} = \begin{cases} (\mathrm{EMP}_{i,t} - \mathrm{EMP}_{i,t-1})/\mathrm{EMP}_{i,t-1}, & \text{available}, \\ 0, & \text{otherwise}, \end{cases}$ $\mathrm{CHEMPIA}_{i,t} = \mathrm{HIRE}_{i,t} - \overline{\mathrm{HIRE}}_{\mathrm{industry},t}$	−1
chpm	$\mathrm{CHPM}_{i,t} = \frac{\mathrm{IB}_{i,t}}{\mathrm{SALE}_{i,t}} - \frac{\mathrm{IB}_{i,t-1}}{\mathrm{SALE}_{i,t-1}}$	+1
chtx	$\mathrm{CHTX}_{i,t} = \frac{\mathrm{TXT}_{i,t} - \mathrm{TXT}_{i,t-1}}{\mathrm{AT}_{i,t-1}}$	+1
cinvest	$\mathrm{CINVEST}_{i,t} = \frac{\mathrm{PPENTQ}_{i,t} - \mathrm{PPENTQ}_{i,t-1}}{\mathrm{SALEQ}_{i,t}} - \frac{1}{3}\sum_{k=1}^{3} \frac{\mathrm{PPENTQ}_{i,t-k} - \mathrm{PPENTQ}_{i,t-k-1}}{\mathrm{SALEQ}_{i,t-k}}$	−1
depr	$\mathrm{DEPR}_{i,t} = \frac{\mathrm{DP}_{i,t}}{\mathrm{PPENT}_{i,t}}$	+1
dolvol	$\mathrm{DOLVOL}_{i,t} = \log(\mathrm{VOL}_{i,t-2}\mathrm{PRC}_{i,t-2})$	−1
dy	$\mathrm{RETDY}_{i,t} = \mathrm{RET}_{i,t} - \mathrm{RETX}_{i,t}, \quad \mathrm{MDIVPAY}_{i,t} = \mathrm{RETDY}_{i,t}\mathrm{ME}_{i,t-1}, \quad \mathrm{DY}_{i,t} = \frac{\sum_{s=t-11}^{t} \mathrm{MDIVPAY}_{i,s}}{\mathrm{ME}_{i,t}}$	+1
ep	$\mathrm{EP}_{i,t} = \frac{\mathrm{IB}_{i,t}}{\mathrm{ME}_{i,t}}$	+1
gma	$\mathrm{GMA}_{i,t} = \frac{\mathrm{REVT}_{i,t} - \mathrm{COGS}_{i,t}}{\mathrm{AT}_{i,t-1}}$	+1
grltnoa	$\mathrm{LTNOA}_{i,t} = (\mathrm{RECT}_{i,t} + \mathrm{INVT}_{i,t} + \mathrm{PPENT}_{i,t} + \mathrm{ACO}_{i,t} + \mathrm{INTAN}_{i,t} + \mathrm{AO}_{i,t}) - (\mathrm{AP}_{i,t} + \mathrm{LCO}_{i,t} + \mathrm{LO}_{i,t}),$ $\Delta\mathrm{WCNOA}_{i,t} = (\mathrm{RECT}_{i,t} - \mathrm{RECT}_{i,t-1}) + (\mathrm{INVT}_{i,t} - \mathrm{INVT}_{i,t-1}) + (\mathrm{ACO}_{i,t} - \mathrm{ACO}_{i,t-1}) - (\mathrm{AP}_{i,t} - \mathrm{AP}_{i,t-1}) - (\mathrm{LCO}_{i,t} - \mathrm{LCO}_{i,t-1}),$ $\mathrm{GRLTNOA}_{i,t} = \frac{\mathrm{LTNOA}_{i,t}}{\mathrm{AT}_{i,t}} - \frac{\mathrm{LTNOA}_{i,t-1}}{\mathrm{AT}_{i,t-1}} - \frac{\Delta\mathrm{WCNOA}_{i,t}}{\frac{1}{2}(\mathrm{AT}_{i,t} + \mathrm{AT}_{i,t-1})}.$	+1

Characteristic	Calculation	Direction
herf	$S_{j,t} = \sum_{i \in j} \text{SALE}_{i,t}, \quad \text{HERF}_{j,t} = \sum_{i \in j} \left(\frac{\text{SALE}_{i,t}}{S_{j,t}} \right)^2$	−1
hire	$\text{HIRE}_{i,t} = \frac{\text{EMP}_{i,t} - \text{EMP}_{i,t-1}}{\text{EMP}_{i,t-1}}$	−1
ill	$\text{ILLIQ}_{i,d} = \frac{\lvert\text{RET}_{i,d}\rvert}{\lvert\text{PRC}_{i,d}\rvert \text{VOL}_{i,d}}$	+1
lev	$\text{LEV}_{i,t} = \frac{\text{LT}_{i,t}}{\text{ME}_{i,t}}$	+1
lgr	$\text{LGR}_{i,t} = \frac{\text{LT}_{i,t}}{\text{LT}_{i,t-1}} - 1$	−1
maxret	$\text{MAXRET}_{i,t} = \max_{d \in D_t} \text{RET}_{i,d}$	−1
me	$\text{ME}_{i,t} = \text{PRC}_{i,t} \text{SHROUT}_{i,t}.$	−1
me_ia	$\text{ME\_IA}_{i,t} = \text{ME}_{i,t} - \overline{\text{ME}}_{\text{industry},t}$	−1
mom12m	$\text{MOM12M}_{i,t} = \prod_{k=1}^{11} (1 + \text{RET}_{i,t-k}) - 1$	+1
mom1m	$\text{MOM1M}_{i,t} = \text{RET}_{i,t}$	−1
mom36m	$\text{MOM36M}_{i,t} = \prod_{k=12}^{35} (1 + \text{RET}_{i,t-k}) - 1$	−1
mom60m	$\text{MOM60M}_{i,t} = \prod_{k=12}^{59} (1 + \text{RET}_{i,t-k}) - 1$	−1
mom6m	$\text{MOM6M}_{i,t} = \prod_{k=1}^{5} (1 + \text{RET}_{i,t-k}) - 1$	+1
ni	$\text{NI}_{i,t} = \log(\text{CSHO}_{i,t} \text{AJEX}_{i,t}) - \log(\text{CSHO}_{i,t-1} \text{AJEX}_{i,t-1})$	−1
nincr	$\text{NINCR}_{i,t} = \sum_{k=1}^{8} \prod_{j=0}^{k-1} \mathbf{1}\{\text{IBQ}_{i,t-j} > \text{IBQ}_{i,t-j-1}\}$	+1
noa	$\text{NOA}_{i,t} = \frac{(\text{AT}_{i,t} - \text{CHE}_{i,t} - \text{IVAO}_{i,t}) - (\text{AT}_{i,t} - \text{DLC}_{i,t} - \text{DLTT}_{i,t} - \text{MIB}_{i,t} - \text{PSTK}_{i,t} - \text{CEQ}_{i,t})}{\text{AT}_{i,t-1}}$	−1
op	$\text{OP}_{i,t} = \frac{\text{REVT}_{i,t} - \text{COGS}_{i,t} - \text{XSGA}_{i,t} - \text{XINT}_{i,t}}{\text{BE}_{i,t}}$	+1
pctacc	$\text{PCTACC}_{i,t} = \frac{\text{ACC}_{i,t}}{\lvert\text{NI}_{i,t}\rvert}$	−1
pm	$\text{PM}_{i,t} = \frac{\text{OIADP}_{i,t}}{\text{SALE}_{i,t}}$	+1

Characteristic	Calculation	Direction
pscore	$\text{PSCORE}_{i,t} = \sum_{j=1}^{9} p_{j,i,t}$, where the nine binary indicators test profitability, operating cash flow, leverage, liquidity, margin, turnover, and equity issuance conditions.	+1
rd_sale	$\text{RD\_SALE}_{i,t} = \dfrac{\text{XRD}_{i,t}}{\text{SALE}_{i,t}}$	+1
rdm	$\text{RDM}_{i,t} = \dfrac{\text{XRD}_{i,t}}{\text{ME}_{i,t}}$	+1
re	$\text{RE}_{i,t} = \dfrac{1}{n}\sum_{k=1}^{n} \text{MONTHLY\_REVISION}_{i,t-k}$, where $n = 3, 4, 5, 6$ for count $4, 5, 6, \geq 7$, respectively.	+1
rna	$\text{RNA}_{i,t} = \dfrac{\text{OIADP}_{i,t}}{\text{NOA}^{raw}_{i,t-1}}$	+1
roa	$\text{ROA}_{i,t} = \dfrac{\text{IB}_{i,t}}{\text{AT}_{i,t-1}}$.	+1
roe	$\text{ROE}_{i,t} = \dfrac{\text{IB}_{i,t}}{\text{CEQ}_{i,t-1}}$	+1
rsup	$\text{RSUP}_{i,t} = \dfrac{\text{SALE}_{i,t} - \text{SALE}_{i,t-1}}{\text{ME}_{i,t}}$	+1
rvar_capm	$\text{RVAR\_CAPM}_{i,t} = \dfrac{1}{w-1}\sum_{s=t-w+1}^{t} (\varepsilon_{i,s} - \bar{\varepsilon}_{i,t})^2$, where ε is from a rolling CAPM excess-return regression.	−1
rvar_ff3	$\text{RVAR\_FF3}_{i,t} = \dfrac{1}{w-1}\sum_{s=t-w+1}^{t} (\varepsilon_{i,s} - \bar{\varepsilon}_{i,t})^2$, where ε is from a rolling Fama–French three-factor regression.	−1
seas1a	$\text{SEAS1A}_{i,t} = \text{RET}_{i,t-11}$	+1
sgr	$\text{SGR}_{i,t} = \dfrac{\text{SALE}_{i,t}}{\text{SALE}_{i,t-1}} - 1$	+1
sp	$\text{SP}_{i,t} = \dfrac{\text{SALE}_{i,t}}{\text{ME}_{i,t}}$	+1
std_dolvol	$\text{STD\_DOLVOL}_{i,t} = \text{Std}^{t}_{s=t-w+1}\left(\log\lvert\text{VOL}_{i,s}\text{PRC}_{i,s}\rvert\right)$	−1
std_turn	$\text{STD\_TURN}_{i,t} = \text{Std}^{t}_{s=t-w+1}\left(\dfrac{\text{VOL}_{i,s}}{\text{SHROUT}_{i,s}}\right)$	−1
sue	$\text{SUE}_{i,t} = \dfrac{\text{EPS}_{i,t} - \text{EPS}_{i,t-4}}{\text{SUE\_STD}_{i,t}}, \quad \text{EPS}_{i,t} = \dfrac{\text{EPSPXQ}_{i,t}}{\text{AJEXQ}_{i,t}}$	+1
svar	$\text{RVAR\_MEAN}_{i,t} = \dfrac{1}{w-1}\sum_{s=t-w+1}^{t} (\text{RET}_{i,s} - \overline{\text{RET}}_{i,t})^2$	−1
turn	$\text{TURN}_{i,t} = \dfrac{\text{VOL}_{i,t}}{\text{SHROUT}_{i,t}}$.	−1

Characteristic	Calculation	Direction
zerotrade	$\text{ZEROTRADE}_{i,t} = \left(\sum_{s=t-w+1}^{t} \text{COUNTZERO}_{i,s} + \frac{1}{\sum_{s=t-w+1}^{t} \text{TURN}_{i,s}} / 11000 \right) \frac{21 \cdot 3}{w}$	+1