

S&P Alpha Factor

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	10 Day MACD Trend	The 10 day exponential moving average of the moving average convergence/divergence ratio (the 12 day exponential moving average of daily closing prices relative to the 26 day exponential moving average of daily closing prices).	Cross-Sectional	DESCENDING	$10DMACD_{i,t} = EMA(10, MACD_{i,t})$ <p>where</p> $MACD_{i,t} = \frac{EMA_{i,t}(12, Close_{i,t}) - EMA_{i,t}(26, Close_{i,t})}{EMA_{i,t}(26, Close_{i,t})}$ $EMA(n, X_{i,t}) = ((X_{i,t} - EMA(n, X_{i,t-1})) * alpha) + EMA(n, X_{i,t-1})$ $\alpha = \frac{2}{n+1}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>
Price Momentum	12M - 1M Price Momentum	The cumulative percentage stock price change over the prior twelve months, excluding the most recent month.	Cross-Sectional	DESCENDING	$PM12M1M_{i,t} = \frac{CloseM_{i,t-1} - CloseM_{i,t-12}}{Close_{i,t-12}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price)</p>
Price Momentum	14-Day Relative Strength Index	This factor follows the definition of RSI. It is calculated over the last 14 days.	Cross-Sectional	ASCENDING	$14DayRSI_{i,t} = 100 \times \frac{EMA(u, 14)}{EMA(u, 14) + EMA(d, 14)}$ <p>where</p> $u = \begin{cases} CloseD_t - CloseD_{t-1}, & \text{when } CloseD_t > CloseD_{t-1}; \\ 0, & \text{Otherwise.} \end{cases}$ $d = \begin{cases} CloseD_t - CloseD_{t-1}, & \text{when } CloseD_t < CloseD_{t-1}; \\ 0, & \text{Otherwise.} \end{cases}$ <p>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>
Price Momentum	15/36 Week Price Ratio	The ratio of a 15 week simple moving average of daily closing prices to a 36 week simple moving average of daily closing prices.	Cross-Sectional	DESCENDING	$PRatio15/36W_{i,t} = \frac{SMA_{s-74,s}(Close_{i,s})}{SMA_{s-179,s}(Close_{i,s})}$ <p>where</p> $SMA_{s_1, s_2}(X_s) = \frac{\sum_{u=s_1}^{s_2} X_u}{s_2 - s_1 + 1}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>

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Price Momentum	180D Price TStat	This factor is the 180 day price T-statistic.	Cross-Sectional	DESCENDING	$StdErr180D = \frac{Beta_{180}(CloseD_{i,t})}{SE(CloseD_{i,t}, 180)}$ $SE(X_{i,t}, n) = \frac{Std(X_{i,t}, n)}{\sqrt{n}}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p><small>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Price Momentum	1M Price High - 1M Price Low	The ratio of the monthly high minus the current price to the current price minus the monthly low price.	Cross-Sectional	DESCENDING	$HL1M_{i,t} = \frac{HIGHM_{i,t} - CloseM_{i,t}}{CloseM_{i,t} - LOWM_{i,t}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price) HIGHM : Adjusted Monthly High (Adjusted Monthly High) LOWM : Adjusted Monthly Low (Adjusted Monthly Low)</small></p>
Price Momentum	1M Price Reversal	The simple stock return over the past month.	Cross-Sectional	ASCENDING	$PM1M_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price)</small></p>
Price Momentum	20 Day Coefficient of Variation of Volume to Price	Coefficient of variation is defined as the standard deviation divided by the mean; this factor is calculated using the volume to price relationship over a period of 20 days.	Cross-Sectional	DESCENDING	$CVVolPrc20D_{i,t} = \frac{Std(CSHTRD_{i,t}, 20)}{Avg(CSHTRD_{i,t}, 20)}$ $\text{where } Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHTRD : Daily Trading Volume (Daily Trading Volume)</small></p>

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Price Momentum	20-Day Lane's Stochastic Indicator	This stochastic factor is calculated as the difference between current closing price and low price of the last 20 days, divided by the difference between high and low of the last 20 days.	Cross-Sectional	ASCENDING	$20D\text{Stochastic}_{i,t} = \frac{\text{CloseD}_{i,t} - \min_{0 \leq j \leq 19} \text{PRCLD}_{i,t-j}}{\max_{0 \leq j \leq 19} \text{PRCHD}_{i,t-j} - \min_{0 \leq j \leq 19} \text{PRCLD}_{i,t-j}}$ <p>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price) PRCLD : Price Low Daily (Price Low Daily) PRCHD : Price High Daily (Price High Daily)</p>
Price Momentum	24M Residual Return Variance	The variance of beta-adjusted returns over the preceding 24 months.	Cross-Sectional	ASCENDING	$24M\text{ResRtnVar}_{i,t} = \frac{1}{23} \sum_{s=0}^{23} (\text{ResRtn}_{i,t-s} - \overline{\text{ResRtn}}_{i,t})^2$ <p>where</p> $\text{ResRtn}_{i,t} = \text{Log}\left(\frac{\text{CloseM}_{i,t}}{\text{CloseM}_{i,t-1}}\right) - \text{Beta}24M_{i,t} \times \text{Log}\left(\frac{\text{SP500}_t}{\text{SP500}_{t-1}}\right)$ $\overline{\text{ResRtn}}_{i,t} = \frac{1}{24} \sum_{s=0}^{23} \text{ResRtn}_{i,t-s}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</p>
Price Momentum	26W Price Stat	This factor is the 26 week price T-statistic.	Cross-Sectional	DESCENDING	$PSlopeSERR26W = \frac{\text{Beta}_{130}(\text{CloseD}_{i,t})}{SE(\text{CloseD}_{i,t}, 130)}$ $SE(X_{i,t}, n) = \frac{Std(X_{i,t}, n)}{\sqrt{n}}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>
Price Momentum	26W Relative Price Strength	The simple stock return over the past six months.	Cross-Sectional	DESCENDING	$RSI26W_{i,t} = \frac{\text{CloseM}_{i,t} - \text{CloseM}_{i,t-6}}{\text{CloseM}_{i,t-6}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price)</p>
Price Momentum	30 Day Coefficient of Variation of Volume to Price	Coefficient of variation is defined as the standard deviation divided by the mean; this factor is calculated using the volume to price relationship over a period of 30 days	Cross-Sectional	DESCENDING	$CVVolPrc30D_{i,t} = \frac{\frac{Std(CSHTRD_{i,t}, 30)}{Avg(CSHTRD_{i,t}, 30)}}{\frac{Std(Close_{i,t}, 30)}{Avg(Close_{i,t}, 30)}}$ <p>where</p> $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHTRD : Daily Trading Volume (Daily Trading Volume)</p>

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Price Momentum	39W Lagged Return	9M Price Momentum, lagged one month.	Cross-Sectional	DESCENDING	$39WRtnLag4W_{i,t} = \frac{CloseW_{i,t-4} - CloseW_{i,t-43}}{CloseW_{i,t-43}}$ <p><small>CloseW : Adjusted Weekly Closing Price (Adjusted Weekly Closing Price)</small></p>
Price Momentum	4W to 52W Price Oscillator	The ratio of a 52 week exponential moving average of weekly closing stock prices to a 4 week exponential moving average.	Cross-Sectional	ASCENDING	$4To52WPrcOsc_{i,t} = \frac{EMA(CloseW_{i,t}, 52)}{EMA(CloseW_{i,t}, 4)}$ <p><i>where</i></p> $EMA(X_{i,t}, n) = \frac{\sum_{s=0}^{n-1} (1-\alpha)^s X_{i,t-s}}{\sum_{s=0}^{n-1} (1-\alpha)^s}$ $\alpha = \frac{2}{n+1}$ <p><small>CloseW : Adjusted Weekly Closing Price (Adjusted Weekly Closing Price)</small></p>
Price Momentum	5 Day Price Reversal	This is a short term signal that measures a stock's 5-day price reversal.	Cross-Sectional	ASCENDING	$PM5D_{i,t} = \frac{CloseD_{i,t} - CloseD_{i,t-5}}{CloseD_{i,t-5}}$ <p><small>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Price Momentum	5 Day Volume Signal	This ratio compares the average of the last 5-day trading volume to the average of the one year trading volume.	Cross-Sectional	DESCENDING	$5DVolSig_t = \frac{\frac{1}{5} \sum_{j=0}^4 CSHTRD_{t-j}}{\frac{1}{128} \sum_{j=0}^{127} CSHTRD_{t-j}}$ <p><small>CSHTRD : Daily Trading Volume (Daily Trading Volume)</small></p>
Price Momentum	50 Day to 200 Day Stock Price	The ratio of a 50 day simple moving average of daily closing prices to a 200 day simple moving average of daily closing prices.	Cross-Sectional	DESCENDING	$50To200PrcRatio = \frac{SMA(Close_{i,t}, 50)}{SMA(Close_{i,t}, 200)}$ <p><i>where</i></p> $SMA(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^{n-1} X_{i,t-s}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>

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Price Momentum	50 Day Volume Signal	This ratio compares the average of the last 50-day trading volume to the average of the one year trading volume.	Cross-Sectional	DESCENDING	$50DVolSig_t = \frac{\frac{1}{50} \sum_{j=0}^{49} CSHTRD_{t-j}}{\frac{1}{252} \sum_{j=0}^{251} CSHTRD_{t-j}}$ <p><small>CSHTRD : Daily Trading Volume (Daily Trading Volume)</small></p>
Price Momentum	52W High Low	The ratio of the stock's 52 week high minus the current price to the current price minus the 52-week low.	Cross-Sectional	ASCENDING	$HL52W_{i,t} = \frac{HIGH_{i,t-11,t} - CloseM_{i,t}}{CloseM_{i,t} - LOW_{i,t-11,t}}$ $HIGH_{i,t_1,t_2} = \text{Max}\{n \in [t_1, t_2] : HighM_{i,t}\}$ $LOW_{i,t_1,t_2} = \text{Min}\{n \in [t_1, t_2] : LowM_{i,t}\}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price) HighM : Adjusted Monthly High (Adjusted Monthly High) LowM : Adjusted Monthly Low (Adjusted Monthly Low)</small></p>
Price Momentum	52-Week Volume Price Trend with 20-Day Lag	This factor is the price volume trend over the last 52 weeks, lagged by 20 days. It is calculated as the sum of daily return weighted daily trading volume, divided by the average shares outstanding over the 52 weeks.	Cross-Sectional	DESCENDING	$52WVPT20DLag_{i,t} = \text{Lag} \left(\frac{\sum_{t=1}^{252} \left[\frac{CloseD_{i,t} - CloseD_{i,t-1}}{CloseD_{i,t-1}} \times TrdVolD_{i,t-1} \right]}{\left(\sum_{j=0}^{11} CSHOQ_{i,t-j} \right) / 12}, 20 \text{ Days} \right)$ <p><small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) TrdVolD : Daily Trading Volume (Daily Trading Volume) CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Price Momentum	5-Day Money Flow/Volume	This factor is the money flow over volume of the last 5 days. The nominator is the 5 day sum of price times trading volume, weighted by the sign of the daily returns. The denominator is the simple 5 day sum of price times trading volume.	Cross-Sectional	ASCENDING	$5DMoneyFlowVol_{i,t} = \frac{\sum_{j=0}^4 CloseD_{i,t-j} \times TrdVolD_{i,t-j} \times \text{Sign} \left(\frac{CloseD_{i,t-j} - CloseD_{i,t-j-1}}{CloseD_{i,t-j-1}} \right)}{\sum_{j=0}^4 CloseD_{i,t-j} \times TrdVolD_{i,t-j}}$ <p><small>TrdVolD : Daily Trading Volume (Daily Trading Volume) CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Price Momentum	6 Month Average Share Turn Over	This factor is defined as the six month average trading volume divided by number of shares outstanding.	Cross-Sectional	ASCENDING	$STO_6M_{i,t} = \frac{\frac{1}{126} \times \sum_{j=0}^{125} CSHTRD_{i,t-j}}{\frac{1}{126} \times \sum_{j=0}^{125} CSHOC_{i,t-j}}$ <p><small>CSHOC : Adjusted Daily Common Shares Outstanding (Adjusted Daily Common Shares Outstanding) CSHTRD : Daily Trading Volume (Daily Trading Volume)</small></p>

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Price Momentum	6 Months Price Reversal	The simple stock return over the past six months.	Cross-Sectional	ASCENDING	$PM6M_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-6}}{CloseM_{i,t}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</p>
Price Momentum	60 Day Coefficient of Variation of Volume to Price	Coefficient of variation is defined as the standard deviation divided by the mean; this factor is calculated using the volume to price relationship over a period of 60 days	Cross-Sectional	DESCENDING	$CVVolPrc60D_{i,t} = \frac{\frac{Std(CSHTRD_{i,t}, 60)}{Avg(CSHTRD_{i,t}, 60)}}{\frac{Std(Close_{i,t}, 60)}{Avg(Close_{i,t}, 60)}}$ <p>where</p> $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHTRD : Daily Trading Volume (Daily Trading Volume)</p>
Price Momentum	60M CAPM Alpha	The average of beta-adjusted returns over the past 60 months.	Cross-Sectional	ASCENDING	$Alpha60M_{i,t} = Avg_{60M}(RtnCloseM_{i,t} - Beta60M_{i,t} \times RtnSP500_t)$ <p>where</p> $RtnCloseM_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ $RtnSP500_t = \frac{SP500_t - SP500_{t-1}}{SP500_{t-1}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</p>
Price Momentum	6M Chg in 12M CAPM Alpha	The relative change from six months ago to the current month in the trailing twelve month average of beta-adjusted returns.	Cross-Sectional	DESCENDING	$Alpha12M6MChg = \frac{Alpha12M_{i,t} - Alpha12M_{i,t-6}}{Alpha12M_{i,t-6}}$ <p>where</p> $Alpha12M_{i,t} = Avg_{12M}(RtnCloseM_{i,t} - Beta12M_{i,t} \times RtnSP500_t)$ $RtnCloseM_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ $RtnSP500_{i,t} = \frac{SP500_t - SP500_{t-1}}{SP500_{t-1}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</p>

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Price Momentum	6M Chg in 18M CAPM Alpha	The relative change from six months ago to the current month in the trailing eighteen month average of beta-adjusted returns.	Cross-Sectional	DESCENDING	$\text{Alpha18M6MChg} = \frac{\text{Alpha18M}_{i,t} - \text{Alpha18M}_{i,t-6}}{\text{Alpha18M}_{i,t-6}}$ <p>where</p> $\text{Alpha18M}_{i,t} = \text{Avg}_{18M}(\text{RtnCloseM}_{i,t} - \text{Beta18M}_{i,t} \times \text{RtnSP500}_t)$ $\text{RtnCloseM}_{i,t} = \frac{\text{CloseM}_{i,t} - \text{CloseM}_{i,t-1}}{\text{CloseM}_{i,t-1}}$ $\text{RtnSP500}_{i,t} = \frac{\text{SP500}_t - \text{SP500}_{t-1}}{\text{SP500}_{t-1}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</p>
Price Momentum	6M Chg in 36M CAPM Alpha	The relative change from six months ago to the current month in the trailing thirty-six month average of beta-adjusted returns.	Cross-Sectional	DESCENDING	$\text{Alpha36M6MChg} = \frac{\text{Alpha36M}_{i,t} - \text{Alpha36M}_{i,t-6}}{\text{Alpha36M}_{i,t-6}}$ <p>where</p> $\text{Alpha36M}_{i,t} = \text{Avg}_{36M}(\text{RtnCloseM}_{i,t} - \text{Beta36M}_{i,t} \times \text{RtnSP500}_t)$ $\text{RtnCloseM}_{i,t} = \frac{\text{CloseM}_{i,t} - \text{CloseM}_{i,t-1}}{\text{CloseM}_{i,t-1}}$ $\text{RtnSP500}_{i,t} = \frac{\text{SP500}_t - \text{SP500}_{t-1}}{\text{SP500}_{t-1}}$
Price Momentum	9 Month Price Momentum	The simple stock return over the past nine months.	Cross-Sectional	DESCENDING	$\text{PM9M}_{i,t} = \frac{\text{CloseM}_{i,t} - \text{CloseM}_{i,t-9}}{\text{CloseM}_{i,t-9}}$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price)</p>
Price Momentum	Change in Number of Buyers	Quarterly change in number of buyers in %; it measures the change of ownership breadth. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$\text{ChgofNumBY}_{i,t} = \frac{\text{NumofBY}_{i,t}}{\text{NumofBY}_{i,t-1}} - 1$ <p>NumofBY : "NumberofBuyers" column from ciqOwnIssueAggregate table (CIQ Ownership XF package only)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Change in Number of Holders	Quarterly change in number of holders in %; it measures the change of ownership breadth. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$ChgofNumHD_{i,t} = \frac{NumofHD_{i,t}}{NumofHD_{i,t-1}} - 1$ <p><small>NumofHD : "NumberofHolders" column from ciqOwnIssueAggregate table (CIQ Ownership XF package only)</small></p>
Price Momentum	Change of Ownership Level - All Managers	Change in the total % ownership by all managers, quarter to quarter Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$ChgOfIOAM = InstOwn_{i,t} - InstOwn_{i,t-1}$ <p>where</p> $InstOwn_{i,t} = \sum_{all\ managers} PctISharesOutstanding_{i,o,t}$ <p><small>t = quarterly periods</small></p> <p><small>PctISharesOutstanding : "percentOfSharesOutstanding" column from ciqOwnCompanyHolding table (CIQ Ownership XF package only)</small></p>
Price Momentum	Change of Ownership Level - Hedge Fund	Change in percent of ownership in Hedge Funds. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$ChgOfIOHF = InstOwnHF_{i,t} - InstOwnHF_{i,t-1}$ <p>where</p> $InstOwnHF_{i,t} = \sum_o PctISharesOutstanding_{i,o,t}$ <p><small>o = [hedge fund managers]</small></p> <p><small>t = quarterly periods</small></p> <p><small>PctISharesOutstanding : "percentOfSharesOutstanding" column from ciqOwnCompanyHolding table (CIQ Ownership XF package only)</small></p>
Price Momentum	Closing Price to 260 Day Low	The ratio of the daily closing price to the lowest daily closing price over the past 260 days.	Cross-Sectional	ASCENDING	$PrcTo260DL_{i,t} = \frac{Close_{i,t}}{\Min(LowD_{i,t-s})}, s \in [0, 259]$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p> <p><small>Low : Adjusted Daily Low Price (Adjusted Daily Low Price)</small></p>
Price Momentum	Closing Price to 52 Week High	The ratio of the daily closing price to the highest daily closing price over the past 52 weeks.	Cross-Sectional	DESCENDING	$PrcTo52WH_{i,t} = \frac{Close_{i,t}}{\Max(HighD_{i,t-s})}, s \in [0, 251]$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p> <p><small>High : Adjusted Daily High Price (Adjusted Daily High Price)</small></p>

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Price Momentum	Foreign Institution Ownership	Percentage of shares held by foreign institutional investors.	Cross-Sectional	DESCENDING	$ForeignInstOwn_i = \sum_{\text{all foreign owners}} PctIOSharesOutstanding_{i,o}$ <p>where $CountryOfOwner \neq CountryOfCompany$</p> <p>PctIOSharesOutstanding : "percentOfSharesOutstanding" column from ciqOwnCompanyHolding table (CIQ Ownership XF package only)</p>
Price Momentum	Institution Ownership Concentration	Ratio of shares held by top 5 institutional investors to shares held by all institutional investors. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	ASCENDING	$Concentration = \frac{\sum_{\text{owner=top5}} SharesHeld_{owner}}{\sum_{\text{owner=all}} SharesHeld_{owner}}$ <p>where $SharesHeld = Shares Held by Per Owner$</p> <p>SharesHeld_owner : "sharesHeld" column in ciqOwnCompanyHoldingTable (CIQ Ownership XF package only)</p>
Price Momentum	Institution Ownership Level	Percentage of company shares owned by total institutional shareholders. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$Level = InstitutionalOwnershipPct$ <p>InstitutionalOwnershipPct : "instlOwnershipPct" column from ciqOwnIssueAggregate table (CIQ Ownership XF package only)</p>
Price Momentum	Institution Ownership Level - Active Manager	Percentage of company shares owned by active managers. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	ASCENDING	$IOLevel(AM)_{i,t} = PctofIO(AM)_{i,t}$ <p>where $PctofIO(AM)_{i,t} = \sum_o PctIOSharesOutstanding_{i,o,t}$</p> <p>$o = [\text{traditional fund managers, endowments, foundations}]$ $t = \text{quarterly periods}$</p> <p>PctIOSharesOutstanding : "percentOfSharesOutstanding" column from ciqOwnCompanyHolding table (CIQ Ownership XF package only)</p>
Price Momentum	Institution Ownership Turnover	Absolute change in shares held by institutional investors to total shares held by all investors. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	ASCENDING	$Turnover = \frac{\frac{1}{4} \times \sum_{j=0}^3 abs(SharesHeld_{i,t-j} - SharesHeld_{i,t-1-j})}{\frac{1}{4} \times \sum_{j=0}^3 SharesHeld_{i,t-j}}$ <p>SharesHeld : "sharesHeld" column from ciqOwnIssueAggregate table, (CIQ Ownership XF package only)</p>

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Price Momentum	Investment Duration	<p>The factor is defined by weighted average length of time that institutional investors have held a stock in their portfolios.</p> <p>Example: an owner owns 5% of total shares of IBM. It bought 2% of those shares 3 quarters back, and the other 3% of shares 5 quarters back. Weighted average age is calculated as $(3*2\% + 5*3\%)/5\% = 4.2$</p> <p>Calculation is weighted over prior eight quarters. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.</p>	Cross-Sectional	DESCENDING	$InvDuration_{i,t} = \sum_{o=allInstOwners} DurationOwner_{i,o,t} * H_{i,o,t}$ $DurationOwner_{i,o,t} = \frac{\sum_{W=1}^7 W * \alpha_{i,o,t-W}}{H_{i,o,t}} + \frac{8 * H_{i,o,t-8}}{H_{i,o,t}}$ $\alpha_{i,j,t} = H_{i,o,t} - H_{i,o,t-1}$ <p>(change in pct shares of stock i held by owner o between $t-1$ and t)</p> $H_{i,o,t} = \text{pct. shares outstanding of stock } i \text{ held by inst. } o \text{ at quarter } t$ $W = \text{number of quarters back}$ PctIOSharesOutstanding : "percentOfSharesOutstanding" column from ciqOwnCompanyHolding table (CIQ Ownership XF package only)
Price Momentum	Log of Unadjusted Stock Price	This is the log value of the monthly stock close price (unadjusted).	Cross-Sectional	ASCENDING	$\text{LogPrice}_{i,t} = \log (\text{CloseM}_{i,t})$
Price Momentum	Max Daily Return in the Past 6 Months	This factor is the max return of a stock in the past 6 months.	Cross-Sectional	ASCENDING	$\text{MaxRetPayoff}_t = \text{Max} \left\{ \frac{P_t - P_{t-1}}{P_{t-1}}, t \in \text{Past 6 months} \right\}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>
Price Momentum	Net Arbitrage Trading	<p>Net Arbitrage Trading is defined as the difference between the change of hedge fund holdings and the change of short interest on a stock. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies. This item is covered in US only.</p>	Cross-Sectional	DESCENDING	$NAT_{i,t} = AHF_{i,t} - ASR_{i,t}$ $AHF_{i,t} = \text{PctofIOHF}_{i,t} - \frac{1}{4} \times \sum_{j=0}^3 \text{PctofIOHF}_{i,t-j}$ $\text{PctofIOHF}_{i,t} = \sum_{o=allhedgefundowners} \text{PctIOSharesOutstanding}_{i,o,t}$ $ASR_{i,t} = \text{ShortIntRatio}_{i,t} - \frac{1}{12} \times \sum_{j=0}^{11} \text{ShortIntRatio}_{i,t-j}$ $\text{ShortIntRatio}_{i,t} = \frac{\text{ShortIntM}_{i,t}}{\text{CSHOM}_{i,t}}$ CSHOM : Adjusted Monthly Common Shares Outstanding (Adjusted Monthly Common Shares Outstanding) ShortIntM : Monthly Short Interest (Monthly Short Interest) PctofIO-HF : Percent of company shares owned by Hedge Funds () PctIOSharesOutstanding : "percentOfSharesOutstanding" column from ciqOwnCompanyHolding table (CIQ Ownership XF package only)

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Ownership Breadth Stability of Institution Ownership by Buyers	Ratio of average number of buyers to stddev of number of buyers, over trailing 12 quarters. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$BreadthStabBuy = \frac{Avg_{12Q}(NumBuyIss)}{Stdev_{12Q}(NumBuyIss)}$ <p>NumBuyIss : "NumberofBuyers" column from ciqOwnIssueAggregate table (CIQ Ownership XF package only)</p>
Price Momentum	Ownership Breadth Stability of Institution Ownership by Holders	Measured by stability of number of holders. It is a standardized measure of the average number of institutional investors holding a firm's shares. Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$BreadthStabHD_{i,t} = \frac{Avg(NumofHD_{i,t}, 12)}{Std(NumofHD_{i,t}, 12)}$ <p>where</p> $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p>NumofHD : "NumberofHolders" column from ciqOwnIssueAggregate table (CIQ Ownership XF package only)</p>
Price Momentum	Percent Above 260-Day Low	This factor is the percent of current closing price over the low of the past year, lagged by 20 days.	Cross-Sectional	DESCENDING	$PA52WL20DLag_{i,t} = Lag \left(\frac{CloseD_{i,t} - \min_{0 \leq j \leq 251} CloseD_{i,t-j}}{\min_{0 \leq j \leq 251} CloseD_{i,t-j}}, 20 \text{ Days} \right)$ <p>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Risk Adjusted Relative Strength	A technical momentum indicator that compares the magnitude of recent gains to recent losses, adjusting for risk, in an attempt to determine overbought and oversold conditions of the stock.	Cross-Sectional	DESCENDING	$RskAdjRS = \frac{Beta_{12}(RSI1M_{i,m})}{Std(RSI1M_{i,m}, 13)}$ $RSI21D_{i,t} = \frac{\text{CloseD}_{i,t} - \text{CloseD}_{i,t-21}}{\text{CloseD}_{i,t-21}} - \frac{\text{CloseD}(SP500D)_{i,t} - \text{CloseD}(SP500D)_{i,t-21}}{\text{CloseD}(SP500D)_{i,t-21}}$ $RSI1M_{i,m} = RSI21D_{i,21} \times t$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p><small>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price) SP500D : SP 500 Index Daily (SP 500 Index Daily)</small></p>
Price Momentum	Share Turnover	The ratio of average daily trading volume over the past month to the number of shares outstanding.	Cross-Sectional	ASCENDING	$STO_{i,t} = \frac{Avg_t(TrdVolD_{i,t})}{CSHOM_{i,t}}$ $Avg_t(X_{i,t}) = \frac{\sum_{month(s)=t} X_{i,s}}{21}$ <p><small>CSHOM : Adjusted Monthly Common Shares Outstanding (Adjusted Monthly Common Shares Outstanding) TrdVolD : Daily Trading Volume (Daily Trading Volume)</small></p>
Price Momentum	Sharpe Ratio	Annualized Sharpe ratio of monthly return over trailing 36 months	Cross-Sectional	ASCENDING	$SharpeRatio = \frac{(1 + Avg_{36m}(r_{i,t}))^{12} - 1}{Stdev_{36m}(r_{i,t})^{\sqrt{12}}}$ $\text{where } r_{i,t} = \frac{\text{CloseM}_{i,t} + \text{DivsM}_{i,t}}{\text{CloseM}_{i,t-1}} - 1$ $CloseM = \text{Monthly Closing Price}$ $DivsM = \text{MonthlyDividends} + \text{CashEquivalents}$ $R_f = \text{Yield on 3Mth US Treasury}$
Price Momentum	Short Interest Ratio	The ratio of monthly short interest to the number of shares outstanding.	Cross-Sectional	ASCENDING	$ShortIntRatio_{i,t} = \frac{ShortIntM_{i,t}}{CSHOM_{i,t}}$ <p><small>CSHOM : Adjusted Monthly Common Shares Outstanding (Adjusted Monthly Common Shares Outstanding) ShortIntM : Monthly Short Interest (Monthly Short Interest)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Short Interest Trading Volume	The ratio of monthly short interest to average daily trading volume.	Cross-Sectional	ASCENDING	$ShortIntTrdVol_{i,t} = \frac{ShortIntM_{i,t}}{Avg_m(TrdVolD_{i,t})}$ $Avg_t(X) = \frac{\sum_{month(s)=t} X_s}{21}$ <p><small>ShortIntM : Monthly Short Interest (Monthly Short Interest) TrdVolD : Daily Trading Volume (Daily Trading Volume)</small></p>
Price Momentum	Slope of 52W Price Trend	Slope of time trend line fitted to weekly closing prices over the past 52 weeks.	Cross-Sectional	DESCENDING	$CloseW_{i,s} = \alpha_{i,t} + 52W Slope_{i,t} \times s + \epsilon_{i,s}$ <p>where</p> $s \in [t - 51, t]$ $\epsilon_{i,s} \sim N(0, \sigma^2)$ <p><small>CloseW : Adjusted Weekly Closing Price (Adjusted Weekly Closing Price)</small></p>
Price Momentum	Stability of Change in Number of Holders	Ratio of change in breadth to the standard deviation of the change. Note that in cases where the numerator of the ratio is negative, the value is multiplied by the standard deviation of the change rather than divided. So negative values will be penalized more for volatility and the magnitude of negative values will appear larger Data is sourced from the CIQ Ownership package in Xpressfeed. Data is not Point-in-Time, for data prior to 2016, a 2 month lag was applied for US companies, and 12 month lag for ex-US.	Cross-Sectional	DESCENDING	$StabofChgHD_{i,t} = \frac{Chg1QNumofHD_{i,t}}{Std(Chg1QNumofHD_{i,t}, 8)}$ <p>where</p> $Chg1QNumofHD_{i,t} = NumofHD_{i,t} - NumofHD_{i,t-1}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^{n-1} X_{i,t-s}$ <p><small>NumofHD : "NumberOfHolders" column from ciqOwnIssueAggregate table (CIQ Ownership XF package only)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Standardized 36M Residual	Residual return from the Fama-French Model scaled by its 36-month standard deviation.	Cross-Sectional	ASCENDING	$stdRR36M_{i,t} = \frac{\varepsilon_{i,t}}{Std(\varepsilon_{i,t}, 36)}$ <p>where</p> $Rtn_{i,t} - R_f = \alpha_{i,t} + \beta_{i,t}^M * (Rtn_{Mkt} - R_f) + \beta_{i,t}^{SMB} * SMB + \beta_{i,t}^{HML} * HML + \varepsilon_{i,t}$ $Rtn_{i,t} = \frac{CloseM_{i,t}}{CloseM_{i,t-1}} - 1$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price)</p>
Price Momentum	Volatility adjusted 12M return	The cumulative percentage stock price change from thirteen months ago to the previous month minus the percentage price change over the past month; all scaled by the standard deviation for the monthly percent changes over the past twelve months.	Cross-Sectional	DESCENDING	$VolAdjRtn12M = \frac{PM12M_{i,t-1} - PM1M_{i,t}}{StdDev13M_{i,t}}$ $PM1M = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ $PM12M = \frac{CloseM_{i,t} - CloseM_{i,t-12}}{CloseM_{i,t-12}}$ $StdDev13M = StdDev(PM1M_{i,t}, PM1M_{i,t-1}, \dots, PM1M_{i,t-12})$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price)</p>
Price Momentum	12 month Relative Price Strength	A technical momentum indicator that compares the magnitude of recent gains to recent losses in an attempt to determine overbought and oversold conditions of the stock. This factor is the industry relative factor for VolAdjRtn12M.	Ind Group Reletive	DESCENDING	$VolAdjRtn12M = \frac{PM12M_{i,t-1} - PM1M_{i,t}}{StdDev13M_{i,t}}$ $PM1M = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ $PM12M = \frac{CloseM_{i,t} - CloseM_{i,t-12}}{CloseM_{i,t-12}}$ $StdDev13M = StdDev(PM1M_{i,t}, PM1M_{i,t-1}, \dots, PM1M_{i,t-12})$ <p>CloseM : Adjusted Closing Price (Adjusted Closing Price)</p>
Price Momentum	4 Week Industry Relative Return	This factor is the 4 week simple return.	Ind Group Reletive	ASCENDING	$IndRelRtn4W_{i,t} = \frac{CloseW_{i,t} - CloseW_{i,t-4}}{CloseW_{i,t-4}}$ <p>CloseW : Adjusted Weekly Closing Price (Adjusted Weekly Closing Price)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Ind Grp Rel 12M - 1M Price Momentum	This factor is the difference between the company's lagged twelve month price momentum and its one month momentum.	Ind Group Reletive	DESCENDING	$PM12M1M_{i,t} = PM12M_{i,t-1} - PM1M_{i,t}$ $PM1M_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ $PM12M_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-12}}{CloseM_{i,t-12}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price)</small></p>
Price Momentum	Ind Grp Rel 1M Price Reversal	1 Month Industry Relative Price Reversal is the one month simple return minus the average one month returns of the industry, scaled by the standard deviation of these returns.	Ind Group Reletive	ASCENDING	$IndRel_PM1M_{i,t} = \frac{PM1M_{i,t} - IndAvg(PM1M_{i,t})}{IndStd(PM1M_{i,t})}$ <p>where</p> $PM1M_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-1}}{CloseM_{i,t-1}}$ $IndAvg(PM1M_{i,t}) = \frac{1}{N(Ind(i))} \sum_{j \in Ind(i)} PM1M_{j,t}$ $IndStd(PM1M_{i,t}) = \sqrt{\frac{\sum_{j \in Ind(i)} [PM1M_{j,t} - IndAvg(PM1M_{i,t})]^2}{N(Ind(i)) - 1}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price)</small></p>
Price Momentum	Ind Grp Rel 5 Day Price Momentum	5 Day Industry Relative Price Momentum is the 5 day simple return minus the average 5 day returns of the industry, scaled by the standard deviation of these returns.	Ind Group Reletive	ASCENDING	$PM5D_{i,t} = \frac{CloseD_{i,t} - CloseD_{i,t-5}}{CloseD_{i,t-5}}$ <p><small>CloseD : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Price Momentum	Ind Grp Rel 50 Day Volume Signal	This ratio compares the average of the last 50-day trading volume to the average of the one year trading volume.	Ind Group Reletive	DESCENDING	$50DVolSig_t = \frac{\frac{1}{50} \sum_{j=0}^{49} CSHTRD_{t-j}}{\frac{1}{252} \sum_{j=0}^{251} CSHTRD_{t-j}}$ <p><small>CSHTRD : Daily Trading Volume (Daily Trading Volume)</small></p>
Price Momentum	Ind Grp Rel 9M Price Momentum	9 Month Price Momentum is the stock's 9 month simple return.	Ind Group Reletive	DESCENDING	$PM9M_{i,t} = \frac{CloseM_{i,t} - CloseM_{i,t-9}}{CloseM_{i,t-9}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Price Momentum	Ind Grp Rel Max Daily Return in the Past 6 Months	This factor is the max return of a stock in the past 6 months.	Ind Group Relitive	ASCENDING	$\text{MaxRetPayoff}_t = \text{Max} \left\{ \frac{P_t - P_{t-1}}{P_{t-1}}, t \in \text{Past 6 months} \right\}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Price Momentum	Ind Grp Rel Price Momentum - 6 Months	This is a momentum factor based on 6-month price data, adjusted by the market 6-month momentum.	Ind Group Relitive	ASCENDING	$\text{PM6M}_{i,t} = \frac{\text{CloseM}_{i,t} - \text{CloseM}_{i,t-6}}{\text{CloseM}_{i,t}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</small></p>
Price Momentum	Ind Grp Rel Short Interest Ratio	This factor is the ratio between short interest and shares outstanding.	Ind Group Relitive	ASCENDING	$\text{ShortIntRatio}_{i,t} = \frac{\text{ShortIntM}_{i,t}}{\text{CSHOM}_{i,t}}$ <p><small>CSHOM : Adjusted Monthly Common Shares Outstanding (Adjusted Monthly Common Shares Outstanding) ShortIntM : Monthly Short Interest (Monthly Short Interest)</small></p>
Price Momentum	Ind Grp Rel Short Interest Trading Volume	This factor is defined as daily short interest divided by average daily trading volume.	Ind Group Relitive	ASCENDING	$\text{ShortIntTrdVol}_{i,t} = \frac{\text{ShortIntM}_{i,t}}{\text{Avg}_m(\text{TrdVolD}_{i,t})}$ $\text{Avg}_t(X) = \frac{\sum_{\text{month}(s)=t} X_s}{21}$ <p><small>ShortIntM : Monthly Short Interest (Monthly Short Interest) TrdVolD : Daily Trading Volume (Daily Trading Volume)</small></p>
Price	-	-	5 Yr Historical Rel		-
Historical Growth	12-Quarter Trendline in Trailing 12-Month Cash Flows	This factor is constructed in the same way as Factor 12QTTMCFTTMEPS. The only difference is that this is the calculation for cash flows instead of earnings.	Cross-Sectional	DESCENDING	$12\text{QTTMCFTrend}_{i,t} = \frac{\beta_{i,t}}{\frac{1}{12} \sum_{j=0}^{47} \text{OANCFQ}_{i,t-j}}$ <p><i>where</i></p> $y_{i,t+j-12} = \alpha_{i,t} + \beta_{i,t}j + \epsilon_{i,t}, j = 1, \dots, 12$ $y_{i,t} = \frac{1}{4} \sum_{j=0}^3 \text{OANCFQ}_{i,t-j}$ <p><small>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	12-Quarter Trendline in Trailing 12-Month Earnings	For each of the past 12 quarters, we use the TTM earnings to calculate the slope of the linear trend line fitted to the 12 data points. Subsequently, the slope will then be divided by the average of all TTM earnings for the past 12 quarters.	Cross-Sectional	DESCENDING	$12QTrendTTMEPS_{i,t} = \frac{\beta_{i,t}}{\frac{1}{12} \sum_{j=0}^{47} EPSFXQ_{i,t-j}}$ <p>where</p> $y_{i,t+j-12} = \alpha_{i,t} + \beta_{i,t}j + \epsilon_{i,t}, j = 1, \dots, 12$ $y_{i,t} = \frac{1}{4} \sum_{j=0}^3 EPSFXQ_{i,t-j}$ <p>EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</p>
Historical Growth	1Y Chg in Asset Adjusted Cash Flow	The 1 year change in trailing four quarter cash flow, relative to average total assets over the year.	Cross-Sectional	DESCENDING	$AstAdjChg1YCF_{i,t} = \frac{TTMCF_{i,t} - TTMCF_{i,t-4}}{AvgAst_{i,t}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $AvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p>IBQ : Quarterly Income Before Extraordinary Items (Q8) ATQ : Total Assets - Quarterly (Q44) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</p>
Historical Growth	1Y Chg in Asset Adjusted EPS	The 1 year change in trailing four quarter earning per share, relative to the average level of total assets per share over the year.	Cross-Sectional	DESCENDING	$AstAdjChg1YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{AvgAstPS_{i,t}}$ <p>where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 EPSQ_{i,t-s}$ $AvgAstPS_{i,t} = \frac{\sum_{s=0}^3 \frac{ATQ_{i,t-s}}{CSHOQ_{i,t-s}}}{4}$ <p>ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	1Y Chg in Asset Adjusted Free Cash Flow	The 1 year change in trailing four quarter free cash flow, divided by average total assets over the year.	Cross-Sectional	DESCENDING	$AstAdjChg1YFCF_{i,t} = \frac{TTMFCF_{i,t} - TTMFCF_{i,t-4}}{TTMAvgAst_{i,t}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $TTMAvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p><small>ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVO : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90)</small></p>
Historical Growth	1Y Chg in Asset Adjusted Operating Cash Flow	The 1 year change in trailing four quarter operating cash flow, divided by average total assets over the year.	Cross-Sectional	DESCENDING	$AstAdjChg1YOCF_{i,t} = \frac{TTMOCF_{i,t} - TTMOCF_{i,t-4}}{AvgAst_{i,t}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s})$ $AvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p><small>ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small></p>
Historical Growth	1Y Chg in Cash Flow per Share	The percentage change from a year ago in trailing four quarter cash flow per share.	Cross-Sectional	DESCENDING	$Chg1YCF_{i,t} = \frac{\frac{TTMCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMCF_{i,t-4}}{AvgCSHO_{i,t-4}}}{\frac{TTMCF_{i,t-4}}{AvgCSHO_{i,t-4}}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>IBQ : Quarterly Income Before Extraordinary Items (Q8) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	1Y Chg in Cash Flow to Price	The 1 year change in trailing four quarter cash flow per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg1YCF_{i,t} = \frac{TTMCF_{i,t} - TTMCF_{i,t-4}}{AvgCSHO_{i,t}} \cdot \frac{Close_{i,t}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</small></p>
Historical Growth	1Y Chg in Earnings per Share	The percentage change from a year ago in trailing four quarter earnings per share.	Cross-Sectional	DESCENDING	$Chg1YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{TTMEPS_{i,t-4}}$ $TTMEPS_{i,t} = \sum_{s=0}^3 (EPSQ_{i,t-s})$ <p><small>EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>
Historical Growth	1Y Chg in Earnings to Price	The 1 year change in trailing four quarter earnings per share, divided by current stock price.	Cross-Sectional	DESCENDING	$PAdjChg1YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{Close_{i,t}}$ <p>where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 EPSQ_{i,t-s}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	1Y Chg in Free Cash Flow per Share	The percentage change from a year ago in trailing four quarter free cash flow per share.	Cross-Sectional	DESCENDING	$Chg1YFCF_{i,t} = \frac{\frac{TTMFCF_{i,t}}{TTMCSHO_{i,t}} - \frac{TTMFCF_{i,t-4}}{TTMCSHO_{i,t-4}}}{\frac{TTMFCF_{i,t-4}}{TTMCSHO_{i,t-4}}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $TTMCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>
Historical Growth	1Y Chg in Free Cash Flow to Price	The 1 year change in trailing four quarter free cash flow per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg1YFCF_{i,t} = \frac{\frac{TTMFCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMFCF_{i,t-4}}{AvgCSHO_{i,t-4}}}{Close_{i,t}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t}}{4}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	1Y Chg in Operating Cash Flow per Share	The percentage change from a year ago in trailing four quarter operating cash flow per share.	Cross-Sectional	DESCENDING	$PAdjChg1YOCF_{i,t} = \frac{\frac{TTMOCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMOCF_{i,t-4}}{AvgCSHO_{i,t-4}}}{Close_{i,t}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>
Historical Growth	1Y Chg in Operating Cash Flow to Price	The 1 year change in trailing four quarter operating cash flow per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$Chg1YOCF_{i,t} = \frac{\frac{TTMOCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMOCF_{i,t-4}}{AvgCSHO_{i,t-4}}}{\frac{TTMOCF_{i,t-4}}{AvgCSHO_{i,t-4}}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>
Historical Growth	1Y Chg in Operating Margin	The percentage change from a year ago in trailing four quarter operating margin.	Cross-Sectional	DESCENDING	$Chg1YOPM_{i,t} = \frac{\frac{TTMOIBDP_{i,t}}{TTMSALES_{i,t}} - \frac{TTMOIBDP_{i,t-4}}{TTMSALES_{i,t-4}}}{\frac{TTMOIBDP_{i,t-4}}{TTMSALES_{i,t-4}}}$ $TTMOIBDP_{i,t} = \sum_{s=0}^3 (OIBDPQ_{i,t-s})$ $TTMSALES_{i,t} = \sum_{s=0}^3 SALEQ_{i,t-s}$ <p>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	1Y Chg in Sales to Price	The 1 year change in trailing four quarter sales per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg1YSales_{i,t} = \frac{\frac{TTMSALES_{i,t}}{TTMCSHO_{i,t}} - \frac{TTMSALES_{i,t-4}}{TTMCSHO_{i,t-4}}}{Close_{i,t}}$ <p>where</p> $TTMSALES_{i,t} = \sum_{s=0}^3 (SALEQ_{i,t-s})$ $TTMCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>
Historical Growth	1Y Chg in Sales Turnover	The percentage change from a year ago in the ratio of trailing four quarter sales to average total assets over the same period.	Cross-Sectional	DESCENDING	$Chg1YAstTo_{i,t} = \frac{\frac{TTMSALES_{i,t}}{AvgAst_{i,t}} - \frac{TTMSALES_{i,t-4}}{AvgAst_{i,t-4}}}{\frac{TTMSALES_{i,t-4}}{AvgAst_{i,t-4}}}$ <p>where</p> $SALES_{i,t} = \sum_{s=0}^3 (SALEQ_{i,t-s})$ $AvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p><small>ATQ : Total Assets - Quarterly (Q44) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>
Historical Growth	3M Momentum in Trailing 12M Sales	This factor is calculated first by taking the difference between the current TTM sales and the TTM sales one year ago divided by the absolute value of the TTM sales one year ago, and then taking the difference between the ratio today and the ratio 3 month ago.	Cross-Sectional	DESCENDING	$3MSalesMom_{i,t} = \Delta \frac{\sum_{j=0}^3 SALEQ_{i,t-j} - \sum_{j=4}^7 SALEQ_{i,t-j}}{\sum_{j=4}^7 SALEQ_{i,t-j}}$ <p>where</p> $\Delta(X) \equiv X_{i,t} - X_{i,t-1}$ <p><small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Foumla
Historical Growth	3Y Average Annual Earnings Growth	This factor is constructed the same way as Factor 3YAvgAnnSalesGrw. The only difference is that this is a calculation for EPS instead of sales.	Cross-Sectional	DESCENDING	$3YAvgAnnEPSGrw_{i,t} = \frac{1}{12} \sum_{j=0}^{11} AnnEPSGrw_{i,t-j}$ $AnnEPSGrw_{i,t} = \frac{\sum_{j=0}^3 EPSFXQ_{i,t-j}}{\sum_{j=3}^7 EPSFXQ_{i,t-j}} - 1$ <p>EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</p>
Historical Growth	3Y Average Annual Sales Growth	We first calculate the 1-year percentage changes in sales, for the past three years. Then, we calculate the three year average of all three 1-year percentage changes.	Cross-Sectional	DESCENDING	$3YAvgAnnSalesGrw_{i,t} = \frac{1}{12} \sum_{j=0}^{11} AnnSalesGrw_{i,t-j}$ $AnnSalesGrw_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\sum_{j=3}^7 SALEQ_{i,t-j}} - 1$ <p>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Historical Growth	3Y Chg in Asset Adjusted Cash Flow	The 3 year change in trailing four quarter cash flow, relative to average total assets over the three years.	Cross-Sectional	DESCENDING	$AstAdjChg3YCF_{i,t} = \frac{TTMCF_{i,t} - TTMCF_{i,t-12}}{3Y AvgAst_{i,t}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $3Y AvgAst_{i,t} = \frac{\sum_{s=0}^{11} ATQ_{i,t-s}}{12}$ <p>IBQ : Quarterly Income Before Extraordinary Items (Q8) ATQ : Total Assets - Quarterly (Q44) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	3Y Chg in Asset Adjusted EPS	The 3 year change in trailing four quarter earnings per share, relative to average total assets per share over the three year period.	Cross-Sectional	DESCENDING	$AstAdjChg3YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-12}}{3YAvgAstPS_{i,t}}$ <p>where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 EPSQ_{i,t-s}$ $3Y AvgAstPS_{i,t} = \frac{\sum_{s=0}^{11} ATQ_{i,t-s}}{12}$ <p> <small>ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small> </p>
Historical Growth	3Y Chg in Asset Adjusted Free Cash Flow	This factor is the 3 Year change in Free Cash Flow divided by the 3 Year Average Total Assets for the firm.	Cross-Sectional	DESCENDING	$AstAdjChg3YFCF_{i,t} = \frac{TTMFCF_{i,t} - TTMFCF_{i,t-12}}{AvgAst_{i,t}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $AvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p> <small>ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> </p>
Historical Growth	3Y Chg in Asset Adjusted Operating Cash Flow	The 3 year change in trailing four quarter operating cash flow, relative to average total assets over the past three years.	Cross-Sectional	DESCENDING	$AstAdjChg3YOCF_{i,t} = \frac{TTMOCF_{i,t} - TTMOCF_{i,t-12}}{3YAvgAst_{i,t}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s})$ $3Y AvgAst_{i,t} = \frac{\sum_{s=0}^{11} ATQ_{i,t-s}}{12}$ <p> <small>ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	3Y Chg in Cash Flow per Share	The percentage change from 3 years ago in trailing four quarter cash flow per share.	Cross-Sectional	DESCENDING	$Chg3YCF_{i,t} = \frac{\frac{TTMCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMCF_{i,t-12}}{AvgCSHO_{i,t-12}}}{\frac{TTMCF_{i,t-12}}{AvgCSHO_{i,t-12}}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>IBQ : Quarterly Income Before Extraordinary Items (Q8) CSHQ : Adjusted Quarterly Common Shares Outstanding (Q61) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</small></p>
Historical Growth	3Y Chg in Cash Flow to Price	The 3 year change in trailing four quarter cash flow per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg3YCF_{i,t} = \frac{\frac{TTMCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMCF_{i,t-12}}{Close_{i,t}}}{Close_{i,t}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t}}{4}$ <p><small>IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHQ : Adjusted Quarterly Common Shares Outstanding (Q61) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</small></p>
Historical Growth	3Y Chg in Earnings per Share	The percentage change from 3 years ago in trailing four quarter earnings per share.	Cross-Sectional	DESCENDING	$Chg3YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-12}}{TTMEPS_{i,t-12}}$ <p>where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 (EPSQ_{i,t-s})$ <p><small>EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	3Y Chg in Earnings to Price	The 3 year change in trailing four quarter earnings per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg3YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-12}}{Close_{i,t}}$ <p>where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 EPSQ_{i,t-s}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</p>
Historical Growth	3Y Chg in Free Cash Flow per Share	The percentage change from three years ago in trailing four quarter free cash flow per share.	Cross-Sectional	DESCENDING	$Chg3YFCF_{i,t} = \frac{\frac{TTMFCF_{i,t}}{TTMCSHO_{i,t}} - \frac{TTMFCF_{i,t-12}}{TTMCSHO_{i,t-12}}}{\frac{TTMFCF_{i,t-12}}{TTMCSHO_{i,t-12}}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $TTMCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	3Y Chg in Free Cash Flow to Price	The 3 year change in trailing four quarter free cash flow per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PrcAdjChg3YFCF_{i,t} = \frac{\frac{TTMFCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMFCF_{i,t-12}}{AvgCSHO_{i,t-12}}}{Close_{i,t}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t}}{4}$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Historical Growth	3Y Chg in Operating Cash Flow per Share	The percentage change from three years ago in trailing four quarter operating cash flow per share.	Cross-Sectional	DESCENDING	$Chg3YOCF_{i,t} = \frac{\frac{TTMOCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMOCF_{i,t-12}}{AvgCSHO_{i,t-12}}}{\frac{TTMOCF_{i,t-12}}{AvgCSHO_{i,t-12}}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	3Y Chg in Operating Cash Flow to Price	The 3 year change in trailing four quarter operating cash flow per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg3YOCF_{i,t} = \frac{\frac{TTMOCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMOCF_{i,t-12}}{AvgCSHO_{i,t-12}}}{Close_{i,t}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 4CSHOQ_{i,t-s}}{4}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small></p>
Historical Growth	3Y Chg in Operating Margin	The percentage change from 3 years ago in trailing four quarter operating margin.	Cross-Sectional	DESCENDING	$Chg3YOPM_{i,t} = \frac{\frac{TTMOIBDP_{i,t}}{TTMSALES_{i,t}} - \frac{TTMOIBDP_{i,t-12}}{TTMSALES_{i,t-12}}}{\frac{TTMOIBDP_{i,t-12}}{TTMSALES_{i,t-12}}}$ $TTMOIBDP_{i,t} = \sum_{s=0}^3 (OIBDPQ_{i,t-s})$ $TTMSALES_{i,t} = \frac{\sum_{s=0}^3 SALEQ_{i,t-s}}{4}$ <p><small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	3Y Chg in Sales to Price	The 3 year change in trailing four quarter sales per share, divided by the current stock price.	Cross-Sectional	DESCENDING	$PAdjChg3YSales_{i,t} = \frac{\frac{TTMSALES_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMSALES_{i,t-12}}{AvgCSHO_{i,t-12}}}{Close_{i,t}}$ <p>where</p> $TTMSALES_{i,t} = \sum_{s=0}^3 (SALEQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>
Historical Growth	3Y Chg in Sales Turnover	The percentage change from three years ago in the ratio of trailing four quarter sales to average total assets over the same period.	Cross-Sectional	DESCENDING	$Chg3YAstTo_{i,t} = \frac{\frac{TTMSALES_{i,t}}{AvgAst_{i,t}} - \frac{TTMSALES_{i,t-12}}{AvgAst_{i,t-12}}}{\frac{TTMSALES_{i,t-12}}{AvgAst_{i,t-12}}}$ <p>where</p> $TTMSALES_{i,t} = \sum_{s=0}^3 (SALEQ_{i,t-s})$ $AvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p><small>ATQ : Total Assets - Quarterly (Q44) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	6M Momentum in Trailing 12M Sales	This factor is calculated the same way as the factor 3MSalesMom. The only difference is that we now take the 6 month difference of the ratios than 3 month.	Cross-Sectional	DESCENDING	$6MTTMSalesMom_{i,t} = \Delta \frac{\sum_{j=0}^3 SALEQ_{i,t-j} - \sum_{j=4}^7 SALEQ_{i,t-j}}{\sum_{j=4}^7 SALEQ_{i,t-j}}$ <p style="text-align: center;">where $\Delta \equiv X_{i,t} - X_{i,t-2}$</p> <p>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Historical Growth	Adj 1Y Chg in Asset Adjusted FCF	This factor is the 1 year change in trailing twelve month free cash flow divided by the average total asset.	Cross-Sectional	DESCENDING	$AdjAstAdjChg1YFCF_{i,t} = \frac{TTMFcf_{i,t} - TTMFCF_{i,t-4}}{TTMAvgAst_{i,t}}$ <p style="text-align: center;">where</p> $TTMFcf_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $TTMAvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p>ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90)</p>
Historical Growth	Adj 1Y Chg in Earnings per Share	This factor is the 1 Year percentage change in Trailing Twelve Month Earnings per Share.	Cross-Sectional	DESCENDING	$AdjChgEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{TTMEPS_{i,t-4}}$ <p style="text-align: center;">where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 (EPSFXQ_{i,t-s})$ <p>EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Adjusted 3Y Chg in Asset Free Cash Flow	This factor is the 3 Year change in Free Cash Flow divided by the 3 Year Average Total Assets for the firm.	Cross-Sectional	DESCENDING	$AdjAstAdjChg3YFCF_{i,t} = \frac{TTMFCF_{i,t} - TTMFCF_{i,t-12}}{AvgAst_{i,t}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFO_{i,t-s} - CAPX_{i,t-s} - DVQ_{i,t-s})$ $AvgAst_{i,t} = \frac{\sum_{s=0}^3 ATQ_{i,t-s}}{4}$ <p> ATQ : Total Assets - Quarterly (Q44) OANCFO : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Historical Growth	Change in Slope of 4-Quarter Trendline through Quarterly Sales	First, we calculate TTM sales for each of the past 4 quarters, and subsequently the average of those TTM values for the past four quarters. The slope of the trend line through the TTM sales will then be calculated and divided by the average quarterly sales. Lastly, the same ratio will be calculated for one year ago, which will be subtracted from the current ratio to obtain the change in slope.	Cross-Sectional	DESCENDING	$Chg4QSlopeTrend_{i,t} = \Delta \frac{\beta_{i,t}}{\frac{1}{4} \sum_{j=0}^3 SALEQ_{i,t-j}}$ <p>where</p> $y_{i,t+j-4} = \alpha_{i,t} + \beta_{i,t}j + \epsilon_{i,t}, j = 1, 2, 3, 4$ $y_{i,t} = \frac{1}{4} \sum_{j=0}^3 SALEQ_{i,t-j}$ $\Delta(X) = X_{i,t} - X_{i,t-4}$ <p>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Historical Growth	Change of Asset Turnover	This factor is the change in the ratio of Trailing Twelve Month Sales to Total Assets.	Cross-Sectional	DESCENDING	$ChgATO_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t}}{\frac{\sum_{j=0}^3 ATQ_{i,t}}{4}} - \frac{\sum_{j=0}^3 SALEQ_{i,t-4}}{\frac{\sum_{j=0}^3 ATQ_{i,t-4}}{4}}$ <p> ATQ : Total Assets - Quarterly (Q44) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Consecutive Quarters of Declines in TTM Overhead/Sales	Starting from the most recent quarter and counting back, if the consecutive quarter-to-quarter changes are negative, each change counts as +1; and if they are positive, each change counts as -1. All TTM values are calculated as the summation of the quarterly values for the past four quarters.	Cross-Sectional	DESCENDING	$TTMOS_{i,t} = \frac{\sum_{t=0}^3 Sales_{i,t} - COGS_{i,t} - IBEx_{i,t}}{\sum_{t=0}^3 Sales_{i,t}}$ $TTMOSQoQChg_{i,t} = TTMOS_{i,t} - TTMOS_{i,t-1}$ $NegChg_{i,t} = \begin{cases} 1 & TTMOSQoQChg_{i,t} < 0 \\ 0 & TTMOSQoQChg_{i,t} \geq 0 \end{cases}$ $ConsQtrsDeclOverheadtoSales_{i,t} = \sum_{i=0}^{23} NegChg_{i,t}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30) </p>
Historical Growth	Dividend Growth	This factor is the one year percent change in trailing twelve month cash dividends.	Cross-Sectional	DESCENDING	$\text{DividendGrowth}_{i,t} = \frac{\sum_{s=0}^3 DVQ_{i,t}}{\sum_{s=0}^3 DVQ_{i,t-4}} - 1$ <p> DVQ : Quarterly Cash Dividends (Q89) </p>
Historical Growth	Dividend per Share Growth	This factor is the one year percent change in trailing twelve month cash dividends per share.	Cross-Sectional	DESCENDING	$\text{DivperShareGrowth}_{i,t} = \frac{\frac{\sum_{s=0}^3 DVQ_{i,t}}{\sum_{s=0}^3 CSHOQ_{i,t}}}{\frac{\sum_{s=0}^3 DVQ_{i,t-4}}{\sum_{s=0}^3 CSHOQ_{i,t-4}}} - 1$ <p> DVQ : Quarterly Cash Dividends (Q89) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	EPS Stability	This factor is measured by the ratio of the one year change in EPS over the standard deviation in the one year change in EPS going eight periods back. For the North American model, securities with a negative value in the numerator are multiplied by the standard deviation rather than divided.	Cross-Sectional	DESCENDING	$EPSSstab_{i,t} = \frac{Chg1YEPSFXQ_{i,t}}{Std(Chg1YEPSFXQ_{i,t}, 8)}$ <p>where</p> $Chg1YEPSFXQ_{i,t} = EPSFXQ_{i,t} - EPSFXQ_{i,t-4}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p>EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</p>
Historical Growth	Expected Earnings Growth: Fiscal Year 2/Fiscal Year 1	This factor is calculated by taking the ratio of the FY2 EPS estimation and the FY1 EPS estimation.	Cross-Sectional	DESCENDING	$FY2OverFY1Growth_{i,t} = \frac{EPSEstFY2_{i,t}}{EPSEstFY1_{i,t}}$ <p>EPSEstFY2 : Mean EPS Estimate for Fiscal Year 2 (EPS Estimate Mean - 2 Yr Out) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out)</p>
Historical Growth	Num of Qtrs of Pos Chgs in TTM Cash Flows/TTM Sales	Starting from the most recent quarter and counting back, if the consecutive quarter-to-quarter changes are positive, each change counts as +1; if they are negative, each change counts as -1.	Cross-Sectional	DESCENDING	$ConsQPoChgTTMCFtoSales_{i,t} = \sum_{j=0}^{23} PosChg_{i,t-j}$ $PosChg_{i,t} = \begin{cases} 1, & TTMCFtoSalesQoQChg_{i,t} > 0; \\ 0, & TTMCFtoSalesQoQChg_{i,t} \leq 0. \end{cases}$ $TTMCFtoSalesQoQChg_{i,t} = TTMCFtoSales_{i,t} - TTMCFtoSales_{i,t-1}$ $TTMCFtoSales_{i,t} = \frac{\sum_{j=0}^3 OANCFQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Num of Quarters of Declines in Receivables and Inventories/TTM Sales	This factor is constructed the same way as Factor ConsQtrsDeclOverheadtoSales but for different data items. Receivables and inventories are calculated as the average of the current quarterly values and the quarterly values one year ago.	Cross-Sectional	DESCENDING	$\text{ConsQDeclRecInvtoSales}_{i,t} = \sum_{j=0}^{23} \text{NegChg}_{i,t-j}$ $\text{NegChg}_{i,t} = \begin{cases} 1, & \text{TTMRISQoQChg}_{i,t} < 0; \\ 0, & \text{TTMRISQoQChg}_{i,t} \geq 0. \end{cases}$ $\text{TTMRISQoQChg}_{i,t} = \text{TTMRIS}_{i,t} - \text{TTMRIS}_{i,t-1}$ $\text{TTMRIS}_{i,t} = \frac{(\text{RECTQ}_{i,t} + \text{RECTQ}_{i,t-4})/2}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ $+ \frac{(\text{INVQTQ}_{i,t} + \text{INVQTQ}_{i,t-4})/2}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p> <small> RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVTO : Inventories - Total - Quarterly (Q38) </small> </p>
Historical Growth	Number of Consecutive Qtrs of Pos. Changes in TTM Cash Flows	For each of the past 24 quarters, we calculate the TTM cash flows, and count the number of times the consecutive changes in those TTM cash flows are positive, we count each change as +1.	Cross-Sectional	DESCENDING	$\text{TTMOCF}_{i,t} = \sum_{s=0}^3 \text{OANCFQ}_{i,t-s}$ $\text{QoQChg}_{i,t} = \text{TTMOCF}_{i,t} - \text{TTMOCF}_{i,t-1}$ $\text{PosChg}_{i,t} = \begin{cases} 1 & \text{QoQChg}_{i,t} > 0 \\ 0 & \text{QoQChg}_{i,t} \leq 0 \end{cases}$ $\text{ConsQPosChginTTMCF}_{i,t} = \sum_{s=0}^{23} \text{PosChg}_{i,t-s}$ <p> <small> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) </small> </p>
Historical Growth	Number of Consecutive Qtrs of Positive Changes in TTM Quarterly Earnings	This factor is constructed the same way as Factor ConsQPosChginTTMCF. The only difference is that this calculation is for TTM earnings.	Cross-Sectional	DESCENDING	$\text{TTMEPS}_{i,t} = \sum_{s=0}^3 \text{EPSQ}_{i,t-s}$ $\text{QoQChg}_{i,t} = \text{TTMEPS}_{i,t} - \text{TTMEPS}_{i,t-1}$ $\text{PosChg}_{i,t} = \begin{cases} 1 & \text{QoQChg}_{i,t} > 0 \\ 0 & \text{QoQChg}_{i,t} \leq 0 \end{cases}$ $\text{ConsQPosChgTTMEPS}_{i,t} = \sum_{s=0}^{23} \text{PosChg}_{i,t-s}$ <p> <small> EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Return on Assets Stability	This factor is measured by the ratio of the one year change in ROA over the standard deviation in the one year change in ROA going eight periods back.	Cross-Sectional	DESCENDING	$ROAStabi,t = \frac{Chg1YROA_{i,t}}{Std(Chg1YROA_{i,t}, 8)}$ <p>where</p> $\text{ROA}_{i,t} = \frac{\sum_{j=0}^3 \text{NOPATQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ATQ}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$ $\text{TaxRateQ}_{i,t} = \frac{\text{TXTQ}_{i,t}}{\text{PIQ}_{i,t}}$ $Chg1YROA_{i,t} = \text{ROA}_{i,t} - \text{ROA}_{i,t-4}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p> <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q23) DPQ : Quarterly Depreciation and Amortization (Q5) TTX : Quarterly Income Tax (Q1) PIQ : Quarterly Pretax Income (Q23)</small> </p>
Historical Growth	Return on Equity Stability	This factor is measured by the ratio of the one year change in ROE over the standard deviation in the one year change in ROE going eight periods back.	Cross-Sectional	DESCENDING	$ROESTabi,t = \frac{Chg1YROE_{i,t}}{Std(Chg1YROE_{i,t}, 8)}$ <p>where</p> $\text{ROE}_{i,t} = \frac{\sum_{j=0}^3 \text{IBCOMQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{CEQQ}_{i,t-j}}$ $Chg1YROE_{i,t} = \text{ROE}_{i,t} - \text{ROE}_{i,t-4}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p> <small>IBCOMQ : Quarterly Income Before Extraordinary Items, Available for Common Equity (Q25) CEQQ : Quarterly Common Equity (Q59)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	ROA 20 Qtr Standard Deviation	This factor is measured as the standard deviation of ROA going twenty quarters back.	Cross-Sectional	ASCENDING	$ROAStddev_{i,t} = Std(ROA_{i,t}, 20)$ $where$ $ROA_{i,t} = \frac{\sum_{j=0}^3 NOPATQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ $NOPATQ_{i,t} = OIQ_{i,t} \times (1 - TaxRateQ_{i,t})$ $OIQ_{i,t} = OIBDPQ_{i,t} - DPQ_{i,t}$ $TaxRateQ_{i,t} = \frac{TXTQ_{i,t}}{PIQ_{i,t}}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ <p> <small>OIQ : Quarterly operating income (Q)</small> <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21)</small> <small>DPQ : Quarterly Depreciation and Amortization (Q5)</small> <small>TXTQ : Quarterly Income Taxes (Q6)</small> <small>PIQ : Quarterly Pretax Income (Q23)</small> <small>ATQ : Total Assets - Quarterly (Q44)</small> </p>
Historical Growth	ROA 60 Month Slope	-	Cross-Sectional	DESCENDING	-
Historical Growth	ROE 20 Qtr Standard Deviation	This factor is measured as the standard deviation of ROE going twenty quarters back.	Cross-Sectional	ASCENDING	-
Historical Growth	Sales Acceleration	This factor measures the growth in the percent change of sales per share.	Cross-Sectional	DESCENDING	$SalesAcc_{i,t} = Growth_{i,4} \left(100 \times \frac{\frac{SALEQ_{i,t}}{CSHOQ_{i,t}} - \frac{SALEQ_{i,t-4}}{CSHOQ_{i,t-4}}}{\frac{SALEQ_{i,t-4}}{CSHOQ_{i,t-4}}} \right)$ <p> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Sustainable Growth Rate	The product of retention ratio and return on equity.	Cross-Sectional	DESCENDING	$SusGrwRate_{i,t} = \text{RetentionRatio}_{i,t} * \frac{\sum_{s=0}^3 EPSQ_{i,t-s}}{TTMCEPS_{i,t}}$ $\text{RetentionRatio}_{i,t} = 1 - \frac{\sum_{s=0}^3 DVQ_{i,t-s}}{\sum_{s=0}^3 EPSQ_{i,t-s}}$ $TTMCEPS_{i,t} = \frac{\sum_{s=0}^3 CEQQ_{i,t-s}}{\frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}}$ <p> CEQQ : Quarterly Common Equity (Q59) DVQ : Quarterly Cash Dividends (Q89) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9) </p>
Historical Growth	Trailing 12-Month Overhead/Trailing 12-Month Sales	This factor is calculated by taking the ratio of the TTM overhead and TTM sales.	Cross-Sectional	ASCENDING	$TTMOverheadtoSales_{i,t} = \frac{\sum_{j=0}^3 (\text{SALEQ}_{i,t-j} - \text{COGSQ}_{i,t-j} - \text{IBQ}_{i,t-j})}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30) </p>
Historical Growth	Trailing 12-Month Receivables and Inventories/Trailing 12-Month Sales	This factor is calculated by taking the ratio of between TTM receivables plus TTM inventories and TTM sales.	Cross-Sectional	DESCENDING	$TTMRecInvToSales_{i,t} = \frac{\frac{1}{2} \times (\text{INVQTQ}_{i,t} + \text{INVQTQ}_{i,t-4})}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}} + \frac{\frac{1}{2} \times (\text{RECTQ}_{i,t} + \text{RECTQ}_{i,t-4})}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p> RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVQTQ : Inventories - Total - Quarterly (Q38) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Ind Grp Rel 1Y Chg in Cash Flow to Price	This factor is the 1 year change in Trailing Twelve Month Cash Flow per Share divided by Current Stock Price.	Ind Group Relitive	DESCENDING	$PAdjChg1YCF_{i,t} = \frac{TTMCF_{i,t} - TTMCF_{i,t-4}}{AvgCSHO_{i,t}} \cdot \frac{Close_{i,t}}{Close_{i,t-4}}$ <p>where</p> $TTMCF_{i,t} = \sum_{s=0}^3 (IBQ_{i,t-s} + DPCQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</small></p>
Historical Growth	Ind Grp Rel 1Y Chg in Earnings per Share	This factor is the 1 Year percentage change in Trailing Twelve Month Earnings per Share.	Ind Group Relitive	DESCENDING	$Chg1YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{TTMEPS_{i,t-4}}$ $TTMEPS_{i,t} = \sum_{s=0}^3 (EPSQ_{i,t-s})$ <p><small>EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>
Historical Growth	Ind Grp Rel 1Y Chg in Earnings to Price	This factor is the one year Change in Trailing Twelve Month Earnings per Share divided by Current Stock Price.	Ind Group Relitive	DESCENDING	$PAdjChg1YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{Close_{i,t}}$ <p>where</p> $TTMEPS_{i,t} = \sum_{s=0}^3 EPSQ_{i,t-s}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Ind Grp Rel 1Y Chg in Free Cash Flow per Share	This factor is the 1 Year percentage Change in Free Cash Flow per Share.	Ind Group Relitive	DESCENDING	$Chg1YFCF_{i,t} = \frac{\frac{TTMFCF_{i,t}}{TTMCSHO_{i,t}} - \frac{TTMFCF_{i,t-4}}{TTMCSHO_{i,t-4}}}{\frac{TTMFCF_{i,t-4}}{TTMCSHO_{i,t-4}}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $TTMCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>
Historical Growth	Ind Grp Rel 1Y Chg in Free Cash Flow to Price	This factor is the 1 Year Change in Trailing Twelve Month Free Cash Flow per Share divided by Current Stock Price.	Ind Group Relitive	DESCENDING	$PAdjChg1YFCF_{i,t} = \frac{\frac{TTMFCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMFCF_{i,t-4}}{AvgCSHO_{i,t-4}}}{Close_{i,t}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t}}{4}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Ind Grp Rel 1Y Chg in Operating Cash Flow per Share	This factor is the 1 Year percentage change in Trailing Twelve Months Operating Cash Flow per Share.	Ind Group Relitive	DESCENDING	$Chg1YOCF_{i,t} = \frac{\frac{TTMOCF_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMOCF_{i,t-4}}{AvgCSHO_{i,t-4}}}{\frac{TTMOCF_{i,t-4}}{AvgCSHO_{i,t-4}}}$ <p>where</p> $TTMOCF_{i,t} = \sum_{s=0}^3 (OANCFOQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>OANCFOQ : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</p>
Historical Growth	Ind Grp Rel 1Y Chg in Operating Margin	This factor is the 1 year percentage change the company's Trailing Twelve Month Operating Margin.	Ind Group Relitive	DESCENDING	$Chg1YOPM_{i,t} = \frac{\frac{TTMOIBDP_{i,t}}{TTMSALES_{i,t}} - \frac{TTMOIBDP_{i,t-4}}{TTMSALES_{i,t-4}}}{\frac{TTMOIBDP_{i,t-4}}{TTMSALES_{i,t-4}}}$ $TTMOIBDP_{i,t} = \sum_{s=0}^3 (OIBDPQ_{i,t-s})$ $TTMSALES_{i,t} = \frac{\sum_{s=0}^3 SALEQ_{i,t-s}}{4}$ <p>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Historical Growth	Ind Grp Rel 1Y Chg in Sales to Price	This factor is the 1 year change in trailing twelve month sales per share divided by price.	Ind Group Relitive	DESCENDING	$PAdjChg1YSales_{i,t} = \frac{\frac{TTMSALES_{i,t}}{TTMCSCO_{i,t}} - \frac{TTMSALES_{i,t-4}}{TTMCSCO_{i,t-4}}}{Close_{i,t}}$ <p>where</p> $TTMSALES_{i,t} = \sum_{s=0}^3 (SALEQ_{i,t-s})$ $TTMCSCO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Historical Growth	Ind Grp Rel 3Y Chg in Sales to Price	This factor is the 3 year change in trailing twelve month sales per share divided by price.	Ind Group Relitive	DESCENDING	$PAdjChg3YSales_{i,t} = \frac{\frac{TTMSALES_{i,t}}{AvgCSHO_{i,t}} - \frac{TTMSALES_{i,t-12}}{AvgCSHO_{i,t-12}}}{Close_{i,t}}$ <p>where</p> $TTMSALES_{i,t} = \sum_{s=0}^3 (SALEQ_{i,t-s})$ $AvgCSHO_{i,t} = \frac{\sum_{s=0}^3 CSHOQ_{i,t-s}}{4}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>
Historical Growth	Ind Grp Rel Sustainable Growth Rate	This factor is defined as 1 minus the payout ratio then times the ratio of trailing twelve month earnings per share to common equity per share. When the payout ratio is greater than 1, this factor is set to 0.	Ind Group Relitive	DESCENDING	$SusGrwRate_{i,t} = PayoutRatio_{i,t} * \frac{\sum_{s=0}^3 EPSQ_{i,t-s}}{TTMCEPS_{i,t}}$ $PayoutRatio_{i,t} = 1 - \frac{\sum_{s=0}^3 DVO_{i,t-s}}{\sum_{s=0}^3 EPSQ_{i,t-s}}$ $TTMCEPS_{i,t} = \frac{\sum_{s=0}^3 CEQQ_{i,t-s}}{4}$ <p><small>CEQQ : Quarterly Common Equity (Q59) DVO : Quarterly Cash Dividends (Q89) CSHQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>
Historical Growth	5 Yr Hist Rel 1Y Chg in Earnings per Share	This factor is the 1 Year percentage change in Trailing Twelve Month Earnings per Share.	5 Yr Historical Rel	DESCENDING	$Chg1YEPS_{i,t} = \frac{TTMEPS_{i,t} - TTMEPS_{i,t-4}}{TTMEPS_{i,t-4}}$ $TTMEPS_{i,t} = \sum_{s=0}^3 (EPSQ_{i,t-s})$ <p><small>EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9)</small></p>
Analyst Expectations	3M Revision in FY1 EPS Estimate	The change in the consensus EPS estimate for FY1 from three months ago, relative to the current stock price.	Cross-Sectional	DESCENDING	$Rev3MFY1_{i,t} = \frac{EPSEstFY1_{i,t} - EPSEstFY1_{i,t-3}}{Close_{i,t}}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Analyst Expectations	3M Revision in FY2 EPS Estimate	The change in the consensus EPS estimate for FY2 from three months ago, relative to the current stock price.	Cross-Sectional	DESCENDING	$Rev3MFY2_{i,t} = \frac{EPSEstFY2_{i,t} - EPSEstFY2_{i,t-3}}{Close_{i,t}}$ <p>EPSEstFY2 : Mean EPS Estimate for Fiscal Year 2 (EPS Estimate Mean - 2 Yr Out) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</p>
Analyst Expectations	6M Avg Chg 1M Recommendation	This factor is the average one month change in the mean number of recommendations made by analysts in a six month period.	Cross-Sectional	ASCENDING	$6MAvgChg1MRec_{i,t} = \frac{\sum_{s=0}^5 Chg1MRec_{i,t-s}}{6}$ <p>where</p> $Chg1MRec_{i,t} = \text{MeanRec}_{i,t} - \text{MeanRec}_{i,t+1}$ <p>MeanRec : Mean Monthly Recommendations ()</p>
Analyst Expectations	Adj Number of EPS FY2 Revisions	This factor represents the number of positive 1 month revisions minus number of negative 1 month revisions in a company's FY2 EPS estimates. For FY2 estimates, this factor uses data from the daily estimates file, but uses data from the monthly estimate file if data is not available in the daily file.	Cross-Sectional	DESCENDING	$AdjEPSNumRevFY2_{i,t} = \frac{EPSNumUpFY2_{i,t-1} - EPSNumDownFY2_{i,t-1}}{EPSNumFY2_{i,t-1}}$ <p>EPSNumUpFY2 : Analyst Up Earnings Estimate for Fiscal Year 2 (EPS Number of Estimates Raised - 2 Yr Out) EPSNumDownFY2 : Analyst Down Earnings Estimate for Fiscal Year 2 (EPS Number of Estimates Lowered - 2 Yr Out) EPSNumFY2 : Total number of Analyst Earnings Estimate for Fiscal Year 2 (EPS Number of Estimates - 2 Yr Out)</p>
Analyst Expectations	Adjusted 3M Revision in FY1 EPS Estimate	The factor measures the last 3 month changes in analyst average earnings estimate for Fiscal Year 1, adjusted by most recent stock price. For FY1 estimates, this factor uses data from the daily estimates file, but uses data from the monthly estimate file if data is not available in the daily file.	Cross-Sectional	DESCENDING	$AdjRev3MFY1_{i,t} = \frac{EPSEstFY1_{i,t} - EPSEstFY1_{i,t-3}}{Close_{i,t}}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Analyst Expectations	Adjusted Inverse PEG	This factor is a modified version of original inverse PEG ratio - securities with negative EPS Mean Estimate and Long Term Growth Rates are excluded from the analysis.	Cross-Sectional	DESCENDING	$AdjInvPEG_{i,t} = \frac{\sum_{j=0}^3 EPSEstQ_{i,t+j}}{Close_{i,t}} \times LTG_{i,t}$ <p> LTG : Mean Long-Term EPS Est. (Mean EPS estimate long term) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price.) EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) </p>
Analyst Expectations	Adjusted Number of EPS FY1 Revisions	This factor represents the number of positive 1 month revisions minus number of negative 1 month revisions in a company's FY1 EPS estimates. For FY1 estimates, this factor uses data from the daily estimates file, but uses data from the monthly estimate file if data is not available in the daily file.	Cross-Sectional	DESCENDING	$AdjEPSNumRevFY1_{i,t} = \frac{EPSNumUpFY1_{i,t-1} - EPSNumDownFY1_{i,t-1}}{EPSNumFY1_{i,t-1}}$ <p> EPSNumUpFY1 : Analyst Up Earnings Estimate for Fiscal Year 1 (EPS Estimate Number of Estimates Raised - 1 Yr Out) EPSNumDownFY1 : Analyst Down Earnings Estimate for Fiscal Year 1 (EPS Number of Estimates Lowered - 1 Yr Out) EPSNumFY1 : Total number of Analyst Earnings Estimate for Fiscal Year 1 (EPS Number of Estimates - 1 Yr Out) </p>
Analyst Expectations	Adjusted Revision Magnitude	The change in the median consensus EPS estimate for FY1 from three months ago relative to the absolute value of the current median median consensus EPS estimate for FY1. To limit the impact of small divisor, the factor is not calculated for firms with FY1 EPS less than 2 cents	Cross-Sectional	DESCENDING	$AdjRevMag_{i,t} = \frac{EPSEstFY1Median_{i,t} - EPSEstFY1Median_{i,t-3}}{ EPSEstFY1_{i,t} }$ <p> EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) EPSEstFY1Median : Median EPS Estimate for Fiscal Year 1 (EPS Estimate Median - 1 Yr Out) </p>
Analyst Expectations	Analyst Dispersion for FY1 EPS	The ratio of the standard deviation of analysts' EPS estimates for FY1 to the absolute value of the mean estimate.	Cross-Sectional	DESCENDING	$EPSEstDispFY1_{i,t} = \frac{EPSEstStdFY1_{i,t}}{ EPSEstFY1_{i,t} }$ <p> EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) EPSEstStdFY1 : Analyst Earnings Estimate Standard Deviation for Fiscal Year 1 (EPS Estimate Standard Deviation - 1 Yr Out) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Analyst Expectations	Analyst Dispersion for FY2 EPS	The ratio of the standard deviation of analysts' EPS estimates for FY2 to the absolute value of the mean estimate.	Cross-Sectional	DESCENDING	$EPSEstDispFY2_{i,t} = \frac{EPSEstStdFY2_{i,t}}{ EPSEstFY2_{i,t} }$ <p> $EPSEstFY2$: Mean EPS Estimate for Fiscal Year 2 (EPS Estimate Mean - 2 Yr Out) $EPSEstStdFY2$: Analyst Estimate Standard Deviation for Fiscal Year 2 (EPS Estimate Standard Deviation - 2 Yr Out) </p>
Analyst Expectations	Analyst Earnings Estimate Diffusion	The factor measures difference between the number of upward 1month revisions and the number of downward 1 month revisions in analyst estimates of FY1 earnings per share, divided by the number of analyst earnings estimates.	Cross-Sectional	DESCENDING	$EstDiff_{i,t} = \frac{EPSNumUpFY1_{i,t} - EPSNumDownFY1_{i,t}}{EPSNumFY1_{i,t}}$ <p> $EPSNumUpFY1$: Analyst Up Earnings Estimate for Fiscal Year 1 (EPS Estimate Number of Estimates Raised - 1 Yr Out) $EPSNumDownFY1$: Analyst Down Earnings Estimate for Fiscal Year 1 (EPS Number of Estimates Lowered - 1 Yr Out) $EPSNumFY1$: Total number of Analyst Earnings Estimate for Fiscal Year 1 (EPS Number of Estimates - 1 Yr Out) </p>
Analyst Expectations	Earnings Surprise	The difference between realized quarterly earnings per share and the consensus estimate, relative the prior day's closing price. *Note that price denominator is fixed at time of announcement and does not change until then next earnings release	Cross-Sectional	DESCENDING	$EPSSurp_{i,t} = \frac{EPSActQ_{i,t} - EPSSurpMeanQ_{i,t}}{Close_{i,t-1}}$ <p> $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) $EPSGAAPAct$: EPS (GAAP) Actual (100284) (EPS (GAAP) Actual (100284)) $EPSGAAPMean$: EPS (GAAP) Surprise Mean (100278) (EPS (GAAP) Surprise Mean (100278)) </p>
Analyst Expectations	Expected LTG	This factor is consensus estimate of long-term growth in earnings per share.	Cross-Sectional	DESCENDING	$LTG_{i,t}$
Analyst Expectations	Inverse PEG	The ratio of the sum of consensus estimates of quarterly earnings per share for the next four quarters to the current stock price, multiplied by the consensus estimate of long-term growth in earnings per share.	Cross-Sectional	DESCENDING	$InvPEG_{i,t} = \frac{\sum_{j=0}^3 EPSEstQ_{i,t+j}}{Close_{i,t}} \times LTG_{i,t}$ <p> LTG : Mean Long-Term EPS Est. (Mean EPS estimate long term) $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) $EPSEstQ$: Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Analyst Expectations	Number of EPS FY1 Revisions	The factor is weighted average of number of net upward 1 month revisions in consensus estimate of FY1 earnings per share in current month, and the number of net upward 1 month revisions in the previous month.	Cross-Sectional	DESCENDING	$EPSNumRevFY1_{i,t} = \frac{1}{3} \times \frac{EPSNumUpFY1_{i,t-1} - EPSNumDownFY1_{i,t-1}}{EPSNumFY1_{i,t-1}}$ $+ \frac{2}{3} \times \frac{EPSNumUpFY1_{i,t} - EPSNumDownFY1_{i,t}}{EPSNumFY1_{i,t}}$ <p> EPSNumUpFY1 : Analyst Up Earnings Estimate for Fiscal Year 1 (EPS Estimate Number of Estimates Raised - 1 Yr Out) EPSNumDownFY1 : Analyst Down Earnings Estimate for Fiscal Year 1 (EPS Number of Estimates Lowered - 1 Yr Out) EPSNumFY1 : Total number of Analyst Earnings Estimate for Fiscal Year 1 (EPS Number of Estimates - 1 Yr Out) </p>
Analyst Expectations	Standardized Unexpected Earnings	The difference between realized quarterly earnings per share and the consensus estimate , relative to the standard deviation of the past differences. For US & Canada, Normalized EPS is used; for ex-NA, we use GAAP EPS.	Cross-Sectional	DESCENDING	$SUE_{i,t} = \frac{EPSNormAct_{i,t} - EPSNormMean_{i,t}}{EPSNormStddev_{i,t}}$ <p> EPSNormAct : EPS Normalized Actual (100179) (EPS Normalized Actual (100179)) EPSNormMean : EPS Normalized Consensus Mean (100173) (EPS Normalized Consensus Mean) EPSNormStddev : EPS Normalized Standard Deviation (100178) (EPS Normalized Standard Deviation) </p>
Analyst Expectations	Street Revision Magnitude	The change in the consensus estimate of FY1 earnings per share from three months ago, relative to the average of current estimates.	Cross-Sectional	DESCENDING	$RevMagFY1_{i,t} = \frac{EPSEstFY1Mean_{i,t} - EPSEstFY1Mean_{i,t-3}}{EPSEstFY1_{i,t}}$ <p> EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) </p>
Analyst Expectations	Ind Grp Rel Analyst Dispersion for FY1 EPS	The ratio of the standard deviation of analysts' EPS estimates for FY1 to the absolute value of the mean estimate.	Ind Group Relative	DESCENDING	$EPSEstDispFY1_{i,t} = \frac{EPSEstStdFY1_{i,t}}{ EPSEstFY1_{i,t} }$ <p> EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) EPSEstStdFY1 : Analyst Earnings Estimate Standard Deviation for Fiscal Year 1 (EPS Estimate Standard Deviation - 1 Yr Out) </p>
Analyst Expectations	Ind Grp Rel Earnings Surprise	The difference between realized quarterly earnings per share and the consensus estimate, relative the prior day's closing price. *Note that price denominator is fixed at time of announcement and does not change until then next earnings release	Ind Group Relative	DESCENDING	$EPSSurp_{i,t} = \frac{EPSActQ_{i,t} - EPSSurpMeanQ_{i,t}}{Close_{i,t-1}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSGAAPAct : EPS (GAAP) Actual (100284) (EPS Qtr Actual Value) EPSGAAPMean : EPS (GAAP) Surprise Mean (100278) (EPS Qtr Surprise Mean) </p>
Analyst Expectations	Ind Grp Rel Expected LTG	This factor is consensus estimate of long-term growth in earnings per share.	Ind Group Relative	DESCENDING	-

Categories	Factor Name	Detail	Type	Rank Order	Formula
Analyst Expectations	Ind Grp Rel Inverse PEG	The ratio of the sum of consensus estimates of quarterly earnings per share for the next four quarters to the current stock price, multiplied by the consensus estimate of long-term growth in earnings per share.	Ind Group Relitive	DESCENDING	$InvPEG_{i,t} = \frac{\sum_{j=1}^4 EPSEstQ_{i,t+j}}{Close_{i,t}} \times LTG_{i,t}$ <p> <small> LTG : Mean Long-Term EPS Est. (Mean EPS estimate long term) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) </small> </p>
Analyst Expectations	Ind Grp Rel Standardized Unexpected Earnings	The difference between realized quarterly earnings per share and the consensus estimate , relative to the standard deviation of the past differences.	Ind Group Relitive	DESCENDING	$SUE_{i,t} = \frac{EPSActQ_{i,t} - EPSSurpMeanQ_{i,t}}{EPSSurpStdQ_{i,t}}$ <p> <small> EPSGAAPAct : EPS (GAAP) Actual (100284) (EPS Qtr Actual Value) EPSGAAPMean : EPS (GAAP) Surprise Mean (100278) (EPS Qtr Surprise Mean) EPSGAAPStddev : EPS (GAAP) Surprise Standard Deviation (100283) (EPS Qtr Surprise Standard Deviation) </small> </p>
Analyst	-	-	5 Yr Historical Rel	-	-
Earnings Quality	1Y Chg in Sales to Earnings	The change from a year ago in the ratio of trailing four quarter sales per share to trailing four quarter earnings per share.	Cross-Sectional	DESCENDING	$SalesToEPSChg_{i,t} = \frac{TTMSalesPerShare_{i,t}}{TTMEPS_{i,t}} - \frac{TTMSalesPerShare_{i,t-4}}{TTMEPS_{i,t-4}}$ <p> <small> where TTMSalesPerShare_{i,t} = $\frac{\sum_{s=0}^3 SALEQ_{i,t-s}}{\frac{1}{4} \sum_{s=0}^3 CSHOQ_{i,t-s}}$ TTMEPS_{i,t} = $\sum_{s=0}^3 EPSQ_{i,t-s}$ CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) EPSQ : Earnings Per Share (Diluted) - Excluding Extraordinary Items (Q9) </small> </p>
Earnings Quality	Accrual Ratio - Balance Sheet	Accrual ratio measures the earning qualities. This is one the two similar definitions that based on balance sheet items.	Cross-Sectional	DESCENDING	$AccrualRatioBS_{i,t} = \frac{NOA_{i,t} - NOA_{i,t-4}}{\frac{1}{2} \times (NOA_{i,t} + NOA_{i,t-4})}$ <p> <small> where NOA_{i,t} = $\frac{1}{4} \times \sum_{j=0}^3 [(ATQ_{i,t-j} - CHEQ_{i,t-j}) - (LTQ_{i,t-j} - DLCQ_{i,t-j} - DLTTQ_{i,t-j})]$ ATQ : Total Assets - Quarterly (Q4) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CHEQ : Quarterly Cash and Short Term Investments (Q36) LTTQ : Liabilities Total (Q54) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Accrual Ratio - Cash Flows	Accrual ratio measures the earning qualities. This is one the two similar definitions that based on cash flow items.	Cross-Sectional	ASCENDING	$\text{AccrualRatioCF}_{i,t} = \frac{\sum_{j=0}^3 (\text{IBQ}_{i,t-j} - (\text{OANCFQ}_{i,t-j} + \text{IVNCFQ}_{i,t-j}))}{\frac{1}{2} \times (\text{NOA}_{i,t} + \text{NOA}_{i,t-4})}$ <p>where</p> $\text{NOA}_{i,t} = \frac{1}{4} \sum_{j=0}^3 (\text{ATQ}_{i,t-j} - \text{CHEQ}_{i,t-j})$ $- \frac{1}{4} \sum_{j=0}^3 (\text{LTQ}_{i,t-j} - \text{DLCQ}_{i,t-j} - \text{DLTTQ}_{i,t-j})$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CHEQ : Quarterly Cash and Short Term Investments (Q36) LTQ : Liabilities, Total (Q54) IVNCFQ : Net Cash Flow from Investing Activities (Q111) </p>
Earnings Quality	Adjusted Accruals	This is an accrual ratio that measures a company's earnings quality.	Cross-Sectional		$\text{AdjAccruals}_t = \frac{\sum_{j=0}^3 (\text{NIQ}_{t-j} - \text{OANCFQ}_{t-j})}{\left \sum_{j=0}^3 \text{NIQ}_{t-j} \right }$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) NIQ : Net Income (Q69) </p>
Earnings Quality	Asset Adjusted Capital Investments	The ratio of the 1 year change in gross property, plant and equipment plus inventory to total assets a year ago.	Cross-Sectional	ASCENDING	$\text{InvToAsset}_{i,t} = \frac{(\text{PPEGTQ}_{i,t} - \text{PPEGTQ}_{i,t-1}) + (\text{INVTQ}_{i,t} - \text{INVTQ}_{i,t-1})}{\text{ATQ}_{i,t-4}}$ <p> ATQ : Total Assets - Quarterly (Q44) INVTQ : Inventories - Total - Quarterly (Q38) PPEGTQ : Property Plant and Equipment - Total (Gross) (Q118) </p>
Earnings Quality	Asset Turnover	The ratio of trailing four quarter sales to average total assets over the same period.	Cross-Sectional	ASCENDING	$\text{AssetTurn}_{i,t} = \frac{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ATQ}_{i,t-j}}$ <p> ATQ : Total Assets - Quarterly (Q44) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Balance Sheet Accruals	The sum of total receivables, inventory, other current assets and accounts payable, relative to total sales.	Cross-Sectional	ASCENDING	$TotalAccruals_{i,t} = \frac{RECTQ_{i,t} + INVQ_{i,t} + ACOQ_{i,t} - APQ_{i,t} - LCOQ_{i,t}}{SALEQ_{i,t}}$ <p> RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVQ : Inventories - Total - Quarterly (Q38) APQ : Accounts Payable - Quarterly (Q46) ACOQ : Current Assets - Other - Total (Q39) LCOQ : Other Current Liabilities - Quarterly (Q48) </p>
Earnings Quality	Capital Expenditure to Sales	The ratio of trailing four quarter sum of capital expenditures to trailing four quarter sum of sales.	Cross-Sectional	ASCENDING	$CapExToSales_{i,t} = \frac{\sum_{s=0}^3 CAPXQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p> CAPXQ : Quarterly Capital Expenditures (Q90) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>
Earnings Quality	Cash Burn Rate	This factor is the rate of net cash flow from all activities over the total cash and short-term investments (marketable securities).	Cross-Sectional	DESCENDING	$CashBurn_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} + IVNCFQ_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 CHEQ_{i,t-j}}$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) CHEQ : Quarterly Cash and Short Term Investments (Q36) IVNCFQ : Net Cash Flow from Investing Activities (Q111) </p>
Earnings Quality	Cash Conversion Cycle	It's defined as the sum of average receivable collection period and average inventory processing period, minus payables payment period.	Cross-Sectional	ASCENDING	$CashCycle_{i,t} = \frac{\frac{1}{4} \times \sum_{j=0}^3 RECTQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}} \times 365 + \frac{\frac{1}{4} \times \sum_{j=0}^3 INVQ_{i,t-j}}{\sum_{j=0}^3 COGSQ_{i,t-j}} \times 365 - \frac{\frac{1}{4} \times \sum_{j=0}^3 APQ_{i,t-j}}{\sum_{j=0}^3 COGSQ_{i,t-j}} \times 365$ <p> RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVQ : Inventories - Total - Quarterly (Q38) COGSQ : Cost of Goods Sold - Quarterly (Q30) APQ : Accounts Payable - Quarterly (Q46) </p>
Earnings Quality	Cash Flow to Invested Capital	This factor is the ratio of net cash flow to invested capital	Cross-Sectional	DESCENDING	$CFIC_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ICAPITQ_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPQ_{i,t}$ <p> ICAPITQ : Quarterly Invested Capital (Q62) IBQ : Quarterly Income Before Extraordinary Items (Q8) DPQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Cash Flow to Total Asset	This metric compares the company's average four quarter net cash flow to its total assets.	Cross-Sectional	DESCENDING	$CFAst_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPQ_{i,t}$ <p style="font-size: small; margin-top: -10px;"> DPQ : Quarterly Depreciation and Amortization (Q5) IBQ : Quarterly Income Before Extraordinary Items (Q8) ATQ : Total Assets - Quarterly (Q4) </p>
Earnings Quality	Cash Ratio	This ratio measures a company's liquidity by including only cash, cash equivalent and short term investment to cover short term liabilities.	Cross-Sectional	DESCENDING	$\text{CashRatio}_{i,t} = \frac{CHEQ_{i,t}}{LCTQ_{i,t}}$
Earnings Quality	Cash to Sales	The ratio of average cash and short term investments over the past 4 quarters to trailing four quarter sum of sales.	Cross-Sectional	ASCENDING	$CashToSales_{i,t} = \frac{\frac{1}{4} \sum_{s=0}^3 CEHQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p style="font-size: small; margin-top: -10px;"> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Earnings Quality	Change EPS to Sales	This factor measures the company's year-over-year change of EPS-to-sales ratio.	Cross-Sectional	DESCENDING	$AdjChgEPStoSales_{i,t} = \frac{\sum_{s=0}^3 EPSFXQ_{i,t-s}}{SALEShare_{i,t}} - \frac{\sum_{s=0}^3 EPSFXQ_{i,t-4}}{SALEShare_{i,t-4}}$ <p style="margin-left: 20px;">where</p> $SALEShare_{i,t} = \frac{\sum_{s=0}^3 SALEQ_{i,t-s}}{\frac{1}{4} \times \sum_{s=0}^3 CSHOQ_{i,t-s}}$ <p style="font-size: small; margin-top: -10px;"> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) </p>
Earnings Quality	Change in Net Charge off to Gross Loan	This factor is the ratio of the change in net loan charge-offs to total gross loans.	Cross-Sectional	ASCENDING	$ChgChgOfftoGL_{i,t} = \% \Delta \left(\frac{NCOQ_{i,t-j}}{LGQ_{i,t-j}} \right)$ <p style="margin-left: 20px;">where</p> $\% \Delta(x_t) = \frac{x_t - x_{t-4}}{x_{t-4}}$ <p style="font-size: small; margin-top: -10px;"> LGQ : Gross Loans () NCOQ : Net Charge-Offs (Q176) </p>
Earnings Quality	Change in Non performing Asset to Reserve Loan Loss	This factor is the one year change in the ratio of non-performing assets to the reserve for loan losses.	Cross-Sectional	ASCENDING	$ChgNonPerfAsttoResLnLos_{i,t} = \frac{NPATQ_{i,t}}{RLLQ_{i,t}} - \frac{NPATQ_{i,t-4}}{RLLQ_{i,t-4}}$ <p style="font-size: small; margin-top: -10px;"> NPATQ : Total Nonperforming Assets - Quarterly (Q99) RLLQ : Reserve for Loan/Asset Losses (Q172) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Change in Non performing Asset to Total Asset	This factor is the one year change in the ratio of non-performing assets to total assets.	Cross-Sectional	ASCENDING	$ChgNonPerfAsttoAst_{i,t} = \frac{NPATQ_{i,t}}{ATQ_{i,t}} - \frac{NPATQ_{i,t-4}}{ATQ_{i,t-4}}$ <p style="text-align: center;"><small>ATQ : Total Assets - Quarterly (Q44) NPATQ : Total Nonperforming Assets - Quarterly (Q99)</small></p>
Earnings Quality	Change in Non Performing Loans to Total Gross Loans	This factor is the ratio of non-performing loans to the total gross loans.	Cross-Sectional	ASCENDING	$ChgNonPerfLnGL_{i,t} = \frac{NPATQ_{i,t}}{LGQ_{i,t}} - \frac{NPATQ_{i,t-4}}{LGQ_{i,t-4}}$ <p style="text-align: center;"><small>NPATQ : Total Nonperforming Assets - Quarterly (Q99) LGQ : Gross Loans ()</small></p>
Earnings Quality	Change in TTM Depr. to Capex	It's defined as the relative change in trailing four quarter depreciation and amortization expense from a year ago, minus the relative change in trailing four quarter capital expenditures from a year ago.	Cross-Sectional	ASCENDING	$ChgDeprCapEx_{i,t} = \left \left(\frac{\sum_{j=0}^3 DPQ_{i,t-j}}{\sum_{j=4}^7 DPQ_{i,t-j}} - 1 \right) - \left(\frac{\sum_{j=0}^3 CAPXY_{i,t-j}}{\sum_{j=4}^7 CAPXY_{i,t-j}} - 1 \right) \right $ <p style="text-align: center;"><small>DPQ : Quarterly Depreciation and Amortization (Q5) CAPXY : Quarterly Capital Expenditures (Q90)</small></p>
Earnings Quality	Change of Sales to Change of EPS	This factor is the difference between the company's change in EPS and change in sales.	Cross-Sectional	ASCENDING	$ChgSalestoChgEPS_{i,t} = \left \% \Delta \left(\frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}} \right) - \% \Delta \left(\sum_{j=0}^3 EPSFXQ_{i,t-j} \right) \right $ <p style="text-align: center;"><small>where $\% \Delta(x_t) = \frac{x_t - x_{t-4}}{x_{t-4}}$</small></p> <p style="text-align: center;"><small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</small></p>
Earnings Quality	Current Ratio	This is a financial liquidity ratio that measures a firm's ability to pay off short term liabilities.	Cross-Sectional	DESCENDING	$CACL_{i,t} = \frac{ACTQ_{i,t}}{LCTQ_{i,t}}$ <p style="text-align: center;"><small>LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Depreciation to Capex Ratio	This factor gives the ratio of the accounting charge for depreciation as a percentage of the amount that a firm spends on new property, plant and equipment.	Cross-Sectional	DESCENDING	$\text{DepToCapex}_{i,t} = \frac{\sum_{j=0}^3 \text{DPCQ}_{i,t-j}}{\sum_{j=0}^3 (\text{CAPXQ}_{i,t-j} - \text{SPPIVQ}_{i,t-j})}$ <p> <small> CAPXQ : Quarterly Capital Expenditures (Q90) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) SPPIVQ : Quarterly Sale of Property, Plant and Equipment (Q102) </small> </p>
Earnings Quality	EBIT Margin	This ratio measures the company's profitability by comparing its earnings before interests and taxes to its total revenue.	Cross-Sectional	DESCENDING	$\text{EBITMargin}_{i,t} = \frac{\sum_{j=0}^3 \text{EBIT}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}},$ <p style="text-align: center;"><i>where,</i></p> $\text{EBIT}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}.$ <p> <small> EBIT : Earnings Before Interest and Taxes (Q21 - Q5) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </small> </p>
Earnings Quality	EBITDA Margin	This ratio measures the company's profitability by comparing its earnings before interests, taxes, depreciation, and amortization to its total revenue.	Cross-Sectional	DESCENDING	$\text{EBITDAMargin}_{i,t} = \frac{\sum_{j=0}^3 \text{OIBDPQ}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p> <small> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </small> </p>
Earnings Quality	Equity Turnover	The ratio of trailing four quarter sales to average book value of common equity over the same period.	Cross-Sectional	DESCENDING	$\text{ETO}_{i,t} = \frac{\sum_{s=0}^3 \text{SALEQ}_{i,t-s}}{\frac{1}{4} \sum_{s=0}^3 \text{CEQQ}_{i,t-s}}$ <p> <small> CEQQ : Quarterly Common Equity (Q59) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </small> </p>
Earnings Quality	Free Cash Flow Stability	This factor measures the stability of the free cash flow using the ratio of the one year change in free cash flow(FCF) over the standard deviation of the FCF for a period of 2 years.	Cross-Sectional	ASCENDING	$\text{ChgNonPerfLnGL}_{i,t} = \frac{\text{NPATQ}_{i,t}}{\text{LGQ}_{i,t}} - \frac{\text{NPATQ}_{i,t-4}}{\text{LGQ}_{i,t-4}}$ <p> <small> NPATQ : Total Nonperforming Assets - Quarterly (Q99) LGQ : Gross Loans () </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Free Cash Flow to Sales	This valuation ratio compares the company's annual free cash flow to its total sales.	Cross-Sectional	DESCENDING	$FCFSales_{i,t} = \frac{TTMFCF_{i,t}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p>where</p> $TTMFCF_{i,t} = \sum_{s=0}^3 (OANCFQ_{i,t-s} - CAPXQ_{i,t-s} - DVQ_{i,t-s})$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>
Earnings Quality	Gross Profit Margin	This ratio measures a company's profitability by comparing its gross profit to its revenue.	Cross-Sectional	DESCENDING	$GPMargin_{i,t} = \frac{\sum_{j=0}^3 (SALEQ_{i,t-j} - COGSQ_{i,t-j})}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30) </p>
Earnings Quality	Inventory to Assets Ratio	This ratio measures the inventory of a firm as a percentage of its total assets.	Cross-Sectional	ASCENDING	$InvToAst_{i,t} = \frac{INVTQ_{i,t}}{ATQ_{i,t}}$ <p> ATQ : Total Assets - Quarterly (Q44) INVTQ : Inventories - Total - Quarterly (Q38) </p>
Earnings Quality	Inventory Turnover	The ratio of trailing four quarter sales to average inventory over the same period.	Cross-Sectional	DESCENDING	$InvTurn_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 INVTQ_{i,t-j}}$ <p> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVTQ : Inventories - Total - Quarterly (Q38) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Net Income Stability	This factor is measured by the ratio of 5-year average of the one year percentage change in Net Income over the mean absolute deviation in the one year percentage change in Net Income going 5 years back.	Cross-Sectional	DESCENDING	$NISstab_{i,t} = \frac{Avg[Chg1YTTMNI_{i,t-5}]}{SumAbsDiffChg1YTTMNI_{i,t}}$ <p>where</p> $Chg1YTTMNI_{i,t} = \frac{\sum_{t=0}^3 IBQ_{i,t} - \sum_{t=0}^3 IBQ_{i,t-4}}{ \sum_{t=0}^3 IBQ_{i,t-4} }$ $SumAbsDiffChg1YTTMNI_{i,t} = \sum_{s=0}^4 Chg1YTTMNI_{i,t-s} - Avg[Chg1YTTMNI_{i,t}, 5] $ $Avg[X_{i,t}, m] = \frac{1}{m} \sum_{m=0}^{m-1} X_{i,t-m}$ <p>IBQ : Quarterly Income Before Extraordinary Items (Q8)</p>
Earnings Quality	Net Profit Margin	It's defined as the ratio of trailing four quarter income before extraordinary items to trailing four quarter sales. Note: From 2010 onward, this factor is not calculated for Banks (GICS 4010).	Cross-Sectional	DESCENDING	$NetProfitMargin_{i,t} = \frac{\sum_{j=0}^3 IBQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p>IBQ : Quarterly Income Before Extraordinary Items (Q8) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Earnings Quality	Non Performing Asset to Reserve Loan Loss	This factor is the ratio of non-performing assets to the reserve for loan losses.	Cross-Sectional	ASCENDING	$NonPerfAstResLnLos_{i,t} = \frac{NPATQ_{i,t}}{RLLQ_{i,t}}$ <p>NPATQ : Total Nonperforming Assets - Quarterly (Q99) RLLQ : Reserve for Loan/Asset Losses (Q172)</p>
Earnings Quality	Operating Cash Flow Stability	This metric compares the company's change of operating cash flow to the standard deviation of its last 8 quarter's history. A higher ratio indicates positive trend of the current quarter and stability of the historical cash generation.	Cross-Sectional	DESCENDING	$OCFStab_{i,t} = \frac{Chg1YOANCFQ_{i,t}}{Std(Chg1YOANCFQ_{i,t}, 8)}$ <p>where</p> $Chg1YOANCFQ_{i,t} = \frac{OANCFQ_{i,t}}{CSHOQ_{i,t}} - \frac{OANCFQ_{i,t-4}}{CSHOQ_{i,t-4}}$ $Std(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - Avg(X_{i,t}, n))^2}$ $Avg(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Operating Cash Flow to Asset	This metric compares the company's four quarter operating cash flow to its total assets.	Cross-Sectional	DESCENDING	$OCFast_{i,t} = \frac{\sum_{j=0}^3 OANCFQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ <small>ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small>
Earnings Quality	Operating Cash Flow to Invested Capital	This factor is the ratio of operating cash flow to invested capital.	Cross-Sectional	DESCENDING	$OCFIC_{i,t} = \frac{\sum_{s=0}^3 OANCFQ_{i,t-s}}{\frac{1}{4} \sum_{s=0}^3 ICAPTQ_{i,t-s}}$ <small>ICAPTQ : Quarterly Invested Capital (Q62) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small>
Earnings Quality	Operating Earnings to Assets Ratio	This ratio measures how effectively a company uses its assets to generate operating earnings.	Cross-Sectional	DESCENDING	$OEAI_{i,t} = \frac{OEPS12_{i,t}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ <small>ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) OEPS12 : Earnings Per Share from Operations - 12 Months (Q178)</small>
Earnings Quality	Operating Margin	The ratio of trailing four quarter operating income before depreciation to trailing four quarter sales.	Cross-Sectional	DESCENDING	$OPM_{i,t} = \frac{\sum_{s=0}^3 OIBDPQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Pretax Income to Net Operating Assets	The ratio of trailing four quarter pretax net income to average net operating assets over the same period.	Cross-Sectional	DESCENDING	$PTIToNOA_{i,t} = \frac{TTMPTI_{i,t}}{TTMNOA_{i,t}}$ where $TTMPTI_{i,t} = \sum_{s=0}^3 PIQ_{i,t-s}$ $TTMNOA_{i,t} = TTMOA_{i,t} - TTMOL_{i,t}$ $TTMOA_{i,t} = \frac{1}{4} \sum_{s=0}^3 ATQ_{i,t-s} - \frac{1}{4} \sum_{s=0}^3 CHEQ_{i,t-s}$ $TTMOL_{i,t} = \frac{1}{4} \sum_{s=0}^3 ATQ_{i,t-s} - \frac{1}{4} \sum_{s=0}^3 DLCQ_{i,t-s} - \frac{1}{4} \sum_{s=0}^3 DLTTQ_{i,t-s}$ $- \frac{1}{4} \sum_{s=0}^3 MIBQ_{i,t-s} - \frac{1}{4} \sum_{s=0}^3 PSTKQ_{i,t-s} - \frac{1}{4} \sum_{s=0}^3 CEQQ_{i,t-s}$ <p> PIQ : Quarterly Pretax Income (Q23) CEQQ : Quarterly Common Equity (Q59) ATO : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Earnings Quality	Provisions and Charge Offs To Sales	This factor is the ratio of loan loss provisions and loan charge-offs to sales.	Cross-Sectional	ASCENDING	$ProvChgOffSales_{i,t} = \frac{\sum_{j=0}^3 (PLLQ_{i,t-j} - NCOQ_{i,t-j})}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) PLLQ : Provisions for Loan/Asset Loans (Q171) NCOQ : Net Charge-Offs (Q176) </p>
Earnings Quality	Quick Ratio	This ratio measures a company's ability to pay off short term liabilities with its most liquid current assets, excluding inventories.	Cross-Sectional	DESCENDING	$\text{QuickRatio}_{i,t} = \frac{\text{CHEQ}_{i,t} + \text{RECTQ}_{i,t}}{\text{LCTQ}_{i,t}}$ <p> RECTQ : Receivables - Total - Quarterly (Q37) CHEQ : Quarterly Cash and Short Term Investments (Q36) LCTQ : Current Liabilities, Total - Quarterly (Q49) </p>
Earnings Quality	Research & Development Intensity	The ratio of trailing four quarter research and development expenses to trailing four quarter sales.	Cross-Sectional	DESCENDING	$RDInt_{i,t} = \frac{\sum_{s=0}^3 XRDQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p> XRDQ : Research and Development Expense Quarterly (Q4) </p>
Earnings Quality	Retained Earnings to Total Assets	The ratio of retained earnings to total assets.	Cross-Sectional	DESCENDING	$REToAst_{i,t} = \frac{REQ_{i,t}}{ATQ_{i,t}}$ <p> ATQ : Total Assets - Quarterly (Q44) REQ : Retained Earnings Quarterly (Q58) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Sales to Gross Profit Margin Growth	The percentage change in gross profit margin from four quarters ago, relative to the percentage change in sales over the same period.	Cross-Sectional	ASCENDING	$ChgSalesMargin_{i,t} = \left(\frac{\sum_{j=0}^3 SALEQ_{i,t}}{\sum_{j=0}^3 SALEQ_{i,t-4}} - 1 \right) - \left(\frac{\sum_{j=0}^3 SALEQ_{i,t-4} - \sum_{j=0}^3 COGSQ_{i,t-4}}{\sum_{j=0}^3 SALEQ_{i,t-4}} - 1 \right)$ <p> $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) $COGSQ$: Cost of Goods Sold - Quarterly (Q30) </p>
Earnings Quality	Sales to Invested Capital	The ratio of trailing four quarter sales to average invested capital over the same period.	Cross-Sectional	DESCENDING	$SalesToInvCap_{i,t} = \frac{\sum_{s=0}^3 SALEQ_{i,t-s}}{\frac{1}{4} \sum_{s=0}^3 ICAPTQ_{i,t-s}}$ <p> $ICAPTQ$: Quarterly Invested Capital (Q62) $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) </p>
Earnings Quality	SG&A to Sales	The ratio of trailing four quarter selling, general and administrative expense to trailing four quarter sales.	Cross-Sectional	ASCENDING	$SGAToSales_{i,t} = \frac{\sum_{s=0}^3 XSGAQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p> $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) $XSGAQ$: Selling, General and Administrative Expenses Quarterly (Q1) </p>
Earnings Quality	Trailing 12-Month Earnings/Trailing 12-Month Sales	It's defined as the ratio of trailing four quarter income before extraordinary items to trailing four quarter sales	Cross-Sectional	DESCENDING	$TTMEPStoTTMSales_{i,t} = \frac{\sum_{j=0}^3 EPSFXQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j} / CSH12Q_{i,t-j}}$ <p> $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) $EPSFXQ$: Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) $CSH12Q$: Common shares used to calculate earnings per share, 12 M moving average. (Q28) </p>
Earnings Quality	Unexpected Inventory Change	The factor measures difference between inventory level and a measure of expected inventory level, relative to total assets four quarters ago.	Cross-Sectional	ASCENDING	$UnexpectedInvChg_{i,t} = \frac{INVQ_{i,t} - INVQ_{i,t-4} \times \left(\frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\sum_{j=4}^7 SALEQ_{i,t-j}} \right)}{ATQ_{i,t-4}}$ <p> ATQ : Total Assets - Quarterly (Q44) $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) $INVQ$: Inventories - Total - Quarterly (Q38) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Unexpected Receivables Change	The difference between accounts receivable level and a measure of expected accounts receivable, relative to total assets four quarters ago.	Cross-Sectional	ASCENDING	$UnexpectedRecChg_{i,t} = \frac{RECTQ_{i,t} - RECTQ_{i,t-4} \times \left(\frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\sum_{j=4}^7 SALEQ_{i,t-j}} \right)}{ATQ_{i,t-1}}$ <p> ATQ : Total Assets - Quarterly (Q44) RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>
Earnings Quality	Working Capital Accruals	The factor is defined as the change from four quarters ago in non-cash assets, minus the change in current liabilities (excluding short term debt and taxes payable) and minus depreciation, relative to average total assets over the past year.	Cross-Sectional	ASCENDING	$WCAccruals_{i,t} = \frac{\Delta(RECTQ_{i,t}) + \Delta(INVTQ_{i,t}) + \Delta(ACOQ_{i,t})}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}} - \frac{\Delta(APQ_{i,t}) + \Delta(LCOQ_{i,t})}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}} - \frac{\sum_{j=0}^3 DPQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ $\Delta(X) \equiv X_{i,t} - X_{i,t-4}$ <p> DPQ : Quarterly Depreciation and Amortization (Q5) ATQ : Total Assets - Quarterly (Q44) RECTQ : Receivables - Total - Quarterly (Q37) INVTQ : Inventories - Total - Quarterly (Q38) APO : Accounts Payable - Quarterly (Q46) ACOQ : Current Assets - Other - Total (Q39) LCOQ : Other Current Liabilities - Quarterly (Q48) </p>
Earnings Quality	Working Capital to Assets Ratio	This ratio measures a company's liquidity by revealing the percentage of remaining liquid assets compared to its total assets.	Cross-Sectional	DESCENDING	$WCA_{i,t} = \frac{ACTQ_{i,t} - LCTQ_{i,t}}{ATQ_{i,t}}$ <p> ATQ : Total Assets - Quarterly (Q44) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </p>
Earnings Quality	Working Capital to Sales	Average current assets and current liabilities over the past four quarters, relative to sales over the same period.	Cross-Sectional	ASCENDING	$WCapToSales_{i,t} = \frac{\frac{1}{4} \sum_{s=0}^3 (ACTQ_{i,t-s} - LCTQ_{i,t-s})}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Working Capital to Total Assets	Average current assets and current liabilities over the past four quarters, relative to average total assets over the same period.	Cross-Sectional	DESCENDING	$WCapToAst_{i,t} = \frac{\sum_{s=0}^3 (ACTQ_{i,t-s} - LCTQ_{i,t-s})}{\sum_{s=0}^3 ATQ_{i,t-s}}$ <p> <small> ATQ : Total Assets - Quarterly (Q44) $LCTQ$: Current Liabilities, Total - Quarterly (Q49) $ACTQ$: Current Assets - Quarterly (Q40) </small> </p>
Earnings Quality	Year over Year Change in SGA to Sales	This factor measures the year-over-year change in a company's SGA to Sales ratio.	Cross-Sectional	ASCENDING	$SGAToSalesChg1Y_{i,t} = \Delta \left(\frac{\sum_{j=0}^3 XSGAQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}} \right)$ <p> <small> $XSGAQ$: Selling, General and Administrative Expenses Quarterly (Q1) $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) </small> </p> <p> <i>where</i> $\Delta(x_t) = x_t - x_{t-4}$ </p>
Earnings Quality	Year over Year Change of EPS to Sales	This factor measure the company's year-over-year change of EPS-to-sales ratio.	Cross-Sectional	DESCENDING	$EPSToSalesChg1Y_{i,t} = \Delta \left(\frac{OEPS12_{i,t}}{\frac{1}{4} \sum_{j=0}^3 SALEQ_{i,t-j}} \right)$ <p> <small> $OEPS12$: Earnings Per Share from Operations - 12 Months (Q178) $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) </small> </p> <p> <i>where</i> $\Delta(x_t) = x_t - x_{t-4}$ </p>
Earnings Quality	Year over Year Change of Inventory to Assets	This factor measures the year-over-year change of the company's inventory-to-assets ratio.	Cross-Sectional	ASCENDING	$InvToAstChg1Y_{i,t} = \Delta \left(\frac{\frac{1}{4} \sum_{j=0}^3 INVTO_{i,t-j}}{\frac{1}{4} \sum_{j=0}^3 ATQ_{i,t-j}} \right)$ <p> <i>where</i> $\Delta(x_t) = x_t - x_{t-4}$ </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel Accrual Ratio - Balance Sheet	Accrual ratio measures the earning qualities. This is one the two similar definitions that based on balance sheet items.	Ind Group Relitive	ASCENDING	$\text{AccrualRatioBS}_{i,t} = \frac{\text{NOA}_{i,t} - \text{NOA}_{i,t-4}}{\frac{1}{2} \times (\text{NOA}_{i,t} + \text{NOA}_{i,t-4})}$ <p>where</p> $\text{NOA}_{i,t} = \sum_{j=0}^4 [(\text{ATQ}_{i,t-j} - \text{CHEQ}_{i,t-j}) - (\text{LTQ}_{i,t-j} - \text{DLCQ}_{i,t-j} - \text{DLTTQ}_{i,t-j})]$ <p> ATQ : Total Assets - Quarterly (Q44) LTQ : Current Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CHEQ : Quarterly Cash and Short Term Investments (Q36) LTQ : Liabilities, Total (Q54) </p>
Earnings Quality	Ind Grp Rel Accrual Ratio - Cash Flows	Accrual ratio measures the earning qualities. This is one the two similar definitions that based on cash flow items.	Ind Group Relitive	ASCENDING	$\text{AccrualRatioCF}_{i,t} = \frac{\text{IBQ}_{i,t} - (\text{OANCFQ}_{i,t} + \text{IVNCFQ}_{i,t})}{\frac{1}{2} \times (\text{NOA}_{i,t} + \text{NOA}_{i,t-4})}$ <p>where</p> $\text{NOA}_{i,t} = \sum_{j=0}^4 (\text{ATQ}_{i,t-j} - \text{CHEQ}_{i,t-j}) - \sum_{j=0}^4 (\text{LTQ}_{i,t-j} - \text{DLCQ}_{i,t-j} - \text{DLTTQ}_{i,t-j})$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CHEQ : Quarterly Cash and Short Term Investments (Q36) LTQ : Liabilities, Total (Q54) IVNCFQ : Net Cash Flow from Investing Activities (Q111) </p>
Earnings Quality	Ind Grp Rel Adjusted Accruals	This is an accrual ratio that measures a company's earnings quality.	Ind Group Relitive	ASCENDING	$\text{AdjAccruals}_t = \frac{\sum_{j=0}^3 (\text{NIQ}_{t-j} - \text{OANCFQ}_{t-j})}{\left \sum_{j=0}^3 \text{NIQ}_{t-j} \right }$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) NIQ : Net Income (Q69) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel Asset Adjusted Capital Investments	Investment-to-assets is defined as the annual change in gross property, plant, and equipment plus the annual change in inventories divided by the lagged book value of assets. This low-investment firms have higher average future returns than high-investment firms.	Ind Group Relitive	ASCENDING	$InvToAsset_{i,t} = \frac{(PPEGTQ_{i,t} - PPEGTQ_{i,t-4}) + (INVTO_{i,t} - INVTO_{i,t-4})}{ATQ_{i,t-4}}$ <p style="text-align: center;"><small>ATQ : Total Assets - Quarterly (Q44) INVTO : Inventories - Total - Quarterly (Q38) PPEGTQ : Property Plant and Equipment - Total (Gross) (Q118)</small></p>
Earnings Quality	Ind Grp Rel Asset Turnover	This factor is the ratio of Trailing Twelve Month Sales to Total Assets.	Ind Group Relitive	DESCENDING	$AssetTurn_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ <p style="text-align: center;"><small>ATQ : Total Assets - Quarterly (Q44) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>
Earnings Quality	Ind Grp Rel Balance Sheet Accruals	This factor measures the total non-cash working capital adjusted by sales.	Ind Group Relitive	ASCENDING	$TotalAccruals_{i,t} = \frac{RECTQ_{i,t} + INVTO_{i,t} + ACOQ_{i,t} - APQ_{i,t} - LCOQ_{i,t}}{SALEQ_{i,t}}$ <p style="text-align: center;"><small>RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVTO : Inventories - Total - Quarterly (Q38) APQ : Accounts Payable - Quarterly (Q46) ACOQ : Current Assets - Other - Total (Q39)</small></p>
Earnings Quality	Ind Grp Rel Cash Conversion Cycle	Cash Cycle is defined as the number of days for a company to convert raw materials into cash flows. More specifically, a company can use credit(Accounts Payable) to purchase inventories and sell them for cash or credit(Accounts Receivable). The factor measures the time from paying out cash to generate sales and receive cash to finish the sales cycle.	Ind Group Relitive	ASCENDING	$CashCycle_{i,t} = \frac{\frac{1}{4} \times \sum_{j=0}^3 RECTQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}} \times 365 + \frac{\frac{1}{4} \times \sum_{j=0}^3 INVTO_{i,t-j}}{\sum_{j=0}^3 COGSQ_{i,t-j}} \times 365 - \frac{\frac{1}{4} \times \sum_{j=0}^3 APQ_{i,t-j}}{\sum_{j=0}^3 COGSQ_{i,t-j}} \times 365$ <p style="text-align: center;"><small>RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) INVTO : Inventories - Total - Quarterly (Q38) COGSQ : Cost of Goods Sold - Quarterly (Q20) APQ : Accounts Payable - Quarterly (Q46)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel Cash Ratio	This ratio measures a company's liquidity by including only cash, cash equivalent and short term investment to cover short term liabilities.	Ind Group Relitive	DESCENDING	$\text{CashRatio}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{LCTQ}_{i,t}}$ <p style="font-size: small;"> CHEQ : Quarterly Cash and Short Term Investments (Q36) LCTQ : Current Liabilities, Total - Quarterly (Q49) </p>
Earnings Quality	Ind Grp Rel Change in TTM Depr. to Capex	This factor measures the difference between depreciation expenses and capital expenditures over the last 12 months.	Ind Group Relitive	ASCENDING	$\text{ChgDeprCapEx}_{i,t} = \left \left(\frac{\sum_{j=0}^3 \text{DPQ}_{i,t-j}}{\sum_{j=4}^7 \text{DPQ}_{i,t-j}} - 1 \right) - \left(\frac{\sum_{j=0}^3 \text{CAPXY}_{i,t-j}}{\sum_{j=4}^7 \text{CAPXY}_{i,t-j}} - 1 \right) \right $ <p style="font-size: small;"> DPQ : Quarterly Depreciation and Amortization (Q5) CAPXY : Quarterly Capital Expenditures (Q90) </p>
Earnings Quality	Ind Grp Rel Current Ratio	This is a financial liquidity ratio that measures a firm's ability to pay off short term liabilities.	Ind Group Relitive	DESCENDING	$\text{CACL}_{i,t} = \frac{\text{ACTQ}_{i,t}}{\text{LCTQ}_{i,t}}$ <p style="font-size: small;"> LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </p>
Earnings Quality	Ind Grp Rel Depreciation to Capex Ratio	This factor gives the ratio of the accounting charge for depreciation as a percentage of the amount that a firm spends on new property, plant and equipment.	Ind Group Relitive	DESCENDING	$\text{DepToCapex}_{i,t} = \frac{\sum_{j=0}^3 \text{DPCQ}_{i,t-j}}{\sum_{j=0}^3 (\text{CAPXQ}_{i,t-j} - \text{SPPIVQ}_{i,t-j})}$ <p style="font-size: small;"> CAPXQ : Quarterly Capital Expenditures (Q90) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) SPPIVQ : Quarterly Sale of Property, Plant and Equipment (Q102) </p>
Earnings Quality	Ind Grp Rel EBIT Margin	This ratio measures the company's profitability by comparing its earnings before interests and taxes to its total revenue.	Ind Group Relitive	DESCENDING	$\text{EBITMargin}_{i,t} = \frac{\sum_{j=0}^3 \text{EBIT}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}},$ <p style="text-align: center; margin-left: 200px;"> <i>where,</i> $\text{EBIT}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}.$ </p> <p style="font-size: small;"> EBIT : Earnings Before Interest and Taxes (Q21 - Q5) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel Gross Profit Margin	This ratio measures a company's profitability by comparing its gross profit to its revenue.	Ind Group Relitive	DESCENDING	$GPMargin_{i,t} = \frac{\sum_{j=0}^3 (SALEQ_{i,t-j} - COGSQ_{i,t-j})}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> <small>COGSQ : Cost of Goods Sold - Quarterly (Q30)</small> </p>
Earnings Quality	Ind Grp Rel Inventory to Assets Ratio	This ratio measures the inventory of a firm as a percentage of its total assets.	Ind Group Relitive	ASCENDING	$InvToAst_{i,t} = \frac{INVTQ_{i,t}}{ATQ_{i,t}}$ <p> <small>ATQ : Total Assets - Quarterly (Q44)</small> <small>INVTQ : Inventories - Total - Quarterly (Q38)</small> </p>
Earnings Quality	Ind Grp Rel Inventory Turnover	This factor is defined as Sales divided by Inventory.	Ind Group Relitive	DESCENDING	$InvTurn_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 INVTQ_{i,t-j}}$ <p> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> <small>INVTQ : Inventories - Total - Quarterly (Q38)</small> </p>
Earnings Quality	Ind Grp Rel Net Profit Margin	This profitability measure is defined simply as the Net Income to Total Sales.	Ind Group Relitive	DESCENDING	$NetProfitMargin_{i,t} = \frac{\sum_{j=0}^3 IBQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p> <small>IBQ : Quarterly Income Before Extraordinary Items (Q8)</small> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> </p>
Earnings Quality	Ind Grp Rel Operating Earnings to Assets Ratio	This ratio measures how effectively a company uses its assets to generate operating earnings.	Ind Group Relitive	DESCENDING	$OEA_{i,t} = \frac{OEPS12_{i,t}}{\frac{1}{4} \times \sum_{j=0}^3 \frac{ATQ_{i,t-j}}{CSHOQ_{i,t-j}}}$ <p> <small>ATQ : Total Assets - Quarterly (Q44)</small> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> <small>OEPS12 : Earnings Per Share from Operations - 12 Months (Q178)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel Operating Margin	This factor is the operating margin calculated as trailing twelve month operating income to sales ratio.	Ind Group Relitive	DESCENDING	$OPM_{i,t} = \frac{\sum_{s=0}^3 OIBDPQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Earnings Quality	Ind Grp Rel Quick Ratio	This ratio measures a company's ability to pay off short term liabilities with its most liquid current assets, excluding inventories.	Ind Group Relitive	DESCENDING	$\text{QuickRatio}_{i,t} = \frac{\text{CHEQ}_{i,t} + \text{RECTQ}_{i,t}}{\text{LCTQ}_{i,t}}$ <p>RECTQ : Receivables - Total - Quarterly (Q37) CHEQ : Quarterly Cash and Short Term Investments (Q36) LCTQ : Current Liabilities, Total - Quarterly (Q49)</p>
Earnings Quality	Ind Grp Rel Sales to Gross Profit Margin Growth	This factor measures the difference in sales growth and gross margin growth.	Ind Group Relitive	ASCENDING	$ChgSalesMargin_{i,t} = \left(\frac{SALEQ_{i,t}}{SALEQ_{i,t-4}} - 1 \right) - \left(\frac{\frac{SALEQ_{i,t}-COGSQ_{i,t}}{SALEQ_{i,t-4}}}{\frac{SALEQ_{i,t-4}-COGSQ_{i,t-4}}{SALEQ_{i,t-4}}} - 1 \right)$ <p>SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30)</p>
Earnings Quality	Ind Grp Rel SG&A to Sales	This factor is the trailing twelve month selling, general and administrative expenses to sales ratio.	Ind Group Relitive	ASCENDING	$SGAToSales_{i,t} = \frac{\sum_{s=0}^3 XSGAQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p>SALEQ : Sales/Turnover (Net) - Quarterly (Q2) XSGAQ : Selling, General and Administrative Expenses Quarterly (Q1)</p>
Earnings Quality	Ind Grp Rel Working Capital Accruals	Accruals are defined as the change in non-cash current assets less the change in current liabilities excluding short term debt and taxes payable and minus depreciation, adjusted by total assets.	Ind Group Relitive	ASCENDING	$WCAccruals_{i,t} = \frac{\Delta(\text{RECTQ}_{i,t}) + \Delta(\text{INVTO}_{i,t}) + \Delta(\text{ACOQ}_{i,t})}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}} - \frac{\Delta(\text{APQ}_{i,t}) + \Delta(\text{LCOQ}_{i,t})}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}} - \frac{\sum_{j=0}^3 DPQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ $\Delta(X) \equiv X_{i,t} - X_{i,t-4}$ <p>DPQ : Quarterly Depreciation and Amortization (Q5) ATQ : Total Assets - Quarterly (Q44) RECTQ : Receivables - Total - Quarterly (Q37) INVTO : Inventories - Total - Quarterly (Q38) APQ : Accounts Payable - Quarterly (Q46) ACOQ : Current Assets - Other - Total (Q39) LCTQ : Current Liabilities, Total - Quarterly (Q49)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel Working Capital to Assets Ratio	This ratio measures a company's liquidity by revealing the percentage of remaining liquid assets compared to its total assets.	Ind Group Relitive	DESCENDING	$WCA_{i,t} = \frac{ACTQ_{i,t} - LCTQ_{i,t}}{ATQ_{i,t}}$ <p style="text-align: center;"> <small>ATQ : Total Assets - Quarterly (Q44) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40)</small> </p>
Earnings Quality	Ind Grp Rel Working Capital to Sales	This factor is the trailing twelve month working capital to sales ratio.	Ind Group Relitive	ASCENDING	$WCapToSales_{i,t} = \frac{\frac{1}{4} \sum_{s=0}^3 (ACTQ_{i,t-s} - LCTQ_{i,t-s})}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p style="text-align: center;"> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40)</small> </p>
Earnings Quality	Ind Grp Rel Year over Year Change of EPS to Sales	This factor measure the company's year-over-year change of EPS-to-sales ratio.	Ind Group Relitive	DESCENDING	$EPSToSalesChg1Y_{i,t} = \Delta \left(\frac{OEPS12_{i,t}}{\frac{1}{4} \sum_{j=0}^3 CSHO_{i,t-j}} \right)$ <p style="text-align: center;"> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) OEPS12 : Earnings Per Share from Operations - 12 Months (Q178)</small> </p> <p style="text-align: center;"> <i>where</i> $\Delta(x_t) = x_t - x_{t-4}$ </p>
Earnings Quality	Ind Grp Rel Year over Year Change of Inventory to Assets	This factor measures the year-over-year change of the company's inventory-to-assets ratio.	Ind Group Relitive	ASCENDING	$InvToAstChg1Y_{i,t} = \Delta \left(\frac{\frac{1}{4} \sum_{j=0}^3 INVTO_{i,t-j}}{\frac{1}{4} \sum_{j=0}^3 ATQ_{i,t-j}} \right)$ <p style="text-align: center;"> <i>where</i> $\Delta(x_t) = x_t - x_{t-4}$ </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	Ind Grp Rel YoY Change in SGA to Sales	This factor measures the year-over-year change in a company's SGA to Sales ratio.	Ind Group Relative	ASCENDING	$\text{SGAToSSalesChg1Y}_{i,t} = \Delta \left(\frac{\sum_{j=0}^3 \text{XSGAQ}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}} \right)$ <p>where</p> $\Delta(x_t) = x_t - x_{t-4}$ <p><small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2) XSGAQ : Selling, General and Administrative Expenses Quarterly (Q1)</small></p>
Earnings Quality	5 Yr Hist Rel Accrual Ratio	Balance Sheet Accrual ratio measures the earning qualities. This is one the two similar definitions that based on balance sheet items.	5 Yr Historical Rel	ASCENDING	$\text{AccrualRatioBS}_{i,t} = \frac{\text{NOA}_{i,t} - \text{NOA}_{i,t-4}}{\frac{1}{2} \times (\text{NOA}_{i,t} + \text{NOA}_{i,t-4})}$ <p>where</p> $\text{NOA}_{i,t} = \sum_{j=0}^4 [(\text{ATQ}_{i,t-j} - \text{CHEQ}_{i,t-j}) - (\text{LTQ}_{i,t-j} - \text{DLCQ}_{i,t-j} - \text{DLTTQ}_{i,t-j})]$ <p><small>ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CHEQ : Quarterly Cash and Short Term Investments (Q36) LTQ : Liabilities, Total (Q54)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	5 Yr Hist Rel Accrual Ratio - Cash Flows	Accrual ratio measures the earning qualities. This is one the two similar definitions that based on cash flow items.	5 Yr Historical Rel	ASCENDING	$\text{AccrualRatioCF}_{i,t} = \frac{\text{IBQ}_{i,t} - (\text{OANCFQ}_{i,t} + \text{IVNCFQ}_{i,t})}{\frac{1}{2} \times (\text{NOA}_{i,t} + \text{NOA}_{i,t-4})}$ <p>where</p> $\text{NOA}_{i,t} = \sum_{j=0}^4 (\text{ATQ}_{i,t-j} - \text{CHEQ}_{i,t-j})$ $- \sum_{j=0}^4 (\text{LTQ}_{i,t-j} - \text{DLCQ}_{i,t-j} - \text{DLTTQ}_{i,t-j})$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) ATQ : Total Assets - Quarterly (Q44) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CHEQ : Quarterly Cash and Short Term Investments (Q36) LTQ : Liabilities, Total (Q54) IVNCFQ : Net Cash Flow from Investing Activities (Q111) </p>
Earnings Quality	5 Yr Hist Rel Adjusted Accruals	This is an accrual ratio that measures a company's earnings quality.	5 Yr Historical Rel	ASCENDING	$\text{AdjAccruals}_t = \frac{\sum_{j=0}^3 (\text{NIQ}_{t-j} - \text{OANCFQ}_{t-j})}{\left \sum_{j=0}^3 \text{NIQ}_{t-j} \right }$ <p> OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) NIQ : Net Income (Q69) </p>
Earnings Quality	5 Yr Hist Rel Cash Ratio	This ratio measures a company's liquidity by including only cash, cash equivalent and short term investment to cover short term liabilities.	5 Yr Historical Rel	DESCENDING	$\text{CashRatio}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{LCTQ}_{i,t}}$ <p> CHEQ : Quarterly Cash and Short Term Investments (Q36) LCTQ : Current Liabilities, Total - Quarterly (Q49) </p>
Earnings Quality	5 Yr Hist Rel Current Ratio	This is a financial liquidity ratio that measures a firm's ability to pay off short term liabilities.	5 Yr Historical Rel	DESCENDING	$\text{CACL}_{i,t} = \frac{\text{ACTQ}_{i,t}}{\text{LCTQ}_{i,t}}$ <p> LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	5 Yr Hist Rel Depreciation to Capex Ratio	This factor gives the ratio of the accounting charge for depreciation as a percentage of the amount that a firm spends on new property, plant and equipment.	5 Yr Historical Rel	DESCENDING	$\text{DepToCapex}_{i,t} = \frac{\sum_{j=0}^3 \text{DPCQ}_{i,t-j}}{\sum_{j=0}^3 (\text{CAPXQ}_{i,t-j} - \text{SPPIVQ}_{i,t-j})}$ <p>CAPXQ : Quarterly Capital Expenditures (Q90) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) SPPIVQ : Quarterly Sale of Property, Plant and Equipment (Q102)</p>
Earnings Quality	5 Yr Hist Rel EBIT Margin	This ratio measures the company's profitability by comparing its earnings before interests and taxes to its total revenue.	5 Yr Historical Rel	DESCENDING	$\text{EBITMargin}_{i,t} = \frac{\sum_{j=0}^3 \text{EBIT}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}},$ <p>where, $\text{EBIT}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$</p> <p>EBIT : Earnings Before Interest and Taxes (Q21 - Q5) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</p>
Earnings Quality	5 Yr Hist Rel Gross Profit Margin	This ratio measures a company's profitability by comparing its gross profit to its revenue.	5 Yr Historical Rel	DESCENDING	$\text{GPMargin}_{i,t} = \frac{\sum_{j=0}^3 (\text{SALEQ}_{i,t-j} - \text{COGSQ}_{i,t-j})}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p>SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30)</p>
Earnings Quality	5 Yr Hist Rel Inventory to Assets Ratio	This ratio measures the inventory of a firm as a percentage of its total assets.	5 Yr Historical Rel	ASCENDING	$\text{InvToAst}_{i,t} = \frac{\text{INVTQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p>ATQ : Total Assets - Quarterly (Q44) INVTQ : Inventories - Total - Quarterly (Q38)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	5 Yr Hist Rel Net Profit Margin	This profitability measure is defined simply as the Net Income to Total Sales.	5 Yr Historical Rel	DESCENDING	$NetProfitMargin_{i,t} = \frac{\sum_{j=0}^3 IBQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p style="font-size: small; margin-top: -10px;"> IBQ : Quarterly Income Before Extraordinary Items (Q8) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>
Earnings Quality	5 Yr Hist Rel Operating Earnings to Assets Ratio	This ratio measures how effectively a company uses its assets to generate operating earnings.	5 Yr Historical Rel	DESCENDING	$OEA_{i,t} = \frac{OEPS12_{i,t}}{\frac{1}{4} \times \sum_{j=0}^3 \frac{ATQ_{i,t-j}}{CSHOQ_{i,t-j}}}$ <p style="font-size: small; margin-top: -10px;"> ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) OEPS12 : Earnings Per Share from Operations - 12 Months (Q178) </p>
Earnings Quality	5 Yr Hist Rel Operating Margin	This factor is the operating margin calculated as trailing twelve month operating income to sales ratio.	5 Yr Historical Rel	DESCENDING	$OPM_{i,t} = \frac{\sum_{s=0}^3 OIBDPQ_{i,t-s}}{\sum_{s=0}^3 SALEQ_{i,t-s}}$ <p style="font-size: small; margin-top: -10px;"> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>
Earnings Quality	5 Yr Hist Rel Quick Ratio	This ratio measures a company's ability to pay off short term liabilities with its most liquid current assets, excluding inventories.	5 Yr Historical Rel	DESCENDING	$QuickRatio_{i,t} = \frac{CHEQ_{i,t} + RECTQ_{i,t}}{LCTQ_{i,t}}$ <p style="font-size: small; margin-top: -10px;"> RECTQ : Receivables - Total - Quarterly (Q37) CHEQ : Quarterly Cash and Short Term Investments (Q36) LCTQ : Current Liabilities, Total - Quarterly (Q49) </p>
Earnings Quality	5 Yr Hist Rel Sales to Gross Profit Margin Growth	This factor measures the difference in sales growth and gross margin growth.	5 Yr Historical Rel	ASCENDING	$ChgSalesMargin_{i,t} = \left(\frac{SALEQ_{i,t}}{SALEQ_{i,t-4}} - 1 \right) - \left(\frac{\frac{SALEQ_{i,t} - COGSQ_{i,t}}{SALEQ_{i,t}}}{\frac{SALEQ_{i,t-4} - COGSQ_{i,t-4}}{SALEQ_{i,t-4}}} - 1 \right)$ <p style="font-size: small; margin-top: -10px;"> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Earnings Quality	5 Yr Hist Rel Working Capital to Assets Ratio	This ratio measures a company's liquidity by revealing the percentage of remaining liquid assets compared to its total assets.	5 Yr Historical Rel	DESCENDING	$WCA_{i,t} = \frac{ACTQ_{i,t} - LCTQ_{i,t}}{ATQ_{i,t}}$ <p style="text-align: center;"> ATQ : Total Assets - Quarterly (Q44) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </p>
Valuation	4-Week Change in 12-Month Forward Earnings Consensus Estimate/Price	The 4 week change in the Consensus Estimate divided by Price.	Cross-Sectional	DESCENDING	$4WChgFwd12MEPS_{i,t} = \Delta \left[\frac{w_1 EPSEstFY1_{i,t} + (1-w_1)EPSEstFY2_{i,t}}{Close_t} \right]$ <p style="text-align: center;"> <i>where</i> $w_1 = \frac{\text{Number of Days Left in the Year}}{252}$ $\Delta(X) = X_{i,t} - X_{i,t-2}$ </p> <p style="text-align: center;"> EPSEstFY2 : Mean EPS Estimate for Fiscal Year 2 (EPS Estimate Mean - 2 Yr Out) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) </p>
Valuation	8-Week Change in 12-Month Forward Earnings Consensus Estimate/Price	The 8 week change in the Consensus Estimate divided by Price.	Cross-Sectional	DESCENDING	$8WChgFwd12MEPS_{i,t} = \Delta \left[\frac{w_1 EPSEstFY1_{i,t} + (1-w_1)EPSEstFY2_{i,t}}{Close_t} \right]$ <p style="text-align: center;"> <i>where</i> $w_1 = \frac{\text{Number of Days Left in the Year}}{252}$ $\Delta(X) = X_{i,t} - X_{i,t-2}$ </p> <p style="text-align: center;"> EPSEstFY2 : Mean EPS Estimate for Fiscal Year 2 (EPS Estimate Mean - 2 Yr Out) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) </p>
Valuation	Adj Forward Free Cash Flow to Price Ratio	This valuation ratio compares the company's forward looking annual free cash flow to its market value. Generally, the lower this ratio is, the more expensive the company is.	Cross-Sectional	DESCENDING	$AdjFwdFCFP_{i,t} = \frac{\sum_{j=0}^3 (DPQ_{i,t-j} - CAPXY_{i,t-j} - DVY_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 CSHQ_{i,t-j}} + \sum_{j=0}^3 EPSEstQ_{i,t-j} \times \frac{1}{CloseM_{i,t}}$ <p style="text-align: center;"> DPQ : Quarterly Depreciation and Amortization (Q5) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHQQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) CloseM : Adjusted Closing Price (Adjusted Closing Price) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Adj Free Cash Flow to Price	This valuation ratio compares the company's annual free cash flow to its market value. Generally, the lower this ratio is, the more expensive the company is.	Cross-Sectional	DESCENDING	$\text{AdjFCFP}_{i,t} = \frac{\sum_{j=0}^3 (\text{OANCFQ}_{i,t-j} - \text{CAPXQ}_{i,t-j} - \text{DVO}_{i,t-j})}{\text{Close}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVO : Quarterly Cash Dividends (Q99) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Adj Growth Flow to Price	The growth-flow-to-price ratio indicates how much the company spends on R&D. Note, however, that this does not indicate how profitable the R&D will turn out in the future.	Cross-Sectional	DESCENDING	$\text{AdjGFP}_{i,t} = \frac{\sum_{j=0}^3 (\text{XRDQ}_{i,t-j} + \text{NIQ}_{i,t-j})}{\text{CloseM}_{i,t} \times \text{CSHOQ}_{i,t}}$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) XRDQ : Research and Development Expense Quarterly (Q4) NIQ : Net Income (Q69) </p>
Valuation	Adj. EBITDA to Enterprise Value	The metric measure how much return the company can generate relative to its enterprise value. *Note that the EV in denominator is updated with monthly frequency	Cross-Sectional	DESCENDING	$\text{AdjEBITDAEV}_{i,t} = \frac{\sum_{j=0}^3 \text{EBITDA}_{i,t-j}}{\text{EV}_{i,t}}$ <p> $\text{EBITDA}_{i,t} = \text{OIBDPQ}_{i,t}$ $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t} + \text{PSTKQ}_{i,t} + \text{MIBQ}_{i,t} - \text{CHEQ}_{i,t}$ if $\text{EV} \leq 0$, then $\text{EV} = 1$ </p> <p> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Foumla
Valuation	Adjusted Book to Enterprise Value	The metric measures the book value of a company relative to its enterprise value. *Note that EV in the denominator is only updated at same time that fundamental data items are updated, either quarterly or annually.	Cross-Sectional	DESCENDING	$\text{AdjBVEV}_{i,t} = \frac{\text{CEQQ}_{i,t}}{\text{EV}_{i,t}}$ <p style="text-align: center;">where</p> $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t}$ <p style="font-size: small;"> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CEQQ : Quarterly Common Equity (Q59) DLTTQ : Quarterly Long Term Debt (Q51) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Adjusted Forward Earnings to Price	This metric compares the company's forward annual earnings to its current market price.	Cross-Sectional	DESCENDING	$\text{AdjFwdEP}_{i,t} = \frac{\sum_{j=1}^4 \text{EPSEstQ}_{i,t+j}}{\text{Close}_{i,t}}$ <p style="font-size: small;"> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) </p>
Valuation	Assets to Price Ratio	The ratio of total assets to market value of common equity.	Cross-Sectional	DESCENDING	$\text{AstP}_{i,t} = \frac{\text{ATQ}_{i,t}}{\text{CSHOQ}_{i,t} \times \text{Close}_{i,t}}$ <p style="font-size: small;"> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Banking FCF to Price	This valuation ratio compares a bank's annual free cash flow to its market value. Generally, the lower this ratio is, the more expensive the bank is.	Cross-Sectional	DESCENDING	$\text{FCFPBK}_{i,t} = \frac{\sum_{j=0}^3 [\text{IBQ}_{i,t-j} - \frac{1}{400} \text{CAPR3Q}_{i,t-j} \times (\text{IBQ}_{i,t-j} - \text{DBQ}_{i,t-j})]}{\text{Close}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSOQ}_{i,t-j}}$ <p style="font-size: small;"> IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DVO : Quarterly Cash Dividends (Q89) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CAPR3Q : Risk_Adjusted Capital Ratio - Combined () </p>
Valuation	Book to Price	The factor is a ratio of book value to market value of common equity.	Cross-Sectional	DESCENDING	$\text{BP}_{i,t} = \frac{\text{CEQQ}_{i,t}}{\text{CSHOQ}_{i,t} \times \text{Close}_{i,t}}$ <p style="font-size: small;"> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CEQQ : Quarterly Common Equity (Q59) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Cash Flow to Equity	This ratio measures how much net cash flow the company can generate for the common equity holders.	Cross-Sectional	DESCENDING	$CFEqt_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 CEQQ_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPQ_{i,t}$ <p> DPQ : Quarterly Depreciation and Amortization (Q5) IBQ : Quarterly Income Before Extraordinary Items (Q8) CEQQ : Quarterly Common Equity (Q59) </p>
Valuation	Cash to Adjusted Enterprise Value	This ratio measures the company's cash holding relative to its enterprise value. *Note that EV in denominator is only updated at the same time as the fundamental data items are updated, either quarterly or annually.	Cross-Sectional	DESCENDING	$\text{CashAdjEV}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{EV}_{i,t}}$ <p>where</p> $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t} + \text{PSTKQ}_{i,t} + \text{MIBQ}_{i,t} - \text{CHEQ}_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Cash to EV Ratio	The ratio of cash and short term investments to enterprise value.	Cross-Sectional	DESCENDING	$\text{CashEV}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{EV}_{i,t}}$ <p>where</p> $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t} + \text{PSTKQ}_{i,t} + \text{MIBQ}_{i,t} - \text{CHEQ}_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Cash to Price	The ratio of cash and short term investments to market value of common equity.	Cross-Sectional	DESCENDING	$\text{CashP}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{CSHOQ}_{i,t} \times \text{CloseM}_{i,t}}$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Cash to Total Assets	The ratio of cash and short term investments to total assets.	Cross-Sectional	DESCENDING	$\text{CashAst}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p style="font-size: small;"> ATQ : Total Assets - Quarterly (Q44) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Current Liability to Price	This factor is the ratio of current liabilities to price.	Cross-Sectional	DESCENDING	$\text{CurLiaP}_{i,t} = \frac{\text{LCTQ}_{i,t}}{\text{CSHOQ}_{i,t} \times \text{CloseM}_{i,t}}$ <p style="font-size: small;"> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) LCTQ : Current Liabilities, Total - Quarterly (Q49) </p>
Valuation	Dividends to Cash Flow	The ratio of trailing four quarter sum of cash dividends to trailing four quarter cash flow.	Cross-Sectional	DESCENDING	$\text{DivToCF}_{i,t} = \frac{\sum_{s=0}^3 \text{DVQ}_{i,t-s}}{\sum_{s=0}^3 (\text{IBQ}_{i,t-s} + \text{DPCQ}_{i,t-s})}$ <p style="font-size: small;"> IBQ : Quarterly Income Before Extraordinary Items (Q8) DVQ : Quarterly Cash Dividends (Q89) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>
Valuation	Dividends to Price Ratio	The ratio of trailing four quarter dividends per share to current stock price.	Cross-Sectional	DESCENDING	$\text{DivP}_{i,t} = \frac{\sum_{j=0}^3 \text{DVQ}_{i,t-j}}{\text{CloseM}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ <p style="font-size: small;"> DVQ : Quarterly Cash Dividends (Q89) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) </p>

Categories	Factor Name	Detail	Type	Rank Order	Foumla
Valuation	Earnings to Price	The ratio of trailing four-quarter earnings per share to current stock price.	Cross-Sectional	DESCENDING	$EP_{i,t} = \frac{\sum_{j=0}^3 EPSFXQ_{i,t-j}}{Close_{i,t}}$ <p>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</p>
Valuation	EBIT to Price	EBIT-to-price ratio measures the company's average four quarter earnings before interests and taxes per share relative to the price that investors would like to pay for a share.	Cross-Sectional	DESCENDING	$EBITP_{i,t} = \frac{\sum_{j=0}^3 EBIT_{i,t-j}}{CloseM_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ $EBIT_{i,t} = NIQ_{i,t} + XINTQ_{i,t} + TXTQ_{i,t}$ <p>TXTQ : Quarterly Income Taxes (Q6) XINTQ : Quarterly Interest and Related Expense (Q22) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) NIQ : Net Income (Q69)</p>
Valuation	EBITDA to Enterprise Value	The ratio of trailing four quarter earnings before interest, taxes, depreciation and amortization expense to enterprise value.	Cross-Sectional	DESCENDING	$EBITDAEV_{i,t} = \frac{\sum_{j=0}^3 EBITDA_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EBITDA_{i,t} = OIBDPQ_{i,t}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36)</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	EBITDA to Price	The ratio of trailing four quarter earnings before interest, taxes, depreciation, and amortization expense to average market value to common equity over the same period.	Cross-Sectional	DESCENDING	$\text{EBITDAP}_{i,t} = \frac{\sum_{j=0}^3 \text{EBITDA}_{i,t-j}}{\text{Close}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ $\text{EBITDA}_{i,t} = \text{OIBDPQ}_{i,t}$ <p> <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> </p>
Valuation	Forward Earnings to Price	The ratio of consensus estimates for the next year's earnings to the current stock price.	Cross-Sectional	DESCENDING	$\text{FwdEP}_{i,t} = \frac{\text{EPSEstFY1}_{i,t}}{\text{Close}_{i,t}}$ <p> <small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out)</small> </p>
Valuation	Forward Free Cash Flow to Price Ratio	The ratio of the consensus forecast of annual free cash flow to the current market value of equity.	Cross-Sectional	DESCENDING	$\text{FwdFCFP}_{i,t} = \frac{\sum_{j=0}^3 (\text{OANCFY}_{i,t-j} - \text{CAPXY}_{i,t-j} - \text{DVY}_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}} + \sum_{j=0}^3 \frac{\text{EPSEstQ}_{i,t-j} \times \frac{1}{\text{CloseM}_{i,t}}}{\text{EPSEstQ}_{i,t-j}}$ <p> <small>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) CloseM : Adjusted Closing Price (Adjusted Closing Price)</small> </p>
Valuation	Free Cash Flow to Common Equity	The ratio of trailing four quarter free cash flow to average book value of common equity over the same period.	Cross-Sectional	DESCENDING	$\text{FCFEqt}_{i,t} = \frac{\sum_{j=0}^3 (\text{OANCFQ}_{i,t-j} - \text{CAPXQ}_{i,t-j} - \text{DVQ}_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 \text{CEQQ}_{i,t-j}}$ <p> <small>CEQQ : Quarterly Common Equity (Q59) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Free Cash Flow to Enterprise Value	It's the ratio of trailing four quarter free cash flow to average enterprise value over the same period.	Cross-Sectional	DESCENDING	$FCFEV_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLITQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DLITQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) DVO : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Free Cash Flow to Price	The ratio of trailing four quarter free cash flow to average market value of equity over the same period.	Cross-Sectional	DESCENDING	$FCFP_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVO : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Growth Flow to Price	The ratio of trailing four quarter income before extraordinary items plus research and development expense, relative to average market value of common equity over the same period.	Cross-Sectional	DESCENDING	$GFP_{i,t} = \frac{\sum_{j=0}^3 (NIQ_{i,t-j} + XRDQ_{i,t-j})}{CloseM_{i,t} \times \frac{1}{4} \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) XRDQ : Research and Development Expense Quarterly (Q4) NIQ : Net Income (Q69) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Indicated Annual Dividends to Price Ratio	The ratio of projected annual dividends per share to the current stock price.	Cross-Sectional	DESCENDING	$\text{IndiDivP}_{i,t} = \frac{\text{DVI}_{i,t}}{\text{CloseM}_{i,t}}$ <p> CloseM : Adjusted Closing Price (Adjusted Closing Price) DVI : Indicated Annual Dividend - Current (Indicated Annual Dividend - Current) </p>
Valuation	Inverse P/E Ratio Adj for Growth and Yield	The ratio of trailing four quarter earnings per share to current stock price, multiplied by the sum of consensus long-term growth estimates and dividend yield.	Cross-Sectional	DESCENDING	$\text{InvPEGY}_{i,t} = \frac{\sum_{j=0}^3 \text{EPSFXQ}_{i,t-j}}{\text{Close}_{i,t}} \times (\text{LTG}_{i,t}/100 + \text{Div}_{i,t}^{\text{Indicated}}/\text{Close}_{i,t})$ <p> LTG : Mean Long-Term EPS Est. (Mean EPS estimate long term) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) DVI : Indicated Annual Dividend - Current (Indicated Annual Dividend - Current) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) </p>
Valuation	Net Cash Flow to Enterprise Value	The ratio of trailing four quarter net cash flow to average enterprise value over the same period.	Cross-Sectional	DESCENDING	$\text{CFEV}_{i,t} = \frac{\sum_{j=0}^3 \text{NCF}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{EV}_{i,t-j}}$ $\text{NCF}_{i,t} = \text{IBQ}_{i,t} + \text{DPCQ}_{i,t}$ $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t} + \text{PSTKQ}_{i,t} + \text{MIBQ}_{i,t} - \text{CHEQ}_{i,t}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Net Cash Flow to Price	The ratio of trailing four quarter net cash flow to average market value of equity over the same period.	Cross-Sectional	DESCENDING	$CFP_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPCQ_{i,t}$ <p> <small> IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </small> </p>
Valuation	Net Current Assets to Price Ratio	The ratio of net current assets (current assets minus total liabilities) to market value of common equity.	Cross-Sectional	DESCENDING	$NCAP_{i,t} = \frac{ACTQ_{i,t} - LTQ_{i,t}}{CSHOQ_{i,t} \times CloseM_{i,t}}$ <p> <small> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) ACTQ : Current Assets - Quarterly (Q40) LTQ : Liabilities, Total (Q54) </small> </p>
Valuation	Normalized EP	60 month average of the trailing four-quarter earnings per share to current stock price.	Cross-Sectional	DESCENDING	$60MAvgTTMEP_{i,t} = \frac{\frac{1}{60} \sum_{s=0}^{60} EPS_{i,t-s}}{Close_{i,t}}$ <p>where</p> $EPS_{i,t} = \sum_{j=0}^3 EPSFXQ_{i,t-j}$ <p> <small> EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Operating Cash Flow to Enterprise Value	The factor is defined as a ratio of trailing four quarter net cash flow from operating activities to average enterprise value over the same period.	Cross-Sectional	DESCENDING	$OCFEV_{i,t} = \frac{\sum_{j=0}^3 OANCFO_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTO_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFO : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTO : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Operating Cash Flow to Price	The ratio of trailing four quarter net cash flow from operating activities to average market value of common equity over the same period.	Cross-Sectional	DESCENDING	$OCFP_{i,t} = \frac{\sum_{j=0}^3 OANCFO_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFO : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Operating Earnings to Price Ratio	The ratio of earnings from operations per share (diluted) to current stock price.	Cross-Sectional	DESCENDING	$OEP_{i,t} = \frac{\sum_{j=0}^3 OPEPSQ_{i,t-j}}{CloseM_{i,t}}$ <p> CloseM : Adjusted Closing Price (Adjusted Closing Price) OPEPSQ : Earnings Per Share from Operations (Q177) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Pretax Income Per Share to Price	The ratio of trailing four quarter pretax income to average market value of common equity over the same period.	Cross-Sectional	DESCENDING	$PTIP_{i,t} = \frac{\sum_{j=0}^3 PIQ_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> PIQ : Quarterly Pretax Income (Q23) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Return on Net Tangible Assets	The ratio measures a company's ability to generate profits using its net fixed assets and working capital.	Cross-Sectional	DESCENDING	$RONA_{i,t} = \frac{\sum_{j=0}^3 IBADJQ_{i,t-j}}{\frac{1}{4} \sum_{j=0}^3 (PPENT_{i,t-j} + ACTQ_{i,t-j} - LCTQ_{i,t-j})}$ <p> LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) IBADJQ : Income Before Extraordinary Items, Adjusted for Common Stock Equivalents, Quarterly (Q10) PPENT : Property Plant and Equipment - Net (q42) </p>
Valuation	Sales to EV Ratio	The ratio of trailing four quarter sales to average enterprise value over the same period.	Cross-Sectional	DESCENDING	$SEV_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ <p> <i>where</i> $EV_{i,t} = CSHOQ_{i,t} \times CloseM_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ </p> <p> DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) CloseM : Adjusted Closing Price (Adjusted Closing Price) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Sales to Price Ratio	The ratio of trailing four quarter sales to average market value of common equity over the same period.	Cross-Sectional	DESCENDING	$SP_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{CloseM_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> <small> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) CloseM : Adjusted Closing Price (Adjusted Closing Price) </small> </p>
Valuation	Solvency Ratio	This ratio measures a company's ability to meet its long term obligations by comparing its income and non-cash spendings to its total liabilities.	Cross-Sectional	DESCENDING	$SolvencyRatio_{i,t} = \frac{\sum_{j=0}^3 (IBQ_{i,t-j} + DPQ_{i,t-j})}{\frac{1}{4} \sum_{j=0}^3 LTQ_{i,t-j}}$ <p> <small> DPQ : Quarterly Depreciation and Amortization (Q5) IBQ : Quarterly Income Before Extraordinary Items (Q8) LTQ : Liabilities, Total (Q54) </small> </p>
Valuation	Adjusted Industry Relative EBIT to Price	EBIT-to-price ratio measures the company's average four quarter earnings before interests and taxes per share relative to the price that investors would like to pay for a share. The industry relative version of this ratio compares peer companies in the same industry.	Ind Group Relitive	DESCENDING	$IndRelEBITP_{i,t} = \frac{\sum_{j=0}^3 EBIT_{i,t-j}}{CloseM_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ $EBIT_{i,t} = NIQ_{i,t} + XINTQ_{i,t} + TXTQ_{i,t}$ <p> <small> TXTQ : Quarterly Income Taxes (Q6) XINTQ : Quarterly Interest and Related Expense (Q22) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) NIQ : Net Income (Q69) </small> </p>
Valuation	Ind Grp Rel Assets to Price Ratio	This ratio compares the company's assets per share value with the company's stock price. If the ratio is too low (high) relative to other comparable companies, the company's assets are undervalued (overvalued).	Ind Group Relitive	DESCENDING	$AstP_{i,t} = \frac{ATQ_{i,t}}{CSHOQ_{i,t} \times Close_{i,t}}$ <p> <small> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Book to Price	This ratio compares the company's book value to its market price.	Ind Group Reletive	DESCENDING	$BP_{i,t} = \frac{CEQQ_{i,t}}{CSHOQ_{i,t} \times Close_{i,t}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CEQQ : Quarterly Common Equity (Q59) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Ind Grp Rel Cash to EV Ratio	This ratio measure the company's cash holding relative to its enterprise value.	Ind Group Reletive	DESCENDING	$\text{CashEV}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{EV}_{i,t}}$ <p> <i>where</i> $\text{EV}_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTO_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - \text{CHEQ}_{i,t}$ </p> <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTO : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Ind Grp Rel Cash to Price	This ratio measures the company's cash holding relative to its market value.	Ind Group Reletive	DESCENDING	$\text{CashP}_{i,t} = \frac{\text{CHEQ}_{i,t}}{CSHOQ_{i,t} \times CloseM_{i,t}}$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Ind Grp Rel Cash to Total Assets	This metric measures the company's quarterly cash and short term investment relative to its quarterly total assets.	Ind Group Reletive	DESCENDING	$\text{CashAst}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p> ATQ : Total Assets - Quarterly (Q44) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Dividends to Price Ratio	This ratio measures how much investors pay for every dollar of dividends. Unlike earning-to-price ratio, dividends are more certain and therefore less likely to be manipulated than earnings.	Ind Group Relitive	DESCENDING	$\text{DivP}_{i,t} = \frac{\sum_{j=0}^3 \text{DVPSXQ}_{i,t-j}}{\text{CloseM}_{i,t}}$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price) DVY : Div per Share-Exdate Quarterly ()</small></p>
Valuation	Ind Grp Rel Earnings to Price	Earning-to-price ratio is a measure of the company's average four quarter earnings per share relative to the stock price. The higher the ratio, the better the earnings would be for each dollar paid for the stock. The industry relative earning-to-price ratio compares peers companies in the same industry.	Ind Group Relitive	DESCENDING	$\text{EP}_{i,t} = \frac{\sum_{j=0}^3 \text{EPSFXQ}_{i,t-j}}{\text{Close}_{i,t}}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9)</small></p>
Valuation	Ind Grp Rel EBITDA to Enterprise Value	The metric measure how much return the company can generate relative to its enterprise value.	Ind Group Relitive	DESCENDING	$\text{EBITDAEV}_{i,t} = \frac{\sum_{j=0}^3 \text{EBITDA}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{EV}_{i,t-j}}$ $\text{EBITDA}_{i,t} = \text{OIBDPQ}_{i,t}$ $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t} + \text{PSTKQ}_{i,t} + \text{MIBQ}_{i,t} - \text{CHEQ}_{i,t}$ <p><small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHQQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Foumla
Valuation	Ind Grp Rel EBITDA to Price	EBITDA-to-price ratio measures the company's average four quarter earnings before interests, taxes and D&A per share relative to the price that investors would like to pay for a share. The industry relative version of this ratio compares peer companies in the same industry.	Ind Group Relitive	DESCENDING	$\text{EBITDAP}_{i,t} = \frac{\sum_{j=0}^3 \text{EBITDA}_{i,t-j}}{\text{Close}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ $\text{EBITDA}_{i,t} = \text{OIBDPQ}_{i,t}$ <p> <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21)</small> <small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> </p>
Valuation	Ind Grp Rel Forward Earnings to Price	The ratio of consensus estimates for the next year's earnings to the current stock price.	Ind Group Relitive	DESCENDING	$\text{FwdEP}_{i,t} = \frac{\text{EPSEstFY1}_{i,t}}{\text{Close}_{i,t}}$ <p> <small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small> <small>EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out)</small> </p>
Valuation	Ind Grp Rel Forward Free Cash Flow to Price Ratio	The ratio of the consensus forecast of annual free cash flow to the current market value of equity.	Ind Group Relitive	DESCENDING	$\text{FwdFCFP}_{i,t} = \frac{\sum_{j=1}^4 (\text{DPCQ}_{i,t-j} + \text{EPSEstQ}_{i,t+j} - \text{CAPXQ}_{i,t-j} - \text{DVQ}_{i,t-j})}{\text{CloseM}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ <p> <small>DVQ : Quarterly Cash Dividends (Q89)</small> <small>CAPXQ : Quarterly Capital Expenditures (Q90)</small> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> <small>EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out)</small> <small>CloseM : Analyst Closing Price (Adjusted Closing Price)</small> <small>DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Free Cash Flow to Common Equity	This ratio measures how much free cash flow the company can generate for the common equity holders.	Ind Group Relitive	DESCENDING	$FCFEqt_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 CEQQ_{i,t-j}}$ <p> $CEQQ$: Quarterly Common Equity (Q59) $OANCFQ$: Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) $CAPXQ$: Quarterly Capital Expenditures (Q90) </p>
Valuation	Ind Grp Rel Free Cash Flow to Enterprise Value	This metric measures average free cash flow generated from the company operations relative to the company's average enterprise value over the last four quarters.	Ind Group Relitive	DESCENDING	$FCFEV_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) $OANCFQ$: Quarterly Net Cash Flow from Operating Activities (Q108) $DLTTQ$: Quarterly Long Term Debt (Q51) $DLCQ$: Quarterly Short Term Debt (Q45) DVQ : Quarterly Cash Dividends (Q89) $CAPXQ$: Quarterly Capital Expenditures (Q90) $CSHOQ$: Adjusted Quarterly Common Shares Outstanding (Q61) $PSTKQ$: Quarterly Preferred/Preference Stock (Q55) $MIBQ$: Quarterly Minority Interest (Q53) $CHEQ$: Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Ind Grp Rel Free Cash Flow to Price	This metric measures a company's free cash flow to price ratio relative to its industry average. The difference is then standardized by the industry's standard deviations.	Ind Group Relitive	DESCENDING	$FCFP_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) $OANCFQ$: Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) $CAPXQ$: Quarterly Capital Expenditures (Q90) $CSHOQ$: Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Growth Flow to Price	The growth-flow-to-price ratio indicates how much the company spends on R&D. Note, however, that this does not indicate how profitable the R&D will turn out in the future.	Ind Group Relitive	DESCENDING	$GFP_{i,t} = \frac{\sum_{j=0}^3 (XRDQ_{i,t-j} + IBADJQ_{i,t-j})}{CloseM_{i,t} \times \frac{1}{4} \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> <small> $CSHOQ$: Adjusted Quarterly Common Shares Outstanding (Q61) $CloseM$: Adjusted Closing Price (Adjusted Closing Price) $XRDQ$: Research and Development Expense Quarterly (Q4) $IBADJQ$: Income Before Extraordinary Items, Adjusted for Common Stock Equivalents, Quarterly (Q10) </small> </p>
Valuation	Ind Grp Rel Indicated Annual Dividends to Price Ratio	Dividend-to-price measures how much investors pay for every dollar of dividends. This indicated-dividend-to-price ratio uses the most recent quarterly dividends as an indicator for future dividends.	Ind Group Relitive	DESCENDING	$IndiDivP_{i,t} = \frac{DVRATED_{i,t}}{CloseM_{i,t}}$ <p> <small> $CloseM$: Adjusted Closing Price (Adjusted Closing Price) DVI : Indicated Annual Dividend - Current (Indicated Annual Dividend - Current) </small> </p>
Valuation	Ind Grp Rel Inverse P/E Ratio Adj for Growth and Yield	The ratio of trailing four quarter earnings per share to current stock price, multiplied by the sum of consensus long-term growth estimates and dividend yield.	Ind Group Relitive	DESCENDING	$InvPEGY_{i,t} = \frac{\sum_{j=0}^3 EPSFXQ_{i,t-j}}{Close_{i,t}} \times (LTG_{i,t} + \text{Div}_{i,t}^{\text{Indicated}} / Close_{i,t})$ <p> <small> LTG : Mean Long-Term EPS Est. (Mean EPS estimate long term) $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) $EPSFXQ$: Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Net Cash Flow to Enterprise Value	This metric measures the company's net cash flow relative to its average enterprise value.	Ind Group Relitive	DESCENDING	$CFEV_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPCQ_{i,t}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CLOSE : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>
Valuation	Ind Grp Rel Net Cash Flow to Price	This metric is a measure of the company's average four quarter net cash flow per share relative to the price paid to each share. The higher the ratio, the more net cash flow the investor receives for each dollar paid for a share.	Ind Group Relitive	DESCENDING	$CFP_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPCQ_{i,t}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>
Valuation	Ind Grp Rel Net Current Assets to Price Ratio	Net-current-asset-to-price is a value metric that will favor stocks that have higher NCAV (Net Current Assets Value) relative to their market prices.	Ind Group Relitive	DESCENDING	$NCAP_{i,t} = \frac{ACTQ_{i,t} - LTQ_{i,t}}{CSHOQ_{i,t} \times CloseM_{i,t}}$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) ACTQ : Current Assets - Quarterly (Q40) LTQ : Liabilities, Total (Q54) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Operating Cash Flow to Enterprise Value	This metric measures operating cash flow generated from the company operations relative to the company's enterprise value.	Ind Group Reletive	DESCENDING	$OCFEV_{i,t} = \frac{\sum_{j=0}^3 OANCFQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	Ind Grp Rel Operating Cash Flow to Price	This metric compares the company's OCFP ratio to the industry average then standardizes the difference by the industry's standard deviation.	Ind Group Reletive	DESCENDING	$OCFP_{i,t} = \frac{\sum_{j=0}^3 OANCFQ_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Ind Grp Rel Operating Earnings to Price Ratio	Different from earning-to-price ratio, this operating-earning-to-price ratio uses operating earnings to measure the return for each dollar paid by the investors.	Ind Group Reletive	DESCENDING	$OEP_{i,t} = \frac{\sum_{j=0}^3 OPEPSQ_{i,t-j}}{CloseM_{i,t}}$ <p> CloseM : Adjusted Closing Price (Adjusted Closing Price) OPEPSQ : Earnings Per Share from Operations (Q177) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Pretax Income Per Share to Price	This metric measures the company's pretax income per share relative to its market share price.	Ind Group Relitive	DESCENDING	$PTIP_{i,t} = \frac{\sum_{j=0}^3 PIQ_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> PIQ : Quarterly Pretax Income (Q23) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	Ind Grp Rel Return on Net Tangible Assets	The ratio measures a company's ability to generate profits using its net fixed assets and working capital	Ind Group Relitive	DESCENDING	-
Valuation	Ind Grp Rel Sales to EV Ratio	Sale-to-enterprise-value ratio is a valuation measure that compares the company's annual sales to its enterprise value. It indicates how much it would cost to buy the company's sales.	Ind Group Relitive	DESCENDING	$SEV_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ <p> <i>where</i> $EV_{i,t} = CSHOQ_{i,t} \times CloseM_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ </p> <p> DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Share Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) CloseM : Adjusted Closing Price (Adjusted Closing Price) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	Ind Grp Rel Sales to Price Ratio	This ratio indicates how much revenue the company could generate given each dollar paid by the shareholders.	Ind Group Relitive	DESCENDING	$SP_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{CloseM_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> $CSHOQ$: Adjusted Quarterly Common Shares Outstanding (Q61) $SALEQ$: Sales/Turnover (Net) - Quarterly (Q2) $CloseM$: Adjusted Closing Price (Adjusted Closing Price) </p>
Valuation	Ind Grp Rel Solvency Ratio	This ratio measures a company's ability to meet its long term obligations by comparing its income and non-cash spendings to its total liabilities.	Ind Group Relitive	DESCENDING	$SolvencyRatio_{i,t} = \frac{\sum_{j=0}^3 (IBQ_{i,t-j} + DPQ_{i,t-j})}{\frac{1}{4} \sum_{j=0}^3 LTQ_{i,t-j}}$ <p> DPQ : Quarterly Depreciation and Amortization (Q5) IBQ : Quarterly Income Before Extraordinary Items (Q8) LTQ : Liabilities, Total (Q54) </p>
Valuation	5 Yr Hist Rel Assets to Price Ratio	This ratio compares the company's assets per share value with the company's stock price. If the ratio is too low (high) relative to other comparable companies, the company's assets are undervalued (overvalued).	5 Yr Historical Rel	DESCENDING	$AstP_{i,t} = \frac{ATQ_{i,t}}{CSHOQ_{i,t} \times Close_{i,t}}$ <p> $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) ATQ : Total Assets - Quarterly (Q44) $CSHOQ$: Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	5 Yr Hist Rel Book to Price	This ratio compares the company's book value to its market price.	5 Yr Historical Rel	DESCENDING	$BP_{i,t} = \frac{CEQQ_{i,t}}{CSHOQ_{i,t} \times Close_{i,t}}$ <p> $Close$: Adjusted Daily Closing Price (Adjusted Daily Closing Price) $CEQQ$: Quarterly Common Equity (Q59) $CSHOQ$: Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Cash to Total Assets	This metric measures the company's quarterly cash and short term investment relative to its quarterly total assets.	5 Yr Historical Rel	DESCENDING	$\text{CashAst}_{i,t} = \frac{\text{CHEQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p style="font-size: small;"> ATQ : Total Assets - Quarterly (Q44) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	5 Yr Hist Rel Earnings to Price	This metric is a measure of the company's average four quarter earnings per share relative to the stock price. The higher the ratio, the better the earnings would be for each dollar paid for the stock.	5 Yr Historical Rel	DESCENDING	$\text{EP}_{i,t} = \frac{\sum_{j=0}^3 \text{EPSFXQ}_{i,t-j}}{\text{Close}_{i,t}}$ <p style="font-size: small;"> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) </p>
Valuation	5 Yr Hist Rel EBITDA to Enterprise Value	The metric measure how much return the company can generate relative to its enterprise value.	5 Yr Historical Rel	DESCENDING	$\text{EBITDAEV}_{i,t} = \frac{\sum_{j=0}^3 \text{EBITDA}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{EV}_{i,t-j}}$ $\text{EBITDA}_{i,t} = \text{OIBDPQ}_{i,t}$ $\text{EV}_{i,t} = \text{CSHOQ}_{i,t} \times \text{Close}_{i,t} + \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t} + \text{PSTKQ}_{i,t} + \text{MIBQ}_{i,t} - \text{CHEQ}_{i,t}$ <p style="font-size: small;"> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel EBITDA to Price	This metric measures the company's average four quarter earnings before interests, taxes and D&A per share relative to the price that investors pay for a share.	5 Yr Historical Rel	DESCENDING	$\text{EBITDAP}_{i,t} = \frac{\sum_{j=0}^3 \text{EBITDA}_{i,t-j}}{\text{Close}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ $\text{EBITDA}_{i,t} = \text{OIBDPQ}_{i,t}$ <p> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	5 Yr Hist Rel Forward Earnings to Price	The ratio of consensus estimates for the next year's earnings to the current stock price.	5 Yr Historical Rel	DESCENDING	$\text{FwdEP}_{i,t} = \frac{\text{EPSEstFY1}_{i,t}}{\text{Close}_{i,t}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSEstFY1 : Mean EPS Estimate for Fiscal Year 1 (EPS Estimate Mean - 1 Yr Out) </p>
Valuation	5 Yr Hist Rel Forward Free Cash Flow to Price Ratio	The ratio of the consensus forecast of annual free cash flow to the current market value of equity.	5 Yr Historical Rel	DESCENDING	$\text{FwdFCFP}_{i,t} = \frac{\sum_{j=1}^4 (\text{DPCQ}_{i,t-j} + \text{EPSEstQ}_{i,t+j} - \text{CAPXQ}_{i,t-j} - \text{DVQ}_{i,t-j})}{\text{CloseM}_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 \text{CSHOQ}_{i,t-j}}$ <p> DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) EPSEstQ : Analyst Earnings Estimate for next n Quarter (EPS Estimate Mean - n Quarter Out) CloseM : Adjusted Closing Price (Adjusted Closing Price) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Free Cash Flow to Common Equity	This ratio measures how much free cash flow the company can generate for the common equity holders.	5 Yr Historical Rel	DESCENDING	$FCFE_{qt,i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 CEQQ_{i,t-j}}$ <p> CEQQ : Quarterly Common Equity (Q59) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) </p>
Valuation	5 Yr Hist Rel Free Cash Flow to Enterprise Value	This metric measures average free cash flow generated from the company operations relative to the company's average enterprise value over the last four quarters.	5 Yr Historical Rel	DESCENDING	$FCFEV_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EV_{i,t} = CSHOOQ_{i,t} \times Close_{i,t} + DLTTO_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTO : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	5 Yr Hist Rel Free Cash Flow to Price	This valuation ratio compares the company's annual free cash flow to its market value. Generally, the lower this ratio is, the more expensive the company is.	5 Yr Historical Rel	DESCENDING	$FCFP_{i,t} = \frac{\sum_{j=0}^3 (OANCFQ_{i,t-j} - CAPXQ_{i,t-j} - DVQ_{i,t-j})}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOOQ_{i,t-j}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90) CSHOOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Growth Flow to Price	The growth-flow-to-price ratio indicates how much the company spends on R&D. Note, however, that this does not indicate how profitable the R&D will turn out in the future.	5 Yr Historical Rel	DESCENDING	$GFP_{i,t} = \frac{\sum_{j=0}^3 (XRDQ_{i,t-j} + IBADJQ_{i,t-j})}{CloseM_{i,t} \times \frac{1}{4} \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> <small> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) XRDQ : Research and Development Expense Quarterly (Q4) IBADJQ : Income Before Extraordinary Items, Adjusted for Common Stock Equivalents, Quarterly (Q10) </small> </p>
Valuation	5 Yr Hist Rel Indicated Annual Dividends to Price Ratio	Dividend-to-price measures how much investors pay for every dollar of dividends. This indicated-dividend-to-price ratio uses the most recent quarterly dividends as an indicator for future dividends.	5 Yr Historical Rel	DESCENDING	$IndiDivP_{i,t} = \frac{DVATED_{i,t}}{CloseM_{i,t}}$ <p> <small> CloseM : Adjusted Closing Price (Adjusted Closing Price) DVATED : Indicated Annual Dividend - Current (Indicated Annual Dividend - Current) </small> </p>
Valuation	5 Yr Hist Rel Inverse P/E Ratio Adj for Growth and Yield	The ratio of trailing four quarter earnings per share to current stock price, multiplied by the sum of consensus long-term growth estimates and dividend yield.	5 Yr Historical Rel	DESCENDING	$InvPEGY_{i,t} = \frac{\sum_{j=0}^3 EPSFXQ_{i,t-j}}{Close_{i,t}} \times (LTG_{i,t} + Div_{i,t}^{Indicated} / Close_{i,t})$ <p> <small> LTG : Mean Long-Term EPS Est. (Mean EPS estimate long term) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) EPSFXQ : Quarterly Earnings Per Share (Diluted), Excluding Extraordinary Items (Q9) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Net Cash Flow to Enterprise Value	This metric measures the company's net cash flow relative to its average enterprise value.	5 Yr Historical Rel	DESCENDING	$CFEV_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPCQ_{i,t}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>
Valuation	5 Yr Hist Rel Net Cash Flow to Price	This metric is a measure of the company's average four quarter net cash flow per share relative to the price paid to each share. The higher the ratio, the more net cash flow the investor receives for each dollar paid for a share.	5 Yr Historical Rel	DESCENDING	$CFP_{i,t} = \frac{\sum_{j=0}^3 NCF_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ $NCF_{i,t} = IBQ_{i,t} + DPCQ_{i,t}$ <p> IBQ : Quarterly Income Before Extraordinary Items (Q8) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) DPCQ : Quarterly Depreciation and Amortization (Cash Flow Item) (Q77) </p>
Valuation	5 Yr Hist Rel Net Current Assets to Price Ratio	Net-current-asset-to-price is a value metric that will favor stocks that have higher NCAV (Net Current Assets Value) relative to their market prices.	5 Yr Historical Rel	DESCENDING	$NCAP_{i,t} = \frac{ACTQ_{i,t} - LTQ_{i,t}}{CSHOQ_{i,t} \times CloseM_{i,t}}$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) ACTQ : Current Assets - Quarterly (Q40) LTQ : Liabilities, Total (Q54) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Operating Cash Flow to Enterprise Value	This metric measures operating cash flow generated from the company operations relative to the company's enterprise value.	5 Yr Historical Rel	DESCENDING	$OCFEV_{i,t} = \frac{\sum_{j=0}^3 OANCFO_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ $EV_{i,t} = CSHOQ_{i,t} \times Close_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFO : Quarterly Net Cash Flow from Operating Activities (Q108) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>
Valuation	5 Yr Hist Rel Operating Cash Flow to Price	This metric compares the company's average four quarter operating cash flow to its market value. The lower this ratio is the more expensive the company.	5 Yr Historical Rel	DESCENDING	$OCFP_{i,t} = \frac{\sum_{j=0}^3 OANCFO_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) OANCFO : Quarterly Net Cash Flow from Operating Activities (Q108) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	5 Yr Hist Rel Operating Earnings to Price Ratio	Different from earning-to-price ratio, this operating-earning-to-price ratio uses operating earnings to measure the return for each dollar paid by the investors.	5 Yr Historical Rel	DESCENDING	$OEP_{i,t} = \frac{\sum_{j=0}^3 OPEPSQ_{i,t-j}}{CloseM_{i,t}}$ <p> CloseM : Adjusted Closing Price (Adjusted Closing Price) OPEPSQ : Earnings Per Share from Operations (Q177) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Pretax Income Per Share to Price	This metric measures the company's pretax income per share relative to its market share price.	5 Yr Historical Rel	DESCENDING	$PTIP_{i,t} = \frac{\sum_{j=0}^3 PIQ_{i,t-j}}{Close_{i,t} \times \frac{1}{4} \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> PIQ : Quarterly Pretax Income (Q23) Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>
Valuation	5 Yr Hist Rel Return on Net Tangible Assets	The ratio measures a company's ability to generate profits using its net fixed assets and <u>working capital</u> .	5 Yr Historical Rel	DESCENDING	-
Valuation	5 Yr Hist Rel Sales to EV Ratio	Sale-to-enterprise-value ratio is a valuation measure that compares the company's annual sales to its enterprise value. It indicates how much it would cost to buy the company's sales.	5 Yr Historical Rel	DESCENDING	$SEV_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 EV_{i,t-j}}$ <p>where</p> $EV_{i,t} = CSHOQ_{i,t} \times CloseM_{i,t} + DLTTQ_{i,t} + DLCQ_{i,t} + PSTKQ_{i,t} + MIBQ_{i,t} - CHEQ_{i,t}$ <p> DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) CloseM : Adjusted Closing Price (Adjusted Closing Price) PSTKQ : Quarterly Preferred/Preference Stock (Q55) MIBQ : Quarterly Minority Interest (Q53) CHEQ : Quarterly Cash and Short Term Investments (Q36) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Valuation	5 Yr Hist Rel Sales to Price Ratio	This ratio indicates how much revenue the company could generate given each dollar paid by the shareholders.	5 Yr Historical Rel	DESCENDING	$SP_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{CloseM_{i,t} \times \frac{1}{4} \times \sum_{j=0}^3 CSHOQ_{i,t-j}}$ <p> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> <small>CloseM : Adjusted Closing Price (Adjusted Closing Price)</small> </p>
Valuation	5 Yr Hist Rel Solvency Ratio	This ratio measures a company's ability to meet its long term obligations by comparing its income and non-cash spendings to its total liabilities.	5 Yr Historical Rel	DESCENDING	$SolvencyRatio_{i,t} = \frac{\sum_{j=0}^3 (IBQ_{i,t-j} + DPQ_{i,t-j})}{\frac{1}{4} \sum_{j=0}^3 LTQ_{i,t-j}}$ <p> <small>DPQ : Quarterly Depreciation and Amortization (Q5)</small> <small>IBQ : Quarterly Income Before Extraordinary Items (Q8)</small> <small>LTQ : Liabilities, Total (Q54)</small> </p>
Capital Efficiency	1Y Chg in Shares Outstanding	The percentage change in common shares outstanding from four quarters ago to the current quarter.	Cross-Sectional	ASCENDING	$ShareChg_{i,t} = \frac{CSHOQ_{i,t}}{CSHOQ_{i,t-4}} - 1$ <p> <small>CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	1Y Chg in Stock Buybacks	The factor is a percentage change from a year ago in trailing four quarter net purchases of common and preferred stock; it measures the change in stock repurchases over the last twelve months.	Cross-Sectional	DESCENDING	$\text{BuyBackChg}_{i,t} = \frac{\sum_{j=0}^3 \text{PRSTKCQ}_{i,t-j}}{\sum_{j=0}^3 \text{PRSTKCQ}_{i,t-j-4}} - 1$ <small>PRSTKCQ : Quarterly Net Purchase of Common and Preferred Stock (Q93)</small>
Capital Efficiency	Adjusted Interest Coverage Ratio	This ratio is a measure of a company's ability to pay for interest on outstanding debt. This one uses OIBDP rather than EBIT	Cross-Sectional	DESCENDING	$\text{AdjIntCov}_{i,t} = \frac{\sum_{j=0}^3 \text{OIBDPQ}_{i,t-j}}{\sum_{j=0}^3 \text{XINTQ}_{i,t-j}}$ <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) XINTQ : Quarterly Interest and Related Expense (Q22)</small>
Capital Efficiency	Asset Growth - 1 Year	One-year percent change in the simple average trailing four quarter total assets.	Cross-Sectional	ASCENDING	$\text{AstGrwth}_{i,t} = \frac{\sum_{j=0}^3 \text{ATQ}_{i,t-j}}{\sum_{j=0}^3 \text{ATQ}_{i,t-j-4}} - 1$ <small>ATQ : Total Assets - Quarterly (Q44)</small>
Capital Efficiency	Capital Acquisition Ratio	The factor is a ratio of trailing four quarter operating cash flow (net of cash dividends) to trailing four quarter capital expenditures. It measures how efficiently a company generates cash from its capital expenditures.	Cross-Sectional	DESCENDING	$\text{CapAcqRatio}_{i,t} = \frac{\sum_{j=0}^3 (\text{OANCFQ}_{i,t-j} - \text{DVQ}_{i,t-j})}{\sum_{j=0}^3 \text{CAPXQ}_{i,t-j}}$ <small>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90)</small>
Capital Efficiency	Capital Expenditure to Total Assets	The ratio of trailing four quarter sum of capital expenditures to average total assets over the same period.	Cross-Sectional	ASCENDING	$\text{CapExToAst}_{i,t} = \frac{\sum_{s=0}^3 \text{CAPXQ}_{i,t-s}}{\frac{1}{4} \sum_{s=0}^3 \text{ATQ}_{i,t-s}}$ <small>ATQ : Total Assets - Quarterly (Q44) CAPXQ : Quarterly Capital Expenditures (Q90)</small>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Cash Flow Return on Invested Capital	The factor measures a ratio of trailing four quarter operating net cash flow to average invested capital over the same period.	Cross-Sectional	DESCENDING	$CFROIC_{i,t} = \frac{\sum_{j=0}^3 OANCFQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ICAPTO_{i,t-j}}$ <p><small>ICAPTO : Quarterly Invested Capital (Q62) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small></p>
Capital Efficiency	Debt to Assets Ratio	The ratio of long term and short term debt to total assets. It indicates the proportion of debt a company has relative to its assets.	Cross-Sectional	ASCENDING	$DA_{i,t} = \frac{DTQ_{i,t}}{ATQ_{i,t}}$ $DTQ_{i,t} = DLTTQ_{i,t} + DLCQ_{i,t}$ <p><small>ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45)</small></p>
Capital Efficiency	Degree of Financial Leverage	Degree of Financial leverage is the ratio of pretax income and interest over total pretax income.	Cross-Sectional	DESCENDING	$FinLev_{i,t} = \frac{\sum_{s=0}^3 (PIQ_{i,t-s} + XINTQ_{i,t-s})}{\sum_{s=0}^3 PIQ_{i,t-s}}$ <p><small>PIQ : Quarterly Pretax Income (Q23) XINTQ : Quarterly Interest and Related Expense (Q22)</small></p>
Capital Efficiency	EBIT to Assets	The ratio of trailing four quarter EBIT to total assets over the same period.	Cross-Sectional	DESCENDING	$EBITTToAst_{i,t} = \frac{\sum_{j=0}^3 OIADPQ_{i,t-j}}{\frac{1}{4} \sum_{j=0}^3 ATQ_{i,t-j}}$ <p><small>ATQ : Total Assets - Quarterly (Q44) OIADPQ : Quarterly Operating Income After Depreciation (OIADPQ)</small></p>
Capital Efficiency	EBITDA to Assets	The ratio of trailing four quarter EBITDA to total assets over the same period.	Cross-Sectional	DESCENDING	$EBITDAToAst_{i,t} = \frac{\sum_{j=0}^3 OIBDPQ_{i,t-j}}{\frac{1}{4} \sum_{j=0}^3 ATQ_{i,t-j}}$ <p><small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) ATQ : Total Assets - Quarterly (Q44)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Financial Leverage (Equity Multiplier)	This ratio measures a company's total assets per dollar of stock holders' common equities. The higher the ratio, the higher the financial leverage is used to finance a company's assets.	Cross-Sectional	DESCENDING	$FL_{i,t} = \frac{ATQ_{i,t}}{CEQQ_{i,t}}$ <p> CEQQ : Quarterly Common Equity (Q59) ATQ : Total Assets - Quarterly (Q44) </p>
Capital Efficiency	Gross Profit to Assets	The ratio of trailing four quarter gross profit to total assets over the same period where gross profit is defined as revenue less cost of goods sold.	Cross-Sectional	DESCENDING	$GrPftToAst_{i,t} = \frac{\sum_{j=0}^3 GrossProfit_{i,t-j}}{\frac{1}{4} \sum_{j=0}^3 ATQ_{i,t-j}}$ <p> <i>where</i> $GrossProfit_{i,j} = SALEQ_{i,t} - COGSQ_{i,t}$ </p> <p> ATQ : Total Assets - Quarterly (Q44) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) COGSQ : Cost of Goods Sold - Quarterly (Q30) </p>
Capital Efficiency	Interest Coverage Ratio	The ratio of operating income after depreciation to interest and related expense.	Cross-Sectional	DESCENDING	$IntCovRatio_{i,t} = \frac{\sum_{j=0}^3 OIADPQ_{i,t-j} - \sum_{j=0}^3 DPQ_{i,t-j}}{\sum_{j=0}^3 XINTQ_{i,t-j}}$ <p> OIADPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) XINTQ : Quarterly Interest and Related Expense (Q22) </p>
Capital Efficiency	Long Term Debt to Assets Ratio	This ratio compares a company's long term debts to its total assets. It not only signals a company's capital structure but also long term solvency.	Cross-Sectional	ASCENDING	$LTDA_t = \frac{DLTTQ_t}{ATQ_t}$ <p> ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) </p>
Capital Efficiency	Long Term Debt to Equity Ratio	The ratio of long term debt to total shareholders' equity. It's an indicator of a company's financial leverage.	Cross-Sectional	ASCENDING	$LTDE_{i,t} = \frac{DLTTQ_{i,t}}{SEQQ_{i,t}}$ <p> SEQQ : Quarterly Stockholders' Equity (Q60) DLTTQ : Quarterly Long Term Debt (Q51) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Normalized ROA	60 month average of the ratio of trailing four quarter after-tax net operating profit to average total assets over the same period.	Cross-Sectional	DESCENDING	$60MAvgTTMROA_{i,t} = \frac{1}{60} \sum_{s=0}^{60} ROA_{i,t-s}$ <p>where</p> $ROA_{i,t} = \frac{\sum_{j=0}^3 NOPATQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 ATQ_{i,t-j}}$ $NOPATQ_{i,t} = OIQ_{i,t} \times (1 - TaxRateQ_{i,t})$ $OIQ_{i,t} = OIBDPQ_{i,t} - DPQ_{i,t}$ $TaxRateQ_{i,t} = \frac{TXTQ_{i,t}}{PIQ_{i,t}}$ <p> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) TXTQ : Quarterly Income Taxes (Q6) PIQ : Quarterly Pretax Income (Q23) </p>
Capital Efficiency	Normalized ROE	60 month average of the ratio of trailing four quarter income before extraordinary items available for common equity to average book value of common equity over the same period.	Cross-Sectional	DESCENDING	$60MAvgTTMROE_{i,t} = \frac{1}{60} \sum_{s=0}^{60} ROE_{i,t-s}$ <p>where</p> $ROE_{i,t} = \frac{\sum_{j=0}^3 IBCOMQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 CEQQ_{i,t-j}}$ <p> IBCOMQ : Quarterly Income Before Extraordinary Items, Available for Common Equity (Q25) CEQQ : Quarterly Common Equity (Q59) </p>
Capital Efficiency	Operating Cash Flow Ratio	This factor is the ratio of operating cash flow over current liabilities	Cross-Sectional	DESCENDING	$OCFRatio_{i,t} = \frac{\sum_{j=0}^3 CFFO_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 LCTQ_{i,t-j}}$ <p> CFFO : Cash From Operations LCTQ : Current Liabilities, Total - Quarterly (Q49) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Operating Cash Flow to Equity	This factor shows the ratio of operating cash flow to total equity.	Cross-Sectional	DESCENDING	$OCFEqt_{i,t} = \frac{\sum_{j=0}^3 OANCFQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 CEQQ_{i,t-j}}$ <p><small>CEQQ : Quarterly Common Equity (Q59) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small></p>
Capital Efficiency	Payout Ratio	The payout ratio is the ratio of trailing twelve month cash dividends to trailing twelve month earnings per share.	Cross-Sectional	ASCENDING	$PayoutRatio_{i,t} = \frac{\sum_{s=0}^3 DVPSXQ_{i,t-s}}{\sum_{s=0}^3 EPSPXQ_{i,t-s}}$ <p><small>DVY : Div per Share-Exdate Quarterly () EPSPXQ : Earnings Per Share (Basic) - Excluding Extraordinary Items (Q19)</small></p>
Capital Efficiency	Pretax Profit Margin	This ratio is a measure of how efficiently a company can generate before-tax profit with certain sales.	Cross-Sectional	DESCENDING	$PTMargin_{i,t} = \frac{\sum_{j=0}^3 PIQ_{i,t-j}}{\sum_{j=0}^3 SALEQ_{i,t-j}}$ <p><small>PIQ : Quarterly Pretax Income (Q23) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>
Capital Efficiency	Receivables Turnover Ratio	This ratio measures how efficiently a company collects its debt.	Cross-Sectional	DESCENDING	$RecTurn_{i,t} = \frac{\sum_{j=0}^3 SALEQ_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 RECTQ_{i,t-j}}$ <p><small>RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Return on Assets	ROA is the ratio of trailing four quarter after-tax net operating profit to average total assets over the same period.	Cross-Sectional	DESCENDING	$\text{ROA}_{i,t} = \frac{\text{NOPATQ}_{i,t}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ATQ}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \sum_{j=0}^3 (\text{OIBDPQ}_{i,t-j} - \text{DPQ}_{i,t-j})$ $\text{TaxRateQ}_{i,t} = \frac{1}{4} \times \sum_{j=0}^3 \frac{\text{TXTQ}_{i,t-j}}{\text{PIQ}_{i,t-j}}$ <p> <small> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) TXTQ : Quarterly Income Taxes (Q6) PIQ : Quarterly Pretax Income (Q23) ATQ : Total Assets - Quarterly (Q44) </small> </p>
Capital Efficiency	Return on Equity	The ratio of trailing four quarter income before extraordinary items available for common equity to average book value of common equity over the same period.	Cross-Sectional	DESCENDING	$\text{ROE}_{i,t} = \frac{\sum_{j=0}^3 \text{IBCOMQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{CEQQ}_{i,t-j}}$ <p> <small> IBCOMQ : Quarterly Income Before Extraordinary Items, Available for Common Equity (Q25) CEQQ : Quarterly Common Equity (Q59) </small> </p>
Capital Efficiency	Return on Invested Capital	This factor is the ratio of trailing four quarter after-tax net operating profit to average total invested capital over the same period.	Cross-Sectional	DESCENDING	$\text{ROIC}_{i,t} = \frac{\text{NOPATQ}_{i,t}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ICAPTQ}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \sum_{j=0}^3 (\text{OIBDPQ}_{i,t-j} - \text{DPQ}_{i,t-j})$ $\text{TaxRateQ}_{i,t} = \frac{1}{4} \times \sum_{j=0}^3 \frac{\text{TXTQ}_{i,t-j}}{\text{PIQ}_{i,t-j}}$ <p> <small> ICAPTQ : Quarterly Invested Capital (Q62) OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) TXTQ : Quarterly Income Taxes (Q6) PIQ : Quarterly Pretax Income (Q23) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Tobin's Q Ratio	This ratio compares a company's market value with its book value.	Cross-Sectional	ASCENDING	$\text{TobinQ}_{i,t} = \frac{\text{CloseM}_{i,t} \times \text{CSHOQ}_{i,t} + \text{LTQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p> ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) LTQ : Liabilities, Total (Q54) </p>
Capital Efficiency	Working Capital Turnover Ratio	This ratio measures how effectively a company is using its working capital to generate sales.	Cross-Sectional	DESCENDING	$\text{WCTurn}_{i,t} = \frac{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 (\text{ACTQ}_{i,t-j} - \text{LCTQ}_{i,t-j})}$ <p> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </p>
Capital Efficiency	Year over Year Change of Total Debt	This factor measures the the year-over-year change in debts. It is normalized by the company's total assets to enable cross sectional comparison.	Cross-Sectional	ASCENDING	$\text{DebtChg1Y} = \Delta \left(\frac{\frac{1}{4} \sum_{j=0}^3 (\text{DLTTQ}_{i,t-j} + \text{DLCQ}_{i,t-j})}{\frac{1}{4} \sum_{j=0}^3 \text{ATQ}_{i,t-j}} \right)$ <p> <i>where</i> $\Delta(x_t) = x_t - x_{t-4}$ </p> <p> ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) </p>
Capital Efficiency	Ind Grp Rel 1Y Chg in Shares Outstanding	This factor indicates the percentage change in common shares outstanding over the last twelve months.	Ind Group Relative	ASCENDING	$\text{ShareChg}_{i,t} = \frac{\text{CSHOQ}_{i,t}}{\text{CSHOQ}_{i,t-4}} - 1$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Ind Grp Rel 1Y Chg in Stock Buybacks	This signal measures the change in stock repurchases over the last twelve months.	Ind Group Reletive	DESCENDING	$\text{BuyBackChg}_{i,t} = \frac{\sum_{j=0}^3 \text{PRSTKCQ}_{i,t-j}}{\sum_{j=0}^3 \text{PRSTKCQ}_{i,t-j-4}} - 1$ <p><small>PRSTKCQ : Quarterly Net Purchase of Common and Preferred Stock (Q93)</small></p>
Capital Efficiency	Ind Grp Rel Capital Acquisition Ratio	This ratio measures how efficiently a company generates cash from its capital expenditures.	Ind Group Reletive	DESCENDING	$\text{CapAcqRatio}_{i,t} = \frac{\sum_{j=0}^3 (\text{OANCFQ}_{i,t-j} - \text{DVQ}_{i,t-j})}{\sum_{j=0}^3 \text{CAPXQ}_{i,t-j}}$ <p><small>OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108) DVQ : Quarterly Cash Dividends (Q89) CAPXQ : Quarterly Capital Expenditures (Q90)</small></p>
Capital Efficiency	Ind Grp Rel Capital Expenditure to Total Assets	This factor is the trailing twelve month capital expenditure to total asset ratio.	Ind Group Reletive	ASCENDING	$\text{CapExToAst}_{i,t} = \frac{\sum_{s=0}^3 \text{CAPXQ}_{i,t-s}}{\frac{1}{4} \sum_{s=0}^3 \text{ATQ}_{i,t-s}}$ <p><small>ATQ : Total Assets - Quarterly (Q44) CAPXQ : Quarterly Capital Expenditures (Q90)</small></p>
Capital Efficiency	Ind Grp Rel Cash Flow Return on Invested Capital	CFROIC measures a company's ability to generate cash flow from the invested capital.	Ind Group Reletive	DESCENDING	$\text{CFROIC}_{i,t} = \frac{\sum_{j=0}^3 \text{OANCFQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ICAPTQ}_{i,t-j}}$ <p><small>ICAPTQ : Quarterly Invested Capital (Q62) OANCFQ : Quarterly Net Cash Flow from Operating Activities (Q108)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Ind Grp Rel Debt to Assets Ratio	This ratio indicates the proportion of debt a company has relative to its assets.	Ind Group Relitive	ASCENDING	$DA_{i,t} = \frac{DTQ_{i,t}}{ATQ_{i,t}}$ $DTQ_{i,t} = DLTTQ_{i,t} + DLCQ_{i,t}$ <p style="font-size: small;"> ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) </p>
Capital Efficiency	Ind Grp Rel Interest Coverage Ratio	This ratio is a measure of a company's ability to pay for interest on outstanding debt.	Ind Group Relitive	DESCENDING	$\text{IntCovRatio}_{i,t} = \frac{\text{OIADPQ}_{i,t}}{\text{XINTQ}_{i,t}}$ $\text{OIADPQ}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$ <p style="font-size: small;"> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) XINTQ : Quarterly Interest and Related Expense (Q22) </p>
Capital Efficiency	Ind Grp Rel Long Term Debt to Assets Ratio	This ratio compares a company's long term debts to its total assets. It not only signals a company's capital structure but also long term solvency.	Ind Group Relitive	ASCENDING	$LTDA_t = \frac{DLTTQ_t}{ATQ_t}$ <p style="font-size: small;"> ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) </p>
Capital Efficiency	Ind Grp Rel Long Term Debt to Equity Ratio	This ratio is an indicator of a company's financial leverage.	Ind Group Relitive	ASCENDING	$LTDE_{i,t} = \frac{DLTTQ_{i,t}}{\text{SEQQ}_{i,t}}$ <p style="font-size: small;"> SEQQ : Quarterly Stockholders' Equity (Q60) DLTTQ : Quarterly Long Term Debt (Q51) </p>
Capital Efficiency	Ind Grp Rel Pretax Profit Margin	This ratio is a measure of how efficiently a company can generate before-tax profit with certain sales.	Ind Group Relitive	DESCENDING	$\text{PTMargin}_{i,t} = \frac{\sum_{j=0}^3 \text{PIQ}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p style="font-size: small;"> PIQ : Quarterly Pretax Income (Q23) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Ind Grp Rel Receivables Turnover Ratio	This ratio measures how efficiently a company collects its debt.	Ind Group Relitive	DESCENDING	$\text{RecTurn}_{i,t} = \frac{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{RECTQ}_{i,t-j}}$ <p> <small> RECTQ : Receivables - Total - Quarterly (Q37) SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </small> </p>
Capital Efficiency	Ind Grp Rel Return on Assets	ROA measures how a company is using its total assets and gives an indication how efficient the management is at using its assets to generate earnings.	Ind Group Relitive	DESCENDING	$\text{ROA}_{i,t} = \frac{\sum_{j=0}^3 \text{NOPATQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ATQ}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$ $\text{TaxRateQ}_{i,t} = \frac{\text{TXTQ}_{i,t}}{\text{PIQ}_{i,t}}$ <p> <small> OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) TXTQ : Quarterly Income Taxes (Q6) PIQ : Quarterly Pretax Income (Q23) ATQ : Total Assets - Quarterly (Q44) </small> </p>
Capital Efficiency	Ind Grp Rel Return on Equity	This ratio is a measure of how much profit a company generates per unit of common equity.	Ind Group Relitive	DESCENDING	$\text{ROE}_{i,t} = \frac{\sum_{j=0}^3 \text{IBCOMQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{CEQQ}_{i,t-j}}$ <p> <small> IBCOMQ : Quarterly Income Before Extraordinary Items, Available for Common Equity (Q25) CEQQ : Quarterly Common Equity (Q59) </small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	Ind Grp Rel Return on Invested Capital	This ratio measures how effectively the company uses its invested capital to generate returns.	Ind Group Relitive	DESCENDING	$\text{ROIC}_{i,t} = \frac{\sum_{j=0}^3 \text{NOPATQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ICAPTQ}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$ $\text{TaxRateQ}_{i,t} = \frac{\text{TXTQ}_{i,t}}{\text{PIQ}_{i,t}}$ <p> <small> ICAPTQ : Quarterly Invested Capital (Q62) OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) TXTQ : Quarterly Income Taxes (Q6) PIQ : Quarterly Pretax Income (Q23) </small> </p>
Capital Efficiency	Ind Grp Rel Tobin's Q Ratio	This ratio compares a company's market value with its book value.	Ind Group Relitive	ASCENDING	$\text{TobinQ}_{i,t} = \frac{\text{CloseM}_{i,t} \times \text{CSHOQ}_{i,t} + \text{LTQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p> <small> ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) LTQ : Liabilities, Total (Q54) </small> </p>
Capital Efficiency	Ind Grp Rel Working Capital Turnover Ratio	This ratio measures how effectively a company is using its working capital to generate sales.	Ind Group Relitive	DESCENDING	$\text{WCTurn}_{i,t} = \frac{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 (\text{ACTQ}_{i,t-j} - \text{LCTQ}_{i,t-j})}$ <p> <small> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40) </small> </p>
Capital Efficiency	Ind Grp Rel Year over Year Change of Total Debt	This factor measures the the year-over-year change in debts. It is normalized by the company's total assets to enable cross sectional comparison.	Ind Group Relitive	ASCENDING	$\text{DebtChg1Y} = \Delta \left(\frac{\frac{1}{4} \sum_{j=0}^3 (\text{DLTTQ}_{i,t-j} + \text{DLCQ}_{i,t-j})}{\frac{1}{4} \sum_{j=0}^3 \text{ATQ}_{i,t-j}} \right)$ <p> <small> ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45) </small> </p> <p>where $\Delta(x_t) = x_t - x_{t-4}$</p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Capital Efficiency	5 Yr Hist Rel Long Term Debt to Assets Ratio	This ratio compares a company's long term debts to its total assets. It not only signals a company's capital structure but also long term solvency.	5 Yr Historical Rel	ASCENDING	$\text{LTDA}_t = \frac{\text{DLTTQ}_t}{\text{ATQ}_t}$ <p> <small>ATQ : Total Assets - Quarterly (Q44)</small> <small>DLTTQ : Quarterly Long Term Debt (Q51)</small> </p>
Capital Efficiency	5 Yr Hist Rel Pretax Profit Margin	This ratio is a measure of how efficiently a company can generate before-tax profit with certain sales.	5 Yr Historical Rel	DESCENDING	$\text{PTMargin}_{i,t} = \frac{\sum_{j=0}^3 \text{PIQ}_{i,t-j}}{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}$ <p> <small>PIQ : Quarterly Pretax Income (Q23)</small> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> </p>
Capital Efficiency	5 Yr Hist Rel Receivables Turnover Ratio	This ratio measures how efficiently a company collects its debt.	5 Yr Historical Rel	DESCENDING	$\text{RecTurn}_{i,t} = \frac{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{RECTQ}_{i,t-j}}$ <p> <small>RECTQ : Receivables - Total - Quarterly (Q37)</small> <small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2)</small> </p>
Capital Efficiency	5 Yr Hist Rel Return on Assets	ROA measures how a company is using its total assets and gives an indication how efficient the management is at using its assets to generate earnings.	5 Yr Historical Rel	DESCENDING	$\text{ROA}_{i,t} = \frac{\sum_{j=0}^3 \text{NOPATQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ATQ}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$ $\text{TaxRateQ}_{i,t} = \frac{\text{TXTQ}_{i,t}}{\text{PIQ}_{i,t}}$ <p> <small>OIBDPQ : Quarterly Operating Income Before Depreciation (Q21)</small> <small>DPQ : Quarterly Depreciation and Amortization (Q5)</small> <small>PIQ : Quarterly Pretax Income (Q23)</small> <small>ATQ : Total Assets - Quarterly (Q44)</small> </p>

Categories	Factor Name	Detail	Type	Rank Order	Foumula
Capital Efficiency	5 Yr Hist Rel Return on Equity	This ratio is a measure of how much profit a company generates per unit of common equity.	5 Yr Historical Rel	DESCENDING	$\text{ROE}_{i,t} = \frac{\sum_{j=0}^3 \text{IBCOMQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{CEQQ}_{i,t-j}}$ <p><small>IBCOMQ : Quarterly Income Before Extraordinary Items, Available for Common Equity (Q25) CEQQ : Quarterly Common Equity (Q59)</small></p>
Capital Efficiency	5 Yr Hist Rel Return on Invested Capital	This ratio measures how effectively the company uses its invested capital to generate returns.	5 Yr Historical Rel	DESCENDING	$\text{ROIC}_{i,t} = \frac{\sum_{j=0}^3 \text{NOPATQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 \text{ICAPTO}_{i,t-j}}$ $\text{NOPATQ}_{i,t} = \text{OIQ}_{i,t} \times (1 - \text{TaxRateQ}_{i,t})$ $\text{OIQ}_{i,t} = \text{OIBDPQ}_{i,t} - \text{DPQ}_{i,t}$ $\text{TaxRateQ}_{i,t} = \frac{\text{TXTQ}_{i,t}}{\text{PIQ}_{i,t}}$ <p><small>ICAPTO : Quarterly Invested Capital (Q62) OIBDPQ : Quarterly Operating Income Before Depreciation (Q21) DPQ : Quarterly Depreciation and Amortization (Q5) TXTQ : Quarterly Income Taxes (Q6) PIQ : Quarterly Pretax Income (Q23)</small></p>
Capital Efficiency	5 Yr Hist Rel Tobin's Q Ratio	This ratio compares a company's market value with its book value.	5 Yr Historical Rel	ASCENDING	$\text{TobinQ}_{i,t} = \frac{\text{CloseM}_{i,t} \times \text{CSHOQ}_{i,t} + \text{LTQ}_{i,t}}{\text{ATQ}_{i,t}}$ <p><small>ATQ : Total Assets - Quarterly (Q44) CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) LTQ : Liabilities, Total (Q54)</small></p>
Capital Efficiency	5 Yr Hist Rel Working Capital Turnover Ratio	This ratio measures how effectively a company is using its working capital to generate sales.	5 Yr Historical Rel	DESCENDING	$\text{WCTurn}_{i,t} = \frac{\sum_{j=0}^3 \text{SALEQ}_{i,t-j}}{\frac{1}{4} \times \sum_{j=0}^3 (\text{ACTQ}_{i,t-j} - \text{LCTQ}_{i,t-j})}$ <p><small>SALEQ : Sales/Turnover (Net) - Quarterly (Q2) LCTQ : Current Liabilities, Total - Quarterly (Q49) ACTQ : Current Assets - Quarterly (Q40)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Size	Log Market Cap	The natural logarithm of market capitalization (month-end number of shares outstanding multiplied by month-end price per share)	Cross-Sectional	ASCENDING	$\text{LogMCap}_{i,t} = \log(\text{CSHOM}_{i,t} \times \text{CloseM}_{i,t})$ <p> CloseM : Adjusted Closing Price (Adjusted Closing Price) CSHOM : Adjusted Monthly Common Shares Outstanding (Adjusted Monthly Common Shares Outstanding) </p>
Size	Log of Market Capitalization Cubed	This factor is the log value of the market capitalization cubed.	Cross-Sectional	ASCENDING	$\text{LogMktCapCubed}_{i,t} = \log((\text{CloseM}_{i,t} \times \text{CSHOQ}_{i,t})^3)$ <p> CSHOQ : Adjusted Quarterly Common Shares Outstanding (Q61) CloseM : Adjusted Closing Price (Adjusted Closing Price) </p>
Size	Log of Total Last Quarter Assets	This is the log value of the company's total assets.	Cross-Sectional	DESCENDING	$\text{LogAssets}_{i,t} = \log\left(\frac{1}{4} \sum_{j=0}^3 \text{ATQ}_{i,t}\right)$ <p> ATQ : Total Assets - Quarterly (Q44) </p>
Size	Log TTM Sales	The natural logarithm of the trailing four quarter sum of sales.	Cross-Sectional	ASCENDING	$\text{LogTTMSales}_{i,t} = \log(\sum_{n=1}^4 \text{SALEQ}_{t-n})$ <p> SALEQ : Sales/Turnover (Net) - Quarterly (Q2) </p>
Size	-	-	Ind Group Reletive	-	-
Size	-	-	5 Yr Historical Rel	-	-
Volatility	12M Realized Price Volatility	The annualized volatility of monthly stock returns over the prior twelve months.	Cross-Sectional	DESCENDING	$\text{AnnVol12M}_{i,t} = \sqrt{12} \times \sqrt{\frac{1}{12} \sum_{n=0}^{11} r_{i,t-n}^2}$ $r_{i,t} = \log\left(\frac{\text{CloseM}_{i,t}}{\text{CloseM}_{i,t-1}}\right)$ <p> CloseM : Adjusted Closing Price (Adjusted Closing Price) </p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Volatility	130 Day Minimum Return	This factor is the minimum return of a stock in the past 130 days.	Cross-Sectional	DESCENDING	$\text{Min130DRtn}_t = \text{Min} \left\{ 100 \times \frac{P_t - P_{t-1}}{P_{t-1}}, t \in \text{Past 130 Days} \right\}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Volatility	1M Realized Price Volatility	The annualized volatility of daily returns over the prior month.	Cross-Sectional	DESCENDING	$AnnVol1M_{i,t} = \sqrt{252} \times \sqrt{\frac{1}{21} \sum_{s=0}^{20} r_{i,t-s}^2}$ $r_{i,t} = \text{Log}\left(\frac{\text{Close}_{i,t}}{\text{Close}_{i,t-1}}\right)$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>
Volatility	1Y Chg in Debt to Assets	This ratio indicates the year over year change in the proportion of debt a company has relative to its assets.	Cross-Sectional	ASCENDING	$\text{YoYChgDA}_{i,t} = \frac{\text{DTQ}_{i,t} - \text{DTQ}_{i,t-4}}{\text{ATQ}_{i,t}} - \frac{\text{DTQ}_{i,t-4}}{\text{ATQ}_{i,t-4}}$ $\text{DTQ}_{i,t} = \text{DLTTQ}_{i,t} + \text{DLCQ}_{i,t}$ <p><small>ATQ : Total Assets - Quarterly (Q44) DLTTQ : Quarterly Long Term Debt (Q51) DLCQ : Quarterly Short Term Debt (Q45)</small></p>
Volatility	60M CAPM Beta	The sensitivity of a stock's return to the return on the market.	Cross-Sectional	DESCENDING	$r_s = \beta_t r_s^{SP500} + \epsilon_s$ <p>where</p> $r_s = \frac{\text{CloseM}_s - \text{CloseM}_{s-1}}{\text{CloseM}_{s-1}}$ $r_s^{SP500} = \frac{SP500_s - SP500_{s-1}}{SP500_{s-1}}$ $s \in [t - 59, t]$ <p><small>CloseM : Adjusted Closing Price (Adjusted Closing Price) SP500 : SP 500 Index Monthly (SP 500 Index Monthly)</small></p>
Volatility	90 Day Coefficient of Variation	The ratio of the standard deviation of daily closing prices over the past 90 days to the average of daily closing prices over the past 90 days.	Cross-Sectional	DESCENDING	$90DCV_{i,t} = \frac{\text{Std}(\text{Close}_{i,t}, 90)}{\text{Avg}(\text{Close}_{i,t}, 90)}$ <p>where</p> $\text{Std}(X_{i,t}, n) = \sqrt{\frac{1}{n-1} \sum_{s=0}^{n-1} (X_{i,s} - \text{Avg}(X_{i,t}, n))^2}$ $\text{Avg}(X_{i,t}, n) = \frac{1}{n} \sum_{s=0}^n X_{i,t-s}$ <p><small>Close : Adjusted Daily Closing Price (Adjusted Daily Closing Price)</small></p>

Categories	Factor Name	Detail	Type	Rank Order	Formula
Volatility	Adj 50 Day Volume Signal	This ratio compares the average of the last 50-day trading volume to the average of the one year trading volume.	Cross-Sectional	DESCENDING	$\text{Adj50DVolSig}_t = \frac{\frac{1}{50} \sum_{j=0}^{49} \text{CSHTRD}_{t-j}}{\frac{1}{266} \sum_{j=0}^{265} \text{CSHTRD}_{t-j}}$ <small>CSHTRD : Daily Trading Volume (Daily Trading Volume)</small>
Volatility	Book Leverage	This ratio indicates the proportion of assets a company has relative to its common equity.	Cross-Sectional	DESCENDING	$\text{BOOKLEV}_{i,t} = \frac{\text{ATQ}_{i,t-j}}{\text{CEQQ}_{i,t-j}}$ <small>CEQQ : Quarterly Common Equity (Q59) ATQ : Total Assets - Quarterly (Q44)</small>
Volatility	-	-	Ind Group Reletive	-	-
Volatility	-	-	5 Yr Historical Rel	-	-