

UNIVERSITY OF AUCKLAND
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Finance 788: Research Essay

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requirements for the degree of Bachelor of Commerce
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Acknowledgements

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Abstract

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1 Introduction (2-3 pages)

1.1 [Placeholder I]

1.2 [Placeholder II]

1.3 [Placeholder III]

2 Literature (3 pages)

2.1 Asset Pricing

Capital Asset Pricing Model (CAPM) use persists, regardless of the invalidation from identifiable shortcomings in market proxies and empirical failings invalidating use (Fama and French, 2004). Nonetheless, this research essay uses the model as a performance metric for comparative purposes.

E. Fama and K. French (1992) validate the explanatory power of size and value (book-to-market) factors in their ability to capture the cross-sectional variation in average stock returns, in association with market risk, size, leverage, book-to-market, and earnings-price ratios. E. Fama and K. French further their analysis on the common characteristics between stocks and bonds (Fama and French, 2021)¹, and add two additional factors to consider profitability and investment. The main combinations are the Fama French Three (FF3) (33) and Five (FF5) (34) models. E. Fama and K. French consider a momentum factor on international stock returns in subsequent years (Fama and French, 2012). The omission of momentum from the models stand.

K. French continues to maintain FF3 and FF5 related datasets (French, 2021) E. Fama, with J. MacBeth, developed the Fama-MacBeth regression (Fama and MacBeth, 1973) to estimate factor loadings and prices. The methodology is a two-stage estimation process, similar for estimating factor loadings, and prices, for a given portfolio. The first step requires determining each asset's β exposures by regressing each of n asset returns against m proposed 35. The second step determines the risk premium (factor pricing) for each asset by regressing all asset returns for each of T periods against previously estimated β s (36).

¹Reprinted. Originally published in 1993

2.2 Machine Learning in Finance

A couple of recent publications highlight the increased application of machine learning algorithms in financial contexts. Li et al., 2020 Gu et al (2020) explore the comparative use of machine learning in empirical asset pricing. However, intepretability issus persist in machine learning applications.

2.3 Loss Functions

3 Motivation (1 page)

3.1 Research Question

Can neural networks, optimised to maximise financial metrics (e.g., Hedge Portfolio Excess Return, Sharpe Ratio etc.) outperform conventional loss minimisation optimisation strategies, when predicting excess returns in individual equities and equity hedge portfolios?

3.2 Hypotheses

4 Methodology

The required methodology to construct the methods to build, develop, and deploy neural networks with custom objective functions.

4.1 Data

4.1.1 Global Factors Dataset

Hou et al., (2020) use an extensive data library to assess 452 anomalies across anomalies literature. Their analysis informs which abnormalities drive the cross section of expected returns. Most abnormalities fail under current standards of empirical finance when using a single hurdle test of absolute t-stat greater or equal to 1.96. Firstly, the paper finds economic fundamentals take precedence over trading frictions in explanatory power, statistical and economic significance. Secondly, micro-caps account for anomalies disproportionately, leading to NYSE breakpoints, value-weighted returns in both portfolio sorts and cross-sectional regressions with weighted least squares. Lastly, arguments in improving anomalies literature credibility follow a closer alignment to economic theory as the field persists to be statistical in nature. Overall, capital market efficiency is higher than expected. Jensen et al., 2021 use the above dataset to explore hierarchical bayesian models of alphas emphasising the joint behaviours of factors, and provide an alternative multiple testing adjustment, more powerful than common methods. Jensen et al., adapt the global dataset to focus only on one-month holding periods for all factors, only include most recent accounting data (quarterly or annually) and add 15 new factors. Section 8.10 describes factor composition, resources for data acquisition, and summary statistics. The complete global dataset has 406 characteristics, a superset of the original 153 in Jensen et al., with 2,739,928 firm-year observations, from January 1st 1961 to December 31st 2020. Subsequently, the complete dataset has 1.112 billion data points. **One month lead excess returns** is the designated target variable for prediction as will inform the construction of hedge portfolios to assess relative performance between optimisation functionalities. The exhaustive nature and accessibility of the global dataset

makes it well-suited for exploring optimisation functions, maximising renown financial metrics, in deep neural-networks.

4.1.2 Processing

Neural networks demand the partitioning of the dataset into training, validation, and testing subsets. The initial training, testing, and validation sets consist of **1031516**, **706908**, and **1001504** global equity firm-year observations across 406 features, respectively. The division of subsets is chronological with firm-year observations [1961-1990), [1990-2000), [2000-2020] for training, validation, and testing, respectively. Two reasons rationalise the reduction in the number of factors from 406 in the Jensen et al., (2021) superset to 153, and the removal of firm-year observations with Micro or Nano size grouping² designations. Firstly, the retention of equities between 20th to 100th percentiles appeals to economic significance. The composition of aggregate market capitalisation is mostly from their contribution. Additionally, their higher liquidity increases the likelihood of analyst coverage and portfolio inclusion. Secondly, factor reduction appeals to parsimony in aligning explanatory variables to prior studies. The training, testing, and validation sets consist of **532218**, **294581**, and **531461** global equity firm-year observations across 160 features after above revisions, respectively. Subsequently, the revised dataset has 217,321,600 data points. Tables 5, 7, and 6 in section 8.10.3 describe summary statistics and factor retention after subset revision.

4.1.3 Cloud Infrastructure

Cloud-centric computational products execute data processing and analysis. Google Cloud Platform Cloud Storage buckets and Compute Engine virtual machine (VM) instances manage large datasets and build, train, and evaluate deep neural networks, respectively. Cryptographic network protocols, mostly secure shells, establish remote connectivity between local and remote infrastructure to communicate and execute commands.

²Mega, Large, and Small remain, reflecting equities with market capitalisations greater than the 80th, 50th, and 20th percentile of all NYSE stocks, respectively. Micro equities reside between the 1st and 20th percentiles, with Nano between below the 1st percentile. The percentiles are non-overlapping and value weighted by market capitalisation on the New York Stock Exchange (NYSE).

However, use of cloud computing does not resolve all resource constraints.³ Section 8.8 elaborates on cloud centric computational approaches and further technologies.

4.2 Neural Networks

4.2.1 Normalisation & Feature Encoding

Deep neural networks require tensors as inputs for fitting, training, and evaluating data. A tensor is a mathematical object describing the physical properties of an object with multilinear relationships between sets of algebraic objects related in vector space. Furthermore, transformation laws govern tensors. Therefore, a tensor is considered an n dimensional array in conjunction with associated transformation laws. The dataset, also known as the feature matrix (\mathbf{X}), must take the form of a tensor. The enumeration of a tensor conversion process for each data subset follows:

1. Identify target variable(s) for fitting, validation, and prediction.
2. Configure dataset into a series of tensor slices
3. Shuffle instances in convert dataset to promotes better training as accommodates randomness
4. Instantiate an input tensor layer and use to extract required normalisation or encoding layer per feature
5. Normalise each numerical feature to zero mean/unit variance, and encode⁴ each categorical feature, using encoding layers to form encoded features
6. Combine instantiated input tensors (4) into a set of inputs tensors, serving as the inputs fro a configured neural network
7. Concatenate all encoded features into an aggregate input tensor for an unconfigured neural network. The concatenation serves as the input layer when configuraing a neural network.

The revised datasets consist of eight categorical features⁵ and 152 numerical features.

³Resource constraints inhibit exploration of the entire dataset within reasonable timeframes at reasonable costs. The most material inhibitions are the inability to explore all 406 factors for all size groupings, the reduction in level of precision for numerical features, and the ability to shuffle training sets at lengths greater than or equal to the input sets when training neural networks. However, the reasons necessitating factor reduction and size grouping exclusion stated in section 8.10.2 superseed resource constraints.

⁴Encoding transforms categorical features instances into a series of binary variables. These may be one-hot encoded, and/or stored in sparse tensors, depending on input and desired application.

⁵Descriptions of the eight categorical features follow. **size_group**, the aforementioned size grouping in section . **permno**, permanent unique firm identifier from CRSP. **permco**, permanent unique issue identifier from CRSP. **crsp_shrcd**, CRSP share code. **crsp_exchcd**,Compustat stock exchange code. **sic**,Firm SIC industry. **ff49**, Classification of stocks in 49 industry groups, based on SIC codes and the methodology in F.Fama & K.French 1997, with the addition of the software industry. **adjfct**, Share Adjustment Factor

4.3 Neural Network Architecture

4.3.1 Activation Functions, Linear Threshold Units, & Perceptrons

Artificial Neural Nets (ANN) frequently outperform other machine learning algorithms on large and complex problems. Linear threshold units (LTU) compose neural networks, feeding the weighted sum of input values (1) into an activation (step) function (2). A perceptron is a single layer of LTUs connected to every input, suitable for both regression and classification tasks. Perceptrons utilize a training algorithm to assess the strength of connections between perceptrons in consideration of errors. A perceptron is fed one training instance sequentially, making predictions for each instance. For every output LTU that produced a wrong prediction, it re-enforces the connection weights using the perception learning rule (3) from the inputs that would have contributed to the right prediction. One input perceptron, multiple hidden perceptrons, and an output perceptron create a Multi Layer Perceptron (MLP). A non-linear activation function ⁶ (i.e., Logistic (4), Rectified Linear Unit (ReLU) (5)) replaces the step functions for an LTU, in each perceptron, in an MLP. A shared activation function replaces the individual activation functions in the output layer to enable exclusive classification or regression.

$$\mathbf{z} = \mathbf{w}^T \cdot \mathbf{x} \quad (1) \quad h_w(\mathbf{x}) = \text{step}(\mathbf{z}) \quad (2) \quad w_{i,j}^{\text{next step}} = w_{i,j} + \eta(\hat{y}_j - y_j)x_i \quad (3)$$

$$\sigma(\mathbf{z}) = \frac{1}{1 + \exp(-\mathbf{z})} \quad (4) \quad \text{ReLU}(\mathbf{z}) = \max(0, \mathbf{z}) \quad (5) \quad \text{Linear}(\mathbf{z}) = \mathbf{z} \quad (6)$$

Where

- $w_{i,j}$: Connection weights between the i th input neuron and the j th output neuron.
- x_i : i th input value of the current training instance.
- \hat{y}_j : Output of the j th output neuron for the current training instance.
- y_j : Output of the j th output neuron for the current training instance.
- η : Rate.

⁶There are several activation functions, each with different strengths and weaknesses

4.3.2 Model Configuration

Figure 1 visualises a standard neural network topography

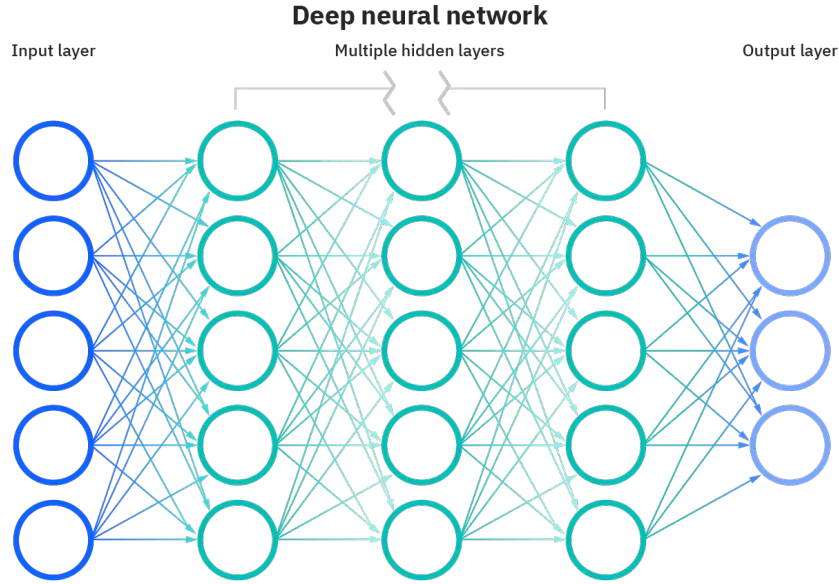


Figure 1: Standard Neural Network Topography (Source: IBM)

The dots and lines represent nodes and connections between nodes, respectively. The architecture of the network is derivative of intended use. Figure 2 illustrates the required configuration for evaluating excess returns. $N(x, y)$ represents the y th node in x th layer. $\mathbf{z} = \sum_{a=1}^{189} w_{(n,a,b)} x_{(n,a,b)} (= \mathbf{w}^T \cdot \mathbf{x})$ is the dot product between all outputs (\mathbf{x}) and connection weights (\mathbf{w}) from the n th layer, between all nodes a and b connecting layers n and $n+1$, respectively. The use of dense layers deeply connects two layers where each node receives an input from the previous layer. The single dropout layer randomly sets input units to 0 with a frequency of rate = 50% at each step during training time. Inputs not set to 0 are scaled up by $2 \left(\frac{1}{(1-(rate=0.5))} \right)$ to leave the sum over all inputs unchanged. The inclusion of a dropout layer helps prevent overfitting. Hidden layers and output later use ReLU 5 and linear 6 activation functions, respectively. An output linear activation (6) is the most suitable for regression, predicting values ($Prediction_k$) between $(-\infty, \infty)$ directly.

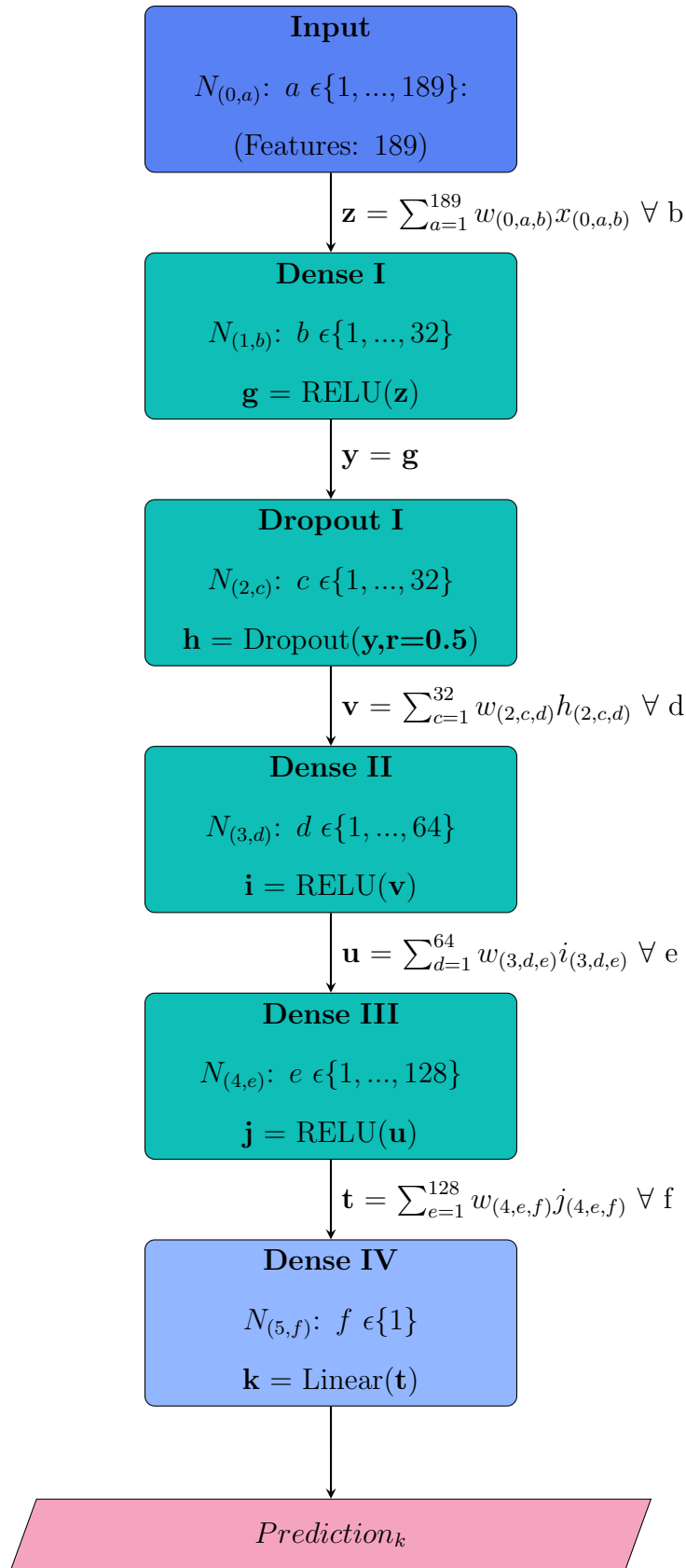


Figure 2: Neural Network Configuration

4.3.3 Loss Functions

Loss functions map an event or variable set, onto a real number, intuitively representing some loss, associated with the event e.g., difference between predicted and realised excess returns. Optimisation algorithms seek to minimise loss functions by finding an exact analytical solution, or applying numerical methods to find an approximate solution, terminating after meeting exit criteria, when an analytical solution is not possible. The training and evaluation of accurate neural networks uses this method.⁷ The configured neural network (figure 2) uses a stochastic gradient descent (SGD) algorithm (8.2).

The relative performance between conventional minimisation loss functions, and maximisation of hedge portfolio excess returns, relies on comparing derivatives to these objectives. The mathematical rigor and suitability of the OLS estimator (8.3) informs the widespread use of OLS regressions, and minimisation of sum of least squares, in prior asset pricing literature. The proposition of three loss functions follow:

1. **In-Built Mean Square Error:** Optimized for neural networks in Tensorflow.⁸
2. **Custom Mean Square Error:** Confirm presence of automatic differentiation functionalities in Tensorflow.⁹
3. **Custom Hedge Portfolio:** A non-convex function seeking to maximise hedge portfolio returns with hedge portfolio weights determined by a monotonic ranking function mapping. The selected mapping weights individual equities by the proportion of their contributions to aggregate returns of all equities in a given month, considering all equities in the portfolio. Section 8.1.2 elaborates on hedge portfolio theory and formulation.

Section 8.1.3 describes both mean squared error and hedge portfolio loss function formulation. Best practice training, validation, and testing practice succeed configuration with one iteration per loss function. The deployment of thirty epochs, shuffling of instances prior to every epoch run, and use of early stopping procedures in validation, help prevent over and under fitting.

4.3.4 Performance Metrics

Performance metrics inform comparisons between loss functions, to assess relative performance, after successfully training and validating a deep neural network for each loss function. Methods for performance metrics inception and formulation follow:

⁷The optimisation algorithm is synonymous with the training algorithm in section (4.3.1).

⁸activation-functionPython library for neural network modelling from Google

⁹A set of techniques to evaluate the derivative of a function specified by a computer programme, exploiting the sequential nature of elementary arithmetic operation and functions, repeatedly applying the chain rule in both forward and backward accumulations to compute gradients. Automatic differentiation solves code inefficiencies and round off error issues associated with symbolic and numerical differentiation methods, while easily calculating higher order derivatives, and partial derivatives with many inputs.

1. The trained models predict one month lead excess returns for each instance (firm-year observation) in the testing dataset.
2. Standard monthly sorts of predicted one month lead excess returns form standard decile ten (top 10%) minus decile one (bottom 10%) hedge portfolios returns per month.
3. Use hedge portfolio to calculate the mean across all months, sharpe ratio, and treynor ratio ¹⁰.
4. Learning curves validate model representation.
5. Ordinary least squares regression, incorporating Newey-West¹¹ estimators and six month lags (Newey and West, 1987), regress:
 - Realised one month lead excess return on predicted one month lead excess return
 - Realised hedge portfolio excess return on predicted one month lead excess return
 - Hedge portfolio returns on monthly Fama-French factors, ¹² to find alpha in CAPM, FF3, FF4, and FF5 models (??).
6. Supplementary to OLS, Fama-MacBeth (Fama and MacBeth, 1973) ¹³ regressions validate OLS estimations.

¹⁰Uses the estimation for systematic risk from the CAPM OLS estimator

¹¹The estimator aims to ensure autocorrelation and heteroskedasticity consistency for the regressions of time-series panel data.

¹²https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

¹³Adjusted for clustered covariance with entity and time fixed effect. Standard Fama-MacBeth regressions only correct standard error for cross-sectional variation, omitting time-series autocorrelation. Standard forms suffice when using daily or weekly returns (and by extension, prices) as time-series correlation is weak. Stronger time-series autocorrelations may exist during longer period. Therefore, one month lead excess returns necessitate time-series correction.

5 Results

5.1 Main Findings

Table ?? summarises main findings

Result	$MSE_{TF}(\hat{y}, y)$	$MSE(\hat{y}, y)$	HP(\hat{y})
$\theta_{(Final)}$			
$\lambda_{(Final)}$			
$\mu_{(HP)}$			
$\alpha_{(HP, CAPM)}$			
$\alpha_{(HP, FF3)}$			
$\alpha_{(HP, FF4)}$			
$\alpha_{(HP, FF5)}$			
SR_{HP}			
TR_{HP}			

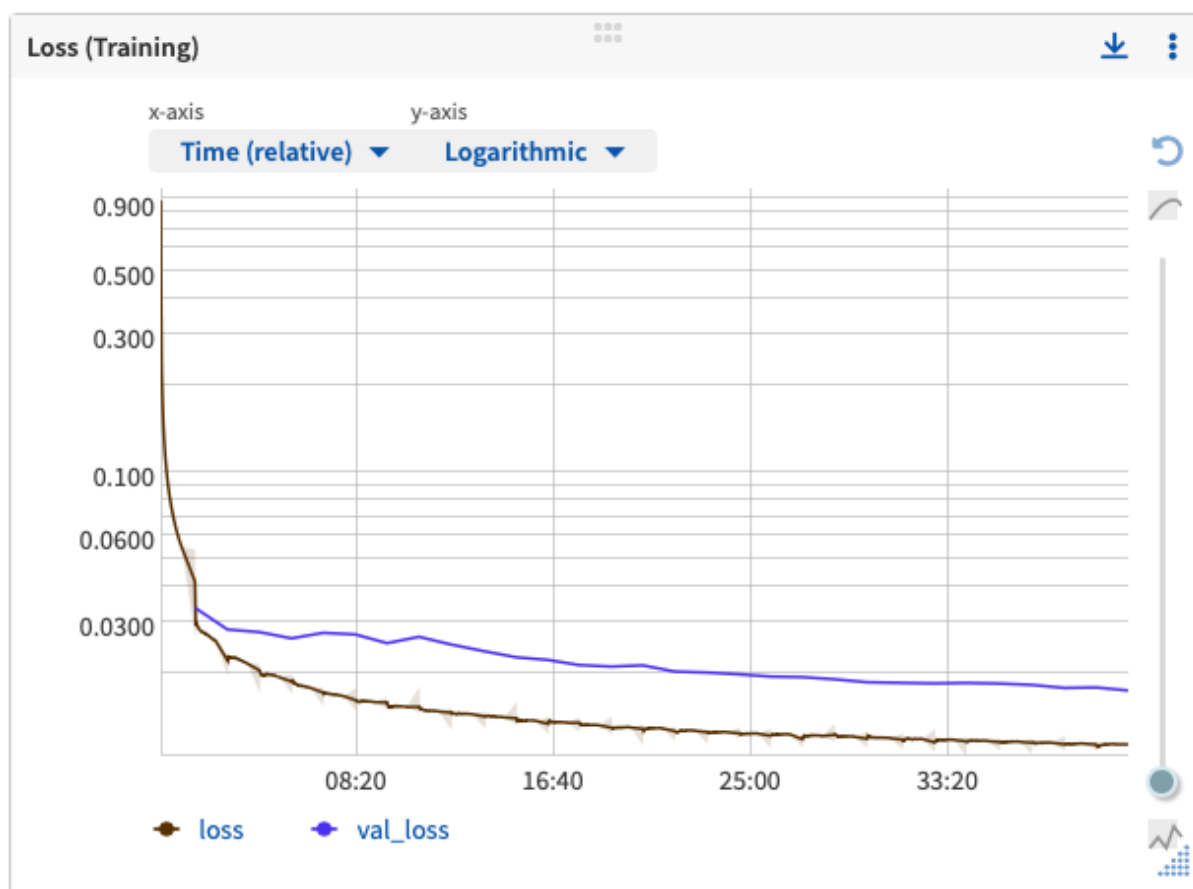
Table 1: Summary of Main Findings

5.2 Performance Matrix

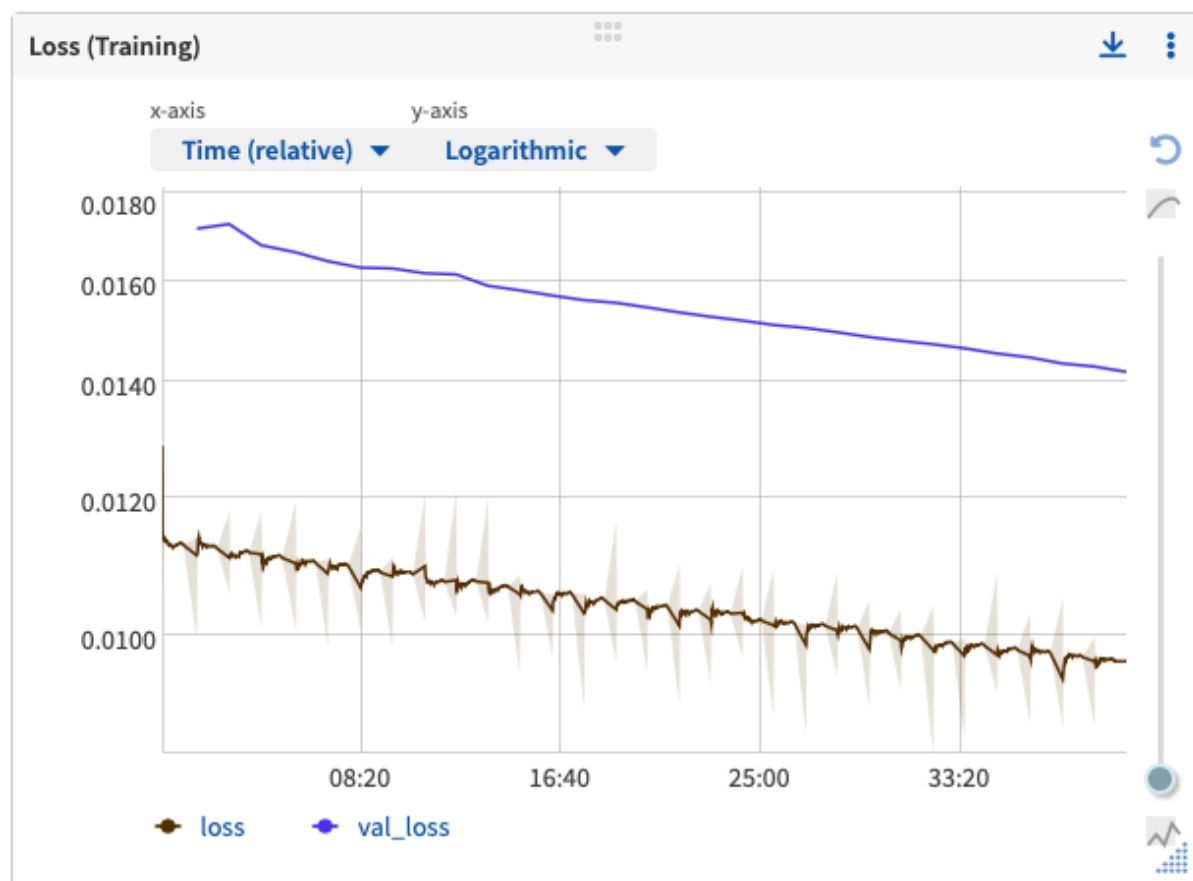
Loss Function	HP Mean	Sharpe Ratio	Treynor Ratio
mean_squared_error	0.327675	3.813235	2.822697
custom_mse	0.324570	3.356488	9.939086
custom_hp	0.005536	2.571108	3.709647

Hlavac, 2018 enables the tables in the regression analysis.

5.3 Learning Curves



(a) In-Built Mean Square Error Learning curve



19
(b) Custom MSE

Figure 3: Learning Curves

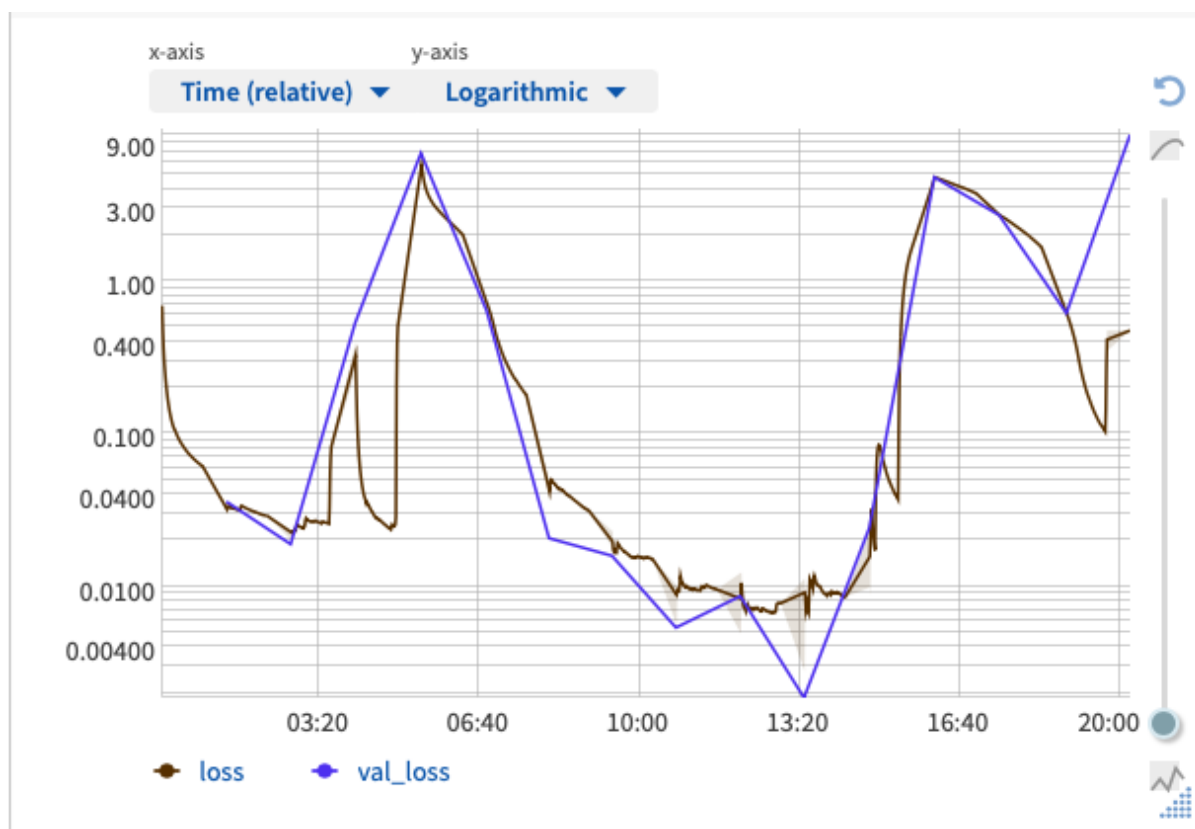


Figure 4: Hedge Portfolio Learning Curves

Figure 3 and 4 visualise learning curves for mean squared error variants, and hedge portfolio loss functions, respectively. Learning curves serve as diagnostic tools for underfitting, or overfitting.¹⁴ **Elaborate all this curves show the dataset is representative, suitable for ML contributions** Section 8.4 aggregates learning curves, and conventional performance metrics, evaluating model training and validation.¹⁵

5.4 Return Predictability

Table 2 regress one month lead excess returns, on the predicted returns, for every loss function. However, the hedge portfolio loss function optimises predicted hedge portfolios.

¹⁴Overfitting: Overlearns training data, generalises new data poorly. Underfitting: Inadequate training leading to poor predictions.

¹⁵Generate using a Custom Neptune.ai callback during model fitting.

<i>Dependent variable: One Month Lead Excess Returns (OMLER)</i>			
	MSE	MSE (Custom)	Hedge Portfolio
Predicted (OMLER)	0.129*** (0.004)	0.238*** (0.005)	-1.319*** (0.210)
Observations	531,461	531,461	531,461
R^2	0.012	0.042	0.001
Adjusted R^2	0.012	0.042	0.001
Residual Std. Error	0.137 (df = 531460)	0.135 (df = 531460)	0.137 (df = 531460)
F Statistic	1188.583*** (df = 1.0; 531460.0)	2037.581*** (df = 1.0; 531460.0)	39.655*** (df = 1.0; 531460.0)

Note: *p<0.1; **p<0.05; ***p<0.01

Table 2: Excess Return Predictability

<i>Dependent variable: Hedge Portfolio (Actual)</i>			
	MSE	MSE (Custom)	Hedge Portfolio
Hedge Portfolio (Predicted)	1.123*** (0.072)	1.125*** (0.080)	62.123*** (4.951)
Observations	252	252	252
R^2	0.841	0.843	0.791
Adjusted R^2	0.840	0.842	0.790
Residual Std. Error	0.166((df = 251)	0.165 (df = 251)	0.190 (df = 251)
F Statistic	241.227*** (df = 1.0; 251.0)	200.062*** (df = 1.0; 251.0)	157.472*** (df = 1.0; 251.0)

Note: *p<0.1; **p<0.05; ***p<0.01

Table 3: Hedge Portfolio Predictability

5.5 Hedge Portfolio Performance

5.5.1 Mean Square Error

<i>One Month Lead Excess Portfolio Return using mean squared error:</i>				
	CAPM	FF3	FF4	FF5
CMA				0.007 (0.373)
HML		-0.540*** (0.208)	-0.637** (0.269)	-0.640* (0.333)
Mkt-RF	0.116 (0.146)	0.170 (0.132)	0.218 (0.154)	0.219 (0.166)
RMW			0.262 (0.275)	0.263 (0.277)
SMB		-0.257 (0.180)	-0.156 (0.208)	-0.157 (0.212)
const	0.327*** (0.013)	0.328*** (0.013)	0.326*** (0.013)	0.326*** (0.013)
Observations	252	252	252	252
R^2	0.004	0.055	0.059	0.059
Adjusted R^2	-0.000	0.043	0.044	0.040
Residual Std. Error	0.086 (df = 250)	0.084 (df = 248)	0.084 (df = 247)	0.084 (df = 246)
F Statistic	0.634 (df = 1.0; 250.0)	2.444* (df = 3.0; 248.0)	1.928 (df = 4.0; 247.0)	1.734 (df = 5.0; 246.0)

*p<0.1; **p<0.05; ***p<0.01

Note:

5.5.2 Mean Square Error (Custom)

<i>One Month Lead Excess Portfolio Return using custom mse:</i>					
	CAPM	FF3	FF4	FF5	
CMA				0.114 (0.442)	
HML		-0.632** (0.272)	-0.736** (0.348)	-0.778* (0.435)	
Mkt-RF	0.033 (0.172)	0.079 (0.159)	0.130 (0.191)	0.145 (0.205)	
RMW			0.280 (0.325)	0.285 (0.332)	
SMB		-0.218 (0.209)	-0.110 (0.234)	-0.116 (0.240)	
const	0.324*** (0.015)	0.325*** (0.014)	0.324*** (0.014)	0.323*** (0.014)	
Observations	252	252	252	252	
R^2	0.000	0.051	0.055	0.055	
Adjusted R^2	-0.004	0.039	0.039	0.036	
Residual Std. Error	0.097(df = 250)	0.095(df = 248)	0.095(df = 247)	0.095(df = 246)	
F Statistic	0.036 (df = 1.0; 250.0)	1.949 (df = 3.0; 248.0)	1.489 (df = 4.0; 247.0)	1.377 (df = 5.0; 246.0)	

*p<0.1; **p<0.05; ***p<0.01

Note:

5.5.3 Hedge Portfolio

<i>One Month Lead Excess Portfolio Return using custom hp:</i>					
	CAPM	FF3	FF4	FF5	
CMA					-0.005 (0.008)
HML		-0.014*** (0.005)	-0.018*** (0.007)		-0.016* (0.008)
Mkt-RF	0.001 (0.005)	0.002 (0.005)	0.004 (0.005)		0.004 (0.006)
RMW			0.009 (0.008)		0.009 (0.008)
SMB		-0.005 (0.005)	-0.001 (0.005)		-0.001 (0.005)
const	0.006*** (0.000)	0.006*** (0.000)	0.005*** (0.000)		0.006*** (0.000)
Observations	252	252	252		252
R^2	0.001	0.053	0.061		0.062
Adjusted R^2	-0.003	0.042	0.046		0.043
Residual Std. Error	0.002(df = 250)	0.002(df = 248)	0.002(df = 247)		0.002(df = 246)
F Statistic	0.086 (df = 1.0; 250.0)	3.026** (df = 3.0; 248.0)	2.411** (df = 4.0; 247.0)		2.232* (df = 5.0; 246.0)

Note: *p<0.1; **p<0.05; ***p<0.01

6 Discussion

7 Conclusion (2 pages)

7.1 Contributions

7.2 Further Research

7.3 Limitations

Further research will rely on addressing several limitations.

7.3.1 Resources

The lack of resources to explore the entire dataset within reasonable timeframes, and at reasonable costs. The most material inhibitions are the inability to explore all 400 factors for all size groupings, the reduction in level of precision for numerical features, and the ability to shuffle training sets at lengths greater than or equal to the input sets.

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8 Appendix

8.1 Mathematics

8.1.1 Equations & Derivations

8.1.2 Hedge Portfolio

Hedge portfolios rely on monotonic ranking functions for optimisation as their monotonic nature preserves or reverses a given ordered set. The analysis cross-section of one-month lead portfolio excess returns using monotonic functions

$$R(y_{i,t}) \tag{7}$$

The ranking function ($R(y_{i,t})$) and thresholds (u, v) form subsets of long and short portfolios. Long (L) or Short (S) sets include excess returns conditioned on the associated monotonic ranking given a threshold, bound by the cardinality of the excess return vector ($|y|$). The subsequent truth sets mathematically express aforementioned time-series hedge portfolios.

$$L = \{y_{i,t} | R(y_{i,t}) \leq u\}$$

$$S = \{y_{i,t} | R(y_{i,t}) \geq v\}$$

$$0 < u \leq |y|$$

$$0 < v \leq |y|$$

$$u < v$$

Equation 8 describes hedge portfolio lead excess returns (H_t) at a given time (t).

$$H_t = \frac{1}{|L|} \sum_{i \in L} y_{i,t} - \frac{1}{|S|} \sum_{i \in S} y_{i,t} \tag{8}$$

Figure 5) illustrates an approximate linear monotonic ranking function with a sample of 100 uniformly distributed excess returns between -10% and 10%. Boundary conditions u

and v are set to 20 and 80 , respectively. Subsequently, excess returns above (below) the green (blue) dotted line belong to the long (L) (short (S)) set.

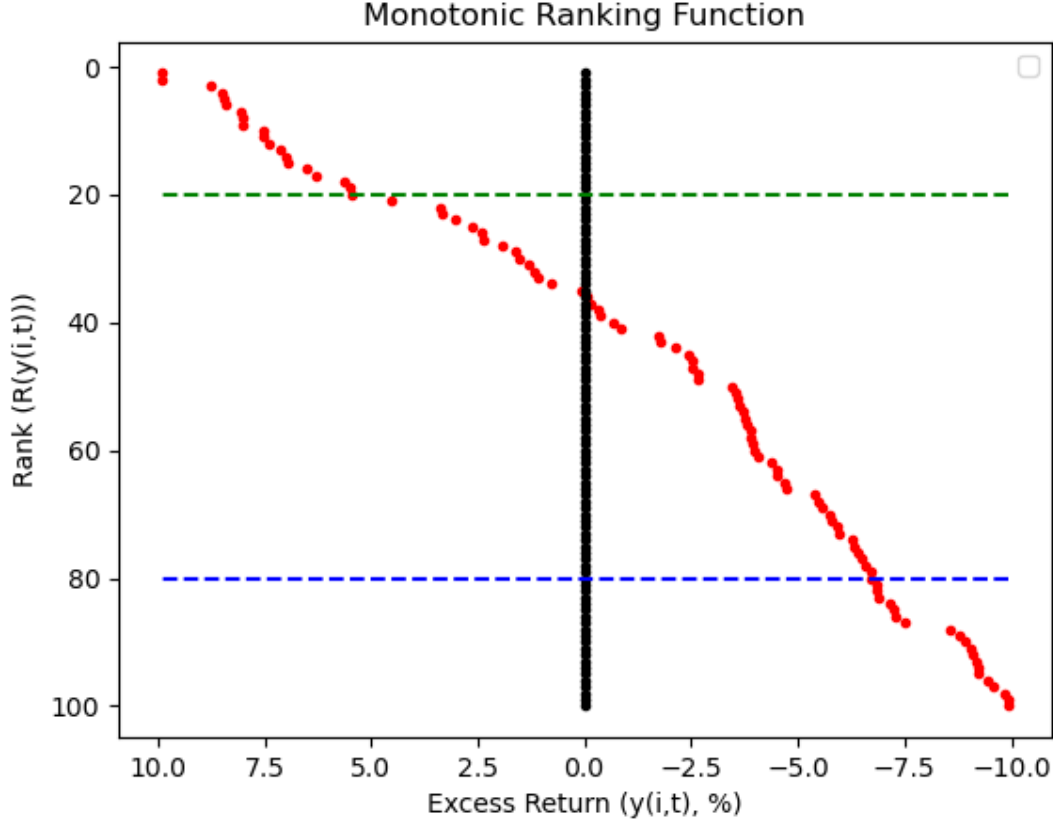


Figure 5: Approximate Linear Monotonic Ranking Function

The permutations in monotonic ranking functions, and subsequent hedge portfolios, are endless. This research essay develops a monotonic ranking function proportionally weighting one month lead excess returns (9). Therefore, equation 10 defines the loss function.

$$R(\hat{y}) = W \tag{9}$$

$$W := \frac{\hat{y}}{\vec{1}\hat{y}}$$

$$\hat{y} = X^T \hat{\theta}$$

$$f_{\hat{\theta}}(X) = \left(\frac{X^T \hat{\theta}}{\vec{1} X^T \hat{\theta}} \right)^{\top} X^T \hat{\theta} \tag{10}$$

The above loss function is differentiable using symbolic mathematic as shown in equation 11.

$$\begin{aligned}\frac{\partial f_{\hat{\theta}}(X)}{\partial \hat{\theta}} &= \frac{\partial ((\frac{X^T \hat{\theta}}{\vec{1} X^T \hat{\theta}})^{\top} X^T \hat{\theta})}{\partial \hat{\theta}} \\ \frac{\partial (f_{\hat{\theta}}(X))}{\partial \hat{\theta}} &= \frac{1}{(\hat{\theta}^{\top} X \vec{1})} X X^{\top} \hat{\theta} + \frac{1}{\vec{1} X^{\top} \hat{\theta}} X X^{\top} \hat{\theta} - \frac{1}{(\hat{\theta}^{\top} X \vec{1})^2} \hat{\theta}^{\top} X X^{\top} \hat{\theta} X \vec{1}\end{aligned}\quad (11)$$

Subsection ?? explains the theory supporting loss minimisation. Applying gradient descent methods to the product of the loss function and scaler of -1 transforms the minimisation to maximisation. This transformation leads to finding the argmax of maximisation function with respect to $\hat{\theta}$ (12). The aforementioned transformation is simply and suitable for exploration in the context of the research intent. More sophisticated methods exist for maximisation such as reinforcement learning (??).

$$\arg \max_{\hat{\theta}} : \left(\frac{X^T \hat{\theta}}{\vec{1} X^T \hat{\theta}} \right)^{\top} X^T \hat{\theta} \quad (12)$$

8.1.3 Loss Functions

Equations 13 and 14 show the loss functions calculating mean squared errors and aforementioned hedge portfolios, respectively. Equations 15 and 16 illustrate optimisation objectives for mean squared error and hedge portfolio loss functions, respectively.¹⁶ Equations 17 and 18 describe the partial derivative functions for both mean squared error and hedge portfolio loss functions, respectively. The global optimum for both functions is the combination of parameters ($\hat{\theta}$) setting the partial derivative to zero. The first is trivial in an analytical form. The second is non-trivial, requiring symbolic, numerical, or automatic methods. The immediate code listings show the translation of loss functions mathematical expressions (13 and 14) into tensor compatible formats for analysis.

$$f_{\hat{\theta}}(y, X) = \frac{\vec{1}}{\vec{1}^T \vec{1}} (\mathbf{y} - X^T \hat{\theta})^{\circ 2} \quad (13)$$

$$f_{\hat{\theta}}(X) = \left(\frac{X^T \hat{\theta}}{\vec{1} X^T \hat{\theta}} \right)^{\top} X^T \hat{\theta} \quad (14)$$

¹⁶ $\arg \max_{\hat{\theta}} : (f_{\hat{\theta}}(X)) \equiv \arg \min_{\hat{\theta}} : (-f_{\hat{\theta}}(X))$

$$\arg \min_{\hat{\theta}} : (f_{\hat{\theta}}(y, X)) \quad (15) \qquad \arg \max_{\hat{\theta}} : (f_{\hat{\theta}}(X)) \quad (16)$$

$$\frac{\partial f_{\hat{\theta}}(y, X)}{\partial \hat{\theta}} = \frac{\vec{1}}{\vec{1}^T \vec{1}} (-2(\mathbf{y} - X^T \hat{\theta})^{\circ 1}) \quad (17)$$

$$\frac{\partial (f_{\hat{\theta}}(X))}{\partial \hat{\theta}} = \frac{1}{(\hat{\theta}^T X \vec{1})} X X^T \hat{\theta} + \frac{1}{\vec{1} X^T \hat{\theta}} X X^T \hat{\theta} - \frac{1}{(\hat{\theta}^T X \vec{1})^2} \hat{\theta}^T X X^T \hat{\theta} X \vec{1} \quad (18)$$

```

1 class custom_mse(tf.keras.losses.Loss):
2     def __init__(self, extra_tensor=None, reduction=tf.keras.losses.
3       Reduction.AUTO, name='custom_mse'):
4         super().__init__(reduction=reduction, name=name)
5         self.extra_tensor = extra_tensor
6
7     def call(self, y_true, y_pred):
8         extra_tensor = self.extra_tensor
9         loss = K.mean(K.square(y_pred - y_true))
10        return loss

```

Listing 1: Custom Mean Squared Error Implementation

```

1 class custom_hp(tf.keras.losses.Loss):
2     def __init__(self, extra_tensor=None, reduction=tf.keras.losses.
3       Reduction.AUTO, name='custom_hp'):
4         super().__init__(reduction=reduction, name=name)
5         self.extra_tensor = extra_tensor
6
7     def call(self, y_true, y_pred):
8         extra_tensor = self.extra_tensor
9         # Calculates sum over vector tensors
10        y_true_sum = K.sum(y_true)
11        y_pred_sum = K.sum(y_pred)
12        #
13        y_true_weights = (y_true/y_true_sum)
14        y_pred_weights = (y_pred/y_pred_sum)
15        # Transpose the weights

```

```

15     y_true_transposed = K.transpose(y_true_weights)
16     y_pred_transposed = K.transpose(y_pred_weights)
17     # Multiply by the weights
18     y_true_loss = K.dot(y_true_transposed, y_true)
19     y_pred_loss = K.dot(y_pred_transposed, y_pred)
20     loss = -1*(y_pred_loss)
21     return loss

```

Listing 2: Custom Hedge Portfolio Implementation

8.2 Stochastic Gradient Descent

Firstly, SGD finds loss function partial derivatives, with the respect to the parameter in a predictive model. Secondly, the exploration of epochs update parameters using a learning rate, moving away from the partial derivatives, until settling in a minimum as a potential solution. Several methods aid escape from local minima to continue searching for global minimum solutions, depending on the algorithm. The below illustrates the use of mean squared error as a loss function, on a linear model, where SGD would adjust both intercept and co-efficient parameters, in order to find the argmax of the loss function.

Equations for linear model (19) and mean squared error (20).

$$\hat{y} = mx_i + b \quad (19)$$

$$f(y, (mx_i + b)) = \frac{1}{n} \sum_{i=1}^n (y_i - (mx_i + b))^2 \quad (20)$$

Partial derivatives of parameters m (21) and b (22), respectively.

$$\frac{\partial f(y, (mx_i + b))}{\partial m} = \frac{1}{n} \sum_{i=1}^n -2x_i(y_i - (mx_i + b))^2 \quad (21)$$

$$\frac{\partial f(y, (mx_i + b))}{\partial b} = \frac{1}{n} \sum_{i=1}^n -2(y_i - (mx_i + b))^2 \quad (22)$$

8.3 Ordinary Least Squares (OLS)

The OLS regression is the most prominent statistical model in asset pricing theory. Rosenfeld (2021) summarises OLS. The composition of the true OLS (23) model includes four components. Firstly, \mathbf{X} , an $n \times k$ matrix of k independent variables for n observations. Secondly, \mathbf{y} , an $n \times 1$ vector of observation on the dependent variable. Thirdly, ϵ , an $n \times 1$ vector of unexplained error. Lastly, θ , a $k \times 1$ vector of parameters to be estimated.

$$y = X\theta + \epsilon \quad (23)$$

8.3.1 Estimation Criteria

The criteria to obtain the parameter estimate ($\hat{\theta}$) relies on the minimisation of the sum of squared residuals (24). We highlight the observed residuals (e) are distinct from unexplained disturbances (ϵ). Equation 25 derives residuals by taking the difference between observations based on parameter estimates.

$$\sum e_i^2 \quad (24)$$

$$e = y - X\hat{\theta} \quad (25)$$

Expanding the quadratic $e^T e$ after substituting in equation 25 leads to the alternative expression of the sum of squared residuals in equation 26. Minimizing the sum of square residuals requires taking the partial derivative of equation 26 with respect to the estimated parameters (equation) using matrix differentiation (27). It is imperative X has full rank where all vectors in the matrix are linearly independent, validating both the presence of a positive definite matrix and minimum.

$$e^T e = y^T y - 2\hat{\theta}^T X^T y + \hat{\theta}^T X^T \hat{\theta} X \quad (26)$$

$$\frac{\partial e^T e}{\partial \hat{\theta}} = -2X^T y + 2X^T X \hat{\theta} = 0 \quad (27)$$

We find the expression for the Ordinary Least Squares (OLS) estimator (28) after rearranging equation 27 to normal form, utilizing inverse matrices to form identity matrices, and simplifying.

$$\begin{aligned}
 2X^T X \hat{\theta} &= 2X^T y \\
 (X^T X)^{-1} (X^T X) \hat{\theta} &= (X^T X)^{-1} X^T y \\
 I \hat{\theta} &= (X^T X)^{-1} X^T y \\
 \hat{\theta} &= (X^T X)^{-1} (X^T y)
 \end{aligned} \tag{28}$$

Therefore, we can use the OLS estimator to make predictions with OLS (29).

$$\hat{y} = X^T \hat{\theta} \tag{29}$$

8.3.2 Properties of OLS Estimators

There are six key properties in addition to the satisfaction in minimizing the summation of squared residuals.

1. The residuals are uncorrelated with the observed values of X i.e., $X^T e = 0$.
2. The sum of the residuals is zero i.e., $\sum e_i = 0$.
3. The sample mean of the residuals is zero i.e., $\bar{e} = \frac{\sum e_i}{n} = 0$.
4. The regression hyperplane passes through the means of observed values i.e., $\frac{e}{n} = \frac{y - X\theta}{n} = 0$. Since $\bar{e} = 0$ assumed, it is implied $\bar{y} = \bar{x}\bar{\theta}$.
5. The residuals are uncorrelated with the predicted y i.e., $\hat{y} = X\hat{\theta}$, $\hat{y}^T e = (X\hat{\theta})^T e = \hat{\theta}^T X^T e = 0$
6. The mean of \hat{y} for the sample will equal the mean of the y.

8.3.3 The Gauss-Markov Theorem

However, OLS makes Gauss-Markov assumptions about the true model to make inferences regarding β from $\hat{\beta}$. The intention of the Gauss-Markov Theorem, conditional on the below assumptions, states the OLS estimator is the best linear, unbiased, and efficient estimator:

$$y = x\beta + \epsilon$$

$$E[\epsilon|X] = 0 \tag{30}$$

$$E(\epsilon\epsilon^T|X) = \Omega = \sigma^2 I \tag{31}$$

$$\epsilon|X \sim N[0, \sigma^2 I] \text{ (hypothesis testing)}$$

- X is an $n \times k$ matrix of full rank
- X must be generated randomly, or fixed, by a mechanism uncorrelated to disturbances.

Equation 30 implies $E(y) = X\beta$ as no observations of the independent variables convey any information about the expected values of the disturbances. Equation 31 captures homoskedasticity and no autocorrelation assumptions.

8.4 Model Training & Validation Performance



Figure 6: Performance: In-Built Mean Square Error

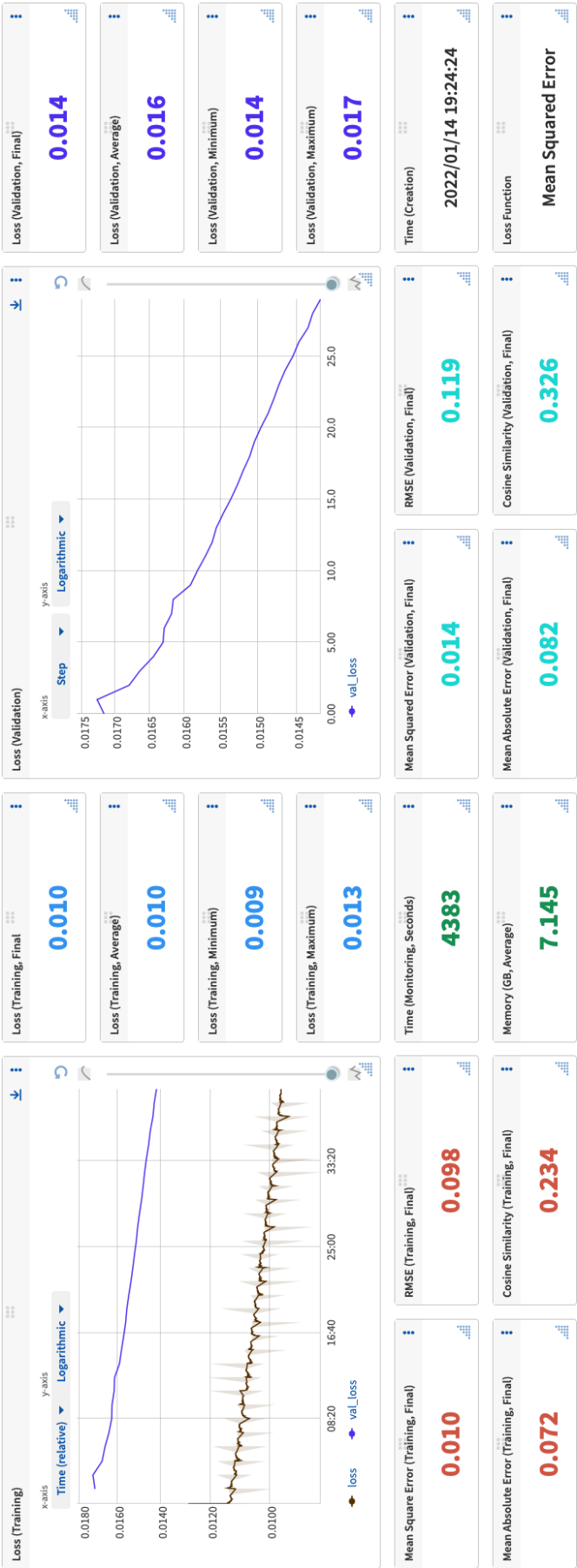


Figure 7: Performance: Custom Mean Square Error

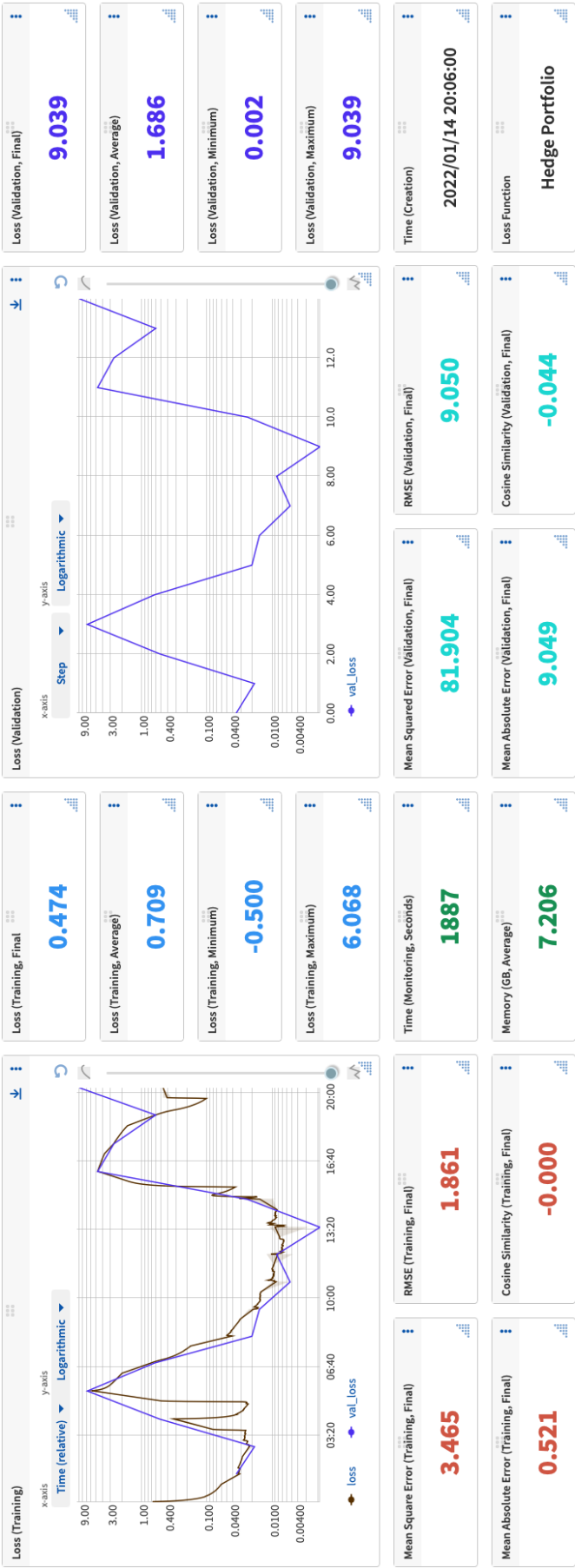


Figure 8: Performance: Custom Hedge Portfolio

8.5 Asset Pricing Models

8.5.1 Capital Asset Pricing Model

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_{i,t}^1(R_{M,t} - R_{f,t}) \quad (32)$$

8.5.2 Fama-French Factor Models

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_{i,t}(R_{M,t} - R_{f,t}) \quad (33)$$

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_{i,t}(R_{M,t} - R_{f,t}) \quad (34)$$

where

- $R_{i,t} - R_{f,t}$: Portfolio Excess Return on the market for a given portfolio and time, value-weighted using all incorporated US CRSP firms incorporated in the US, listed on the NYSE, AMEX, or NASDAQ.
- $\alpha_{i,t}$: Jensen's alpha indicating mispricing in the asset.
- β_t^1 : Market Risk Factor (co-efficient)
- β_t^1 : Size Factor (co-efficient)
- β_t^2 : Value Factor (co-efficient)
- β_t^2 : Value Factor (co-efficient)
- β_t^3 : Profitability Factor (co-efficient)
- β_t^4 : Investment Factor (co-efficient)
- $(R_{M,t} - R_{f,t})$: Market Risk Premium

- SMB_t : Size Premium (small minus big) is the difference in average return between nine small stock and nine large value-weighted portfolios.
- HML_t : Value Premium (high minus low) is the difference in average return between two value and two growth value-weighted portfolios.
- RMW_t : Profitability Premium (robust minus weak) is the difference in average return between two robust operating profitability and two weak operating profitability value-weighted portfolios.
- CMA_t : Investment Premium minus aggressive is the difference in average return on the two conservative and two aggressive investment portfolios

8.5.3 Fama-MacBeth Regressions

$$R_{n,t} = \alpha_n + \sum_{f=1}^F \beta_{n,F_f} F_{f,t} + \epsilon_{n,t} \quad (35)$$

$$\forall n \in \{1, \dots, N\}$$

$$R_{i,t} = \gamma_{t,0} + \sum_{f=1}^F \gamma_{t,f} \hat{\beta}_{i,F_f} + \epsilon_{i,t} \quad (36)$$

$$t \in \{1, \dots, N\}$$

Where

- $R_{n,t}$: Return for an asset (n) at a time (t).
- α_n : Jensen's alpha for an asset (n) implying mispricing.
- β_{n,F_f} : An asset's (n) exposure to a factor (f)
- $\hat{\beta}_{i,F_f}$: Estimated factor loading for a factor (f) from regression of asset (i)
- $F_{f,t}$: Risk factor (f) at a given time (t) e.g., SMB, HML etc.,

- $\epsilon_{n,t}$: Residual for an asset at a time (t)
- $\gamma_{t,f}$: Factor pricing for a factor (f)

8.6 Performance Measures

8.6.1 Sharpe Ratio

Nobel Laurette William F. Sharpe (1994) introduced the Sharpe Ratio (37) as a measure for risk-adjusted returns, where $\mathbb{E}[R_a - R_f]$ is the expectation for excess returns, and $\sigma(R_a)$ is the standard deviation of excess returns.

$$SR = \mathbb{E} \frac{[R_a - R_f]}{\sigma(R_a)} \quad (37)$$

$$\sigma = \sqrt{\sum_{i=1}^n \frac{(R_a) - \bar{R}_a)^2}{n}}$$

8.6.2 Treynor Ratio

The Treynor ratio is another risk-return measure (38), evaluating the excess return of a portfolio per unit of systemic risk¹⁷. $\mathbb{E}[R_a - R_f]$ is the excess return on the market. β_M is systematic risk

$$\text{Treynor} = \mathbb{E} \frac{[R_a - R_b]}{\beta_M} \quad (38)$$

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8.7 Pooled Ordinary Least Square Regressions

8.7.1 In-Built Mean Square Error

Dep. Variable:	ret_exc_lead1m	R-squared:	0.0120			
Estimator:	PooledOLS	R-squared (Between):	-0.0158			
No. Observations:	531461	R-squared (Within):	0.0166			
Date:	Fri, Jan 14 2022	R-squared (Overall):	0.0120			
Time:	14:00:15	Log-likelihood	3.039e+05			
Cov. Estimator:	Clustered					
		F-statistic:	6482.1			
Entities:	7282	P-value	0.0000			
Avg Obs:	72.983	Distribution:	F(1,531460)			
Min Obs:	1.0000					
Max Obs:	252.00	F-statistic (robust):	18.104			
		P-value	0.0000			
Time periods:	252	Distribution:	F(1,531460)			
Avg Obs:	2109.0					
Min Obs:	1869.0					
Max Obs:	3400.0					
	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
predict	0.1288	0.0303	4.2548	0.0000	0.0695	0.1881

8.7.2 Custom Mean Square Error

Dep. Variable:	ret_exc_lead1m	R-squared:	0.0417			
Estimator:	PooledOLS	R-squared (Between):	-0.0567			
No. Observations:	531461	R-squared (Within):	0.0555			
Date:	Fri, Jan 14 2022	R-squared (Overall):	0.0417			
Time:	14:00:45	Log-likelihood	3.12e+05			
Cov. Estimator:	Clustered					
		F-statistic:	2.313e+04			
Entities:	7282	P-value	0.0000			
Avg Obs:	72.983	Distribution:	F(1,531460)			
Min Obs:	1.0000					
Max Obs:	252.00	F-statistic (robust):	52.654			
		P-value	0.0000			
Time periods:	252	Distribution:	F(1,531460)			
Avg Obs:	2109.0					
Min Obs:	1869.0					
Max Obs:	3400.0					
	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
predict	0.2381	0.0328	7.2563	0.0000	0.1738	0.3024

8.7.3 Custom Hedge Portfolio

Dep. Variable:	ret_exc_lead1m	R-squared:	0.0010			
Estimator:	PooledOLS	R-squared (Between):	-0.0060			
No. Observations:	531461	R-squared (Within):	0.0007			
Date:	Fri, Jan 14 2022	R-squared (Overall):	0.0010			
Time:	14:02:48	Log-likelihood	3.01e+05			
Cov. Estimator:	Clustered					
		F-statistic:	529.44			
Entities:	7282	P-value	0.0000			
Avg Obs:	72.983	Distribution:	F(1,531460)			
Min Obs:	1.0000					
Max Obs:	252.00	F-statistic (robust):	5.4613			
		P-value	0.0194			
Time periods:	252	Distribution:	F(1,531460)			
Avg Obs:	2109.0					
Min Obs:	1869.0					
Max Obs:	3400.0					
	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
predict	-1.3194	0.5646	-2.3369	0.0194	-2.4260	-0.2128

8.8 Technical Details

8.8.1 Organisation

This research essay uses data science best practise (Wilson et al., 2016). Data and results saved regularly and reproducible. Data retention in all forms receives high levels of attention. Project files synchronises continuously to Google Drive (Google LLC, 2020). Git (Linus Torvalds, 2020) manages version control protocols for source code, data, documents, and results. Git stores a complete history of versions using Git hashes. These hashes are strings unique to each state of the publicly available finance-honours repos-

itory¹. Git hashes enable discretisation of finance-honours development, enabling the accessibility and recollection of all previous states given a unique git hash. This functionality enables reproducibility, error correction, and the ability to revert to previous models.

8.8.2 Version Control

Git, hosted by GitHub, provides a comprehensive set of version control technologies and range of benefits. These technologies manage version control for the programming of approximately 40 methods, classes, and functions. Firstly, Git enables collaborative functionalities. The master version of a project is accessible for all who have access to the repository. Each contributor can create custom copies of branches through pull requests on the master branch. Contributors can commit changes to custom branches and push these changes to the master branch through push requests. Product managers can review push requests, approving valid requests for integrating changes to the master branch. Collaborative efforts are possible with commit messages describing contributions from each contributor. This research essay has only one contributor, rendering collaborative functionalities redundant in this instance. Git ensures the storage of code, work, and author histories. The descriptive nature of commit logs ensures journal accuracy.

8.8.3 Directories

This research essay follows directory structure recommendations from Wilson et al (2016). Organisation is crucial as the modelling of artificial neural networks involves integrating a range of optimisation models, data files and documents. Directory management is most efficient and comprehensive. **finance-honours** is the root directory containing the following sub directories: bin, data, doc, src, and results. The **bin** sub directory contains external scripts and compiled programmes. The **data** sub directory contains all raw data associated with the project. The **doc** sub directory stores user guides, academic resources, research reports and project deliverables. The **results** sub directory contains

¹<https://github.com/CMCD1996/finance-honours>

the outputs from project analysis. The **src** sub directory stores the source code for preparing datasets, partitioning sets of geographies with varying granularities. All files were continuously backed up using Google Drive and Git.

8.8.4 Python

Python 3.9.7 is the primary programming language for this research essay. The language is omnipresent, widespread in software development. Python's language design makes the language highly productive and simple to use. Python can hand off computationally straining tasks to C/C++ using supporting first-class integration capabilities. The language also has a very active and supportive community. Python is the most popular coding language on the planet defined by the PYPL PopularitY of Programming Language Index. As at December 2021, Python has 30.21% of all language tutorial search instances on Google (PYPL, 2021). Python's dynamic, low cost, and open source nature makes programming quick.

8.8.5 Package Management

The Anaconda package management platform for Python (Anaconda, Inc., 2020) is the chosen coding environment. Anaconda is a well defined, free platform, with known versions of python packages such as matplotlib, numpy, and pip. The use of this environment ensures reproducibility and consistency across infrastructure. Pip is the default package manager for Python, included in the Anaconda package. Pip manages package installation and updates.

8.8.6 Code Style

The PEP8 style for Python Code is formatting style for development code Guido Van Rossum and Coghlan, 2001. Yapf, a formatter maintained by Google, manages formatting. Standardised formatting is important as makes supports readability, optimisation, and consistency. Docstrings and rigourous commenting are important in documentation. A docstring is a Python inline comment describing function use, inputs, and outputs.

An unique docstring belongs to each Python class and function. The Google style docstring is most appropriate because of it's readability, writing ease, and consistency with Google's Style Guide. The parsing of yapf docstrings enables automated documentation generators to create docstring documents describing functions and classes.

8.8.7 Infrastructure

This research essay deploys variations in artificial neural networks of changing size and complexity. Analysis either took place locally, or remotely, depending on the computational requirements for the particular analysis. An Apple MacBook Pro 13 Inch 2019 with 8 GB 2133 MHz LPDDR3 memory and 1.4 GHz Quad-Core Intel Core i5 processor handles simple tasks locally. A Virtual Machine Instance on the Google Cloud Platform handles more complex tasks remotely. The instance is a n1-standard-8 machine, with an intel Broadwell CPU platform, outfitted with one NVIDIA Tesla K80 GPU. The boot disk stores up to 100GB. CPU and GPU capacity are 30GB and 10GB, respectively

8.8.8 Documentation

The research essay documentation keeps an accurate record of key design decisions. Commit histories (8.8.2) is the most important form of documentation. Application of auxiliary documentation methods are supplementary.

8.9 Code

All files, resources, and code is available for download from Github. The document listing function and class docstring is available for download here. Furthermore, the coding listings for this research essay follow. Try update.

8.10 Data

8.10.1 Composition & Sources

The authors provide documentation and web-based resources on GitHub to reconstruct an updated dataset from Wharton Research Data Services (WRDS) using SAS Studio. Identifier variables (e.g., size group), Accounting variables (e.g., COGS), accounting characteristics (e.g., change in net working capital, solvency ratios etc.), market variables (e.g., share price, excess return), market characteristics (e.g., market equity, 60 month CAPM β), and detailed characteristics (e.g., equity duration, Altman Z-Score) and Foreign Exchange Conversion Rates feature in the dataset's composition.

8.10.2 Data Processing

However, the computational complexity exceeds resources available at the time of analysis. The replacement of NaN values in a feature columns with the median value of the respective column to retain observations. Subsequently, training sets require further preprocessing in addition to reconfiguring infrastructure. Furthermore, the reduction in numerical feature precision from float64 to float32 effectively halves memory usage. Memory monitoring methods accompany the aforementioned preprocessing adjustments, monitoring CPU and GPU utilisation, reconfiguring GPU's, and configuring application programming interfaces for monitoring modelling performance.

8.10.3 Summary Statistics

The dataset is exhaustive as illustrated by the both summary statistics and Global Factor Data Documentation in the author's GitHub repository. Table 4 describes summary statistics for the entire global factor dataset. Tables 5, 6, and 7 list summary statistics for revised training, validation, and testing sets, respectively.

	count	mean	std	min	25%	50%	75%	max
permno	2739928.0	5.405281e+04	2.782267e+04	10000.0000	2.651800e+04	5.715400e+04	8.018600e+04	9.343600e+04
permco	2739928.0	1.843974e+04	1.402881e+04	3.0000	7.702000e+03	1.640850e+04	2.321000e+04	5.766700e+04
crsp_shred	2739928.0	1.089520e+01	4.571000e-01	10.0000	1.100000e+01	1.100000e+01	1.100000e+01	1.200000e+01
crsp_exched	2739928.0	2.127400e+00	9.343000e-01	1.0000	1.000000e+00	3.000000e+00	3.000000e+00	3.000000e+00
sic	2692217.0	4.605936e+03	1.921398e+03	100.0000	3.271000e+03	4.011000e+03	6.036000e+03	9.999000e+03
ff49	2674304.0	3.037380e+01	1.341740e+01	1.0000	1.800000e+01	3.400000e+01	4.300000e+01	4.900000e+01
adjfct	2739928.0	2.838700e+00	1.267170e+01	0.0000	1.000000e+00	1.000000e+00	2.000000e+00	1.215000e+03
shares	2739928.0	6.078630e+01	2.852566e+02	0.0830	4.399000e+00	1.251900e+01	3.808200e+01	2.920640e+04
me	2739928.0	2.241254e+03	1.473073e+04	1.1708	4.367020e+01	1.565628e+02	7.167608e+02	2.255969e+06
me_company	2739928.0	2.283180e+03	1.527340e+04	1.1708	4.387450e+01	1.574086e+02	7.211363e+02	2.255969e+06
prc	2739928.0	2.876220e+01	6.488772e+02	0.0078	7.875000e+00	1.612500e+01	2.912500e+01	1.416000e+05
prc_local	2739928.0	2.876220e+01	6.488772e+02	0.0078	7.875000e+00	1.612500e+01	2.912500e+01	1.416000e+05
dolvol	2580622.0	3.282292e+08	2.520900e+09	0.0000	1.070786e+06	7.165154e+06	7.076108e+07	8.441730e+11
ret	2719460.0	1.640000e-02	1.672000e-01	-1.0000	-5.880000e-02	4.100000e-03	7.410000e-02	2.400000e+01
ret_local	2719460.0	1.640000e-02	1.672000e-01	-1.0000	-5.880000e-02	4.100000e-03	7.410000e-02	2.400000e+01
ret_exc	2719460.0	1.270000e-02	1.673000e-01	-1.0068	-6.250000e-02	7.000000e-04	7.060000e-02	2.399690e+01
ret_lag_dif	2739928.0	1.000000e+00	0.000000e+00	1.0000	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00
ret_exc_lead1m	2732542.0	6.400000e-03	1.559000e-01	-1.0113	-6.560000e-02	-1.800000e-03	6.710000e-02	1.988170e+01
market_equity_rank_x	2739928.0	5.982920e+01	2.380660e+01	1.0000	4.000000e+01	6.000000e+01	8.000000e+01	9.950000e+01
enterprise_value_rank_x	2480615.0	5.845440e+01	2.501660e+01	1.0000	3.800000e+01	5.900000e+01	8.000000e+01	9.950000e+01
book_equity_rank_x	2452453.0	5.800700e+01	2.593820e+01	1.0000	3.800000e+01	5.900000e+01	8.000000e+01	9.950000e+01
assets_rank_x	2522907.0	5.751850e+01	2.635510e+01	1.0000	3.700000e+01	5.900000e+01	8.000000e+01	9.950000e+01
sales_rank_x	2509790.0	5.691950e+01	2.717080e+01	1.0000	3.600000e+01	5.900000e+01	8.000000e+01	9.950000e+01
net_income_rank_x	2517298.0	5.581200e+01	2.878360e+01	1.0000	3.300000e+01	6.000000e+01	8.000000e+01	9.950000e+01
bidask_x	2739928.0	1.289000e-01	3.351000e-01	0.0000	0.000000e+00	0.000000e+00	0.000000e+00	1.000000e+00
prc_high_x	2355383.0	2.540480e+01	2.608370e+01	0.1790	9.250000e+00	1.850000e+01	3.300000e+01	4.617600e+02
prc_low_x	2365005.0	2.211970e+01	2.325750e+01	0.0818	7.640000e+00	1.600000e+01	2.880000e+01	4.175300e+02
tvol_x	2580622.0	8.316484e+06	2.941295e+07	0.0000	9.875000e+04	5.510000e+05	3.923700e+06	6.485186e+08
div1m_me_x	2718102.0	1.300000e-03	3.700000e-03	0.0000	0.000000e+00	0.000000e+00	0.000000e+00	9.010000e-02

	count	mean	std	min	25%	50%	75%	max
div3m_me_x	2718121.0	4.000000e-03	6.000000e-03	0.0000	0.000000e+00	0.000000e+00	6.700000e-03	1.164000e-01
div6m_me_x	2660395.0	8.100000e-03	1.170000e-02	0.0000	0.000000e+00	0.000000e+00	1.360000e-02	1.472000e-01
div12m_me_x	2548844.0	1.670000e-02	2.350000e-02	0.0000	0.000000e+00	3.800000e-03	2.780000e-02	4.015000e-01
chcsho_1m_x	2720001.0	3.200000e-03	2.550000e-02	-0.1168	0.000000e+00	0.000000e+00	0.000000e+00	1.096800e+00
chcsho_3m_x	2681179.0	1.240000e-02	6.180000e-02	-0.1424	0.000000e+00	0.000000e+00	3.300000e-03	1.686700e+00
chcsho_6m_x	2624125.0	2.810000e-02	1.189000e-01	-0.1880	0.000000e+00	9.000000e-04	1.070000e-02	3.832600e+00
chcsho_12m_x	2514147.0	6.190000e-02	2.297000e-01	-0.2696	0.000000e+00	4.700000e-03	3.390000e-02	8.477000e+00
eqnpo_1m_x	2718435.0	-1.500000e-03	2.310000e-02	-0.6801	-0.000000e+00	0.000000e+00	0.000000e+00	1.263000e-01
eqnpo_3m_x	2677912.0	-6.200000e-03	5.200000e-02	-0.9973	-1.800000e-03	0.000000e+00	8.000000e-03	1.696000e-01
eqnpo_6m_x	2618619.0	-1.350000e-02	8.900000e-02	-1.5754	-7.400000e-03	0.000000e+00	1.640000e-02	2.788000e-01
eqnpo_12m_x	2504936.0	-2.670000e-02	1.474000e-01	-2.2489	-2.450000e-02	0.000000e+00	3.340000e-02	4.743000e-01
ret_1_0_x	2541516.0	1.490000e-02	1.481000e-01	-0.7242	-6.120000e-02	7.900000e-03	7.690000e-02	2.176500e+00
ret_2_0_x	2521767.0	2.960000e-02	2.125000e-01	-0.8327	-8.110000e-02	1.480000e-02	1.176000e-01	3.342500e+00
ret_3_0_x	2503682.0	4.400000e-02	2.649000e-01	-0.8864	-9.610000e-02	2.270000e-02	1.506000e-01	5.000000e+00
ret_3_1_x	2502019.0	2.870000e-02	2.108000e-01	-0.8310	-8.140000e-02	1.440000e-02	1.167000e-01	3.342500e+00
ret_6_0_x	2447794.0	8.830000e-02	3.970000e-01	-0.9396	-1.267000e-01	4.500000e-02	2.336000e-01	8.555600e+00
ret_6_1_x	2446030.0	7.230000e-02	3.553000e-01	-0.9171	-1.184000e-01	3.700000e-02	2.059000e-01	8.411800e+00
ret_9_0_x	2393988.0	1.336000e-01	5.093000e-01	-0.9721	-1.466000e-01	6.750000e-02	3.069000e-01	9.857100e+00
ret_9_1_x	2392087.0	1.168000e-01	4.700000e-01	-0.9555	-1.414000e-01	5.930000e-02	2.812000e-01	9.273700e+00
ret_12_0_x	2341375.0	1.813000e-01	6.179000e-01	-0.9783	-1.593000e-01	9.080000e-02	3.773000e-01	1.301590e+01
ret_12_1_x	2339380.0	1.635000e-01	5.789000e-01	-0.9728	-1.558000e-01	8.200000e-02	3.514000e-01	1.223080e+01
ret_12_7_x	2337747.0	7.050000e-02	3.478000e-01	-0.9055	-1.163000e-01	3.610000e-02	2.015000e-01	8.509400e+00
ret_18_1_x	2239551.0	2.625000e-01	7.812000e-01	-0.9850	-1.710000e-01	1.321000e-01	4.926000e-01	2.048480e+01
ret_24_1_x	2145964.0	3.596000e-01	9.260000e-01	-0.9890	-1.717000e-01	1.837000e-01	6.267000e-01	1.484620e+01
ret_24_12_x	2142652.0	1.821000e-01	6.037000e-01	-0.9678	-1.493000e-01	9.260000e-02	3.714000e-01	1.345160e+01
ret_36_1_x	1976435.0	5.673000e-01	1.234400e+00	-0.9935	-1.548000e-01	2.964000e-01	8.916000e-01	1.914000e+01
ret_36_12_x	1972590.0	3.838000e-01	9.482000e-01	-0.9864	-1.546000e-01	2.006000e-01	6.490000e-01	1.702520e+01
ret_48_12_x	1821582.0	5.938000e-01	1.256400e+00	-0.9918	-1.358000e-01	3.161000e-01	9.172000e-01	1.811810e+01
ret_48_1_x	1826053.0	7.976000e-01	1.577300e+00	-0.9965	-1.285000e-01	4.175000e-01	1.176300e+00	1.772000e+01

	count	mean	std	min	25%	50%	75%	max
ret_60_1_x	1691563.0	1.064400e+00	2.014800e+00	-0.9985	-9.170000e-02	5.486000e-01	1.492300e+00	2.754720e+01
ret_60_12_x	1686573.0	8.258000e-01	1.611700e+00	-0.9960	-1.096000e-01	4.364000e-01	1.200000e+00	2.063640e+01
ret_60_36_x	1680619.0	3.857000e-01	9.340000e-01	-0.9860	-1.429000e-01	2.072000e-01	6.479000e-01	1.808570e+01
seas_1_1an_x	2426517.0	1.420000e-02	1.421000e-01	-0.6705	-6.040000e-02	7.600000e-03	7.560000e-02	1.823500e+00
seas_1_1na_x	1870192.0	1.490000e-02	4.360000e-02	-0.2355	-7.800000e-03	1.280000e-02	3.460000e-02	3.871000e-01
seas_2_5an_x	1599992.0	1.520000e-02	6.790000e-02	-0.2970	-2.260000e-02	1.180000e-02	4.810000e-02	6.337000e-01
at_gr1_x	2426455.0	2.641000e-01	9.239000e-01	-0.7398	4.800000e-03	9.050000e-02	2.391000e-01	3.163840e+01
ca_gr1_x	2184566.0	3.206000e-01	1.336600e+00	-0.8313	-3.830000e-02	9.400000e-02	2.815000e-01	4.636900e+01
nca_gr1_x	2183067.0	3.950000e-01	1.682300e+00	-0.8737	-1.530000e-02	8.250000e-02	2.844000e-01	5.781320e+01
lt_gr1_x	2408077.0	3.042000e-01	9.791000e-01	-0.8021	-2.990000e-02	8.560000e-02	2.894000e-01	1.783760e+01
cl_gr1_x	2190296.0	2.996000e-01	8.898000e-01	-0.8494	-6.490000e-02	1.114000e-01	3.701000e-01	1.634630e+01
ncl_gr1_x	2075342.0	9.926000e-01	5.509500e+00	-1.0000	-1.023000e-01	3.970000e-02	3.376000e-01	1.990000e+02
be_gr1_x	2311345.0	3.178000e-01	1.301000e+00	-0.9166	5.900000e-03	9.660000e-02	2.271000e-01	3.373330e+01
debt_gr1_x	2158693.0	7.838000e-01	4.707200e+00	-1.0000	-1.456000e-01	1.900000e-02	3.292000e-01	1.090000e+02
sale_gr1_x	2362404.0	2.228000e-01	6.711000e-01	-0.9960	5.000000e-03	1.032000e-01	2.478000e-01	1.370570e+01
cogs_gr1_x	2358805.0	2.142000e-01	6.122000e-01	-0.9619	-4.700000e-03	1.032000e-01	2.613000e-01	1.190030e+01
sga_gr1_x	1997437.0	1.844000e-01	3.963000e-01	-1.0000	1.340000e-02	1.044000e-01	2.389000e-01	6.765800e+00
opex_gr1_x	2387208.0	1.949000e-01	4.470000e-01	-0.7668	7.900000e-03	1.058000e-01	2.505000e-01	7.187400e+00
capx_gr1_x	2147147.0	6.016000e-01	2.183000e+00	-1.3370	-2.236000e-01	1.144000e-01	6.251000e-01	3.425000e+01
inv_gr1_x	1910333.0	2.595000e-01	9.931000e-01	-1.0000	-6.850000e-02	8.260000e-02	2.909000e-01	1.698080e+01
at_gr3_x	2114339.0	9.104000e-01	2.670800e+00	-0.8797	8.870000e-02	3.426000e-01	8.167000e-01	6.899070e+01
ca_gr3_x	1898998.0	9.832000e-01	3.187300e+00	-0.9099	2.890000e-02	3.230000e-01	8.289000e-01	7.748590e+01
nca_gr3_x	1897746.0	1.592100e+00	6.786800e+00	-0.9628	4.280000e-02	3.455000e-01	1.005000e+00	1.792615e+02
lt_gr3_x	2091277.0	1.135900e+00	3.376000e+00	-0.8936	3.580000e-02	3.474000e-01	9.457000e-01	5.633890e+01
cl_gr3_x	1906078.0	9.845000e-01	2.656400e+00	-0.9194	9.000000e-03	3.652000e-01	9.754000e-01	4.535460e+01
ncl_gr3_x	1803330.0	4.168200e+00	2.242620e+01	-1.0000	-1.231000e-01	2.914000e-01	1.285200e+00	8.323333e+02
be_gr3_x	1998122.0	1.009400e+00	3.275200e+00	-0.9384	7.210000e-02	3.326000e-01	7.902000e-01	6.699660e+01
debt_gr3_x	1882647.0	3.622500e+00	2.086590e+01	-1.0000	-2.165000e-01	2.251000e-01	1.145100e+00	4.310000e+02
sale_gr3_x	2063618.0	8.605000e-01	2.814400e+00	-1.0000	7.210000e-02	3.286000e-01	7.527000e-01	8.620390e+01

	count	mean	std	min	25%	50%	75%	max
cogs_gr3_x	2052669.0	7.935000e-01	2.179500e+00	-1.0000	4.870000e-02	3.267000e-01	7.894000e-01	4.537560e+01
sga_gr3_x	1713690.0	6.540000e-01	1.324200e+00	-1.0000	9.470000e-02	3.366000e-01	7.294000e-01	2.400000e+01
opex_gr3_x	2073541.0	7.171000e-01	1.625000e+00	-0.8979	7.650000e-02	3.367000e-01	7.689000e-01	2.833740e+01
capx_gr3_x	1846897.0	1.692700e+00	5.902400e+00	-1.2088	-2.368000e-01	3.214000e-01	1.355700e+00	1.128462e+02
cash_gr1a_x	2396920.0	1.480000e-02	1.380000e-01	-1.1898	-1.600000e-02	2.800000e-03	3.520000e-02	8.303000e-01
inv_gr1a_x	2351255.0	1.250000e-02	5.090000e-02	-0.3723	-7.000000e-04	7.000000e-04	2.250000e-02	2.978000e-01
rec_gr1a_x	2363716.0	2.190000e-02	6.430000e-02	-0.4405	-2.700000e-03	1.190000e-02	4.270000e-02	3.340000e-01
ppeg_gr1a_x	2178200.0	5.240000e-02	1.039000e-01	-0.8431	8.900000e-03	3.670000e-02	8.330000e-02	5.756000e-01
lti_gr1a_x	2205853.0	5.400000e-03	4.060000e-02	-0.4964	0.000000e+00	0.000000e+00	1.100000e-03	3.478000e-01
intan_gr1a_x	2110874.0	1.080000e-02	6.690000e-02	-0.9608	-7.000000e-04	0.000000e+00	1.700000e-03	5.336000e-01
debtst_gr1a_x	2395084.0	3.900000e-03	6.220000e-02	-0.5236	-5.000000e-03	0.000000e+00	1.320000e-02	4.847000e-01
ap_gr1a_x	2267822.0	1.460000e-02	4.890000e-02	-0.2766	-3.900000e-03	6.100000e-03	2.540000e-02	2.945000e-01
txp_gr1a_x	2057276.0	9.000000e-04	1.130000e-02	-0.0902	-9.000000e-04	0.000000e+00	2.200000e-03	9.250000e-02
debtlt_gr1a_x	2411829.0	1.770000e-02	9.970000e-02	-0.6085	-1.080000e-02	0.000000e+00	3.540000e-02	5.760000e-01
txdltc_gr1a_x	2135161.0	2.300000e-03	1.280000e-02	-0.1302	0.000000e+00	0.000000e+00	4.800000e-03	8.330000e-02
coa_gr1a_x	2167569.0	3.450000e-02	1.005000e-01	-0.7908	-4.200000e-03	2.200000e-02	7.140000e-02	4.923000e-01
col_gr1a_x	2191221.0	1.980000e-02	6.480000e-02	-0.4855	-5.500000e-03	1.350000e-02	4.240000e-02	3.834000e-01
cowc_gr1a_x	2146736.0	1.440000e-02	8.680000e-02	-0.6052	-1.810000e-02	9.000000e-03	4.750000e-02	4.185000e-01
ncoa_gr1a_x	2185140.0	4.890000e-02	1.438000e-01	-1.8841	-5.500000e-03	2.970000e-02	9.040000e-02	7.494000e-01
ncol_gr1a_x	2174709.0	6.300000e-03	3.310000e-02	-0.3605	-1.100000e-03	1.900000e-03	1.180000e-02	3.338000e-01
nncoa_gr1a_x	2147813.0	4.270000e-02	1.424000e-01	-1.8841	-9.700000e-03	2.500000e-02	8.290000e-02	7.692000e-01
oa_gr1a_x	2167557.0	8.310000e-02	2.025000e-01	-2.5884	-3.400000e-03	6.800000e-02	1.668000e-01	8.176000e-01
ol_gr1a_x	2174709.0	2.620000e-02	8.090000e-02	-0.6433	-4.900000e-03	2.070000e-02	5.460000e-02	5.422000e-01
fna_gr1a_x	2497393.0	5.700000e-03	6.030000e-02	-0.7055	0.000000e+00	0.000000e+00	0.000000e+00	6.896000e-01
fnl_gr1a_x	2418391.0	2.150000e-02	1.353000e-01	-1.2296	-1.620000e-02	1.000000e-04	5.400000e-02	1.130300e+00
nfna_gr1a_x	2418391.0	-1.580000e-02	1.552000e-01	-1.1078	-5.900000e-02	-9.000000e-04	2.760000e-02	1.384100e+00
gp_gr1a_x	2387365.0	3.580000e-02	1.161000e-01	-0.8663	-2.200000e-03	2.080000e-02	7.290000e-02	1.372100e+00
ebitda_gr1a_x	2390711.0	9.700000e-03	9.740000e-02	-0.8685	-1.050000e-02	9.300000e-03	3.840000e-02	1.237100e+00
ebit_gr1a_x	2392217.0	5.200000e-03	9.760000e-02	-0.8536	-1.310000e-02	6.700000e-03	3.280000e-02	1.345400e+00

	count	mean	std	min	25%	50%	75%	max
ope_gr1a_x	2056758.0	9.400000e-03	1.005000e-01	-0.9869	-1.390000e-02	1.090000e-02	3.950000e-02	1.233300e+00
ni_gr1a_x	2402691.0	8.000000e-04	1.303000e-01	-1.6889	-1.340000e-02	3.900000e-03	2.430000e-02	2.739400e+00
nix_gr1a_x	2402691.0	6.000000e-04	1.422000e-01	-1.8549	-1.540000e-02	3.800000e-03	2.570000e-02	2.791300e+00
dp_gr1a_x	2309627.0	3.900000e-03	1.560000e-02	-0.3935	0.000000e+00	2.500000e-03	7.500000e-03	1.932000e-01
fincf_gr1a_x	2053075.0	1.220000e-02	2.465000e-01	-2.0255	-5.480000e-02	2.700000e-03	7.330000e-02	1.485100e+00
ocf_gr1a_x	2334713.0	1.000000e-04	1.397000e-01	-0.9941	-4.190000e-02	2.900000e-03	4.640000e-02	1.151200e+00
fcf_gr1a_x	2181931.0	-7.300000e-03	1.637000e-01	-1.1368	-6.050000e-02	-4.000000e-04	5.020000e-02	1.202900e+00
nwc_gr1a_x	2164316.0	2.640000e-02	1.763000e-01	-1.4272	-2.650000e-02	1.650000e-02	7.240000e-02	9.090000e-01
eqnetis_gr1a_x	2052797.0	1.170000e-02	2.127000e-01	-1.19975	-1.000000e-02	0.000000e+00	1.380000e-02	1.207600e+00
dltnetis_gr1a_x	2373431.0	-3.100000e-03	1.313000e-01	-0.7874	-2.580000e-02	0.000000e+00	2.250000e-02	7.003000e-01
dstnetis_gr1a_x	2290818.0	7.000000e-04	8.970000e-02	-0.8063	-1.090000e-02	0.000000e+00	1.870000e-02	7.197000e-01
dbnetis_gr1a_x	2374474.0	-2.600000e-03	1.670000e-01	-1.0269	-4.130000e-02	0.000000e+00	4.330000e-02	1.017900e+00
netis_gr1a_x	2052412.0	8.700000e-03	2.717000e-01	-2.0764	-6.040000e-02	1.700000e-03	7.550000e-02	1.539900e+00
eqnpo_gr1a_x	2047069.0	-1.104000e-02	2.148000e-01	-1.1821	-1.480000e-02	0.000000e+00	1.310000e-02	1.940900e+00
tax_gr1a_x	2398103.0	3.100000e-03	2.840000e-02	-0.2157	-3.800000e-03	1.000000e-03	1.140000e-02	2.047000e-01
eqbb_gr1a_x	1893504.0	1.700000e-03	3.370000e-02	-0.3806	0.000000e+00	0.000000e+00	3.000000e-04	2.809000e-01
eqis_gr1a_x	2000469.0	1.360000e-02	2.117000e-01	-2.0255	-2.500000e-03	0.000000e+00	5.700000e-03	1.226200e+00
div_gr1a_x	2382722.0	1.100000e-03	1.270000e-02	-0.2183	0.000000e+00	0.000000e+00	1.200000e-03	2.439000e-01
eqpo_gr1a_x	1891334.0	2.900000e-03	4.380000e-02	-0.4620	-1.000000e-04	0.000000e+00	4.100000e-03	3.915000e-01
capx_gr1a_x	2184434.0	7.400000e-03	5.440000e-02	-0.4868	-7.300000e-03	2.300000e-03	1.940000e-02	4.471000e-01
be_gr1a_x	2311289.0	4.620000e-02	1.699000e-01	-2.0718	1.600000e-03	3.510000e-02	8.970000e-02	8.561000e-01
cash_gr3a_x	2081646.0	2.960000e-02	1.755000e-01	-2.5781	-1.260000e-02	9.500000e-03	6.320000e-02	9.052000e-01
inv_gr3a_x	2033267.0	2.900000e-02	8.700000e-02	-0.6971	0.000000e+00	6.800000e-03	5.550000e-02	4.115000e-01
rec_gr3a_x	2047864.0	4.970000e-02	1.082000e-01	-0.7795	1.400000e-03	3.280000e-02	8.960000e-02	4.887000e-01
ppeg_gr3a_x	1890568.0	1.277000e-01	2.118000e-01	-2.1282	3.190000e-02	1.080000e-01	2.163000e-01	9.231000e-01
lti_gr3a_x	1864897.0	1.290000e-02	7.040000e-02	-0.6566	0.000000e+00	0.000000e+00	8.800000e-03	4.683000e-01
intan_gr3a_x	1784074.0	2.520000e-02	1.171000e-01	-1.7938	0.000000e+00	0.000000e+00	2.360000e-02	6.632000e-01
debtst_gr3a_x	2078323.0	8.500000e-03	7.970000e-02	-0.8315	-6.500000e-03	3.000000e-04	2.440000e-02	5.514000e-01
ap_gr3a_x	1936459.0	3.440000e-02	8.510000e-02	-0.4973	-3.000000e-04	1.600000e-02	4.880000e-02	4.801000e-01

	count	mean	std	min	25%	50%	75%	max
txp_gr3a_x	1751204.0	1.900000e-03	1.400000e-02	-0.0976	-1.200000e-03	0.000000e+00	4.400000e-03	1.079000e-01
debtlt_gr3a_x	2098723.0	4.090000e-02	1.579000e-01	-1.1700	-1.120000e-02	1.060000e-02	1.011000e-01	7.496000e-01
txdltc_gr3a_x	1843283.0	6.200000e-03	2.480000e-02	-0.2172	0.000000e+00	0.000000e+00	1.330000e-02	1.273000e-01
coa_gr3a_x	1880953.0	7.660000e-02	1.701000e-01	-1.4412	6.100000e-03	6.190000e-02	1.549000e-01	6.791000e-01
col_gr3a_x	1907173.0	4.420000e-02	9.650000e-02	-0.9653	4.300000e-03	3.750000e-02	8.380000e-02	4.559000e-01
cowc_gr3a_x	1861920.0	3.210000e-02	1.338000e-01	-1.0405	-2.130000e-02	2.260000e-02	9.140000e-02	5.604000e-01
ncoa_gr3a_x	1899708.0	1.091000e-01	2.575000e-01	-4.5815	1.230000e-02	1.026000e-01	2.250000e-01	8.112000e-01
ncol_gr3a_x	1887939.0	1.640000e-02	5.970000e-02	-0.5782	-0.000000e+00	9.000000e-03	3.080000e-02	4.104000e-01
nncoa_gr3a_x	1861492.0	9.300000e-02	2.474000e-01	-3.9391	1.200000e-03	8.690000e-02	2.030000e-01	8.094000e-01
oa_gr3a_x	1880920.0	1.840000e-01	3.641000e-01	-5.1474	4.560000e-02	2.082000e-01	3.829000e-01	9.247000e-01
ol_gr3a_x	1887939.0	6.020000e-02	1.295000e-01	-1.1795	1.270000e-02	5.900000e-02	1.138000e-01	6.233000e-01
fna_gr3a_x	2302373.0	1.560000e-02	8.920000e-02	-1.1421	0.000000e+00	0.000000e+00	0.000000e+00	7.162000e-01
fnl_gr3a_x	2105333.0	4.560000e-02	2.040000e-01	-1.8999	-1.910000e-02	2.600000e-02	1.304000e-01	8.753000e-01
nfna_gr3a_x	2105333.0	-3.150000e-02	2.282000e-01	-1.3255	-1.318000e-01	-2.310000e-02	4.440000e-02	2.048000e+00
gp_gr3a_x	2074121.0	7.850000e-02	1.870000e-01	-1.2858	4.200000e-03	5.550000e-02	1.554000e-01	1.274100e+00
ebitda_gr3a_x	2079592.0	2.410000e-02	1.330000e-01	-1.0362	-8.600000e-03	2.410000e-02	7.360000e-02	1.478800e+00
ebit_gr3a_x	2081034.0	1.490000e-02	1.346000e-01	-1.1637	-1.460000e-02	1.620000e-02	6.010000e-02	1.985300e+00
ope_gr3a_x	1772515.0	2.290000e-02	1.350000e-01	-1.1140	-1.410000e-02	2.540000e-02	7.260000e-02	1.382600e+00
ni_gr3a_x	2095331.0	5.500000e-03	1.607000e-01	-2.0040	-1.480000e-02	8.900000e-03	4.110000e-02	3.365400e+00
nix_gr3a_x	2095331.0	5.200000e-03	1.722000e-01	-2.2144	-1.670000e-02	8.800000e-03	4.270000e-02	3.330500e+00
dp_gr3a_x	1998657.0	9.200000e-03	2.780000e-02	-0.6566	5.000000e-04	7.400000e-03	1.760000e-02	3.627000e-01
ocf_gr3a_x	2026157.0	1.030000e-02	1.536000e-01	-0.9623	-3.950000e-02	1.100000e-02	6.680000e-02	1.459300e+00
fcf_gr3a_x	1875380.0	-2.300000e-03	1.806000e-01	-0.9594	-6.520000e-02	3.500000e-03	6.430000e-02	1.668700e+00
nwc_gr3a_x	1880705.0	5.470000e-02	2.333000e-01	-3.1433	-2.400000e-02	4.470000e-02	1.438000e-01	9.475000e-01
dltnetis_gr3a_x	2057295.0	-7.000000e-03	1.381000e-01	-0.9437	-3.150000e-02	0.000000e+00	2.360000e-02	8.602000e-01
dstnetis_gr3a_x	1975805.0	-1.000000e-04	7.960000e-02	-0.7776	-1.420000e-02	0.000000e+00	1.680000e-02	6.541000e-01
dbnetis_gr3a_x	2058325.0	-7.400000e-03	1.681000e-01	-1.2437	-4.610000e-02	0.000000e+00	4.140000e-02	1.075700e+00
tax_gr3a_x	2090131.0	6.500000e-03	3.600000e-02	-0.2190	-4.800000e-03	2.700000e-03	1.970000e-02	2.106000e-01
div_gr3a_x	2069485.0	2.200000e-03	1.420000e-02	-0.2110	0.000000e+00	0.000000e+00	4.200000e-03	2.609000e-01

	count	mean	std	min	25%	50%	75%	max
capx_gr3a_x	1877910.0	1.340000e-02	6.720000e-02	-0.6838	-6.700000e-03	6.500000e-03	3.240000e-02	3.679000e-01
capx_at_x	2305667.0	6.630000e-02	7.300000e-02	-0.0305	1.920000e-02	4.470000e-02	8.570000e-02	6.092000e-01
spi_at_x	2376699.0	-1.010000e-02	4.960000e-02	-1.3123	-2.700000e-03	0.000000e+00	0.000000e+00	1.961000e-01
xido_at_x	2513016.0	-5.000000e-04	1.800000e-02	-0.4152	0.000000e+00	0.000000e+00	0.000000e+00	1.762000e-01
nri_at_x	2375825.0	-1.080000e-02	6.070000e-02	-1.5759	-4.600000e-03	0.000000e+00	0.000000e+00	2.675000e-01
gp_sale_x	2468341.0	8.440000e-02	3.062100e+00	-124.7476	2.080000e-01	3.345000e-01	5.045000e-01	9.763000e-01
ebitda_sale_x	2470375.0	-3.073000e-01	4.409900e+00	-171.6176	5.970000e-02	1.272000e-01	2.277000e-01	7.373000e-01
ebit_sale_x	2470818.0	-3.840000e-01	4.578500e+00	-185.0447	3.170000e-02	8.990000e-02	1.721000e-01	6.154000e-01
pi_sale_x	2473639.0	-4.469000e-01	4.876400e+00	-184.2990	1.190000e-02	7.260000e-02	1.445000e-01	7.101000e-01
ni_sale_x	2474362.0	-4.693000e-01	4.796100e+00	-184.2990	7.200000e-03	4.550000e-02	9.440000e-02	5.566000e-01
nix_sale_x	2472905.0	-4.745000e-01	4.848700e+00	-184.2990	6.200000e-03	4.620000e-02	9.640000e-02	6.508000e-01
ocf_sale_x	2414346.0	-3.439000e-01	3.755000e+00	-140.2577	-1.520000e-02	5.800000e-02	1.448000e-01	1.412300e+00
fcf_sale_x	2267091.0	-5.418000e-01	4.134400e+00	-125.9694	-1.053000e-01	-1.100000e-03	6.670000e-02	1.210500e+00
gp_at_x	2503159.0	3.011000e-01	2.895000e-01	-1.2660	1.023000e-01	2.659000e-01	4.563000e-01	1.412300e+00
ebitda_at_x	2505194.0	7.710000e-02	1.992000e-01	-2.1076	2.950000e-02	1.080000e-01	1.699000e-01	5.122000e-01
ebit_at_x	2506116.0	4.100000e-02	1.986000e-01	-2.1142	1.820000e-02	7.130000e-02	1.269000e-01	4.730000e-01
fi_at_x	2185678.0	1.660000e-02	2.114000e-01	-2.6041	2.010000e-02	6.410000e-02	9.800000e-02	3.716000e-01
cop_at_x	2259456.0	1.333000e-01	1.925000e-01	-1.1882	3.940000e-02	1.365000e-01	2.302000e-01	1.940400e+00
ni_at_x	2514966.0	-5.000000e-03	2.045000e-01	-2.8828	3.400000e-03	3.510000e-02	7.410000e-02	3.332000e-01
ope_be_x	2108352.0	1.569000e-01	5.427000e-01	-8.8149	9.490000e-02	2.136000e-01	3.261000e-01	3.725100e+00
ni_be_x	2444347.0	-1.990000e-02	5.962000e-01	-10.7541	1.720000e-02	9.500000e-02	1.504000e-01	1.450500e+00
nix_be_x	2444347.0	-2.270000e-02	6.187000e-01	-11.9515	1.490000e-02	9.590000e-02	1.526000e-01	1.558300e+00
ocf_be_x	2375509.0	4.150000e-02	5.350000e-01	-7.2459	-3.990000e-02	1.089000e-01	2.199000e-01	4.068700e+00
fcf_be_x	2219533.0	-1.352000e-01	6.520000e-01	-9.8959	-2.117000e-01	-4.000000e-03	1.206000e-01	2.895100e+00
gp_be_v_x	2404319.0	6.940000e-01	1.236500e+00	-11.0645	2.172000e-01	4.625000e-01	8.366000e-01	1.753110e+01
ebitda_be_v_x	2406313.0	5.730000e-02	1.310800e+00	-38.6063	9.750000e-02	1.837000e-01	2.972000e-01	3.290900e+00
ebit_be_v_x	2406990.0	-2.510000e-02	1.386000e+00	-41.0563	5.220000e-02	1.282000e-01	2.282000e-01	2.800000e+00
fi_be_v_x	2116451.0	-8.600000e-02	1.345800e+00	-38.5103	4.190000e-02	9.910000e-02	1.608000e-01	2.274200e+00
cop_be_v_x	2188818.0	3.139000e-01	8.344000e-01	-8.9448	8.920000e-02	2.259000e-01	4.111000e-01	1.607970e+01

	count	mean	std	min	25%	50%	75%	max
gp_ppen_x	2466653.0	2.763900e+00	6.510900e+00	-130.5385	4.559000e-01	1.518900e+00	3.353000e+00	1.035052e+02
ebitda_ppen_x	2468488.0	-1.134000e-01	1.280070e+01	-558.0000	1.689000e-01	4.726000e-01	1.116300e+00	3.389320e+01
fcf_ppen_x	2270795.0	-8.658000e-01	1.104610e+01	-423.4211	-3.778000e-01	-1.180000e-02	3.338000e-01	3.272670e+01
fincf_at_x	2181057.0	6.050000e-02	2.270000e-01	-0.9085	-4.100000e-02	1.800000e-03	8.120000e-02	1.643700e+00
netis_at_x	2180970.0	2.900000e-02	2.576000e-01	-1.3681	-4.860000e-02	0.000000e+00	5.940000e-02	1.592800e+00
eqnetis_at_x	2181226.0	5.680000e-02	1.918000e-01	-0.3507	-8.000000e-04	6.000000e-04	1.520000e-02	1.488800e+00
eqis_at_x	2142004.0	7.050000e-02	1.912000e-01	-0.1034	0.000000e+00	3.200000e-03	2.280000e-02	1.535600e+00
dbnetis_at_x	2487875.0	-2.120000e-02	1.573000e-01	-1.3624	-3.980000e-02	-8.000000e-04	2.270000e-02	6.456000e-01
dltnetis_at_x	2487184.0	-2.430000e-02	1.364000e-01	-1.2268	-3.180000e-02	-2.200000e-03	1.200000e-03	5.184000e-01
dstnetis_at_x	2428021.0	3.500000e-03	6.050000e-02	-0.4789	-5.100000e-03	0.000000e+00	1.130000e-02	4.836000e-01
eqnpo_at_x	2177364.0	-4.470000e-02	1.949000e-01	-1.4673	-1.110000e-02	8.000000e-04	2.020000e-02	4.462000e-01
eqbb_at_x	2059717.0	1.250000e-02	3.500000e-02	-0.0026	0.000000e+00	0.000000e+00	5.300000e-03	4.018000e-01
div_at_x	2500964.0	1.160000e-02	2.170000e-02	0.0000	0.000000e+00	1.900000e-03	1.660000e-02	3.183000e-01
oaccruals_at_x	2261617.0	-1.580000e-02	1.522000e-01	-2.2637	-7.200000e-02	-1.830000e-02	4.760000e-02	6.719000e-01
oaccruals_ni_x	2260635.0	-5.853000e-01	6.180500e+00	-71.4418	-1.208700e+00	-2.712000e-01	6.967000e-01	8.515790e+01
taccruals_at_x	2240180.0	-3.100000e-02	2.045000e-01	-2.4802	-9.100000e-02	-1.180000e-02	4.930000e-02	1.294200e+00
taccruals_ni_x	2238904.0	-1.448100e+00	8.683400e+00	-131.5096	-1.516600e+00	-1.946000e-01	7.622000e-01	6.728570e+01
noa_at_x	2142866.0	6.816000e-01	4.649000e-01	-1.1515	4.896000e-01	6.884000e-01	8.418000e-01	1.038840e+01
be_beve_x	2368048.0	1.343100e+00	2.666700e+00	0.0326	5.543000e-01	8.086000e-01	1.190400e+00	6.053070e+01
debt_beve_x	2416506.0	4.732000e-01	6.162000e-01	0.0000	1.399000e-01	3.804000e-01	6.012000e-01	1.276120e+01
cash_beve_x	2397575.0	8.357000e-01	3.110100e+00	0.0000	3.800000e-02	1.245000e-01	4.276000e-01	8.007360e+01
pstk_beve_x	2418755.0	2.720000e-02	1.704000e-01	0.0000	0.000000e+00	0.000000e+00	0.000000e+00	7.089400e+00
debtlt_beve_x	2412477.0	3.446000e-01	4.482000e-01	0.0000	5.390000e-02	2.671000e-01	4.815000e-01	9.026500e+00
debtst_beve_x	2403343.0	1.233000e-01	2.903000e-01	0.0000	3.200000e-03	3.390000e-02	1.172000e-01	5.633000e+00
int_debt_x	1959042.0	1.258000e-01	3.153000e-01	0.0000	5.310000e-02	7.610000e-02	1.063000e-01	7.750000e+00
int_debtlt_x	1874541.0	3.393000e-01	1.552500e+00	0.0000	6.360000e-02	9.400000e-02	1.485000e-01	4.145000e+01
ebitda_debt_x	2242375.0	2.161600e+00	2.312980e+01	-362.2105	1.666000e-01	3.959000e-01	9.501000e-01	5.562212e+02
profit_cl_x	2270271.0	4.298000e-01	1.566600e+00	-11.9038	2.114000e-01	5.648000e-01	1.016300e+00	6.155300e+00
ocf_cl_x	2269486.0	5.390000e-02	1.456200e+00	-14.9568	-1.363000e-01	2.183000e-01	5.993000e-01	5.976400e+00

	count	mean	std	min	25%	50%	75%	max
ocf_debt_x	2189764.0	1.253200e+00	1.968000e+01	-264.1167	-7.590000e-02	1.564000e-01	5.185000e-01	4.307215e+02
cash_lt_x	2487462.0	7.781000e-01	2.113200e+00	0.0000	4.150000e-02	1.312000e-01	5.084000e-01	2.990910e+01
inv_act_x	2124755.0	2.719000e-01	2.276000e-01	0.0000	4.860000e-02	2.538000e-01	4.448000e-01	9.113000e-01
rec_act_x	2130411.0	3.499000e-01	2.071000e-01	0.0000	1.990000e-01	3.479000e-01	4.754000e-01	9.455000e-01
debtst_debt_x	2235158.0	2.916000e-01	3.181000e-01	0.0000	3.900000e-02	1.578000e-01	4.582000e-01	1.000000e+00
cl_lt_x	2271050.0	5.408000e-01	2.822000e-01	0.0172	3.033000e-01	5.188000e-01	7.861000e-01	1.000000e+00
debtlt_debt_x	2251637.0	7.215000e-01	3.158000e-01	0.0000	5.637000e-01	8.571000e-01	9.724000e-01	1.000000e+00
lt_ppen_x	2467297.0	1.413180e+01	4.095230e+01	0.0809	1.032300e+00	2.019600e+00	5.768200e+00	7.630447e+02
debtlt_be_x	2439883.0	7.140000e-01	1.464700e+00	0.0000	3.360000e-02	3.025000e-01	7.618000e-01	2.225160e+01
opex_at_x	2503218.0	9.413000e-01	8.196000e-01	0.0029	3.295000e-01	7.872000e-01	1.304500e+00	7.158500e+00
nwc_at_x	2253296.0	2.724000e-01	2.457000e-01	-0.7924	8.520000e-02	2.536000e-01	4.349000e-01	9.547000e-01
debt_at_x	2514980.0	2.331000e-01	2.095000e-01	0.0000	5.090000e-02	1.957000e-01	3.591000e-01	1.428700e+00
debt_be_x	2444508.0	9.825000e-01	1.972300e+00	0.0000	9.520000e-02	4.426000e-01	1.023800e+00	3.440000e+01
ebit_int_x	2038745.0	1.266250e+01	1.784445e+02	-3702.0000	1.253300e+00	4.003000e+00	1.124330e+01	3.302250e+03
inv_days_x	2394275.0	8.869850e+01	1.683021e+02	0.0000	9.009300e+00	5.392190e+01	1.091676e+02	3.574195e+03
rec_days_x	2403668.0	3.602296e+02	9.967740e+02	0.0000	3.863530e+01	5.827670e+01	8.822010e+01	7.354934e+03
ap_days_x	2314657.0	1.459695e+03	7.489965e+03	0.7812	2.587680e+01	4.209780e+01	7.865320e+01	1.412089e+05
cash_conversion_x	1836443.0	1.256743e+02	2.122532e+02	0.0000	4.172550e+01	8.193360e+01	1.398610e+02	3.521431e+03
cash_cl_x	2262167.0	1.419800e+00	3.231200e+00	0.0000	1.124000e-01	3.726000e-01	1.177400e+00	3.650000e+01
caliq_cl_x	2241081.0	2.487700e+00	3.827100e+00	0.0581	9.004000e-01	1.378900e+00	2.376600e+00	4.066670e+01
ca_cl_x	2252774.0	3.162200e+00	3.912700e+00	0.0824	1.372500e+00	2.102000e+00	3.307100e+00	4.119530e+01
inv_turnover_x	1990611.0	1.861590e+01	4.951140e+01	0.0438	2.956600e+00	5.130900e+00	1.205000e+01	7.307939e+02
at_turnover_x	2482416.0	1.084900e+00	9.318000e-01	0.0000	3.768000e-01	9.269000e-01	1.525100e+00	9.298300e+00
rec_turnover_x	2400338.0	1.234110e+01	2.636800e+01	0.0000	4.039600e+00	6.187900e+00	9.236800e+00	2.787135e+02
ap_turnover_x	2229997.0	1.163840e+01	1.238900e+01	-0.1258	4.826800e+00	8.918500e+00	1.434510e+01	1.336129e+02
sale_bev_x	2408388.0	2.269200e+00	2.923100e+00	0.0000	7.623000e-01	1.580300e+00	2.598800e+00	3.887110e+01
sale_be_x	2437063.0	2.732600e+00	3.718300e+00	0.0000	9.001000e-01	1.758000e+00	3.096000e+00	5.438940e+01
div_ni_x	1963756.0	3.126000e-01	5.775000e-01	0.0000	0.000000e+00	1.650000e-01	4.135000e-01	1.293670e+01
sale_nwc_x	2017664.0	9.746900e+00	2.267620e+01	0.0000	2.066900e+00	3.971600e+00	7.750900e+00	3.110241e+02

	count	mean	std	min	25%	50%	75%	max
tax_pi_x	1999061.0	3.279000e-01	3.117000e-01	-7.2981	2.705000e-01	3.654000e-01	4.329000e-01	5.548900e+00
cash_at_x	2496082.0	1.581000e-01	2.035000e-01	0.0000	2.580000e-02	7.260000e-02	2.026000e-01	9.799000e-01
ni_emp_x	2332173.0	-1.044570e+01	1.898294e+02	-3810.3810	4.055000e-01	4.200600e+00	1.703640e+01	1.438498e+03
sale_emp_x	2328826.0	2.691786e+02	5.003031e+02	0.0000	6.301400e+01	1.411000e+02	2.763478e+02	7.782523e+03
sale_emp_gr1_x	2120715.0	1.123000e-01	4.553000e-01	-0.9563	-3.330000e-02	5.300000e-02	1.513000e-01	7.027000e+00
emp_gr1_x	2048454.0	7.670000e-02	2.504000e-01	-1.3333	-3.060000e-02	4.520000e-02	1.538000e-01	1.483100e+00
ni_inc8q_x	1837805.0	3.116800e+00	3.262400e+00	0.0000	0.000000e+00	2.000000e+00	7.000000e+00	8.000000e+00
noa_gr1a_x	2130139.0	1.277000e-01	4.002000e-01	-0.7366	-1.750000e-02	4.940000e-02	1.574000e-01	1.075230e+01
ppeinv_gr1a_x	2130674.0	1.104000e-01	2.282000e-01	-0.5663	9.400000e-03	5.870000e-02	1.436000e-01	3.078700e+00
lnoa_gr1a_x	2042945.0	3.180000e-02	9.170000e-02	-0.5778	-3.800000e-03	1.370000e-02	4.740000e-02	7.544000e-01
capx_gr2_x	1996106.0	1.219100e+00	4.305300e+00	-1.4277	-2.477000e-01	2.272000e-01	1.043000e+00	7.697220e+01
saleq_gr1_x	2256822.0	2.428000e-01	8.315000e-01	-1.0000	-1.270000e-02	9.890000e-02	2.606000e-01	1.574840e+01
niq_be_x	2153966.0	5.000000e-04	1.393000e-01	-2.0216	1.600000e-03	2.420000e-02	4.290000e-02	6.993000e-01
niq_at_x	2218680.0	-2.200000e-03	6.080000e-02	-0.6672	0.000000e+00	8.200000e-03	2.060000e-02	1.818000e-01
niq_be_chg1_x	1961181.0	-7.700000e-03	1.339000e-01	-2.0038	-1.650000e-02	-6.000000e-04	1.090000e-02	1.227600e+00
niq_at_chg1_x	2044996.0	3.000000e-04	5.400000e-02	-0.4547	-7.100000e-03	-0.000000e+00	5.600000e-03	8.413000e-01
dsale_dinv_x	1796036.0	-4.380000e-02	8.780000e-01	-19.4778	-1.460000e-01	2.150000e-02	1.949000e-01	5.598300e+00
dsale_drec_x	2136436.0	-3.080000e-02	6.202000e-01	-7.3996	-1.418000e-01	1.500000e-03	1.418000e-01	7.637700e+00
dgp_dsale_x	2120443.0	2.720000e-02	5.405000e-01	-5.9700	-7.530000e-02	2.300000e-03	8.380000e-02	1.201120e+01
dsale_dsga_x	1827645.0	2.310000e-02	3.643000e-01	-2.2251	-8.920000e-02	-1.000000e-04	9.360000e-02	6.963700e+00
saleq_su_x	1944544.0	1.618000e-01	1.699500e+00	-16.0960	-8.666000e-01	1.532000e-01	1.125000e+00	3.358810e+01
niq_su_x	1972831.0	-1.123000e-01	1.940400e+00	-50.8463	-7.565000e-01	5.100000e-03	7.529000e-01	2.019490e+01
capex_abn_x	1806456.0	1.173000e-01	9.626000e-01	-1.1469	-3.685000e-01	-6.920000e-02	2.932000e-01	1.196350e+01
op_atl1_x	2415570.0	1.320000e-01	2.472000e-01	-6.9463	4.860000e-02	1.355000e-01	2.227000e-01	1.125400e+00
gp_atl1_x	2413733.0	3.639000e-01	3.763000e-01	-1.9036	1.162000e-01	3.032000e-01	5.356000e-01	2.788000e+00
ope_bell_x	2010286.0	2.202000e-01	6.575000e-01	-13.6285	1.063000e-01	2.425000e-01	3.880000e-01	4.617600e+00
cop_atl1_x	2237311.0	1.409000e-01	2.863000e-01	-3.8344	4.500000e-02	1.505000e-01	2.563000e-01	1.923400e+00
pi_nix_x	1959639.0	1.615000e+00	6.861000e-01	0.1059	1.340700e+00	1.572900e+00	1.777900e+00	1.989360e+01
ocf_at_x	2449158.0	1.150000e-02	1.872000e-01	-1.8184	-2.140000e-02	4.090000e-02	1.033000e-01	5.979000e-01

	count	mean	std	min	25%	50%	75%	max
op_at_x	2505194.0	1.113000e-01	1.575000e-01	-1.2330	4.200000e-02	1.205000e-01	1.892000e-01	5.662000e-01
ocf_at_chg1_x	2333855.0	2.300000e-03	1.627000e-01	-1.0782	-4.770000e-02	-1.000000e-04	4.630000e-02	1.390100e+00
at_be_x	2452393.0	3.714900e+00	4.779700e+00	1.0000	1.469000e+00	2.029600e+00	3.240900e+00	5.963100e+01
niq_saleq_std_x	1902197.0	1.360600e+00	1.149800e+01	0.0008	1.930000e-02	4.260000e-02	1.236000e-01	3.177766e+02
roe_be_std_x	1799259.0	1.611000e-01	4.732000e-01	0.0021	2.230000e-02	4.760000e-02	1.133000e-01	9.225400e+00
tangibility_x	2201788.0	6.502000e-01	1.916000e-01	0.0025	5.540000e-01	6.638000e-01	7.614000e-01	1.684700e+00
earnings_variability_x	1752776.0	8.639000e-01	1.037400e+00	0.0243	2.577000e-01	5.765000e-01	1.052900e+00	1.145280e+01
aliq_at_x	2174808.0	8.263000e-01	8.005000e-01	0.1044	5.792000e-01	6.946000e-01	8.423000e-01	2.803980e+01
f_score_x	1978727.0	4.911500e+00	1.728500e+00	0.0000	4.000000e+00	5.000000e+00	6.000000e+00	9.000000e+00
o_score_x	2127585.0	-1.902100e+00	3.035200e+00	-9.3872	-3.598500e+00	-2.309000e+00	-8.857000e-01	2.287030e+01
z_score_x	2126989.0	5.526800e+00	9.357000e+00	-37.3359	1.992200e+00	3.446700e+00	5.637300e+00	1.744239e+02
intrinsic_value_x	1899809.0	1.317903e+03	5.258077e+03	0.0982	3.489040e+01	1.295681e+02	5.706605e+02	1.130984e+05
kz_index_x	2167838.0	-1.126290e+01	5.190800e+01	-1723.5716	-6.936600e+00	-1.467200e+00	5.962000e-01	8.903350e+01
gpoa_ch5_x	1799428.0	-5.000000e-03	1.939000e-01	-1.1201	-7.080000e-02	-2.900000e-03	5.560000e-02	1.669700e+00
roe_ch5_x	1718355.0	-1.400000e-02	5.543000e-01	-7.5143	-7.570000e-02	-6.100000e-03	5.400000e-02	7.791500e+00
roa_ch5_x	1824336.0	4.900000e-03	1.917000e-01	-1.6595	-3.640000e-02	-1.800000e-03	2.650000e-02	3.283900e+00
cfoa_ch5_x	1759171.0	1.520000e-02	1.825000e-01	-0.9610	-5.570000e-02	2.500000e-03	7.100000e-02	2.175100e+00
gmar_ch5_x	1777826.0	4.200000e-02	9.593000e-01	-24.3597	-4.330000e-02	2.700000e-03	5.140000e-02	3.059480e+01
ni_ar1_x	1798398.0	2.127000e-01	6.110000e-01	-3.9640	-1.463000e-01	1.674000e-01	5.078000e-01	9.144200e+00
ni_ivol_x	1798398.0	5.090000e-02	1.054000e-01	0.0003	7.900000e-03	1.910000e-02	4.640000e-02	1.756800e+00
at_me_x	2522907.0	2.710400e+00	4.953100e+00	0.0086	5.788000e-01	1.230200e+00	2.687400e+00	1.923122e+02
be_me_x	2452453.0	7.411000e-01	7.141000e-01	0.0050	3.072000e-01	5.729000e-01	9.557000e-01	2.516310e+01
debt_me_x	2515141.0	7.136000e-01	1.647800e+00	0.0000	3.610000e-02	2.333000e-01	7.145000e-01	6.550580e+01
netdebt_me_x	2515141.0	4.707000e-01	1.480500e+00	-3.4965	-6.240000e-02	1.146000e-01	5.472000e-01	5.866260e+01
cash_me_x	2496218.0	2.459000e-01	5.843000e-01	0.0000	3.340000e-02	9.500000e-02	2.301000e-01	1.478940e+01
sale_me_x	2509790.0	1.848400e+00	3.088100e+00	0.0000	3.854000e-01	9.080000e-01	2.049100e+00	7.507530e+01
gp_me_x	2504145.0	4.729000e-01	6.845000e-01	-5.3506	1.503000e-01	2.955000e-01	5.587000e-01	1.896990e+01
ebitda_me_x	2506237.0	1.594000e-01	2.707000e-01	-5.8474	5.650000e-02	1.331000e-01	2.363000e-01	5.597900e+00
ebit_me_x	2507305.0	9.600000e-02	2.455000e-01	-7.4186	3.000000e-02	9.500000e-02	1.716000e-01	3.506600e+00

	count	mean	std	min	25%	50%	75%	max
ope_me_x	2183835.0	1.085000e-01	2.516000e-01	-8.0248	3.920000e-02	1.084000e-01	1.911000e-01	3.793500e+00
ni_me_x	2517298.0	1.200000e-03	3.459000e-01	-18.9294	5.500000e-03	4.900000e-02	8.530000e-02	9.917000e-01
nix_me_x	2517298.0	-1.200000e-03	3.693000e-01	-20.3694	4.100000e-03	4.920000e-02	8.650000e-02	1.036200e+00
cop_me_x	2259562.0	2.183000e-01	5.014000e-01	-3.5452	4.550000e-02	1.406000e-01	2.768000e-01	2.124680e+01
ocf_me_x	2450553.0	4.280000e-02	2.747000e-01	-5.6691	-1.830000e-02	5.360000e-02	1.205000e-01	5.711200e+00
fcf_me_x	2303306.0	-7.030000e-02	3.536000e-01	-8.5448	-1.065000e-01	-2.600000e-03	5.530000e-02	4.202300e+00
div_me_x	2501593.0	1.780000e-02	2.950000e-02	0.0000	0.000000e+00	3.900000e-03	2.660000e-02	1.049700e+00
eqbb_me_x	2059868.0	1.380000e-02	3.780000e-02	-0.0037	0.000000e+00	0.000000e+00	7.800000e-03	8.704000e-01
eqis_me_x	2142182.0	4.550000e-02	1.388000e-01	-0.1339	1.000000e-04	3.500000e-03	1.830000e-02	5.839400e+00
eqpo_me_x	2058263.0	3.150000e-02	5.660000e-02	-0.0013	0.000000e+00	1.120000e-02	4.150000e-02	1.725500e+00
eqnpo_me_x	2177501.0	-1.430000e-02	1.450000e-01	-6.1142	-8.100000e-03	1.200000e-03	3.130000e-02	1.442900e+00
eqnetis_me_x	2181408.0	3.130000e-02	1.401000e-01	-0.6866	-1.400000e-03	7.000000e-04	1.260000e-02	5.679700e+00
at_me_v_x	2480516.0	1.759600e+00	3.280300e+00	0.0085	5.638000e-01	1.008000e+00	1.587100e+00	6.916660e+01
bev_me_v_x	2404633.0	6.919000e-01	5.487000e-01	0.0009	3.194000e-01	6.308000e-01	9.482000e-01	1.692550e+01
ppen_me_v_x	2459710.0	3.322000e-01	3.872000e-01	0.0000	5.950000e-02	1.893000e-01	4.753000e-01	6.654400e+00
be_me_v_x	2410201.0	6.153000e-01	8.336000e-01	0.0050	2.513000e-01	4.357000e-01	7.057000e-01	2.914710e+01
cash_me_v_x	2460357.0	2.333000e-01	6.611000e-01	0.0000	2.350000e-02	6.940000e-02	1.825000e-01	1.486960e+01
sale_me_v_x	2472091.0	1.265200e+00	1.765600e+00	0.0000	3.146000e-01	7.343000e-01	1.550900e+00	3.775600e+01
gp_me_v_x	2467238.0	3.453000e-01	4.647000e-01	-2.4081	1.209000e-01	2.305000e-01	4.284000e-01	1.314000e+01
ebitda_me_v_x	2469299.0	1.012000e-01	2.101000e-01	-5.5869	5.090000e-02	1.060000e-01	1.669000e-01	2.711700e+00
ebit_me_v_x	2470075.0	6.010000e-02	2.226000e-01	-6.8743	2.670000e-02	7.470000e-02	1.222000e-01	2.601300e+00
cop_me_v_x	2243652.0	1.516000e-01	2.798000e-01	-2.3844	4.200000e-02	1.203000e-01	2.126000e-01	8.747500e+00
ocf_me_v_x	2431339.0	3.150000e-02	1.968000e-01	-4.7377	-1.650000e-02	4.340000e-02	9.350000e-02	2.334400e+00
fcf_me_v_x	2286863.0	-3.800000e-02	2.261000e-01	-6.0410	-8.630000e-02	-2.300000e-03	4.670000e-02	1.728000e+00
debt_me_v_x	2480615.0	3.008000e-01	3.502000e-01	0.0000	4.020000e-02	2.106000e-01	4.607000e-01	7.224300e+00
pstk_me_v_x	2479267.0	1.480000e-02	5.860000e-02	0.0000	0.000000e+00	0.000000e+00	0.000000e+00	1.220500e+00
debtlt_me_v_x	2476104.0	2.224000e-01	2.443000e-01	0.0000	1.400000e-02	1.446000e-01	3.542000e-01	2.411300e+00
debtst_me_v_x	2461067.0	8.090000e-02	2.125000e-01	0.0000	9.000000e-04	1.690000e-02	7.010000e-02	5.292900e+00
dltnetis_me_v_x	2453443.0	-3.150000e-02	1.853000e-01	-3.5613	-3.440000e-02	-1.900000e-03	1.200000e-03	6.324000e-01

	count	mean	std	min	25%	50%	75%	max
dstnetis_mev_x	2393968.0	4.100000e-03	9.390000e-02	-1.0163	-4.800000e-03	0.000000e+00	1.110000e-02	1.122900e+00
dbnetis_mev_x	2454176.0	-2.880000e-02	2.223000e-01	-4.4848	-4.210000e-02	-6.000000e-04	2.280000e-02	1.188800e+00
netis_mev_x	2164671.0	-8.300000e-03	2.729000e-01	-4.6395	-5.040000e-02	0.000000e+00	5.030000e-02	5.358400e+00
fincf_mev_x	2164802.0	3.700000e-02	2.405000e-01	-2.3006	-4.040000e-02	1.300000e-03	7.090000e-02	6.822000e+00
aliq_mat_x	2036506.0	5.016000e-01	2.661000e-01	0.0270	3.052000e-01	4.793000e-01	6.504000e-01	3.973200e+00
eq_dur_x	2193667.0	1.598720e+01	5.630900e+00	0.2861	1.413720e+01	1.612420e+01	1.764670e+01	3.430355e+02
beta_60m_x	2090801.0	1.153800e+00	6.856000e-01	-1.7467	6.897000e-01	1.081600e+00	1.528500e+00	4.912400e+00
ivol_capm_60m_x	2090801.0	1.172000e-01	6.560000e-02	0.0288	7.050000e-02	1.002000e-01	1.454000e-01	5.392000e-01
resff3_12_1_x	2274040.0	-2.210000e-02	2.736000e-01	-1.1550	-1.908000e-01	-8.900000e-03	1.610000e-01	7.899000e-01
resff3_6_1_x	2273172.0	-5.420000e-02	5.396000e-01	-2.9537	-3.435000e-01	-2.040000e-02	2.734000e-01	1.925800e+00
mispricing_mgmt_x	2414716.0	4.896000e-01	1.856000e-01	0.0147	3.610000e-01	5.047000e-01	6.284000e-01	9.427000e-01
mispricing_perf_x	2649116.0	5.208000e-01	2.065000e-01	0.0099	3.773000e-01	5.270000e-01	6.749000e-01	9.881000e-01
zero_trades_21d_x	2568596.0	9.102000e-01	2.670500e+00	0.0000	1.800000e-03	3.700000e-03	7.200000e-03	2.100980e+01
dolvol_126d_x	2527407.0	1.272436e+07	5.041472e+07	36.1000	6.023594e+04	3.756701e+05	3.493927e+06	1.038495e+09
dolvol_var_126d_x	2527340.0	1.275800e+00	7.751000e-01	0.2622	7.587000e-01	1.088500e+00	1.545100e+00	8.289100e+00
turnover_126d_x	2527415.0	4.300000e-03	6.800000e-03	0.0000	9.000000e-04	2.200000e-03	5.300000e-03	2.857000e-01
turnover_var_126d_x	2527348.0	1.251900e+00	7.609000e-01	0.2796	7.459000e-01	1.058700e+00	1.509700e+00	7.678300e+00
zero_trades_126d_x	2527415.0	9.170000e-01	2.511100e+00	0.0000	1.900000e-03	4.000000e-03	1.771000e-01	1.949730e+01
zero_trades_252d_x	2472485.0	9.236000e-01	2.470600e+00	0.0001	2.000000e-03	4.300000e-03	2.625000e-01	1.910030e+01
bidaskhl_21d_x	2474735.0	1.470000e-02	1.810000e-02	0.0011	5.600000e-03	9.400000e-03	1.710000e-02	5.318000e-01
rvolhl_21d_x	2474735.0	2.130000e-02	1.570000e-02	0.0000	1.100000e-02	1.720000e-02	2.680000e-02	1.854000e-01
beta_21d_x	2469080.0	8.736000e-01	1.205700e+00	-11.1429	2.238000e-01	8.042000e-01	1.458000e+00	1.276490e+01
ivol_capm_21d_x	2469080.0	2.710000e-02	1.960000e-02	0.0018	1.400000e-02	2.160000e-02	3.380000e-02	2.415000e-01
iskew_capm_21d_x	2469046.0	2.407000e-01	8.745000e-01	-3.5665	-2.542000e-01	2.053000e-01	7.097000e-01	3.715300e+00
coskew_21d_x	2469074.0	-1.530000e-02	3.111000e-01	-1.4678	-2.232000e-01	-2.070000e-02	1.886000e-01	1.347500e+00
beta_dimson_21d_x	2469080.0	9.503000e-01	1.950600e+00	-19.3713	4.290000e-02	8.515000e-01	1.798400e+00	2.341690e+01
ivol_ff3_21d_x	2469080.0	2.640000e-02	1.930000e-02	0.0018	1.360000e-02	2.100000e-02	3.300000e-02	2.340000e-01
iskew_ff3_21d_x	2469068.0	1.990000e-01	7.943000e-01	-3.1203	-2.632000e-01	1.696000e-01	6.344000e-01	3.455800e+00
ivol_hxz4_21d_x	2332649.0	2.680000e-02	1.960000e-02	0.0018	1.370000e-02	2.130000e-02	3.350000e-02	2.397000e-01

	count	mean	std	min	25%	50%	75%	max
iskew_hxz4_21d_x	2332643.0	1.777000e-01	7.585000e-01	-3.0805	-2.681000e-01	1.513000e-01	6.005000e-01	3.275600e+00
rmax5_21d_x	2469033.0	3.860000e-02	2.910000e-02	0.0022	1.960000e-02	3.050000e-02	4.810000e-02	3.544000e-01
rmax1_21d_x	2469033.0	6.730000e-02	5.830000e-02	0.0035	3.110000e-02	5.000000e-02	8.280000e-02	8.996000e-01
rvol_21d_x	2469080.0	2.970000e-02	2.060000e-02	0.0018	1.590000e-02	2.400000e-02	3.690000e-02	2.515000e-01
rskew_21d_x	2469038.0	2.439000e-01	8.740000e-01	-3.5810	-2.529000e-01	2.077000e-01	7.136000e-01	3.808400e+00
ami_126d_x	2427976.0	2.294900e+00	1.277990e+01	0.0000	6.300000e-03	8.310000e-02	7.621000e-01	7.242321e+02
beta_252d_x	2434576.0	8.972000e-01	6.011000e-01	-1.8325	4.682000e-01	8.481000e-01	1.259200e+00	4.013900e+00
ivol_capm_252d_x	2434576.0	2.910000e-02	1.710000e-02	0.0050	1.700000e-02	2.480000e-02	3.650000e-02	1.684000e-01
betadown_252d_x	2406390.0	1.001300e+00	7.817000e-01	-3.9821	5.127000e-01	9.352000e-01	1.414000e+00	5.699200e+00
prc_highprc_252d_x	2434268.0	7.724000e-01	1.997000e-01	0.0167	6.610000e-01	8.272000e-01	9.318000e-01	1.000000e+00
rvol_252d_x	2434576.0	3.110000e-02	1.740000e-02	0.0052	1.870000e-02	2.680000e-02	3.870000e-02	1.690000e-01
corr_1260d_x	1904407.0	3.603000e-01	1.650000e-01	-0.0374	2.362000e-01	3.573000e-01	4.786000e-01	8.219000e-01
betabab_1260d_x	1893789.0	1.075600e+00	5.871000e-01	-0.3259	6.475000e-01	1.000500e+00	1.410600e+00	4.274900e+00
rmax5_rvol_21d_x	2343331.0	1.232900e+00	5.049000e-01	0.1125	8.720000e-01	1.159900e+00	1.512600e+00	4.328700e+00
age_x	2739928.0	2.184690e+02	1.888040e+02	1.0000	7.900000e+01	1.590000e+02	3.000000e+02	1.115000e+03
qmj_x	1825615.0	8.990000e-02	9.763000e-01	-1.7027	-7.318000e-01	1.204000e-01	9.350000e-01	1.701100e+00
qmj_prof_x	2502382.0	9.110000e-02	9.846000e-01	-1.7036	-7.339000e-01	1.300000e-01	9.456000e-01	1.698800e+00
qmj_growth_x	1825622.0	3.610000e-02	9.739000e-01	-1.7018	-7.911000e-01	4.900000e-02	8.716000e-01	1.702100e+00
qmj_safety_x	2579701.0	8.730000e-02	9.713000e-01	-1.7012	-7.189000e-01	1.215000e-01	9.239000e-01	1.708800e+00

Table 4: Complete Global Factor Dataset Summary Statistics

	count	mean	std	min	25%	50%	75%	max
beta_60m_x	532218.0	1.171000e+00	4.530000e-01	-0.350	0.886	1.149	1.393000e+00	3.389000e+00
index	532218.0	8.806473e+05	4.668442e+05	651.000	528652.250	821568.500	1.220481e+06	2.733106e+06
mth	532218.0	1.976878e+05	8.005020e+02	196101.000	197103.000	197711.000	1.984030e+05	1.989120e+05
permno	532218.0	3.638201e+04	1.839758e+04	10006.000	21573.000	32302.000	4.972900e+04	9.322000e+04
permco	532218.0	1.740521e+04	8.516931e+03	4.000	8611.000	21173.000	2.289400e+04	5.628500e+04
crsp_shred	532218.0	1.066100e+01	5.230000e-01	10.000	10.000	11.000	1.100000e+01	1.200000e+01
crsp_exched	532218.0	1.509000e+00	8.170000e-01	1.000	1.000	1.000	2.000000e+00	3.000000e+00
sic	532218.0	4.147325e+03	1.685914e+03	100.000	2899.000	3721.000	5.311000e+03	9.511000e+03
ff49	532218.0	2.874800e+01	1.327400e+01	1.000	18.000	31.000	4.100000e+01	4.900000e+01
adjfct	532218.0	6.901000e+00	2.505700e+01	0.000	1.000	2.000	4.000000e+00	1.215000e+03
shares	532218.0	1.992800e+01	4.235100e+01	0.212	4.200	8.553	1.963800e+01	1.426344e+03
me	532218.0	6.983350e+02	2.292746e+03	17.030	94.162	196.351	5.360830e+02	1.020223e+05
me_company	532218.0	7.058630e+02	2.338138e+03	17.030	94.471	197.355	5.383670e+02	1.020223e+05
prc	532218.0	3.142100e+01	5.300700e+01	0.422	17.375	26.000	3.775000e+01	8.675000e+03
prc_local	532218.0	3.142100e+01	5.300700e+01	0.422	17.375	26.000	3.775000e+01	8.675000e+03
dolvol	532218.0	2.686159e+07	1.110126e+08	0.000	1586250.000	4175525.000	1.458036e+07	9.027815e+09
ret	532218.0	1.700000e-02	1.090000e-01	-0.761	-0.043	0.008	6.800000e-02	3.185000e+00
ret_local	532218.0	1.700000e-02	1.090000e-01	-0.761	-0.043	0.008	6.800000e-02	3.185000e+00
ret_exc	532218.0	1.100000e-02	1.090000e-01	-0.771	-0.049	0.003	6.200000e-02	3.180000e+00
ret_lag_dif	532218.0	1.000000e+00	0.000000e+00	1.000	1.000	1.000	1.000000e+00	1.000000e+00
ret_exc_lead1m	532218.0	5.000000e-03	1.060000e-01	-1.005	-0.052	0.000	5.800000e-02	2.472000e+00
niq_su_x	532218.0	3.200000e-02	1.438000e+00	-15.807	-0.293	0.033	4.670000e-01	1.642400e+01
ret_6_1_x	532218.0	8.100000e-02	2.470000e-01	-0.811	-0.057	0.039	1.860000e-01	2.811000e+00
ret_12_1_x	532218.0	1.810000e-01	4.100000e-01	-0.859	-0.043	0.095	3.260000e-01	6.188000e+00
saleq_su_x	532218.0	2.610000e-01	1.384000e+00	-11.313	-0.177	0.192	7.030000e-01	3.358800e+01
tax_gr1a_x	532218.0	6.000000e-03	2.200000e-02	-0.153	-0.001	0.003	1.200000e-02	1.500000e-01
ni_inc8q_x	532218.0	3.814000e+00	2.800000e+00	0.000	3.000	3.000	7.000000e+00	8.000000e+00
prc_highprc_252d_x	532218.0	8.310000e-01	1.410000e-01	0.116	0.766	0.853	9.380000e-01	1.000000e+00
resff3_6_1_x	532218.0	-4.200000e-02	5.010000e-01	-2.954	-0.282	-0.019	2.320000e-01	1.926000e+00

	count	mean	std	min	25%	50%	75%	max
resff3_12_1_x	532218.0	-1.800000e-02	2.550000e-01	-1.155	-0.161	-0.007	1.370000e-01	7.900000e-01
be_me_x	532218.0	8.110000e-01	5.520000e-01	0.012	0.448	0.724	1.022000e+00	1.009700e+01
debt_me_x	532218.0	7.170000e-01	1.271000e+00	0.000	0.123	0.332	7.470000e-01	2.510800e+01
at_me_x	532218.0	2.978000e+00	5.266000e+00	0.037	0.831	1.482	2.495000e+00	5.293000e+01
ret_60_12_x	532218.0	9.080000e-01	1.395000e+00	-0.939	0.286	0.550	1.046000e+00	2.063600e+01
ni_me_x	532218.0	8.300000e-02	9.300000e-02	-4.344	0.054	0.074	1.150000e-01	8.570000e-01
fcf_me_x	532218.0	-1.330000e-01	3.110000e-01	-6.788	-0.149	-0.070	-1.600000e-02	2.322000e+00
div12m_me_x	532218.0	3.200000e-02	2.500000e-02	0.000	0.013	0.028	4.600000e-02	1.750000e-01
eqpo_me_x	532218.0	3.300000e-02	3.900000e-02	-0.000	0.019	0.020	3.600000e-02	6.870000e-01
eqpo_me_x	532218.0	1.300000e-02	6.100000e-02	-1.569	0.010	0.010	2.700000e-02	5.800000e-01
sale_gr3_x	532218.0	5.970000e-01	1.045000e+00	-0.983	0.250	0.396	6.210000e-01	2.835500e+01
sale_gr1_x	532218.0	1.680000e-01	2.990000e-01	-0.911	0.061	0.121	2.020000e-01	8.495000e+00
ebitda_me_v_x	532218.0	1.650000e-01	1.360000e-01	-2.840	0.109	0.143	1.960000e-01	2.712000e+00
sale_me_x	532218.0	2.020000e+00	2.490000e+00	0.000	0.786	1.518	2.269000e+00	6.705800e+01
ocf_me_x	532218.0	1.500000e-02	2.220000e-01	-4.015	-0.020	0.020	8.100000e-02	2.748000e+00
intrinsic_value_x	532218.0	4.197170e+02	8.801200e+02	0.099	65.828	113.423	3.517070e+02	9.626163e+03
bev_me_v_x	532218.0	7.700000e-01	4.030000e-01	0.009	0.505	0.773	9.770000e-01	5.615000e+00
netdebt_me_x	532218.0	4.110000e-01	1.070000e+00	-3.343	0.016	0.201	5.340000e-01	2.390300e+01
eq_dur_x	532218.0	1.460200e+01	2.748000e+00	0.286	13.409	14.948	1.632600e+01	3.766200e+01
capex_abn_x	532218.0	3.600000e-02	5.400000e-01	-1.139	-0.142	-0.061	9.300000e-02	9.084000e+00
at_gr1_x	532218.0	1.790000e-01	3.130000e-01	-0.588	0.058	0.108	1.900000e-01	6.247000e+00
ppeinv_gr1a_x	532218.0	1.200000e-01	1.630000e-01	-0.566	0.058	0.088	1.370000e-01	2.396000e+00
noa_at_x	532218.0	7.700000e-01	2.170000e-01	-0.206	0.701	0.758	8.310000e-01	3.512000e+00
noa_gr1a_x	532218.0	1.000000e-01	1.790000e-01	-0.585	0.036	0.068	1.120000e-01	3.209000e+00
lnoa_gr1a_x	532218.0	2.800000e-02	4.300000e-02	-0.345	0.014	0.018	3.200000e-02	4.360000e-01
capx_gr1_x	532218.0	3.080000e-01	1.049000e+00	-1.263	-0.024	0.135	3.410000e-01	3.425000e+01
capx_gr2_x	532218.0	6.110000e-01	1.740000e+00	-1.324	0.069	0.278	5.800000e-01	4.400000e+01
capx_gr3_x	532218.0	8.810000e-01	2.349000e+00	-1.209	0.190	0.405	7.490000e-01	5.162800e+01
chcsho_12m_x	532218.0	3.300000e-02	1.100000e-01	-0.270	0.000	0.002	2.000000e-02	1.928000e+00

	count	mean	std	min	25%	50%	75%	max
equpo_l2m_x	532218.0	7.000000e-03	9.200000e-02	-0.976	-0.000	0.021	4.500000e-02	4.740000e-01
debt_gr3_x	532218.0	1.250000e+00	5.505000e+00	-1.000	0.099	0.318	7.220000e-01	1.709550e+02
inv_gr1_x	532218.0	1.780000e-01	4.590000e-01	-1.000	0.032	0.106	1.960000e-01	8.957000e+00
inv_gr1a_x	532218.0	1.800000e-02	4.400000e-02	-0.353	0.000	0.008	2.700000e-02	2.980000e-01
oaccruals_at_x	532218.0	6.800000e-02	9.900000e-02	-1.094	0.031	0.055	9.600000e-02	6.720000e-01
taccruals_at_x	532218.0	4.600000e-02	8.300000e-02	-1.068	0.024	0.038	6.400000e-02	7.950000e-01
cowc_gr1a_x	532218.0	2.300000e-02	5.700000e-02	-0.546	0.001	0.018	3.600000e-02	4.190000e-01
coa_gr1a_x	532218.0	4.500000e-02	7.000000e-02	-0.618	0.015	0.036	6.000000e-02	4.920000e-01
col_gr1a_x	532218.0	2.100000e-02	4.100000e-02	-0.372	0.005	0.017	3.200000e-02	3.650000e-01
nncoa_gr1a_x	532218.0	4.600000e-02	7.400000e-02	-0.951	0.017	0.031	6.200000e-02	5.960000e-01
ncoa_gr1a_x	532218.0	5.400000e-02	7.700000e-02	-0.965	0.022	0.037	7.200000e-02	5.770000e-01
ncol_gr1a_x	532218.0	7.000000e-03	1.700000e-02	-0.180	0.001	0.003	1.000000e-02	1.700000e-01
nfna_gr1a_x	532218.0	-2.100000e-02	9.400000e-02	-0.807	-0.049	-0.008	1.000000e-02	7.900000e-01
lti_gr1a_x	532218.0	5.000000e-03	3.000000e-02	-0.496	0.000	0.000	0.000000e+00	3.480000e-01
fnl_gr1a_x	532218.0	2.700000e-02	8.600000e-02	-0.726	-0.005	0.008	4.900000e-02	6.180000e-01
be_gr1a_x	532218.0	5.700000e-02	7.900000e-02	-0.977	0.022	0.045	7.500000e-02	7.450000e-01
oaccruals_ni_x	532218.0	1.258000e+00	4.084000e+00	-32.889	0.431	0.794	1.390000e+00	8.515800e+01
taccruals_ni_x	532218.0	6.240000e-01	2.539000e+00	-84.700	0.425	0.640	8.670000e-01	4.606200e+01
netis_at_x	532218.0	2.000000e-02	9.400000e-02	-0.939	0.001	0.007	1.900000e-02	1.385000e+00
eqnetis_at_x	532218.0	1.100000e-02	6.000000e-02	-0.201	0.000	0.000	2.000000e-03	1.283000e+00
dbnetis_at_x	532218.0	1.700000e-02	8.400000e-02	-0.933	-0.008	0.000	4.000000e-02	6.460000e-01
niq_be_x	532218.0	3.200000e-02	3.600000e-02	-1.486	0.029	0.030	3.900000e-02	3.710000e-01
niq_be_chg1_x	532218.0	-1.000000e-03	3.500000e-02	-1.288	-0.001	-0.000	1.000000e-03	8.180000e-01
niq_at_x	532218.0	1.500000e-02	1.600000e-02	-0.401	0.012	0.013	1.900000e-02	1.470000e-01
niq_at_chg1_x	532218.0	-0.000000e+00	1.300000e-02	-0.279	-0.000	-0.000	0.000000e+00	3.050000e-01
ebit_be_v_x	532218.0	2.100000e-01	2.350000e-01	-7.292	0.118	0.153	2.450000e-01	2.122000e+00
ebit_sale_x	532218.0	1.260000e-01	2.260000e-01	-17.327	0.077	0.103	1.770000e-01	5.410000e-01
sale_be_v_x	532218.0	2.096000e+00	1.939000e+00	0.000	1.145	1.796	2.305000e+00	2.035900e+01
at_turnover_x	532218.0	1.283000e+00	9.470000e-01	0.000	0.654	1.253	1.600000e+00	9.298000e+00

	count	mean	std	min	25%	50%	75%	max
gp_at_x	532218.0	3.330000e-01	2.380000e-01	-1.266	0.156	0.313	4.450000e-01	1.350000e+00
gp_atl1_x	532218.0	3.940000e-01	2.990000e-01	-1.629	0.179	0.360	5.150000e-01	2.081000e+00
ope_be_x	532218.0	2.690000e-01	1.900000e-01	-5.541	0.213	0.245	3.270000e-01	1.636000e+00
ope_bell_x	532218.0	3.220000e-01	2.540000e-01	-4.721	0.240	0.277	3.740000e-01	3.210000e+00
op_at_x	532218.0	1.550000e-01	9.900000e-02	-1.233	0.107	0.140	2.010000e-01	5.210000e-01
op_atl1_x	532218.0	1.830000e-01	1.300000e-01	-1.902	0.121	0.159	2.320000e-01	9.190000e-01
cop_at_x	532218.0	1.010000e-01	1.210000e-01	-1.188	0.065	0.098	1.490000e-01	8.660000e-01
cop_atl1_x	532218.0	1.010000e-01	1.800000e-01	-3.468	0.074	0.107	1.620000e-01	8.260000e-01
f_score_x	532218.0	4.987000e+00	1.462000e+00	0.000	4.000	5.000	6.000000e+00	9.000000e+00
o_score_x	532218.0	-2.600000e+00	1.428000e+00	-8.827	-3.333	-2.108	-2.063000e+00	1.890400e+01
z_score_x	532218.0	4.292000e+00	3.950000e+00	-4.581	2.871	3.583	4.396000e+00	1.279700e+02
pi_nix_x	532218.0	1.711000e+00	4.590000e-01	0.188	1.526	1.726	1.887000e+00	8.722000e+00
at_be_x	532218.0	3.303000e+00	4.371000e+00	1.000	1.592	1.971	2.618000e+00	4.812300e+01
saleq_gr1_x	532218.0	1.670000e-01	3.690000e-01	-0.986	0.066	0.117	1.900000e-01	1.273600e+01
opex_at_x	532218.0	1.020000e+00	8.020000e-01	0.030	0.473	1.019	1.282000e+00	7.158000e+00
emp_gr1_x	532218.0	6.200000e-02	1.610000e-01	-1.301	0.006	0.043	8.400000e-02	1.483000e+00
age_x	532218.0	2.681630e+02	1.779190e+02	1.000	129.000	234.000	3.870000e+02	7.680000e+02
dsale_dinv_x	532218.0	-9.000000e-03	3.880000e-01	-5.274	-0.051	0.016	8.300000e-02	3.661000e+00
dsale_drec_x	532218.0	-2.200000e-02	3.390000e-01	-6.314	-0.079	-0.002	6.700000e-02	3.915000e+00
dgp_dsale_x	532218.0	2.300000e-02	3.430000e-01	-3.695	-0.045	0.001	5.100000e-02	1.201100e+01
dsale_dsga_x	532218.0	-1.000000e-03	1.860000e-01	-2.225	-0.034	-0.006	2.500000e-02	3.436000e+00
sale_emp_gr1_x	532218.0	8.900000e-02	1.970000e-01	-0.812	0.029	0.074	1.220000e-01	6.027000e+00
tangibility_x	532218.0	6.880000e-01	1.050000e-01	0.137	0.650	0.685	7.300000e-01	1.389000e+00
kz_index_x	532218.0	-3.152000e+00	7.543000e+00	-121.722	-3.120	-1.111	-5.090000e-01	1.529200e+01
cash_at_x	532218.0	9.400000e-02	1.010000e-01	0.000	0.031	0.062	1.180000e-01	8.810000e-01
ni_ar1_x	532218.0	2.880000e-01	4.890000e-01	-2.015	0.080	0.243	4.840000e-01	3.490000e+00
ni_livol_x	532218.0	1.500000e-02	2.000000e-02	0.000	0.006	0.013	1.500000e-02	6.330000e-01
earnings_variability_x	532218.0	3.330000e-01	2.800000e-01	0.024	0.181	0.269	3.420000e-01	3.436000e+00
aliq_at_x	532218.0	7.560000e-01	2.310000e-01	0.240	0.666	0.727	7.750000e-01	5.901000e+00

	count	mean	std	min	25%	50%	75%	max
aliqu_mat_x	532218.0	5.760000e-01	2.150000e-01	0.041	0.477	0.586	6.460000e-01	3.973000e+00
seas_1_1an_x	532218.0	1.500000e-02	1.020000e-01	-0.591	-0.041	0.008	6.300000e-02	1.250000e+00
seas_1_1na_x	532218.0	1.600000e-02	2.700000e-02	-0.141	0.005	0.013	2.500000e-02	2.410000e-01
seas_2_5an_x	532218.0	1.500000e-02	4.400000e-02	-0.252	-0.002	0.012	2.900000e-02	5.730000e-01
ivol_ff3_21d_x	532218.0	1.800000e-02	9.000000e-03	0.004	0.012	0.016	2.100000e-02	1.330000e-01
ivol_capm_252d_x	532218.0	2.000000e-02	8.000000e-03	0.007	0.014	0.019	2.300000e-02	1.030000e-01
ivol_capm_21d_x	532218.0	1.800000e-02	9.000000e-03	0.004	0.012	0.017	2.200000e-02	1.340000e-01
ivol_hxz4_21d_x	532218.0	1.900000e-02	8.000000e-03	0.005	0.013	0.020	2.000000e-02	1.290000e-01
rvol_21d_x	532218.0	2.000000e-02	1.100000e-02	0.004	0.013	0.019	2.400000e-02	1.560000e-01
betabab_1260d_x	532218.0	1.152000e+00	4.620000e-01	0.106	0.874	1.109	1.340000e+00	4.226000e+00
beta_dimson_21d_x	532218.0	9.880000e-01	1.424000e+00	-19.371	0.274	0.848	1.630000e+00	2.341700e+01
turnover_126d_x	532218.0	2.000000e-03	2.000000e-03	0.000	0.001	0.001	2.000000e-03	1.500000e-02
turnover_var_126d_x	532218.0	1.131000e+00	5.060000e-01	0.344	0.813	1.059	1.254000e+00	6.403000e+00
dolvol_126d_x	532218.0	1.040906e+06	2.747060e+06	175.564	85266.781	208631.680	6.878182e+05	2.997359e+07
dolvol_var_126d_x	532218.0	1.160000e+00	5.200000e-01	0.363	0.834	1.090	1.288000e+00	6.326000e+00
ami_126d_x	532218.0	3.380000e-01	1.263000e+00	0.000	0.033	0.128	3.250000e-01	2.019330e+02
zero_trades_21d_x	532218.0	3.070000e-01	1.367000e+00	0.000	0.002	0.005	7.000000e-03	2.009700e+01
zero_trades_126d_x	532218.0	3.050000e-01	1.240000e+00	0.000	0.003	0.006	8.000000e-03	1.904100e+01
zero_trades_252d_x	532218.0	3.050000e-01	1.201000e+00	0.000	0.003	0.006	9.000000e-03	1.861000e+01
rmax1_21d_x	532218.0	4.600000e-02	3.100000e-02	0.006	0.026	0.040	5.500000e-02	4.290000e-01
rskew_21d_x	532218.0	2.520000e-01	7.770000e-01	-2.611	-0.195	0.247	6.720000e-01	3.177000e+00
iskew_capm_21d_x	532218.0	2.350000e-01	7.530000e-01	-2.841	-0.202	0.227	6.370000e-01	3.099000e+00
iskew_ff3_21d_x	532218.0	1.930000e-01	6.900000e-01	-2.111	-0.212	0.186	5.650000e-01	2.802000e+00
iskew_hxz4_21d_x	532218.0	1.690000e-01	6.030000e-01	-2.064	-0.115	0.165	4.170000e-01	2.680000e+00
coskew_21d_x	532218.0	-1.700000e-02	3.000000e-01	-1.437	-0.206	-0.026	1.660000e-01	1.300000e+00
ret_1_0_x	532218.0	1.600000e-02	1.040000e-01	-0.606	-0.041	0.008	6.500000e-02	1.167000e+00
betadown_252d_x	532218.0	1.050000e+00	6.690000e-01	-3.043	0.615	0.938	1.373000e+00	5.248000e+00
bidaskhl_21d_x	532218.0	7.000000e-03	5.000000e-03	0.001	0.004	0.006	8.000000e-03	2.540000e-01
ret_3_1_x	532218.0	3.200000e-02	1.480000e-01	-0.717	-0.049	0.014	1.030000e-01	1.556000e+00

	count	mean	std	min	25%	50%	75%	max
ret_9_1_x	532218.0	1.310000e-01	3.340000e-01	-0.836	-0.054	0.066	2.600000e-01	4.818000e+00
ret_12_7_x	532218.0	7.700000e-02	2.420000e-01	-0.779	-0.055	0.041	1.770000e-01	2.934000e+00
corr_1260d_x	532218.0	4.190000e-01	9.900000e-02	0.040	0.376	0.389	4.820000e-01	7.180000e-01
rmax5_21d_x	532218.0	2.700000e-02	1.500000e-02	0.003	0.016	0.024	3.200000e-02	2.040000e-01
rmax5_rvol_21d_x	532218.0	1.246000e+00	4.630000e-01	0.141	0.933	1.193	1.486000e+00	3.492000e+00
ni_be_x	532218.0	1.210000e-01	1.370000e-01	-7.189	0.098	0.116	1.570000e-01	6.490000e-01
ocf_at_x	532218.0	1.200000e-02	1.070000e-01	-1.358	-0.022	0.015	6.500000e-02	5.980000e-01
ocf_at_chg1_x	532218.0	-3.000000e-03	1.240000e-01	-1.078	-0.038	-0.001	3.100000e-02	1.153000e+00
mispricing_perf_x	532218.0	5.500000e-01	1.990000e-01	0.010	0.413	0.555	6.980000e-01	9.880000e-01
mispricing_mgmt_x	532218.0	4.850000e-01	1.800000e-01	0.015	0.376	0.503	6.060000e-01	9.430000e-01
qmj_x	532218.0	1.900000e-01	8.050000e-01	-1.703	-0.249	0.127	7.640000e-01	1.701000e+00
qmj_prof_x	532218.0	1.690000e-01	8.830000e-01	-1.704	-0.471	0.124	8.850000e-01	1.699000e+00
qmj_growth_x	532218.0	5.500000e-02	7.940000e-01	-1.701	-0.429	0.043	5.710000e-01	1.702000e+00
qmj_safety_x	532218.0	2.720000e-01	8.670000e-01	-1.701	-0.336	0.270	9.970000e-01	1.705000e+00

Table 5: Revised Global Factor Dataset Summary Statistics: Training Set

	count	mean	std	min	25%	50%	75%	max
beta_60m_x	294581.0	1.096000e+00	5.200000e-01	-1.747	8.060000e-01	1.075000e+00	1.300000e+00	3.873000e+00
index	294581.0	1.362950e+06	6.892364e+05	1202.000	7.803110e+05	1.500595e+06	1.905059e+06	2.733128e+06
nth	294581.0	1.994940e+05	2.842530e+02	199001.000	1.992120e+05	1.995080e+05	1.997110e+05	1.999120e+05
permno	294581.0	5.554521e+04	2.573578e+04	10010.000	3.027700e+04	6.277000e+04	7.797600e+04	9.322000e+04
permco	294581.0	1.494868e+04	8.865682e+03	4.000	7.662000e+03	1.419100e+04	2.128600e+04	5.701800e+04
crsp_shred	294581.0	1.105000e+01	2.420000e-01	10.000	1.100000e+01	1.100000e+01	1.100000e+01	1.200000e+01
crsp_exched	294581.0	1.860000e+00	9.660000e-01	1.000	1.000000e+00	1.000000e+00	3.000000e+00	3.000000e+00
sic	294581.0	4.670888e+03	1.847487e+03	100.000	3.330000e+03	4.813000e+03	6.153000e+03	9.997000e+03
ff49	294581.0	3.098800e+01	1.313100e+01	1.000	2.100000e+01	3.400000e+01	4.300000e+01	4.900000e+01
adjfct	294581.0	2.352000e+00	4.866000e+00	0.000	1.000000e+00	1.000000e+00	2.000000e+00	2.880000e+02
shares	294581.0	6.768500e+01	1.581650e+02	0.542	1.463600e+01	2.761800e+01	6.018400e+01	5.160025e+03
me	294581.0	2.685416e+03	1.012770e+04	62.992	2.917890e+02	6.017040e+02	1.685533e+03	6.024329e+05
me_company	294581.0	2.745729e+03	1.033108e+04	62.992	2.934430e+02	6.080760e+02	1.703233e+03	6.024329e+05
prc	294581.0	4.176600e+01	7.262160e+02	0.172	1.700000e+01	2.525000e+01	3.687500e+01	7.830500e+04
prc_local	294581.0	4.176600e+01	7.262160e+02	0.172	1.700000e+01	2.525000e+01	3.687500e+01	7.830500e+04
dolvol	294581.0	1.878977e+08	7.930779e+08	0.000	1.077097e+07	3.501225e+07	1.211556e+08	8.464558e+10
ret	294581.0	2.400000e-02	1.420000e-01	-0.982	-4.600000e-02	1.200000e-02	7.900000e-02	9.374000e+00
ret_local	294581.0	2.400000e-02	1.420000e-01	-0.982	-4.600000e-02	1.200000e-02	7.900000e-02	9.374000e+00
ret_exc	294581.0	2.000000e-02	1.420000e-01	-0.986	-5.000000e-02	8.000000e-03	7.500000e-02	9.370000e+00
ret_lag_dif	294581.0	1.000000e+00	0.000000e+00	1.000	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00
ret_exc_lead1m	294581.0	1.000000e-02	1.340000e-01	-0.998	-5.600000e-02	5.000000e-03	6.900000e-02	6.404000e+00
niq_su_x	294581.0	-9.000000e-02	1.850000e+00	-17.871	-4.600000e-01	3.000000e-03	5.610000e-01	5.228000e+00
ret_6_1_x	294581.0	1.000000e-01	3.090000e-01	-0.838	-5.900000e-02	4.700000e-02	2.060000e-01	3.244000e+00
ret_12_1_x	294581.0	2.220000e-01	5.210000e-01	-0.907	-3.200000e-02	9.900000e-02	3.560000e-01	5.633000e+00
saleq_su_x	294581.0	2.490000e-01	1.562000e+00	-4.939	-5.680000e-01	1.380000e-01	9.630000e-01	8.854000e+00
tax_gr1a_x	294581.0	5.000000e-03	2.200000e-02	-0.132	-1.000000e-03	2.000000e-03	1.100000e-02	1.170000e-01
ni_inc8q_x	294581.0	3.200000e+00	3.102000e+00	0.000	0.000000e+00	2.000000e+00	7.000000e+00	8.000000e+00
prc_highprc_252d_x	294581.0	8.250000e-01	1.580000e-01	0.074	7.520000e-01	8.630000e-01	9.490000e-01	1.000000e+00
resff3_6_1_x	294581.0	-3.500000e-02	4.830000e-01	-2.692	-2.600000e-01	-2.500000e-02	2.170000e-01	1.705000e+00

	count	mean	std	min	25%	50%	75%	max
resff3_12_1_x	294581.0	-1.500000e-02	2.450000e-01	-0.946	-1.480000e-01	-1.300000e-02	1.260000e-01	7.460000e-01
be_me_x	294581.0	5.250000e-01	4.100000e-01	0.006	2.500000e-01	4.460000e-01	6.950000e-01	1.020500e+01
debt_me_x	294581.0	5.460000e-01	1.217000e+00	0.000	3.700000e-02	2.120000e-01	5.900000e-01	5.045200e+01
at_me_x	294581.0	2.217000e+00	4.123000e+00	0.009	4.800000e-01	1.022000e+00	2.134000e+00	1.278460e+02
ret_60_12_x	294581.0	8.620000e-01	1.375000e+00	-0.964	2.690000e-01	3.870000e-01	9.770000e-01	1.328900e+01
ni_me_x	294581.0	3.500000e-02	1.150000e-01	-8.106	2.000000e-02	4.700000e-02	7.200000e-02	4.830000e-01
fef_me_x	294581.0	5.000000e-03	1.600000e-01	-5.425	-2.000000e-02	1.600000e-02	4.900000e-02	2.588000e+00
div12m_me_x	294581.0	1.400000e-02	1.900000e-02	0.000	0.000000e+00	6.000000e-03	2.300000e-02	2.000000e-01
eqpo_me_x	294581.0	2.600000e-02	4.200000e-02	-0.001	0.000000e+00	1.200000e-02	3.300000e-02	7.260000e-01
eqpo_me_x	294581.0	-2.000000e-03	8.400000e-02	-1.644	-4.000000e-03	5.000000e-03	2.700000e-02	6.710000e-01
sale_gr3_x	294581.0	8.400000e-01	2.577000e+00	-0.988	1.720000e-01	3.570000e-01	6.530000e-01	5.854700e+01
sale_gr1_x	294581.0	2.460000e-01	6.080000e-01	-0.895	3.300000e-02	1.160000e-01	2.550000e-01	1.088600e+01
ebitda_mev_x	294581.0	1.100000e-01	9.900000e-02	-1.984	6.400000e-02	1.050000e-01	1.450000e-01	1.386000e+00
sale_me_x	294581.0	1.201000e+00	1.595000e+00	0.000	3.790000e-01	7.530000e-01	1.424000e+00	5.494600e+01
ocf_me_x	294581.0	7.700000e-02	1.570000e-01	-3.829	2.400000e-02	6.800000e-02	1.190000e-01	3.793000e+00
intrinsic_value_x	294581.0	1.027543e+03	2.258605e+03	0.141	1.283670e+02	2.713090e+02	7.443850e+02	2.371766e+04
bev_mev_x	294581.0	5.360000e-01	3.550000e-01	0.001	2.680000e-01	5.140000e-01	7.610000e-01	6.841000e+00
netdebt_me_x	294581.0	3.810000e-01	1.060000e+00	-2.464	-3.000000e-02	1.210000e-01	4.720000e-01	4.390200e+01
eq_dur_x	294581.0	1.648500e+01	2.528000e+00	1.790	1.538700e+01	1.673400e+01	1.760300e+01	5.375100e+01
capex_abn_x	294581.0	6.200000e-02	6.730000e-01	-1.147	-1.480000e-01	-8.000000e-02	1.250000e-01	9.274000e+00
at_gr1_x	294581.0	3.000000e-01	7.580000e-01	-0.663	3.100000e-02	1.060000e-01	2.690000e-01	1.121900e+01
ppeinv_gr1a_x	294581.0	1.150000e-01	2.250000e-01	-0.533	3.300000e-02	5.800000e-02	1.290000e-01	2.601000e+00
noa_at_x	294581.0	7.040000e-01	4.150000e-01	-0.509	5.610000e-01	6.720000e-01	8.010000e-01	4.641000e+00
noa_gr1a_x	294581.0	1.380000e-01	3.540000e-01	-0.612	1.100000e-02	5.200000e-02	1.450000e-01	4.058000e+00
lnoa_gr1a_x	294581.0	3.000000e-02	7.000000e-02	-0.351	7.000000e-03	1.200000e-02	3.400000e-02	5.060000e-01
capx_gr1_x	294581.0	4.830000e-01	1.638000e+00	-1.337	-4.900000e-02	1.380000e-01	4.700000e-01	3.033300e+01
capx_gr2_x	294581.0	1.010000e+00	3.574000e+00	-1.428	3.200000e-02	2.730000e-01	7.390000e-01	6.113600e+01
capx_gr3_x	294581.0	1.387000e+00	5.155000e+00	-1.199	1.450000e-01	3.660000e-01	8.780000e-01	1.076800e+02
chcsho_12m_x	294581.0	6.800000e-02	2.060000e-01	-0.245	0.000000e+00	9.000000e-03	4.300000e-02	2.658000e+00

	count	mean	std	min	25%	50%	75%	max
equpo_12m_x	294581.0	-3.500000e-02	1.480000e-01	-1.255	-3.300000e-02	-2.000000e-03	2.700000e-02	4.210000e-01
debt_gr3_x	294581.0	2.550000e+00	1.542700e+01	-1.000	-3.300000e-02	1.920000e-01	7.310000e-01	3.188620e+02
inv_gr1_x	294581.0	2.290000e-01	8.790000e-01	-1.000	-4.000000e-03	9.000000e-02	2.020000e-01	1.302400e+01
inv_gr1a_x	294581.0	1.100000e-02	4.100000e-02	-0.357	-0.000000e+00	0.000000e+00	1.500000e-02	2.630000e-01
oaccruals_at_x	294581.0	-3.400000e-02	9.600000e-02	-0.935	-6.800000e-02	-3.800000e-02	2.000000e-03	5.230000e-01
taccruals_at_x	294581.0	-5.100000e-02	1.640000e-01	-1.432	-9.400000e-02	-4.300000e-02	9.000000e-03	9.610000e-01
cowc_gr1a_x	294581.0	1.400000e-02	6.700000e-02	-0.605	-8.000000e-03	8.000000e-03	3.300000e-02	4.170000e-01
coa_gr1a_x	294581.0	3.900000e-02	8.300000e-02	-0.791	4.000000e-03	2.200000e-02	6.200000e-02	4.540000e-01
col_gr1a_x	294581.0	2.400000e-02	5.300000e-02	-0.471	3.000000e-03	1.500000e-02	3.800000e-02	3.440000e-01
nncoa_gr1a_x	294581.0	5.400000e-02	1.210000e-01	-1.080	7.000000e-03	2.700000e-02	8.000000e-02	6.480000e-01
ncoa_gr1a_x	294581.0	6.400000e-02	1.250000e-01	-0.943	1.200000e-02	3.300000e-02	9.400000e-02	6.630000e-01
ncol_gr1a_x	294581.0	8.000000e-03	2.900000e-02	-0.224	-0.000000e+00	2.000000e-03	1.100000e-02	2.190000e-01
nfna_gr1a_x	294581.0	-1.700000e-02	1.370000e-01	-0.983	-5.000000e-02	0.000000e+00	2.000000e-02	9.650000e-01
lti_gr1a_x	294581.0	9.000000e-03	4.200000e-02	-0.360	0.000000e+00	0.000000e+00	1.000000e-03	2.940000e-01
fml_gr1a_x	294581.0	2.400000e-02	1.260000e-01	-0.831	-1.200000e-02	0.000000e+00	4.900000e-02	9.140000e-01
be_gr1a_x	294581.0	6.900000e-02	1.440000e-01	-1.017	9.000000e-03	3.600000e-02	9.700000e-02	7.940000e-01
oaccruals_ni_x	294581.0	-1.254000e+00	4.986000e+00	-60.944	-1.275000e+00	-5.450000e-01	2.200000e-02	3.908000e+01
taccruals_ni_x	294581.0	-2.223000e+00	8.905000e+00	-112.262	-1.845000e+00	-6.590000e-01	1.330000e-01	3.405000e+01
netis_at_x	294581.0	1.700000e-02	2.100000e-01	-1.171	-3.900000e-02	-1.000000e-03	3.500000e-02	1.489000e+00
eqnetis_at_x	294581.0	4.400000e-02	1.550000e-01	-0.216	-0.000000e+00	1.000000e-03	1.300000e-02	1.389000e+00
dbnetis_at_x	294581.0	-2.400000e-02	1.460000e-01	-1.135	-4.200000e-02	-3.000000e-03	1.500000e-02	6.040000e-01
niq_be_x	294581.0	2.400000e-02	9.700000e-02	-1.913	1.500000e-02	3.000000e-02	4.900000e-02	4.290000e-01
niq_be_chg1_x	294581.0	-5.000000e-03	9.600000e-02	-1.766	-9.000000e-03	-1.000000e-03	6.000000e-03	9.390000e-01
niq_at_x	294581.0	9.000000e-03	4.200000e-02	-0.555	3.000000e-03	1.100000e-02	2.300000e-02	1.120000e-01
niq_at_chg1_x	294581.0	-0.000000e+00	3.500000e-02	-0.349	-4.000000e-03	-0.000000e+00	3.000000e-03	4.710000e-01
ebit_bev_x	294581.0	1.310000e-01	8.300000e-01	-16.386	9.500000e-02	1.520000e-01	2.550000e-01	2.332000e+00
ebit_sale_x	294581.0	-1.000000e-02	1.335000e+00	-32.364	6.200000e-02	1.110000e-01	1.940000e-01	5.370000e-01
sale_bev_x	294581.0	2.200000e+00	2.665000e+00	0.000	8.240000e-01	1.530000e+00	2.507000e+00	2.745100e+01
at_turnover_x	294581.0	1.044000e+00	8.280000e-01	0.000	4.160000e-01	9.120000e-01	1.411000e+00	4.719000e+00

	count	mean	std	min	25%	50%	75%	max
gp_at_x	294581.0	3.160000e-01	2.760000e-01	-0.853	1.120000e-01	2.570000e-01	4.710000e-01	1.412000e+00
gp_atl1_x	294581.0	3.960000e-01	3.830000e-01	-1.018	1.300000e-01	3.020000e-01	5.580000e-01	2.455000e+00
ope_be_x	294581.0	2.480000e-01	3.340000e-01	-5.705	1.720000e-01	2.240000e-01	3.330000e-01	2.299000e+00
ope_bell_x	294581.0	3.220000e-01	4.980000e-01	-5.420	2.020000e-01	2.470000e-01	3.970000e-01	4.618000e+00
op_at_x	294581.0	1.470000e-01	1.280000e-01	-1.058	7.700000e-02	1.370000e-01	2.080000e-01	5.660000e-01
op_atl1_x	294581.0	1.830000e-01	1.990000e-01	-1.949	9.200000e-02	1.520000e-01	2.450000e-01	1.125000e+00
cop_at_x	294581.0	1.890000e-01	1.500000e-01	-1.029	1.120000e-01	1.700000e-01	2.590000e-01	8.800000e-01
cop_atl1_x	294581.0	2.280000e-01	2.250000e-01	-1.844	1.330000e-01	1.880000e-01	3.000000e-01	1.507000e+00
f_score_x	294581.0	5.173000e+00	1.413000e+00	1.000	5.000000e+00	5.000000e+00	6.000000e+00	9.000000e+00
o_score_x	294581.0	-2.721000e+00	2.068000e+00	-8.385	-3.800000e+00	-2.767000e+00	-2.092000e+00	1.799600e+01
z_score_x	294581.0	5.789000e+00	8.539000e+00	-7.856	2.387000e+00	3.525000e+00	5.488000e+00	9.787600e+01
pi_nix_x	294581.0	1.623000e+00	6.310000e-01	0.244	1.468000e+00	1.544000e+00	1.657000e+00	9.259000e+00
at_be_x	294581.0	3.946000e+00	4.895000e+00	1.023	1.596000e+00	2.137000e+00	3.387000e+00	5.215100e+01
saleq_gr1_x	294581.0	2.800000e-01	7.890000e-01	-0.988	2.200000e-02	1.130000e-01	2.780000e-01	1.052800e+01
opex_at_x	294581.0	8.560000e-01	7.380000e-01	0.036	3.030000e-01	7.170000e-01	1.156000e+00	4.588000e+00
emp_gr1_x	294581.0	9.700000e-02	2.260000e-01	-1.333	2.000000e-03	6.200000e-02	1.390000e-01	1.440000e+00
age_x	294581.0	2.577090e+02	2.162820e+02	7.000	8.100000e+01	1.780000e+02	3.920000e+02	8.880000e+02
dsale_dinv_x	294581.0	-1.700000e-02	7.120000e-01	-9.498	-4.700000e-02	3.000000e-02	1.140000e-01	3.472000e+00
dsale_drec_x	294581.0	-3.200000e-02	5.320000e-01	-6.378	-1.010000e-01	2.000000e-03	9.500000e-02	3.597000e+00
dgp_dsale_x	294581.0	3.200000e-02	4.350000e-01	-4.610	-4.300000e-02	2.000000e-03	6.500000e-02	4.688000e+00
dsale_dsga_x	294581.0	2.200000e-02	2.700000e-01	-1.680	-2.400000e-02	2.000000e-03	4.000000e-02	3.562000e+00
sale_emp_gr1_x	294581.0	8.300000e-02	3.340000e-01	-0.841	-4.000000e-03	4.000000e-02	1.100000e-01	4.904000e+00
tangibility_x	294581.0	6.350000e-01	1.730000e-01	0.111	5.600000e-01	6.440000e-01	7.300000e-01	1.390000e+00
kz_index_x	294581.0	-6.962000e+00	2.127700e+01	-352.632	-5.199000e+00	-1.327000e+00	2.110000e-01	1.127800e+01
cash_at_x	294581.0	1.330000e-01	1.820000e-01	0.000	1.700000e-02	5.600000e-02	1.650000e-01	9.310000e-01
ni_ar1_x	294581.0	1.810000e-01	4.900000e-01	-1.898	1.000000e-02	1.240000e-01	3.310000e-01	3.331000e+00
ni_livol_x	294581.0	3.000000e-02	4.600000e-02	0.000	1.000000e-02	2.400000e-02	3.100000e-02	7.070000e-01
earnings_variability_x	294581.0	7.750000e-01	6.210000e-01	0.027	3.660000e-01	7.820000e-01	9.030000e-01	6.427000e+00
aliq_at_x	294581.0	8.390000e-01	6.100000e-01	0.181	6.100000e-01	6.980000e-01	8.330000e-01	1.083700e+01

	count	mean	std	min	25%	50%	75%	max
aliqu_mat_x	294581.0	4.510000e-01	1.870000e-01	0.050	3.440000e-01	4.330000e-01	5.490000e-01	1.842000e+00
seas_1_1an_x	294581.0	2.000000e-02	1.160000e-01	-0.578	-3.700000e-02	9.000000e-03	6.900000e-02	1.407000e+00
seas_1_1na_x	294581.0	1.900000e-02	3.300000e-02	-0.160	7.000000e-03	1.400000e-02	2.800000e-02	2.910000e-01
seas_2_5an_x	294581.0	1.500000e-02	4.400000e-02	-0.276	5.000000e-03	1.200000e-02	2.600000e-02	5.270000e-01
ivol_ff3_21d_x	294581.0	2.300000e-02	1.400000e-02	0.005	1.300000e-02	1.900000e-02	2.800000e-02	1.910000e-01
ivol_capm_252d_x	294581.0	2.500000e-02	1.200000e-02	0.007	1.600000e-02	2.200000e-02	3.100000e-02	1.360000e-01
ivol_capm_21d_x	294581.0	2.300000e-02	1.400000e-02	0.005	1.400000e-02	2.000000e-02	2.900000e-02	1.910000e-01
ivol_hxz4_21d_x	294581.0	2.300000e-02	1.400000e-02	0.005	1.300000e-02	1.900000e-02	2.800000e-02	1.920000e-01
rvol_21d_x	294581.0	2.500000e-02	1.500000e-02	0.006	1.500000e-02	2.200000e-02	3.100000e-02	1.990000e-01
betabab_1260d_x	294581.0	1.025000e+00	5.100000e-01	-0.326	7.170000e-01	9.110000e-01	1.255000e+00	3.650000e+00
beta_dimson_21d_x	294581.0	9.630000e-01	1.780000e+00	-17.092	7.100000e-02	8.230000e-01	1.721000e+00	1.921100e+01
turnover_126d_x	294581.0	3.000000e-03	3.000000e-03	0.000	1.000000e-03	3.000000e-03	4.000000e-03	2.900000e-02
turnover_var_126d_x	294581.0	1.143000e+00	6.230000e-01	0.405	7.510000e-01	9.860000e-01	1.324000e+00	6.770000e+00
dolvol_126d_x	294581.0	6.536392e+06	1.464928e+07	486.102	5.446526e+05	1.610104e+06	5.476749e+06	1.547992e+08
dolvol_var_126d_x	294581.0	1.148000e+00	6.240000e-01	0.383	7.540000e-01	1.002000e+00	1.333000e+00	6.601000e+00
ami_126d_x	294581.0	2.060000e-01	1.300000e+00	0.000	4.000000e-03	1.800000e-02	7.700000e-02	1.666870e+02
zero_trades_21d_x	294581.0	2.430000e-01	1.301000e+00	0.000	2.000000e-03	3.000000e-03	5.000000e-03	2.009600e+01
zero_trades_126d_x	294581.0	2.490000e-01	1.223000e+00	0.000	2.000000e-03	3.000000e-03	6.000000e-03	1.791600e+01
zero_trades_252d_x	294581.0	2.580000e-01	1.216000e+00	0.000	2.000000e-03	3.000000e-03	6.000000e-03	1.752300e+01
rmax1_21d_x	294581.0	5.700000e-02	4.400000e-02	0.007	2.900000e-02	4.500000e-02	6.900000e-02	6.240000e-01
rskew_21d_x	294581.0	2.430000e-01	8.120000e-01	-2.818	-2.200000e-01	2.130000e-01	6.900000e-01	3.243000e+00
iskew_capm_21d_x	294581.0	2.440000e-01	7.890000e-01	-2.563	-2.120000e-01	2.130000e-01	6.800000e-01	3.091000e+00
iskew_ff3_21d_x	294581.0	1.980000e-01	7.250000e-01	-2.308	-2.310000e-01	1.730000e-01	6.050000e-01	2.800000e+00
iskew_hxz4_21d_x	294581.0	1.780000e-01	6.920000e-01	-2.037	-2.370000e-01	1.550000e-01	5.730000e-01	2.748000e+00
coskew_21d_x	294581.0	-1.900000e-02	3.120000e-01	-1.468	-2.240000e-01	-2.200000e-02	1.840000e-01	1.154000e+00
ret_1_0_x	294581.0	2.300000e-02	1.300000e-01	-0.619	-4.400000e-02	1.100000e-02	7.600000e-02	1.600000e+00
betadown_252d_x	294581.0	9.990000e-01	7.080000e-01	-3.514	5.370000e-01	9.180000e-01	1.339000e+00	5.699000e+00
bidaskhl_21d_x	294581.0	1.000000e-02	7.000000e-03	0.002	5.000000e-03	7.000000e-03	1.200000e-02	1.790000e-01
ret_3_1_x	294581.0	4.100000e-02	1.820000e-01	-0.707	-5.200000e-02	2.000000e-02	1.160000e-01	2.077000e+00

	count	mean	std	min	25%	50%	75%	max
ret_9_1_x	294581.0	1.590000e-01	4.120000e-01	-0.879	-4.800000e-02	7.300000e-02	2.810000e-01	4.691000e+00
ret_12_7_x	294581.0	9.700000e-02	2.910000e-01	-0.797	-4.400000e-02	4.200000e-02	1.960000e-01	3.295000e+00
corr_1260d_x	294581.0	3.380000e-01	1.280000e-01	-0.037	2.630000e-01	3.170000e-01	4.110000e-01	7.320000e-01
rmax5_21d_x	294581.0	3.300000e-02	2.200000e-02	0.005	1.900000e-02	2.800000e-02	4.100000e-02	2.990000e-01
rmax5_rvol_21d_x	294581.0	1.265000e+00	4.620000e-01	0.234	9.530000e-01	1.190000e+00	1.522000e+00	3.545000e+00
ni_be_x	294581.0	6.800000e-02	3.810000e-01	-7.304	6.100000e-02	1.110000e-01	1.650000e-01	8.470000e-01
ocf_at_x	294581.0	6.500000e-02	1.280000e-01	-1.240	1.900000e-02	7.100000e-02	1.260000e-01	4.950000e-01
ocf_at_chg1_x	294581.0	6.000000e-03	1.090000e-01	-0.852	-2.600000e-02	-0.000000e+00	3.000000e-02	1.036000e+00
mispricing_perf_x	294581.0	5.780000e-01	1.820000e-01	0.021	4.540000e-01	5.790000e-01	7.130000e-01	9.610000e-01
mispricing_mgmt_x	294581.0	4.900000e-01	1.790000e-01	0.052	3.680000e-01	4.950000e-01	6.230000e-01	8.840000e-01
qmj_x	294581.0	2.170000e-01	7.590000e-01	-1.698	-7.800000e-02	1.140000e-01	7.470000e-01	1.698000e+00
qmj_prof_x	294581.0	3.300000e-01	9.150000e-01	-1.698	-3.660000e-01	4.030000e-01	1.126000e+00	1.698000e+00
qmj_growth_x	294581.0	7.200000e-02	7.390000e-01	-1.698	-2.810000e-01	3.500000e-02	5.130000e-01	1.698000e+00
qmj_safety_x	294581.0	2.230000e-01	8.930000e-01	-1.698	-4.430000e-01	2.640000e-01	9.700000e-01	1.701000e+00

Table 6: Revised Global Factor Dataset Summary Statistics: Validation Set

	count	mean	std	min	25%	50%	75%	max
beta_60m_x	531461.0	1.143000e+00	6.650000e-01	-0.762	7.160000e-01	1.081000e+00	1.428000e+00	4.912000e+00
index	531461.0	1.639772e+06	8.608909e+05	1495.000	8.349320e+05	1.872142e+06	2.405852e+06	2.739927e+06
mth	531461.0	2.009810e+05	6.308130e+02	200001.000	2.004070e+05	2.010030e+05	2.015100e+05	2.020120e+05
permno	531461.0	6.249862e+04	2.927243e+04	10012.000	3.294200e+04	7.752600e+04	8.648900e+04	9.343600e+04
permco	531461.0	2.536554e+04	1.682836e+04	7.000	1.205800e+04	2.098100e+04	4.099800e+04	5.766700e+04
crsp_shred	531461.0	1.110400e+01	3.060000e-01	10.000	1.100000e+01	1.100000e+01	1.100000e+01	1.200000e+01
crsp_exched	531461.0	1.820000e+00	9.770000e-01	1.000	1.000000e+00	1.000000e+00	3.000000e+00	3.000000e+00
sic	531461.0	4.731309e+03	1.973094e+03	100.000	3.312000e+03	4.813000e+03	6.211000e+03	9.999000e+03
ff49	531461.0	3.088900e+01	1.275800e+01	1.000	2.100000e+01	3.400000e+01	4.200000e+01	4.900000e+01
adjfct	531461.0	1.190000e+00	1.201000e+00	0.000	1.000000e+00	1.000000e+00	1.000000e+00	1.120000e+02
shares	531461.0	2.183130e+02	6.077150e+02	1.009	3.797500e+01	7.258200e+01	1.709880e+02	2.920640e+04
me	531461.0	9.114197e+03	3.153046e+04	178.093	9.360740e+02	2.009547e+03	5.793820e+03	2.255969e+06
me_company	531461.0	9.284112e+03	3.274782e+04	178.093	9.401740e+02	2.023393e+03	5.869141e+03	2.255969e+06
prc	531461.0	6.448400e+01	1.368034e+03	0.120	1.815000e+01	3.059000e+01	4.950000e+01	1.416000e+05
prc_local	531461.0	6.448400e+01	1.368034e+03	0.120	1.815000e+01	3.059000e+01	4.950000e+01	1.416000e+05
dolvol	531461.0	1.430663e+09	5.379275e+09	0.000	1.191406e+08	3.596018e+08	1.153573e+09	8.441730e+11
ret	531461.0	1.800000e-02	1.510000e-01	-0.984	-4.800000e-02	1.200000e-02	7.300000e-02	1.988400e+01
ret_local	531461.0	1.800000e-02	1.510000e-01	-0.984	-4.800000e-02	1.200000e-02	7.300000e-02	1.988400e+01
ret_exc	531461.0	1.600000e-02	1.510000e-01	-0.985	-4.900000e-02	1.000000e-02	7.200000e-02	1.988200e+01
ret_lag_dif	531461.0	1.000000e+00	0.000000e+00	1.000	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00
ret_exc_lead1m	531461.0	7.000000e-03	1.370000e-01	-1.001	-5.400000e-02	7.000000e-03	6.700000e-02	4.100000e+00
niq_su_x	531461.0	-9.700000e-02	1.914000e+00	-50.846	-6.530000e-01	-1.100000e-02	6.410000e-01	2.019500e+01
ret_6_1_x	531461.0	8.200000e-02	3.500000e-01	-0.917	-7.900000e-02	4.600000e-02	1.920000e-01	8.412000e+00
ret_12_1_x	531461.0	1.800000e-01	5.820000e-01	-0.973	-8.800000e-02	8.600000e-02	3.200000e-01	1.223100e+01
saleq_su_x	531461.0	1.380000e-01	1.682000e+00	-16.096	-7.990000e-01	1.300000e-01	1.062000e+00	8.648000e+00
tax_gr1a_x	531461.0	2.000000e-03	2.800000e-02	-0.216	-4.000000e-03	1.000000e-03	9.000000e-03	2.050000e-01
ni_inc8q_x	531461.0	2.918000e+00	3.092000e+00	0.000	0.000000e+00	2.000000e+00	6.000000e+00	8.000000e+00
prc_highprc_252d_x	531461.0	8.110000e-01	1.820000e-01	0.017	7.290000e-01	8.640000e-01	9.510000e-01	1.000000e+00
resff3_6_1_x	531461.0	-2.900000e-02	4.950000e-01	-2.363	-2.870000e-01	-2.200000e-02	2.540000e-01	1.833000e+00

	count	mean	std	min	25%	50%	75%	max
resff3_12_1_x	531461.0	-1.300000e-02	2.530000e-01	-1.046	-1.600000e-01	-1.200000e-02	1.440000e-01	7.740000e-01
be_me_x	531461.0	5.420000e-01	5.170000e-01	0.005	2.440000e-01	4.390000e-01	6.890000e-01	2.516300e+01
debt_me_x	531461.0	5.270000e-01	1.260000e+00	0.000	4.300000e-02	2.080000e-01	5.440000e-01	6.550600e+01
at_me_x	531461.0	1.997000e+00	3.652000e+00	0.010	4.730000e-01	9.520000e-01	2.011000e+00	1.923120e+02
ret_60_12_x	531461.0	7.400000e-01	1.402000e+00	-0.996	1.350000e-01	3.530000e-01	9.310000e-01	1.791400e+01
ni_me_x	531461.0	1.900000e-02	2.300000e-01	-18.929	1.300000e-02	4.200000e-02	6.600000e-02	9.920000e-01
fcf_me_x	531461.0	2.900000e-02	1.710000e-01	-7.856	2.000000e-03	3.700000e-02	7.200000e-02	4.202000e+00
div12m_me_x	531461.0	1.200000e-02	1.900000e-02	0.000	0.000000e+00	2.000000e-03	1.900000e-02	4.020000e-01
eqpo_me_x	531461.0	3.400000e-02	5.400000e-02	-0.000	1.000000e-03	1.600000e-02	4.500000e-02	1.725000e+00
eqpo_me_x	531461.0	9.000000e-03	9.600000e-02	-3.911	-3.000000e-03	9.000000e-03	3.800000e-02	1.443000e+00
sale_gr3_x	531461.0	7.190000e-01	2.545000e+00	-1.000	6.800000e-02	2.950000e-01	6.090000e-01	8.620400e+01
sale_gr1_x	531461.0	1.910000e-01	6.470000e-01	-0.996	4.000000e-03	8.700000e-02	2.090000e-01	1.370600e+01
ebitda_mev_x	531461.0	9.300000e-02	1.190000e-01	-5.587	5.500000e-02	9.000000e-02	1.290000e-01	1.983000e+00
sale_me_x	531461.0	9.930000e-01	1.606000e+00	0.000	2.740000e-01	5.560000e-01	1.105000e+00	7.507500e+01
ocf_me_x	531461.0	9.300000e-02	1.560000e-01	-4.343	3.900000e-02	7.500000e-02	1.280000e-01	5.711000e+00
intrinsic_value_x	531461.0	3.673158e+03	9.322883e+03	0.515	2.746770e+02	6.616840e+02	2.401336e+03	1.130984e+05
bev_mev_x	531461.0	5.450000e-01	4.310000e-01	0.001	2.580000e-01	4.990000e-01	7.490000e-01	1.692600e+01
netdebt_me_x	531461.0	3.480000e-01	1.073000e+00	-3.496	-5.200000e-02	1.000000e-01	4.220000e-01	5.866300e+01
eq_dur_x	531461.0	1.683500e+01	5.240000e+00	1.053	1.565800e+01	1.686700e+01	1.783200e+01	3.430350e+02
capex_abn_x	531461.0	4.500000e-02	6.920000e-01	-1.028	-2.420000e-01	-6.700000e-02	1.680000e-01	1.196300e+01
at_gr1_x	531461.0	2.660000e-01	1.181000e+00	-0.740	3.000000e-03	7.700000e-02	2.080000e-01	3.163800e+01
ppeinv_gr1a_x	531461.0	7.400000e-02	1.740000e-01	-0.449	1.000000e-02	4.000000e-02	8.300000e-02	3.079000e+00
noa_at_x	531461.0	6.120000e-01	4.870000e-01	-1.152	4.460000e-01	6.240000e-01	7.550000e-01	1.038800e+01
noa_gr1a_x	531461.0	1.040000e-01	4.220000e-01	-0.737	-1.300000e-02	3.300000e-02	1.020000e-01	1.075200e+01
lnoa_gr1a_x	531461.0	3.500000e-02	1.020000e-01	-0.578	-4.000000e-03	1.200000e-02	4.500000e-02	7.540000e-01
capx_gr1_x	531461.0	3.700000e-01	1.543000e+00	-1.021	-1.390000e-01	1.030000e-01	4.080000e-01	3.277600e+01
capx_gr2_x	531461.0	7.800000e-01	3.210000e+00	-1.010	-1.390000e-01	2.160000e-01	6.650000e-01	7.697200e+01
capx_gr3_x	531461.0	1.128000e+00	4.517000e+00	-1.000	-1.030000e-01	2.930000e-01	8.460000e-01	1.128460e+02
chcsho_12m_x	531461.0	4.600000e-02	2.130000e-01	-0.227	-9.000000e-03	7.000000e-03	2.600000e-02	8.477000e+00

	count	mean	std	min	25%	50%	75%	max
equpo_12m_x	531461.0	-2.000000e-02	1.340000e-01	-2.249	-2.100000e-02	1.000000e-03	3.300000e-02	3.470000e-01
debt_gr3_x	531461.0	4.136000e+00	2.614000e+01	-1.000	-9.000000e-02	1.730000e-01	7.340000e-01	4.310000e+02
inv_gr1_x	531461.0	1.820000e-01	8.460000e-01	-1.000	-1.300000e-02	7.700000e-02	1.570000e-01	1.698100e+01
inv_gr1a_x	531461.0	6.000000e-03	2.900000e-02	-0.288	-0.000000e+00	0.000000e+00	9.000000e-03	2.080000e-01
oaccruals_at_x	531461.0	-5.600000e-02	1.000000e-01	-2.264	-8.100000e-02	-4.400000e-02	-1.400000e-02	3.810000e-01
taccruals_at_x	531461.0	-6.900000e-02	1.810000e-01	-2.480	-1.150000e-01	-4.900000e-02	-4.000000e-03	1.294000e+00
cowc_gr1a_x	531461.0	3.000000e-03	5.500000e-02	-0.605	-1.400000e-02	3.000000e-03	2.000000e-02	3.410000e-01
coa_gr1a_x	531461.0	2.000000e-02	6.500000e-02	-0.777	-2.000000e-03	1.400000e-02	3.900000e-02	4.190000e-01
col_gr1a_x	531461.0	1.700000e-02	5.000000e-02	-0.485	-2.000000e-03	1.100000e-02	3.000000e-02	3.830000e-01
nncoa_gr1a_x	531461.0	4.100000e-02	1.340000e-01	-1.884	-8.000000e-03	2.000000e-02	7.000000e-02	7.690000e-01
ncoa_gr1a_x	531461.0	4.900000e-02	1.420000e-01	-1.884	-4.000000e-03	2.600000e-02	8.100000e-02	7.490000e-01
ncol_gr1a_x	531461.0	7.000000e-03	3.600000e-02	-0.360	-2.000000e-03	2.000000e-03	1.500000e-02	3.340000e-01
nfna_gr1a_x	531461.0	-1.400000e-02	1.460000e-01	-1.108	-4.800000e-02	-0.000000e+00	2.700000e-02	1.384000e+00
lti_gr1a_x	531461.0	5.000000e-03	3.500000e-02	-0.231	0.000000e+00	0.000000e+00	1.000000e-03	2.570000e-01
fml_gr1a_x	531461.0	2.200000e-02	1.270000e-01	-1.230	-1.400000e-02	0.000000e+00	4.300000e-02	1.130000e+00
be_gr1a_x	531461.0	4.500000e-02	1.460000e-01	-2.072	1.000000e-03	2.800000e-02	8.100000e-02	8.560000e-01
oaccruals_ni_x	531461.0	-2.033000e+00	5.721000e+00	-71.442	-1.715000e+00	-7.240000e-01	-2.420000e-01	1.429400e+01
taccruals_ni_x	531461.0	-2.755000e+00	9.625000e+00	-131.510	-2.469000e+00	-8.370000e-01	-6.300000e-02	6.728600e+01
netis_at_x	531461.0	-2.800000e-02	2.270000e-01	-1.368	-8.500000e-02	-1.800000e-02	1.300000e-02	1.593000e+00
eqnetis_at_x	531461.0	2.100000e-02	1.510000e-01	-0.351	-1.500000e-02	0.000000e+00	7.000000e-03	1.489000e+00
dbnetis_at_x	531461.0	-4.800000e-02	1.610000e-01	-1.362	-6.200000e-02	-6.000000e-03	0.000000e+00	5.670000e-01
niq_be_x	531461.0	1.800000e-02	1.130000e-01	-2.022	9.000000e-03	2.600000e-02	4.600000e-02	6.990000e-01
niq_be_chg1_x	531461.0	-2.000000e-03	1.130000e-01	-2.004	-1.100000e-02	-1.000000e-03	1.000000e-02	1.228000e+00
niq_at_x	531461.0	6.000000e-03	4.700000e-02	-0.667	2.000000e-03	1.000000e-02	2.200000e-02	1.820000e-01
niq_at_chg1_x	531461.0	1.000000e-03	4.500000e-02	-0.455	-5.000000e-03	0.000000e+00	5.000000e-03	8.410000e-01
ebit_bev_x	531461.0	5.600000e-02	1.346000e+00	-41.056	7.400000e-02	1.310000e-01	2.330000e-01	2.800000e+00
ebit_sale_x	531461.0	-2.370000e-01	4.578000e+00	-185.045	5.700000e-02	1.170000e-01	2.090000e-01	6.150000e-01
sale_bev_x	531461.0	2.041000e+00	3.073000e+00	0.000	6.210000e-01	1.261000e+00	2.224000e+00	3.887100e+01
at_turnover_x	531461.0	8.410000e-01	7.220000e-01	0.000	3.210000e-01	6.760000e-01	1.141000e+00	4.267000e+00

	count	mean	std	min	25%	50%	75%	max
gp_at_x	531461.0	2.740000e-01	2.480000e-01	-1.169	1.000000e-01	2.390000e-01	3.990000e-01	1.293000e+00
gp_atl1_x	531461.0	3.240000e-01	3.250000e-01	-1.904	1.130000e-01	2.680000e-01	4.630000e-01	2.788000e+00
ope_be_x	531461.0	2.340000e-01	4.400000e-01	-8.815	1.450000e-01	2.040000e-01	3.170000e-01	3.725000e+00
ope_bell_x	531461.0	2.740000e-01	5.480000e-01	-13.628	1.680000e-01	2.280000e-01	3.610000e-01	4.420000e+00
op_at_x	531461.0	1.320000e-01	1.220000e-01	-1.224	6.700000e-02	1.260000e-01	1.940000e-01	5.380000e-01
op_atl1_x	531461.0	1.470000e-01	2.450000e-01	-6.946	7.400000e-02	1.400000e-01	2.240000e-01	1.018000e+00
cop_at_x	531461.0	1.910000e-01	1.510000e-01	-0.924	1.070000e-01	1.760000e-01	2.650000e-01	1.940000e+00
cop_atl1_x	531461.0	2.190000e-01	2.240000e-01	-3.834	1.190000e-01	1.960000e-01	3.020000e-01	1.923000e+00
f_score_x	531461.0	5.234000e+00	1.422000e+00	1.000	4.000000e+00	5.000000e+00	6.000000e+00	9.000000e+00
o_score_x	531461.0	-2.944000e+00	2.326000e+00	-9.387	-4.243000e+00	-3.020000e+00	-2.185000e+00	2.287000e+01
z_score_x	531461.0	5.413000e+00	9.607000e+00	-37.336	1.997000e+00	3.275000e+00	5.180000e+00	1.744240e+02
pi_nix_x	531461.0	1.519000e+00	6.770000e-01	0.106	1.334000e+00	1.488000e+00	1.589000e+00	1.989400e+01
at_be_x	531461.0	3.707000e+00	4.571000e+00	1.023	1.582000e+00	2.157000e+00	3.430000e+00	5.963100e+01
saleq_gr1_x	531461.0	2.020000e-01	7.530000e-01	-1.000	-7.000000e-03	8.500000e-02	2.150000e-01	1.574800e+01
opex_at_x	531461.0	7.050000e-01	6.560000e-01	0.003	2.430000e-01	5.380000e-01	9.460000e-01	4.437000e+00
emp_gr1_x	531461.0	7.300000e-02	2.000000e-01	-1.165	-1.000000e-02	5.100000e-02	1.190000e-01	1.442000e+00
age_x	531461.0	3.164250e+02	2.392710e+02	10.000	1.300000e+02	2.440000e+02	4.400000e+02	1.115000e+03
dsale_dinv_x	531461.0	-2.300000e-02	7.480000e-01	-19.478	-6.100000e-02	2.500000e-02	9.800000e-02	5.598000e+00
dsale_drec_x	531461.0	-2.200000e-02	5.420000e-01	-7.400	-1.120000e-01	4.000000e-03	1.160000e-01	7.638000e+00
dgp_dsale_x	531461.0	3.700000e-02	4.720000e-01	-5.970	-4.200000e-02	5.000000e-03	6.500000e-02	7.188000e+00
dsale_dsga_x	531461.0	2.300000e-02	2.880000e-01	-2.001	-4.200000e-02	3.000000e-03	5.400000e-02	6.964000e+00
sale_emp_gr1_x	531461.0	7.800000e-02	3.670000e-01	-0.956	-3.000000e-02	3.900000e-02	1.070000e-01	7.027000e+00
tangibility_x	531461.0	5.840000e-01	2.060000e-01	0.002	4.580000e-01	6.190000e-01	7.020000e-01	1.685000e+00
kz_index_x	531461.0	-1.475800e+01	5.964000e+01	-1723.572	-9.717000e+00	-2.274000e+00	2.400000e-01	8.730000e+01
cash_at_x	531461.0	1.680000e-01	2.030000e-01	0.000	2.900000e-02	8.300000e-02	2.240000e-01	9.800000e-01
ni_ar1_x	531461.0	1.460000e-01	5.670000e-01	-3.964	-1.330000e-01	1.060000e-01	3.650000e-01	9.144000e+00
ni_ivol_x	531461.0	4.200000e-02	8.300000e-02	0.000	1.000000e-02	2.300000e-02	3.700000e-02	1.757000e+00
earnings_variability_x	531461.0	1.119000e+00	1.132000e+00	0.044	5.490000e-01	8.810000e-01	1.192000e+00	1.145300e+01
aliq_at_x	531461.0	7.410000e-01	9.790000e-01	0.104	5.050000e-01	6.250000e-01	7.440000e-01	2.804000e+01

	count	mean	std	min	25%	50%	75%	max
aliqu_mat_x	531461.0	3.770000e-01	1.890000e-01	0.027	2.380000e-01	3.610000e-01	4.780000e-01	2.246000e+00
seas_1_1an_x	531461.0	1.600000e-02	1.280000e-01	-0.670	-4.500000e-02	7.000000e-03	6.800000e-02	1.824000e+00
seas_1_1na_x	531461.0	1.600000e-02	3.900000e-02	-0.235	-2.000000e-03	1.200000e-02	3.000000e-02	3.870000e-01
seas_2_5an_x	531461.0	1.500000e-02	5.600000e-02	-0.297	-9.000000e-03	1.100000e-02	3.500000e-02	6.340000e-01
ivol_ff3_21d_x	531461.0	2.000000e-02	1.500000e-02	0.002	1.000000e-02	1.600000e-02	2.400000e-02	2.280000e-01
ivol_capm_252d_x	531461.0	2.300000e-02	1.300000e-02	0.005	1.400000e-02	2.000000e-02	2.800000e-02	1.410000e-01
ivol_capm_21d_x	531461.0	2.100000e-02	1.600000e-02	0.002	1.100000e-02	1.600000e-02	2.600000e-02	2.420000e-01
ivol_hxz4_21d_x	531461.0	2.000000e-02	1.500000e-02	0.002	1.000000e-02	1.500000e-02	2.400000e-02	2.310000e-01
rvol_21d_x	531461.0	2.500000e-02	1.800000e-02	0.002	1.400000e-02	2.000000e-02	3.100000e-02	2.520000e-01
betabab_1260d_x	531461.0	1.071000e+00	4.730000e-01	-0.029	7.670000e-01	1.029000e+00	1.303000e+00	3.831000e+00
beta_dimson_21d_x	531461.0	1.175000e+00	1.449000e+00	-13.953	4.250000e-01	1.041000e+00	1.786000e+00	1.954200e+01
turnover_126d_x	531461.0	9.000000e-03	8.000000e-03	0.000	4.000000e-03	7.000000e-03	1.200000e-02	2.800000e-01
turnover_var_126d_x	531461.0	7.410000e-01	4.240000e-01	0.280	4.880000e-01	6.180000e-01	8.450000e-01	7.510000e+00
dolvol_126d_x	531461.0	5.434158e+07	9.867098e+07	2317.257	5.641453e+06	1.690584e+07	5.411359e+07	1.038495e+09
dolvol_var_126d_x	531461.0	7.390000e-01	4.300000e-01	0.262	4.840000e-01	6.190000e-01	8.520000e-01	8.104000e+00
ami_126d_x	531461.0	2.500000e-02	6.470000e-01	0.000	0.000000e+00	1.000000e-03	4.000000e-03	9.796700e+01
zero_trades_21d_x	531461.0	1.100000e-02	2.260000e-01	0.000	1.000000e-03	2.000000e-03	3.000000e-03	1.575900e+01
zero_trades_126d_x	531461.0	1.300000e-02	2.210000e-01	0.000	1.000000e-03	2.000000e-03	3.000000e-03	1.400900e+01
zero_trades_252d_x	531461.0	1.500000e-02	2.330000e-01	0.000	1.000000e-03	2.000000e-03	3.000000e-03	1.359200e+01
rmax1_21d_x	531461.0	5.600000e-02	5.000000e-02	0.003	2.700000e-02	4.100000e-02	6.600000e-02	9.000000e-01
rskew_21d_x	531461.0	1.350000e-01	9.260000e-01	-3.581	-3.520000e-01	1.140000e-01	5.940000e-01	3.808000e+00
iskew_capm_21d_x	531461.0	1.560000e-01	9.940000e-01	-3.566	-3.640000e-01	1.340000e-01	6.520000e-01	3.715000e+00
iskew_ff3_21d_x	531461.0	1.300000e-01	8.940000e-01	-3.120	-3.550000e-01	1.110000e-01	5.920000e-01	3.456000e+00
iskew_hxz4_21d_x	531461.0	1.200000e-01	8.400000e-01	-3.081	-3.460000e-01	1.020000e-01	5.650000e-01	3.276000e+00
coskew_21d_x	531461.0	-3.000000e-03	3.090000e-01	-1.128	-2.090000e-01	-7.000000e-03	2.000000e-01	1.347000e+00
ret_1_0_x	531461.0	1.700000e-02	1.360000e-01	-0.724	-4.700000e-02	1.100000e-02	7.200000e-02	2.176000e+00
betadown_252d_x	531461.0	1.087000e+00	5.640000e-01	-1.626	7.370000e-01	1.024000e+00	1.371000e+00	3.822000e+00
bidaskhl_21d_x	531461.0	9.000000e-03	6.000000e-03	0.001	5.000000e-03	7.000000e-03	1.100000e-02	1.540000e-01
ret_3_1_x	531461.0	3.300000e-02	1.990000e-01	-0.831	-6.100000e-02	2.000000e-02	1.090000e-01	3.342000e+00

	count	mean	std	min	25%	50%	75%	max
ret_9_1_x	531461.0	1.300000e-01	4.620000e-01	-0.955	-8.700000e-02	6.700000e-02	2.590000e-01	9.274000e+00
ret_12_7_x	531461.0	7.800000e-02	3.330000e-01	-0.906	-7.500000e-02	3.900000e-02	1.840000e-01	8.509000e+00
corr_1260d_x	531461.0	4.620000e-01	1.510000e-01	-0.010	3.610000e-01	4.500000e-01	5.780000e-01	8.220000e-01
rmax5_21d_x	531461.0	3.200000e-02	2.400000e-02	0.002	1.700000e-02	2.500000e-02	3.900000e-02	3.380000e-01
rmax5_rvol_21d_x	531461.0	1.195000e+00	4.900000e-01	0.112	8.620000e-01	1.117000e+00	1.435000e+00	4.329000e+00
ni_be_x	531461.0	5.000000e-02	4.660000e-01	-10.754	3.800000e-02	9.600000e-02	1.630000e-01	1.451000e+00
ocf_at_x	531461.0	7.400000e-02	1.290000e-01	-1.818	3.100000e-02	8.100000e-02	1.330000e-01	3.960000e-01
ocf_at_chg1_x	531461.0	7.000000e-03	1.060000e-01	-0.912	-2.300000e-02	1.000000e-03	2.700000e-02	1.390000e+00
mispricing_perf_x	531461.0	5.800000e-01	1.740000e-01	0.031	4.650000e-01	5.890000e-01	7.090000e-01	9.240000e-01
mispricing_mgmt_x	531461.0	4.940000e-01	1.650000e-01	0.065	3.850000e-01	5.040000e-01	6.150000e-01	8.790000e-01
qmj_x	531461.0	2.090000e-01	8.600000e-01	-1.698	-3.550000e-01	1.780000e-01	9.070000e-01	1.698000e+00
qmj_prof_x	531461.0	3.650000e-01	9.230000e-01	-1.698	-3.270000e-01	4.870000e-01	1.161000e+00	1.698000e+00
qmj_growth_x	531461.0	7.800000e-02	8.590000e-01	-1.698	-5.550000e-01	1.120000e-01	7.300000e-01	1.698000e+00
qmj_safety_x	531461.0	1.040000e-01	9.040000e-01	-1.698	-6.120000e-01	1.430000e-01	8.510000e-01	1.708000e+00

Table 7: Revised Global Factor Dataset Summary Statistics: Testing Set