

The Appendix for “A Novel Dynamic Deep Ensemble Learning
Approach for ESG Portfolio Selection”

December 27, 2025

A Supplementary on Data and Sampling

Category	Variable	Frequency
Price and Volume	Opening Price	Daily
	Closing Price	Daily
	Highest Price	Daily
	Lowest Price	Daily
	Weekly High Price	Daily
	Monthly High Price	Daily
	Weekly Low Price	Daily
	Monthly Low Price	Daily
	Turnover Rate	Daily
	Liquidity Indicator	Daily
	Log of Consecutive Up Days	Daily
	Log of Consecutive Down Days	Daily
	Log of Consecutive Volume Increase Days	Daily
	Log of Consecutive Volume Decrease Days	Daily
Technical Indicators	Relative Strength Index	Daily
	KDJ Indicator	Daily
	Moving Average Convergence Divergence	Daily
Market Capitalization and Valuation	Total Shares	Daily
	Circulating Shares	Daily
	Price-to-Earnings Ratio	Daily
	Price-to-Book Ratio	Daily
	Price-to-Sales Ratio	Daily
	Overall Value Score	Daily
Market Attention	Overall Growth Score	Daily
	Log of News Count	Daily
	Log of Analyst Attention	Annual
	Log of Report Attention	Annual
Macroeconomic Indicators	Institutional Holding Ratio	Quarterly
	Exchange Rate	Daily
	Consumer Price Index	Monthly
	Macroeconomic sentiment index	Monthly
	Gross Domestic Product	Quarterly
	Economic Policy Uncertainty	Monthly

Table 1: Characteristic variables of asset returns

Category	Variable	Frequency
ESG Evaluation	Environmental Score	Daily
	Social Score	Daily
	Governance Score	Daily
	ESG Controversy Score	Daily
	ESG Management Practice Score	Daily
Rights Protection Disclosure	Log of Customer and Consumer Rights Protection Disclosures	Annual
	Log of Employee Rights Protection Disclosures	Annual
	Log of Workplace Safety Disclosures	Annual
	Log of Supplier Rights Protection Disclosures	Annual
	Log of Shareholder Rights Protection Disclosures	Annual
	Log of Public Relations and Social Welfare Disclosures	Annual
Environmental Disclosure	Log of Environmental Performance Disclosures	Annual
	Log of Resource Consumption Disclosures	Annual
	Log of Environmental Emission Disclosures	Annual
Market Attention	Log of News Count	Daily
	Log of Analyst Attention	Annual
	Log of Report Attention	Annual
	Institutional Holding Ratio	Quarterly
Macroeconomic Indicators	Exchange Rate	Daily
	Consumer Price Index	Monthly
	Macroeconomic sentiment index	Monthly
	Gross Domestic Product	Quarterly
	Economic Policy Uncertainty	Monthly

Table 2: Characteristic variables of asset ESG level

Sample Asset Security Codes					
000596	000661	000708	000725	000786	000807
000858	000895	000963	000999	001965	002129
002179	002271	002304	002311	002410	002415
002459	002460	002475	002493	002555	002594
002601	002603	002648	002709	002714	002736
002821	002841	002916	002920	002938	300122
300124	300142	300274	300308	300316	300347
300450	300628	300750	300759	300760	300782
600000	600019	600028	600031	600048	600050
600089	600188	600196	600276	600406	600438
600489	600570	600584	600588	600837	600875
600886	600887	600989	601009	601012	601066
601088	601117	601138	601166	601211	601229
601238	601318	601390	601600	601601	601618
601633	601658	601668	601669	601688	601699
601800	601808	601818	601857	601865	601872
601877	601881	601898	601899	601919	601998
603019	603259	603288	603369	603659	603799
603899	603986	603993	688008	688009	688012

Table 3: List of sample asset